

INTERNATIONAL GRADUATE COLLOQUIUM

i-SPEAK **2026**

**SPORTS AND PHYSICAL EXERCISE
ASSEMBLY OF KNOWLEDGE SHARING**

SERIES 1. 2026

COLLOQUIUM PROCEEDINGS

EXTENDED ABSTRACT



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70300 Seremban, Negeri Sembilan,
Malaysia
Tel: +606-6342000
Faks: +606-6335812
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Editors

Muhamad Safiq Saiful Annur (Chief Editor)

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

Mardiana Mazaulan

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

Noor Azila Azreen Md Radzi

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

Nur Hani Syazwani Bakri

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

Muhamad Noor Mohamed

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

Muhamad Zulqarnain Mohd Nasir

Faculty of Sports Science and Recreation,
Universiti Teknologi MARA
Seremban Campus, Negeri Sembilan, Malaysia

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i-SPEAK 2026

CHAIR MESSAGE



*"Where sports and knowledge
come together"*



Dear colleagues, postgraduate researchers, and distinguished guests,

It is with great pleasure and sincere appreciation that I welcome you to the proceedings of the International Graduate Colloquium: Sports and Physical Exercise Assembly of Knowledge Sharing (iSPEAK) 2026. This colloquium continues to serve as an important academic platform for postgraduate students, researchers, academicians, and practitioners to share ideas, exchange knowledge, and strengthen scholarly engagement in the field of sports science and physical exercise.

i-SPEAK 2026 reflects our continuous commitment to nurturing a vibrant research culture that values academic excellence, innovation, and meaningful contribution to society. The range of topics presented highlights the multidisciplinary nature of sports science across health, physical activity, exercise, coaching, and human performance.

I would like to express my sincere appreciation to all presenters, participants, reviewers, committee members, and supporting staff for their valuable contributions. May these proceedings inspire new ideas, encourage future research, and strengthen collaboration within the field.

I thank our partners, organizing committee, and reviewers for their dedication. I encourage all participants to engage actively, present with confidence, and use this experience to strengthen future research and practice.

Thank you.

Wahidah Tumijan

Head of the Study Center
Faculty of Sports Science & Recreation
UiTM Negeri Sembilan

i-SPEAK 2026

EDITORIAL PREFACE



*"Where sports and knowledge
come together"*



Dear colleagues, postgraduate researchers, and respected guests,

It is my pleasure to welcome you to i-SPEAK 2026, organized on 10th February 2026 in conjunction with the International Cross-Cultural Sports Education Exchange, ICCSEE 3.0 Inbound, involving Universiti Teknologi MARA and Universitas Suryakencana. This programme gathers emerging scholars who share interest in sports science, physical exercise, and research advancement.

i-SPEAK 2026 offers a meaningful space for participants to present findings, discuss ideas, and develop academic confidence. Through every presentation and discussion, you bring evidence, viewpoints, and reflections shaped by your learning experiences and cultural perspectives.

The collaboration with ICCSEE 3.0 Inbound enriches this academic journey. It allows participants to appreciate different educational practices, expand research understanding, and build networks beyond national boundaries.

My sincere appreciation goes to our partners, committee members, reviewers, presenters, and participants for their commitment and support. May this colloquium inspire inquiry, collaboration, and future contributions to sports research and practice.

Thank you.

Muhamad Safiq Saiful Annur

Chief Editor

Faculty of Sports Science & Recreation

UiTM Negeri Sembilan

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Effect of Different Kinesiology Tape Techniques on Ankle Balance Among Futsal Players

Abdul Hadi Che Mokhtar¹, Mardiana Mazaulan^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Raja Nurul Jannat Raja Hussain¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mardiana9840@uitm.edu.my

Keywords: Kinesiology Taping, Dynamic Balance, Ankle Stability, Futsal Players, mSEBT

I. INTRODUCTION

Futsal is a high-intensity indoor sport characterised by rapid acceleration, deceleration, and frequent changes of direction, placing substantial mechanical stress on the ankle joint [1]. Ankle injuries are among the most common injuries in futsal due to loss of balance, improper landing, and repetitive agility movements [2]. Impaired dynamic balance has been strongly associated with increased risk of ankle instability and recurrent sprains, making balance enhancement a key focus in sports performance and rehabilitation research [3].

Kinesiology taping is widely used in sports settings to improve proprioception, enhance neuromuscular control, and provide joint support without restricting range of motion [4]. Several taping techniques have been developed, including Kenzo Kase Technique (KKT), New Balance Taping (NBT), and placebo taping. KKT primarily follows muscle alignment to facilitate muscle function, whereas NBT emphasises joint stabilisation and proprioceptive stimulation. Placebo taping serves as a control condition without therapeutic intention [5].

Although previous studies have reported improvements in balance and functional performance following taping application [4][5][6], most research has focused on injured soccer players rather than actively participating futsal athletes. Limited evidence exists on the comparative effectiveness of different taping techniques among Malaysian futsal players. Therefore, this study aimed to investigate the immediate effects of KKT, NBT, and placebo taping on dynamic balance performance using the Modified Star Excursion Balance Test (mSEBT).

II. METHODS

This study employed a randomised crossover within-subject experimental design to investigate the immediate effects of three kinesiology taping techniques: Kenzo Kase Technique (KKT), New Balance Taping (NBT), and placebo taping. Each participant completed all three taping conditions in randomised order, separated by a minimum 48-hour washout period to minimise carry-over effects. This

design allowed participants to serve as their own control, thereby reducing inter-individual variability.

A total of 24 male recreational futsal players aged 18-35 years, each with a history of at least one ankle injury within the past 12 months, were recruited using purposive sampling. Sample size was determined using G*Power 3.1.9.7 based on repeated-measures ANOVA (effect size = 0.5, alpha = 0.05, power = 0.80). Participant eligibility was confirmed using the Physical Activity Readiness Questionnaire (PAR-Q) and the Cumberland Ankle Instability Tool (CAIT).

Dynamic balance performance was assessed using the Modified Star Excursion Balance Test (mSEBT), a reliable and validated tool for evaluating dynamic postural control [7]. Participants performed three recorded trials in the anterior, posteromedial, and posterolateral directions. Reach distances were averaged and normalised to leg length. Data were analysed using repeated-measures ANOVA. When significant main effects were identified, Bonferroni-adjusted post hoc comparisons were conducted. Statistical significance was set at $p < .05$.

III. RESULTS AND DISCUSSION

Repeated-measures ANOVA revealed a significant main effect of taping condition on dynamic balance performance across all three reach directions of the Modified Star Excursion Balance Test (mSEBT). Significant differences were observed in the anterior direction, $F(2, 46) = 24.50$, $p < .001$; posteromedial direction, $F(2, 46) = 17.70$, $p < .001$; and posterolateral direction, $F(2, 46) = 11.80$, $p < .001$.

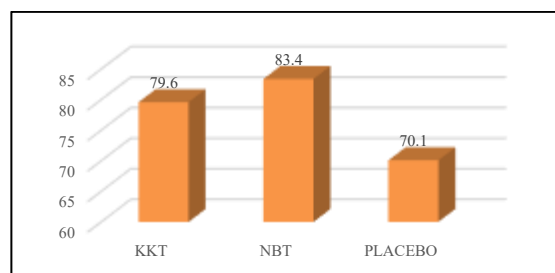


Fig. 1 Mean reach distances in the anterior direction

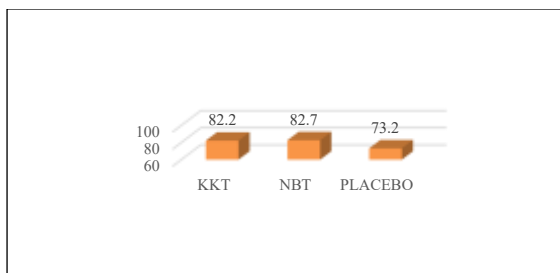


Fig. 2 Mean reach distances in the posteromedial direction

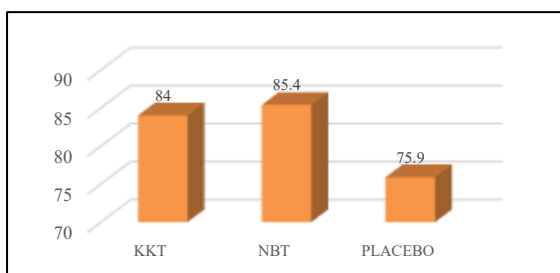


Fig. 3 Mean reach distances in the posterolateral direction

IV. CONCLUSIONS

This study demonstrated that kinesiology taping significantly improved dynamic ankle balance performance among futsal players. Both Kenzo Kase Technique (KKT) and New Balance Taping (NBT) produced significantly greater mSEBT reach distances than placebo taping ($p < .01$). Although NBT showed slightly higher mean values across all three directions, no statistically significant difference was observed between KKT and NBT. Therefore, both therapeutic taping techniques were equally effective in enhancing short-term dynamic balance performance. These findings suggest that kinesiology taping may serve as a practical short-term intervention to enhance ankle stability in futsal players, particularly those with a history of ankle injury. Coaches, sports scientists, and physiotherapists may consider incorporating therapeutic taping techniques as part of injury prevention or pre-competition preparation strategies.

However, this study was limited to a small sample of male recreational futsal players and examined only the immediate effects of taping. Future research

should investigate long-term applications, include diverse athlete populations, and incorporate biomechanical and neuromuscular measurements to better understand the mechanisms underlying taping effectiveness.

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Comparison of The Effectiveness Between Swedish Massage and Deep-Tissue Massage on Jumping and Sprinting Among Adolescent Football Athletes

Ahmad Ariff Razali¹, Nur Allysha Hani Mohd Fakrul Hadi¹, Muhamad Izal Aidil Mohd Zain¹,
Muhammad Syazwan Harull Anuar¹, Norhazman Noorhisham¹, Mardiana Mazaulan¹, & Muhamad
Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Swedish Massage, Deep-Tissue Massage, Recovery, Jump Performance, Sprint Performance, Adolescent Football

I. INTRODUCTION

Football is a high-intensity sport that requires repeated sprinting, jumping, tackling, and quick changes of direction. These movements place stress on the muscles and joints, especially among adolescent footballers who are still growing. Therefore, proper recovery is important to reduce soreness, manage fatigue, and maintain performance. Explosive performance is important in football because players need to sprint, jump, and react quickly during a match. Sprint, agility, and jump performance are important physical qualities for football players [1]. Jump performance is also commonly used to assess lower-body power in children and adolescents [2]. Massage therapy is a common recovery method in sport. It is often used to reduce muscle soreness, improve relaxation, and support recovery after exercise. Brummitt [3] explained that massage is widely used in sports performance and rehabilitation. Previous study [4] also reported that sports massage helps reduce delayed-onset muscle soreness and improve flexibility. Swedish massage and deep-tissue massage are two common massage techniques. Swedish massage uses lighter pressure and is often used for relaxation, while deep-tissue massage applies stronger pressure to deeper muscles. Previous studies showed that Swedish massage may reduce muscle soreness [5], while deep-tissue massage may improve flexibility [6]. Although massage is widely used in sport, limited research has compared Swedish massage and deep-tissue massage among adolescent footballers. Therefore, this study aimed to examine the effects of Swedish massage and deep-tissue massage on recovery and explosive performance among adolescent football players.

II. METHODS

This study used a crossover design in which each participant completed both the Swedish massage and deep-tissue massage conditions, separated by a 48-hour washout period. Four adolescent football athletes aged 15 to 16 years who participated in MSSJ 2025 and had no lower-limb injuries in the

previous three months were recruited through purposive sampling. Participants completed baseline tests for 20 m sprint time and standing broad jump distance. They then performed a standardised warm-up followed by the Yo-Yo Intermittent Recovery Test Level 1 to induce fatigue. After the fatigue protocol, participants received either a 15-minute lower-limb Swedish massage or deep-tissue massage before repeating the sprint and jump tests. Sprint time and jump distance were analysed using descriptive statistics and paired-samples t-tests to compare baseline and post-massage performance for each technique.

III. RESULTS AND DISCUSSION

Normality testing (Shapiro–Wilk) indicated no violation of normality for baseline variables in either condition ($p = 0.109–0.441$)

TABLE I
NORMALITY TEST (SHAPIRO-WILK)

Baseline	Massage	W	p
Standing	Swedish	0.911	0.441
Broad Jump	Massage		
Standing	Deep-tissue	0.831	0.109
Broad Jump	Massage		
20m Sprint	Swedish	0.889	0.315
	Massage		
20m Sprint	Deep-tissue	0.875	0.247
	Massage		

Standing broad jump distance improved from baseline after both massage techniques. Jump distance increased from 2.44 m ($SD = 0.126$) to 2.52 m ($SD = 0.103$) after Swedish massage and to 2.56 m ($SD = 0.143$) after deep-tissue massage. Paired-samples t-tests showed significant improvements for Swedish massage, $t(5) = -3.601$, $p = 0.016$, and deep-tissue massage, $t(5) = -6.102$, $p = 0.002$. Deep-tissue massage produced a larger mean improvement than Swedish massage, approximately 4.9% compared with 3.3%. For the 20 m sprint, time improved from 2.77 s ($SD = 0.108$) at baseline to 2.68 s ($SD = 0.098$) after Swedish massage and 2.73 s ($SD = 0.102$) after

deep-tissue massage. However, these changes were not statistically significant for Swedish massage, $t(5) = 2.362$, $p = 0.065$, or deep-tissue massage, $t(5) = 0.829$, $p = 0.445$.

TABLE II
DESCRIPTIVE

	N	Mean	SD
Baseline of Standing broad jump	6	2.44m	0.1261
Baseline of 20 m sprint	6	2.77s	0.1084
Standing broad jump (Swedish massage)	6	2.52m	0.1031
20 m sprint (Swedish massage)	6	2.68s	0.0983
Standing broad jump (Deep-tissue massage)	6	2.56m	0.1433
20 m sprint (Deep-tissue massage)	6	2.73s	0.1023

TABLE III
PAIRED SAMPLE T-TEST

		t	df	p
Baseline of Standing broad jump	Swedish massage	-3.601	5.00	0.016
	Deep-tissue massage	-6.102	5.00	0.002
Baseline of 20 m sprint	Swedish massage	2.362	5.00	0.065
	Deep-tissue massage	0.829	5.00	0.445

Overall, both massage techniques showed positive effects on lower-limb explosive power, with deep-tissue massage producing greater improvement in jump performance. However, effects on sprint performance were smaller and non-significant. These findings support previous evidence that massage may assist recovery, reduce soreness, and improve flexibility, although its direct effects on performance outcomes such as sprinting may be limited or inconsistent [3][4][5][6].

IV. CONCLUSIONS

This study concluded that both Swedish massage and deep-tissue massage significantly improved standing broad jump performance among adolescent football athletes after fatigue. Deep-tissue massage produced greater improvement and appeared to be more effective for enhancing explosive lower-limb power. However, neither massage technique significantly improved 20 m sprint performance, although Swedish massage showed a small positive trend. These findings suggest that massage may be

more beneficial for jump-related power recovery than for short sprint performance. From a practical perspective, deep-tissue massage may be prioritised after training when the goal is to support lower-limb power recovery, while Swedish massage may be used for general relaxation and recovery. Future research should involve larger samples, longer follow-up periods, and additional physiological measures to strengthen the evidence on massage-based recovery among adolescent athletes.

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First and foremost, I would like to thank Allah SWT for His blessings, guidance, and strength in completing this research project. I would like to express my sincere appreciation to my supervisor, Muhamad Noor Mohamed, for his guidance, advice, patience, and continuous support throughout this study. My appreciation also goes to all lecturers, staff, and respondents who contributed to this study. Finally, I would like to thank my family and friends for their prayers, support, patience, and motivation. I also sincerely appreciate everyone who helped me directly or indirectly in completing this research project.

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Kinematic Comparison of Free Throw Shooting Between Amateur and Intermediate Basketball Players

Ahmad Faris Imran Bin Alias¹, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Maisarah Shari², & Noor Azila Azreen Md Radzi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: azila_azreen7172@uitm.edu.my

Keywords: Free Throw, Kinematics, Amateur Players, Intermediate Players

I. INTRODUCTION

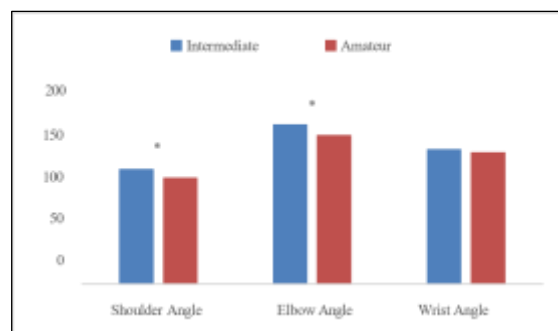
Shooting efficiency is widely recognised as a critical determinant of game success in basketball across all competitive levels, from amateur to professional play [1]. Previous research has extensively examined the biomechanical factors associated with optimal shooting performance, with particular emphasis on joint kinematics, release mechanics, and coordination patterns [2]. Despite this growing body of literature, limited evidence exists regarding how shooting mechanics differ according to players' skill and experience levels [3]. A clearer understanding of these differences is necessary to inform coaching strategies and performance development. Therefore, the present study aimed to investigate variations in kinematic characteristics of the free throw between amateur and intermediate basketball players.

II. METHODS

A total of 12 male basketball players, comprising 6 amateur and 6 intermediate players aged between 18 and 24 years, participated in this study. All participants performed 10 free throw trials from the regulation free throw distance. Kinematic variables during the ball release phase, specifically shoulder, elbow, and wrist joint angles, were recorded using a two-dimensional video analysis approach. A smartphone camera was positioned perpendicular to the sagittal plane to ensure accurate movement capture. Recorded videos were subsequently analysed using Kinovea motion analysis software. Each participant completed 10 attempts, resulting in a maximum possible score of 50 points. Independent-samples t-tests were conducted to determine differences in kinematic variables and shooting accuracy between amateur and intermediate players.

III. RESULTS AND DISCUSSION

Significant differences were identified between amateur and intermediate players in shoulder and elbow joint angles during free throw shooting. Intermediate players demonstrated greater shoulder elevation and elbow extension at ball release compared with amateur players. In contrast, no significant difference was found in wrist angle between the two groups.



* $p < 0.05$

Fig. 1 Comparison between skill levels on shooting kinematics and accuracy

Previous research indicates that skilled shooters exhibit distinct shoulder and elbow mechanics compared with less skilled players, reflecting more refined proximal joint coordination with experience [1]. Differences in joint positioning between performance levels suggest that skill development is associated with improved control of shoulder and elbow movement during the release phase. Upper limb biomechanical analyses further highlight the dominant role of the shoulder and elbow in regulating release mechanics. Shoulder rotation contributes substantially to the vertical component of release velocity, whereas elbow and wrist actions primarily influence horizontal velocity and ball backspin [5]. In contrast, wrist mechanics appear less sensitive to differences in skill level. Evidence on coordination variability suggests that distal joint motion, particularly at the wrist, remains relatively stable across performance groups, while proximal joint coordination at the shoulder and elbow serves as a clearer marker of shooting proficiency [6].

IV. CONCLUSIONS

This study identified biomechanical differences between amateur and intermediate basketball players during free throw shooting. Significant differences were found in shoulder and elbow joint angles, while wrist angle did not differ between groups. These findings indicate that skill progression is mainly associated with changes in proximal joint mechanics rather than distal joint movement. Practically,

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coaches should focus on improving shoulder alignment and elbow extension to enhance shooting efficiency, particularly among amateur players.

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The Post-Activation Performance Enhancement (PAPE) Effect of Plyometric Warm-Up on Agility Among University Rugby Players

Ahmad Imran Hakim Ahmad Zamani¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Post-Activation Performance Enhancement (PAPE), Isometric Squat, Isotonic Squat, Agility, Rugby Players, Warm-Up, Trained Athletes

I. INTRODUCTION

Agility is a critical physical attribute in rugby, requiring rapid changes of direction during offensive and defensive play. Warm-up strategies may acutely influence performance through Post-Activation Performance Enhancement (PAPE), a neurophysiological phenomenon where a conditioning activity temporarily enhances subsequent explosive muscle contractions [1]. While general warm-ups are foundational for preparation, emerging evidence suggests plyometric stimuli may better capitalise on PAPE to improve change-of-direction speed [2]. Limited research has directly compared plyometric and general warm-up protocols on agility specifically among university rugby players, particularly within the Malaysian context. This study aimed to examine the acute effects of both warm-up protocols on agility performance measured at 1, 3, and 5 minutes post-activation and to compare their effectiveness.

II. METHODS

A randomised pre-post experimental design was employed with 18 male university rugby players from UiTM Seremban 3 (age: 18–25 years). Participants were randomly assigned to either a plyometric warm-up (PWU) or general warm-up (GWU) condition ($n = 9$ per group). The PWU consisted of 2 sets $\times$ 10 ankle hops, 3 sets $\times$ 5 hurdle hops, and 5 depth jumps [3]. The GWU comprised 10 bodyweight squats, 10 front lunges, and 3 minutes of dynamic stretching. Agility was assessed using the Illinois Agility Test (ICC = 0.85–0.98) [4] at baseline and at 1, 3, and 5 minutes post-warm-up. Anthropometric measurements were taken using a Seca 213 stadiometer and Seca 713 scale (both ICC = 0.99). Data were analysed using repeated-measures ANOVA with Bonferroni post-hoc corrections; significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

Baseline agility scores were comparable between groups (GWU: 17.5 $\pm$ 2.22 s; PWU: 17.8 $\pm$ 1.85 s), and Shapiro-Wilk tests confirmed normal distribution for all variables ($p > .05$), justifying the use of parametric analysis. For the plyometric warm-up condition, repeated-measures ANOVA revealed no statistically significant change in agility across the three post-activation time points ($F = 1.10$, $df = 3$, $p = .367$). Similarly, the general warm-up condition produced no significant time effect ($F = 0.921$, $df = 3$, $p = .446$). These findings indicate that neither warm-up type induced measurable agility improvements across the 1, 3, and 5-minute recovery windows.

Between-group comparisons further revealed no significant difference in agility performance at any post-activation time point ($F = 0.00414$, $p = .950$), indicating that the plyometric warm-up did not confer superior benefits over the general warm-up. results are consistent with [5], who reported context-dependent potentiation effects in elite athletes, and with Behm et al., who noted that general warm-ups prepare the body but may not maximally prime neuromuscular pathways for explosive tasks [2].

Notably, contrast analysis within the PWU group revealed a statistically significant improvement at 5 minutes post-activation relative to earlier time points (estimate = -1.1567, $t = -3.0157$, $p = .017$). This delayed enhancement aligns with the PAPE concept, which suggests potentiation may emerge after sufficient recovery from the conditioning stimulus. Tobin and Delahunt similarly observed delayed performance improvements several minutes after plyometric stimulation in professional rugby players [3]. The absence of a significant main time effect despite this contrast finding may reflect individual variability and the small sample size limiting statistical power.

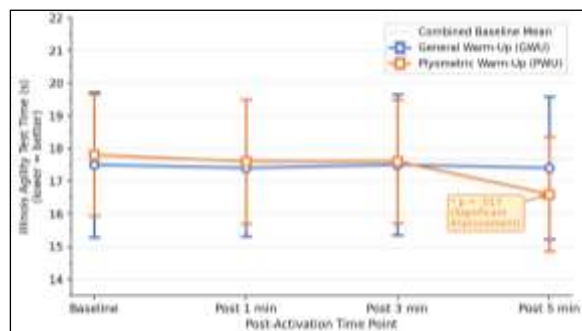


Fig. 1 Illinois Agility Test performance (Mean $\pm$ SD) for GWU and PWU groups across post-activation time points.
* Denotes significant improvement at 5 min post-PWU ($p=.017$).

IV. CONCLUSIONS

Neither plyometric nor general warm-up protocols produced statistically significant acute enhancements in agility performance under the tested conditions. However, the significant delayed improvement at 5 minutes post-PWU suggests a potential PAPE response. Future studies with larger samples and optimised recovery intervals (e. g., 5–10 minutes) are recommended to better understand the practical application of plyometric warm-ups for university rugby players.

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Influence of Different Music Genres on Sport Activity Experience Among Marathon Runners in Klang Valley

Amirul Azreeq Mohammad Adzha¹, & Wahidah Tumijan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: wahidah06@uitm.edu.my

Keywords: Music Genre, Sport Activity Experience, Motivation, Physical Strength, Psychological Endurance

I. INTRODUCTION

The application of music in sports has evolved from entertainment to a potent ergogenic aid capable of enhancing performance [1]. Theoretical frameworks suggest that music influences athletes through rhythm response, musicality, and cultural impact, as well as by diverting attention from fatigue [2]. However, existing literature has predominantly focused on music tempo rather than the distinct structural characteristics of music genre [3]. This study aimed to identify the music genres commonly listened to by runners in Klang Valley and examine the influence of genres on their sport activity experience, specifically motivation, physical strength and performance, and psychological endurance.

II. METHODS

This study employed a quantitative, non-experimental research design using a cross-sectional survey. The population consisted of active marathon runners in Klang Valley, with a final sample size of $n = 417$ recruited through purposive sampling. Inclusion criteria required participants to be aged 18 to 40 years and to have completed at least one marathon event. The research instrument was the Impact of Music on Sportive Activities Scale (IMSAS), a validated questionnaire. Data were analysed using descriptive analysis to identify genre prevalence and one-way ANOVA to determine differences in experience scores between genres.

III. RESULTS AND DISCUSSION

Descriptive analysis revealed that Rock/Alternative (36.0%) and Hip-Hop/Rap (33.1%) were the most preferred genres, while Pop/Mainstream and EDM were less common. The one-way ANOVA results (Table I) indicated significant differences in sport activity experience based on music genre. A significant difference was found ($p = .043$). Post hoc analysis revealed that Hip-Hop/Rap scored significantly higher than Pop/Mainstream. This aligns with the theory that Hip-Hop lyrics contain themes of struggle and triumph, acting as verbal persuasion to enhance self-belief [4]. A significant difference was observed ($p = .021$). Hip-Hop/Rap participants perceived higher physical strength compared with the Pop group. This

supports the concept of auditory-motor synchronisation, where the strong, consistent bass beats of Hip-Hop (80 to 100 BPM) facilitate metabolic efficiency. No significant difference was found ($p = .051$). This suggests that, at high levels of fatigue, physiological feedback overrides the dissociative effects of music regardless of genre [2].

TABLE I
DIFFERENCE IN SPORT ACTIVITY DIMENSIONS BASED ON MUSIC GENRE

Dimension	EDM	Hip-Hop	Pop	Rock	F	p
Motivation	3.78	3.98	3.63	3.91	2.74	.043
Physical Strength	3.73	3.97	3.56	3.91	3.27	.021
Psychological Endurance	3.82	3.98	3.64	3.95	2.62	.051

IV. CONCLUSIONS

This study confirms that music genre significantly influences motivation and perceived physical strength among marathon runners in Klang Valley. Hip-Hop/Rap was identified as the most effective genre for these dimensions, likely because of its rhythmic assertiveness and lyrical content. However, music genre has limited capacity to influence deep psychological endurance during high-fatigue activities. Runners are recommended to curate playlists with Hip-Hop or Rock tracks to optimise training intensity and motivation.

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Comparison of Sports Environments on Emotional Regulation in University Athletes: Perspectives from Indoor and Outdoor Sports Environments

Arham Abd Rani¹, & Wahidah Tumijan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: wahidah06@uitm.edu.my

Keywords: Emotional Regulation, Cognitive Reappraisal, Expressive Suppression, Indoor Sports, Outdoor Sports

I. INTRODUCTION

This study explores emotional regulation among university athletes and compares differences between athletes who participate in indoor and outdoor sports. Emotional regulation plays an important role in sport performance, as athletes must manage their emotions effectively during training and competition [1][2]. Two main emotional regulation strategies are commonly discussed: cognitive reappraisal, which involves changing how one thinks about a situation, and expressive suppression, which involves controlling emotional expression. While previous studies have examined emotional regulation in athletes based on team and individual sports [3], limited research has compared emotional regulation strategies based on sport environment, particularly indoor versus outdoor sports. Understanding these differences may provide useful insight into how environmental contexts influence athletes' psychological responses. Therefore, this study aimed to examine the level of emotional regulation among university athletes and to compare emotional regulation between indoor and outdoor sport athletes.

II. METHODS

This study employed a quantitative, cross-sectional research design. Data were collected using an online questionnaire distributed to university athletes. The instrument used was the Emotion Regulation Questionnaire (ERQ), which measures two subscales: cognitive reappraisal and expressive suppression. A total of 249 university athletes participated in this study, consisting of athletes involved in indoor and outdoor sports. Because the data were not normally distributed, median and interquartile range (IQR) were used to report descriptive statistics. The Kolmogorov–Smirnov test was conducted to assess normality. Since the data were not normally distributed, non-parametric statistical analyses were applied to compare emotional regulation between indoor and outdoor sport athletes.

III. RESULTS AND DISCUSSION

A. Result for Emotional Regulation on Indoor Sports

TABLE I
DESCRIPTIVE OF EMOTIONAL REGULATION ON INDOOR SPORT

	Sport Environment	N	Median (IQR)
Cognitive Reappraisal	Indoor Sports	91	6.50 (0.66)
Expressive Suppression	Indoor Sports	91	6.25 (1.25)

The results show that indoor sport athletes reported a median score of 6.50 (IQR = 0.66) for cognitive reappraisal. This indicates that most indoor athletes frequently used cognitive reappraisal strategies to manage their emotions during sport participation. For expressive suppression, indoor athletes recorded a median score of 6.25 (IQR = 1.25). Although this score was slightly lower than cognitive reappraisal, it still reflected relatively frequent use of suppression strategies among indoor athletes.

B. Result for Emotional Regulation on Outdoor Sports

TABLE II
DESCRIPTIVE OF EMOTIONAL REGULATION ON OUTDOOR SPORT

	Sport Environments	N	Median (IQR)
Cognitive Reappraisal	Outdoor Sports	158	6.67 (0.83)
Expressive Suppression	Outdoor Sports	158	6.50 (1.00)

The findings indicate that athletes in outdoor sports reported a median cognitive reappraisal score of 6.67 (IQR = 0.83). This suggests that outdoor athletes also frequently applied cognitive reappraisal strategies, with a slightly higher central tendency than indoor athletes. For expressive suppression, outdoor athletes recorded a median score of 6.50 (IQR = 1.00), showing that suppression was also commonly used among outdoor athletes.

C. Result for Comparison Between Indoor and Outdoor Athletes

TABLE I
COMPARISON OF EMOTIONAL REGULATION BETWEEN INDOOR
AND OUTDOOR UNIVERSITY ATHLETES

	Sport Environments	N	U	p
Cognitive	Indoor Sport	91	6674	0.341
Reappraisal	Outdoor Sport	158		
Expressive	Indoor Sport	91	6049	0.035*
Suppression	Outdoor Sport	158		

Since the data were not normally distributed, the Mann–Whitney U test was conducted to examine differences between indoor and outdoor athletes. The results indicated no significant difference in cognitive reappraisal between indoor and outdoor sport athletes ($p > .05$). However, a significant group difference was found in expressive suppression ($p < .05$), with outdoor athletes scoring higher. This suggests that athletes participating in outdoor sports were more likely to inhibit outward emotional expression compared with those in indoor sports. This pattern may be attributed to greater environmental unpredictability, higher competitive intensity, and increased social evaluation in outdoor settings, which may require greater control over emotional displays [1][2]. Furthermore, the physically demanding and dynamic nature of many outdoor sports may increase the need for expressive suppression to maintain focus and performance [3]. These findings underscore the influence of the physical sport environment on specific emotion regulation strategies and highlight that expressive suppression may be contextually adaptive in response to situational demands.

IV. CONCLUSIONS

This study examined emotional regulation among university athletes and compared differences between indoor and outdoor sports. The findings showed that athletes generally reported high use of both cognitive reappraisal and expressive suppression strategies. No significant difference was found in cognitive reappraisal between indoor and outdoor athletes. However, a significant difference was observed in expressive suppression, with outdoor athletes reporting slightly higher levels. These results suggest that the sport environment may influence how athletes manage and control their emotions. Future research should explore other psychological and environmental factors that may affect emotional regulation and consider using more balanced samples across different sport types.

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Effects of Rigid Tape and Ankle Guards on Balance Performance Among Rugby Players

Asyifa' Husna Azhar¹, Mardiana Mazaulan^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Raja Nurul Jannat Raja Hussain¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mardiana9840@uitm.edu.my,

Keywords: Rigid Tape, Ankle Guard, Dynamic Balance, Rugby Players, MSEBT

I. INTRODUCTION

Rugby is a high intensity contact sport that requires rapid changes of direction, acceleration, and physical collisions, which increase the risk of ankle injuries. Ankle sprain is one of the most common injuries among rugby players and may lead to reduced balance performance and recurrent instability. Dynamic balance is essential for maintaining postural control during sport-specific movements and for reducing injury risk.

External ankle supports such as rigid tape, and ankle guards are widely used in rugby to enhance joint stability and prevent injury. Rigid tape provides firm mechanical restriction and limits excessive ankle movement, whereas ankle guards offer moderate support with greater flexibility. However, limited research has directly compared their effects on balance performance among rugby players. Therefore, this study aimed to determine the effects of rigid tape and ankle guards on balance performance among rugby players.

II. METHODS

A within-subject crossover experimental design was used in this study. A total of ten male rugby players aged between 18 and 25 years who were free from ankle injuries for at least six months participated in this study. Each participant attended two testing sessions separated by 48 to 72 hours to minimize fatigue and carryover effects. Dynamic balance was assessed using the Modified Star Excursion Balance Test (MSEBT) in three reach directions: anterior (ANT), posteromedial (PM), and posterolateral (PL). Participants performed the test under two conditions: wearing rigid tape and wearing an ankle guard. Three trials were conducted for each direction, and the average reach distance was recorded. Paired-samples t-test analysis was conducted using Jamovi software, with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

Based on the mean graph of MSEBT scores, rigid tape showed higher mean values than ankle guards across several reach directions. In the anterior

direction, the mean score was 80.8 for rigid tape and 64.6 for ankle guards. In the posteromedial direction, the mean score was 123.0 for rigid tape and 104.5 for ankle guards. In the posterolateral direction, the mean score was 122.3 for rigid tape and 105.0 for ankle guards. These findings indicate that rigid tape provides better dynamic balance performance. The mean differences across all directions and conditions suggest that more rigid external support provides additional stability to the ankle joint during the balance test.

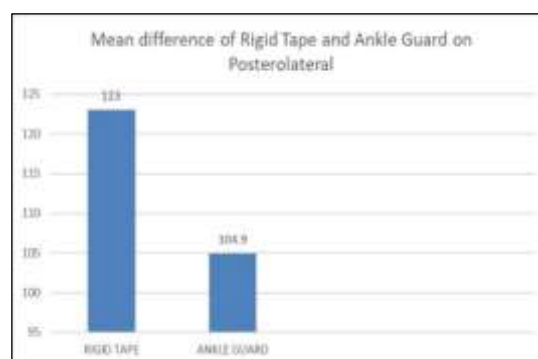


Fig.1 Comparison between rigid tape and ankle guard on posterolateral

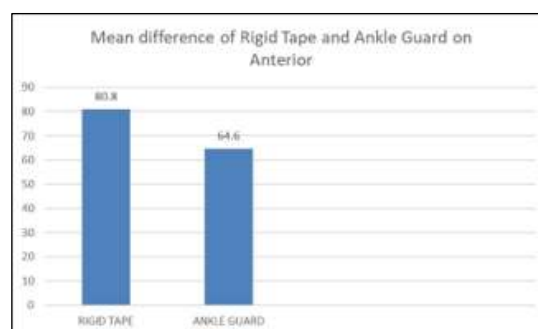


Fig.2 Comparison between rigid tape and ankle guard on anterior

The results showed that rigid tape significantly improved dynamic balance performance compared with ankle guards in all reach directions. A highly significant difference was found in the anterior direction ($p < .001$), while significant improvements

were also observed in the posteromedial direction ($p = 0.016$) and posterolateral direction ($p = 0.010$).

These findings support previous studies showing that rigid tape can improve joint stability and proprioceptive feedback. The mechanical restriction provided by rigid tape may reduce excessive ankle movement and improve neuromuscular control during single-leg standing. In contrast, ankle guards provide more flexible support, allowing greater joint movement and resulting in smaller improvements in balance. Overall, the findings of this study suggest that rigid tape provides better stabilisation and may be more beneficial for injury prevention and performance enhancement among rugby players compared with ankle guards.

IV. CONCLUSIONS

Rigid tape significantly improves dynamic balance performance compared with ankle guards among rugby players. These findings provide practical implications for coaches, physiotherapists, and sports practitioners in selecting appropriate ankle support to enhance performance and reduce injury risk. Future studies are recommended to involve larger sample sizes and long-term intervention designs.

ACKNOWLEDGMENT

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Effects of Isometric and Isotonic Squat Exercise in Post-Activation Performance Enhancement on Vertical Jump for Trained Male Athletes

Broery Alim Syah Md Daud¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹,
Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana
Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Post-Activation Performance Enhancement (PAPE), Isometric Squat, Isotonic Squat, Countermovement Jump, Trained Athletes

I. INTRODUCTION

Explosive lower-body power is fundamental to many sports, with vertical jump height widely recognised as an indicator of neuromuscular readiness. Post-activation performance enhancement (PAPE) is a phenomenon whereby high-intensity muscular contractions acutely improve subsequent explosive performance through mechanisms including increased muscle temperature, motor unit recruitment, and phosphorylation of myosin regulatory light chains [1]. Squat exercises, performed isometrically (static hold) or isotonically (dynamic movement), are commonly used PAPE conditioning activities. However, the optimal contraction mode for peak PAPE expression remains unclear. Mixed findings in the literature, methodological inconsistencies, and the absence of localised research among Malaysian collegiate athletes highlight the need for a controlled, time-sensitive investigation comparing these two squat modalities on vertical jump performance.

II. METHODS

A quantitative randomised controlled trial (RCT) with a repeated-measures design was employed. Twelve trained male collegiate athletes from UiTM Negeri Sembilan (mean age 19.5 ± 0.67 years; height 169.9 ± 4.78 cm; body mass 65.3 ± 10.09 kg; 1RM 86.1 ± 22.18 kg) were randomly assigned into three equal groups ($n = 4$): isometric squat, isotonic squat, and control (normal warm-up). Squat interventions were performed at 75% of one-repetition maximum (1RM). The isometric group performed a static squat hold at 90° knee flexion, the isotonic group performed three repetitions of full-range dynamic squats, and the control group completed a general warm-up with no resistance loading. Countermovement jump (CMJ) height was measured using a jump mat immediately, 3 minutes, and 6 minutes post-intervention. Pre-screening was conducted using the PAR-Q. Data were analysed in Jamovi (v2.6.44) using a two-way repeated-measures ANOVA ($\alpha = 0.05$). Sample size was calculated

using G*Power 3.1 (effect size $f = 0.72$, power = 0.80, minimum $n = 9$).

III. RESULTS AND DISCUSSION

The Shapiro-Wilk test confirmed normality of pre-test data ($W = 0.924$, $p = .316$). The two-way repeated-measures ANOVA revealed no significant main effect of time ($F(2,18) = 1.978$, $p = .167$), no significant group $\times$ time interaction ($F(4,18) = 0.443$, $p = .776$), and no significant between-subjects group effect ($F(2,9) = 2.91$, $p = .106$). Minor fluctuations in CMJ height were observed across time points but did not reach statistical significance. These findings are consistent with [2], who reported no significant differences between isometric and isotonic protocols on CMJ performance. The absence of a PAPE effect may be attributed to the fatigue-potential balance at moderate intensity, the short 6-minute post-activation window, and inter-individual neuromuscular variability. Previous study [3] similarly found that PAPE protocols do not consistently enhance jump performance beyond standard warm-up effects in trained individuals.

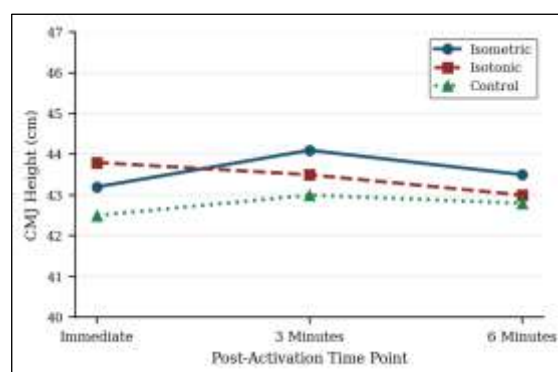


Fig. 1 Mean CMJ height (cm) across post-activation time points by group

IV. CONCLUSIONS

Moderate-intensity isometric and isotonic squat exercises at 75% 1RM did not elicit a significant PAPE effect on vertical jump performance among trained male collegiate athletes within a 6-minute post-activation window. All null hypotheses were accepted ($p > 0.05$). These findings indicate that contraction type alone is insufficient to determine acute performance enhancement. Training intensity, recovery duration, and individual athlete characteristics are critical determinants of effective PAPE protocols. Future research should investigate higher loading intensities, extended time courses, and individualised approaches to optimise pre-competition warm-up strategies for trained athletes.

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Effectiveness of Foam Rolling and Massage Gun on Muscle Soreness (DOMS) Among Rugby Players

Emil Azrai Mohd Hanafiah¹, Mardiana Mazaulan^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Raja Nurul Jannat Raja Hussain¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mardiana9840@uitm.edu.my

Keywords: Delayed Onset Muscle Soreness (DOMS), Foam Rolling, Massage Gun, Range of Motion (ROM), Rugby Players, Sports Recovery

I. INTRODUCTION

Delayed onset muscle soreness (DOMS) is a well-known condition that affects athletes following intense or unfamiliar physical activity. It is characterised by muscle pain, stiffness, and reduced range of motion, typically appearing 24 to 48 hours after exercise and peaking within 72 hours [1]. In rugby, a high-impact contact sport involving repeated sprinting, tackling, scrummaging, and rapid changes of direction, lower-limb muscles such as the quadriceps, hamstrings, and calves are particularly susceptible to DOMS [2]. If left unmanaged, DOMS can impair athletic performance, reduce training quality, and increase injury risk.

Among recovery strategies used to manage DOMS, self-myofascial release techniques have become increasingly popular. Foam rolling (FR) involves applying pressure through a cylindrical foam device to tight or sore muscle groups, promoting circulation and reducing fascial tightness [3]. Massage guns (MG), newer percussive therapy devices, deliver rapid vibration pulses directly into muscle tissue to achieve similar effects [4]. Although both tools are widely adopted in athletic settings, comparative research on their effectiveness, especially among rugby players, remains limited.

This study aimed to investigate and compare the effects of foam rolling and massage gun therapy on muscle soreness and range of motion in lower-limb muscles among university-level male rugby players, with the goal of providing evidence-based recovery guidance for athletes and practitioners.

II. METHODS

A quasi-experimental research design was used in this study. A total of 20 male rugby players aged 18 to 30 years from Universiti Teknologi MARA (UiTM) Seremban 3 were recruited using purposive sampling. Participants were randomly divided into two groups of 10: a foam rolling group and a massage gun group. Inclusion criteria required participants to be actively training and free from lower-limb injuries for at least six months.

Both interventions were applied immediately after a rugby match simulation targeting the lower-limb

muscles, including the quadriceps, hamstrings, and calves. The foam rolling protocol was adapted from [5], in which participants rolled each muscle group for 45 seconds, with 15 seconds of rest, over two sets of four repetitions. The massage gun protocol followed [6], with a round ball attachment applied at 50 Hz for the quadriceps and hamstrings and 30 Hz for the calves, for 5 minutes per leg. Muscle soreness was measured using the Visual Analogue Scale (VAS), rated from 0 (no pain) to 10 (severe pain). Range of motion (ROM) was assessed through active knee extension measured with a goniometer. Measurements were taken at baseline (pre-test), 24 hours, 48 hours, and 72 hours after the intervention. Data were analysed using descriptive statistics, Shapiro-Wilk normality tests, and repeated-measures ANOVA with Bonferroni post hoc comparisons via Jamovi software (version 2.6.4).

III. RESULTS AND DISCUSSION

The results demonstrated a significant effect of both foam rolling (FR) and massage gun (MG) interventions on lower-limb pain scores and lower-limb range of motion (ROM) across the four time points: pre-test, 24 hours, 48 hours, and 72 hours post-intervention. Further analysis revealed that the FR group showed greater improvement in right lower-limb pain reduction, while the MG group achieved better results in right lower-limb range of motion recovery. These findings suggest that each intervention may offer specific benefits depending on the targeted lower-limb performance outcome and the side assessed.

Figure 1 illustrates the mean pain scores for both the left and right lower limbs between the two intervention groups. For the left lower limb, the foam rolling (FR) group recorded a slightly higher mean pain score ($M = 4.90$) than the massage gun (MG) group ($M = 4.65$), indicating that the massage gun was marginally more effective in reducing muscle soreness on the left side. In contrast, for the right lower limb, the FR group achieved a lower mean pain score ($M = 4.66$) than the MG group ($M = 5.83$), suggesting that foam rolling was more effective in alleviating pain on the right side. Since lower pain

scores reflect greater reductions in muscle soreness, these findings indicate that both interventions were effective overall, but their relative effectiveness differed by limb.

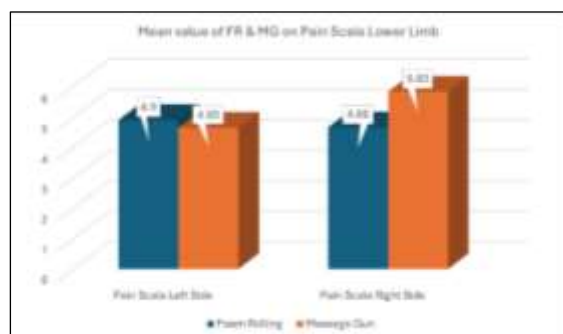


Fig.1 Mean Value of FR and MG on Pain Scale

Figure 2 shows the mean ROM values for both lower limbs between the two groups. On the left side, the FR group recorded a mean of 25.43 degrees, while the MG group recorded 25.58 degrees. The difference between groups was very small, indicating that both methods produced similar outcomes for left-side joint mobility. On the right side, however, the difference was more apparent.

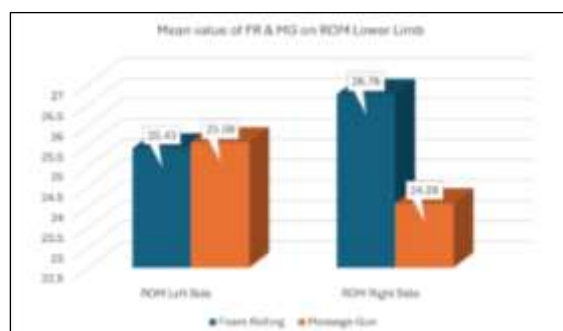


Fig.2 Mean Value of FR and MG on ROM

The FR group had a mean of 26.76 degrees, while the MG group recorded a lower mean of 24.08 degrees. In the active knee extension test, a lower degree reading indicates better muscle flexibility and recovery. Therefore, the MG group showed a stronger recovery response on the right side. Overall, these results suggest that massage gun therapy may be more helpful than foam rolling for recovering right lower-limb flexibility.

IV. CONCLUSIONS

In conclusion, both foam rolling and massage gun therapy are effective recovery strategies for managing DOMS among university rugby players. Both interventions led to significant reductions in muscle soreness and improvements in range of

motion over a 72-hour recovery period. Although no consistent superiority was found between the two methods, each showed minor advantages in specific outcomes. Foam rolling may offer slightly greater pain relief, while massage gun therapy may provide marginally better ROM recovery. These findings support the use of either method as a practical, evidence-based recovery tool for rugby athletes, with selection based on availability, preference, and specific recovery goals.

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Interplay Between Social Media Use and Depression Among Student-Athletes

Farah Farzana Jamaluddin¹, Hasmiza Abdul Majeed^{1*}, Azman Ahmad Tajri¹, Wahidah Tumijan¹,
Rozita Abdul Latif¹, & Mohammad Adzly Rajli¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: hasmiza@uitm.edu.my

Keywords: Social Media Use, Patient Health Questionnaire, Depression, Student-Athletes, University Students

I. INTRODUCTION

Student-athletes are among the groups in academic settings who experience highly challenging lives due to their multiple roles. They must balance academic tasks with sports requirements. This situation may contribute to major health issues, including depression. In relation to this, previous exploratory research has identified that social media can affect student-athlete mental health [1]. Thus, this study aimed to provide insight into the link between social media use and depression among student-athletes. By identifying levels of social media use and depression and investigating their relationship, this study provides insights into how social media use is linked with depression in this specific population.

II. METHODS

The present study employed a quantitative cross-sectional design. A total of 130 UTHM student-athletes aged between 18 and 30 years participated in the study. Data were collected through a survey using a set of questionnaires. Social media use was measured using the Social Media Use Scale (SMUS) [2], and respondents' depression was assessed using the Patient Health Questionnaire-9 (PHQ-9) [3]. Descriptive statistics were used to determine the frequency of social media use and the level of depression. Pearson correlation analysis was conducted to investigate the relationship between social media use and depression among student-athletes.

III. RESULTS AND DISCUSSION

A. Frequency of Social Media Use Among UTHM Student-Athletes

The descriptive analysis indicated that the mean score for total social media use among respondents was 66.37, with a standard deviation of 28.58, suggesting a moderate level of variability in social media usage patterns. This means that while social media was widely used among student-athletes, levels of participation varied considerably. Further analysis based on usage categories showed that most respondents fell into the moderate social media use category, comprising 63 participants (48.4%). This was followed by those with high social media use, comprising 35 respondents (26.9%), while 32

respondents (24.6%) were classified as having low social media use. Overall, these findings indicate that nearly half of the respondents reported a moderate level of social media use, while a smaller proportion demonstrated high usage levels.

B. Level of Depression Among UTHM Student-Athletes

The descriptive analysis of depression showed a mean score of 12.41, with a standard deviation of 6.68, indicating a moderate level of depression with some variability across participants. The distribution of depression levels among UTHM student-athletes indicated that the majority experienced mild to moderately severe symptoms. Specifically, 13.1% reported minimal depression, 26.2% mild depression, 20.0% moderate depression, 26.2% moderately severe depression, and 14.6% severe depression. This suggests that a considerable proportion of student-athletes experienced elevated depressive symptoms.

C. Relationship Between Social Media Use and Depression Among UTHM Student-Athletes

The results of the Pearson correlation analysis showed a significant positive relationship between social media use and depression among UTHM student-athletes ($r = 0.539, p < 0.001$). This indicates that higher social media use was associated with higher levels of depression. For student-athletes, this relationship may be shaped by factors such as social comparison on social media, pressure to curate and maintain an online identity, and difficulty balancing academic demands with athletic commitments.

IV. CONCLUSIONS

Overall, the findings indicate that UTHM student-athletes reported a moderate level of social media use and varying levels of depression, with most respondents falling within the mild to moderately severe range. A significant positive relationship was found between social media use and depression, indicating that higher usage was associated with higher depression levels. These findings highlight the importance of promoting balanced social media use and the need for effective mental health support within academic and sporting environments to promote student-athletes' overall well-being.

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The Role of Anaerobic Conditioning in Combat Sport Performance: A Systematic Review of Training Regimens and Performance Outcomes

Haris Nur Iman Haris Fadzillah^{1*}, & Muhammad Zulqarnain Mohd Nasir¹.

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2023858682@student.uitm.edu.my

Keywords: Anaerobic Conditioning; Combat Sports; High-Intensity Interval Training; Sprint Interval Training; Peak Power; Lactate Clearance; Detraining; Systematic Review

I. INTRODUCTION

Combat sports are decided within milliseconds of explosive movement, yet those actions are framed by a rhythm that demands relentless anaerobic replenishment. Time-motion studies show judo, boxing, taekwondo and mixed-martial arts feature 1–5 s maximal bursts separated by pauses of similar length, with work-to-rest ratios seldom exceeding 2:1. Metabolic models confirm heavy reliance on phosphagen and glycolytic pathways: lactate in Olympic boxing exceeds 12 mmol L⁻¹ by round end, and one-third of simulated judo randori energy is supplied anaerobically. Coaches therefore integrate high- and sprint-interval protocols, yet divergent study designs, small samples and inconsistent metrics obscure the most effective prescriptions and the durability of their benefits.

This systematic review collates evidence published between 2015 and June 2025 on high-intensity interval, sprint-interval, repeated-sprint, hypoxic and blood-flow-restriction regimens in adult combat athletes. It examines dose–response patterns, sex-specific adaptations, detraining kinetics and the correspondence between laboratory and field assessments. By synthesising these strands, the review aims to provide practitioners with a coherent framework for programming and monitoring anaerobic conditioning that aligns with the stop-and-go tempo, technical precision and congested calendars of contemporary combat sport. It highlights current methodological gaps while advocating multi-centre, longitudinal studies that integrate molecular, physiological and competitive data. The resulting guidance is intended to help strength coaches, sport scientists and medical teams worldwide advance athlete preparation with evidence-based precision, moving forward.

II. METHODS

Following PRISMA 2020, a protocol was registered prospectively. Comprehensive searches of PubMed, Embase, SPORTDiscus, Scopus and Web of Science were completed on 1 February 2025 with pilot-tested strings combining controlled vocabulary and free-text terms for combat disciplines and anaerobic training modalities. The window spanned

January 2015 to June 2025 to balance recency and context. Eligible studies were English, peer-reviewed interventions applying high-intensity interval, sprint-interval, repeated-sprint, hypoxic or blood-flow-restriction conditioning to healthy combat athletes aged ≥ 18 years with at least one competitive season. Two reviewers independently screened records, extracted programme structure, load markers, physiological adaptations and performance outcomes, and assessed bias using PEDro (randomised) or ROBINS-I (non-randomised). Outcomes reported by at least three homogeneous trials were pooled with DerSimonian–Laird random-effects models, otherwise narrative synthesis was conducted. Certainty of evidence was graded with GRADE. Pre-planned sub-group analyses contrasted male versus female responses, compared work-rest ratios, evaluated sport-specific against generic drills and modelled decay at four, eight and twelve weeks of detraining. Sensitivity tests excluded studies scoring < 5 on PEDro or at serious ROBINS-I risk. All statistics were run in R (v4.3.2) using meta for and dmetar; funnel plots and Egger tests explored small-study bias. Missing data were imputed conservatively using last observations.

III. RESULTS AND DISCUSSION

Fourteen trials involving 399 adult competitors across boxing, judo, taekwondo, karate, wrestling and mixed-martial arts met the criteria. Generic high-intensity or repeated-sprint blocks (4 - 12 weeks) raised maximal oxygen uptake by 3 - 10 percent, while protocols embedding repeated throws, pad combinations or kick ladders produced parallel gains in agility, strike volume and Special Judo Fitness Test scores. Meta-analysis showed moderate effects for peak power ($g = 0.53$) and large effects for mean power ($g = 0.87$). Hypoxic or blood-flow-restriction add-ons yielded an extra 2 - 4 percent Wingate improvement and faster lactate clearance, offering efficient options when time is limited. Detraining analysis revealed a 7 - 12 percent peak-power loss by week 12 and declining Special Judo Fitness Test throws after four weeks of inactivity. Sex-specific comparisons indicated equivalent relative gains, yet female athletes displayed greater ferritin depletion

and higher Relative Energy Deficiency in Sport prevalence, highlighting the need for nutritional surveillance. Laboratory improvements translated to competition: lower Wingate fatigue indices and higher Taekwondo Anaerobic Intermittent Kick Test scores predicted wider victory margins and superior win-loss ratios. Sessions consist of two interval sets weekly to maintain adaptations.

IV. CONCLUSIONS

Eight to twelve well-designed high-intensity, sprint-interval or repeated-sprint sessions per mesocycle enhance aerobic capacity, anaerobic power and technical output in combat athletes. Protocols using approximately 1:4 work-rest or incorporating brief hypoxic or occlusion stress deliver the largest peak-power and lactate-clearance gains. Sport-specific drills ensure these physiological improvements convert to wider score differentials and better win-loss records, as shown by superior Taekwondo Anaerobic Intermittent Kick Test outputs and lower Wingate fatigue indices fighters. Two interval sets weekly during taper or off-season are advised because measurable declines emerge after four weeks of inactivity and accelerate by week 12. Female competitors need proactive iron management and tailored recovery to mitigate the heightened risk of Relative Energy Deficiency in Sport.

Although short-term effects are compelling, evidence is limited by brief interventions, uneven field-laboratory concordance and sparse mechanistic tracking, especially in mixed-sex cohorts. Future studies should span full macrocycles, integrate molecular markers with neuromuscular and competitive metrics, and compare autoregulatory models such as APRE, VBRT, repeated-sprint hypoxia and blood-flow-restriction HIIT to optimise dosing. Until such data emerge, this synthesis equips practitioners to apply evidence-based anaerobic conditioning confidently, matching interval architecture to bout tempo, layering environmental or vascular stress judiciously and monitoring responses with validated laboratory and field tests to translate transient metabolic bursts into sustained competitive supremacy for athletes.

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Acute Effects of Plyometric Exercises Versus Static Stretching on Sprinting and Jumping Performance Among UiTMNS FC Soccer Players

Harith Hacqimie Rashidi¹, Mohd Aizzat Adnan^{1*}, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Noor Azila Azreen Md Radzi¹, Mardiana Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mohd5782@uitm.edu.my

Keywords: Plyometric Exercise, Static Stretching, Sprint Performance, Vertical Jump, Acute Effect

I. INTRODUCTION

Soccer requires high levels of explosive performance, particularly sprint acceleration and vertical jumping ability. Warm-up strategies are widely implemented to optimize neuromuscular readiness before competition. Plyometric exercises utilize the stretch–shortening cycle (SSC) to enhance power output and neuromuscular activation. While static stretching is traditionally used to increase flexibility but may acutely improve force production. This study aimed to compare the acute effects of plyometric exercises and static stretching on sprinting and jumping performance among UiTMNS FC soccer players.

II. METHODS

A crossover experimental design was employed involving 17 male semi-professional UiTMNS FC soccer players aged 18–25 years. Participants completed two warm-up conditions: (1) plyometric exercises and (2) static stretching, separated by 72-hour washout periods. Sprinting performance was assessed using a 20 m sprint test, while jumping performance was measured using the Vertec vertical jump test. Data were analysed using paired-samples t-tests, with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results indicated that plyometric exercises significantly improved sprinting and jumping performance ($p < 0.05$), whereas static stretching demonstrated smaller or non-significant improvements ($p > 0.05$). The findings support the role of the stretch–shortening cycle in enhancing neuromuscular activation and explosive performance. Static stretching may temporarily reduce muscle stiffness and neural drive, potentially limiting maximal force output.

IV. CONCLUSION

In conclusion, plyometric exercises were more effective than static stretching in enhancing acute sprinting and jumping performance among UiTMNS FC soccer players. Coaches and practitioners are

encouraged to incorporate plyometric-based warm-up strategies to optimise pre-competition explosive performance.

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exercises on speed and flexibility of soccer player

Acute Effect of Plyometric Exercise on Speed and Agility Among Adolescents Squash Athletes

Harith Rusydi Abd Rahman¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹,
Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana
Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Plyometric Exercise, Post-Activation Performance Enhancement, Adolescent Athletes, Speed, Agility, Squash

I. INTRODUCTION

Squash is a high-intensity racket sport demanding rapid accelerations, frequent changes of direction, and sustained cardiovascular effort, with match heart rates exceeding 190 bpm [1]. Speed and agility are central performance qualities, enabling players to react to opponents' shots and reposition efficiently across the court [1]. For adolescent athletes, optimising warm-up strategies is crucial, as pre-performance preparation directly influences neuromuscular readiness and acute movement output. Post activation Performance Enhancement (PAPE) describes a short-term improvement in muscular output following a high-intensity conditioning activity [2]. Plyometric exercises exploit the stretch-shortening cycle (SSC) to develop explosive force and may serve as effective PAPE stimuli within warm-up routines [3]. However, the acute effects of specific plyometric drills in adolescent squash players and how they compare to traditional sport-specific warm-ups remain poorly understood [2], presenting a sport and age specific evidence gap that this study directly addresses.

II. METHODS

A quantitative experimental randomised crossover design was employed with 20 Malaysian adolescent squash athletes (13–16 years; 12 male, 8 female; mean age 13.9 ± 1.07 years). Sample size was determined via G*Power analysis ($d = 0.76$, power = 0.80, $\alpha = .05$), yielding a minimum of 16 participants [4]. Participants completed both warm-up conditions in counterbalanced order, separated by a 48-hour washout period. Condition-1 was a Traditional Squash Warm-Up (TSW) using a six-corner ghosting drill [1]. Condition 2 was an Alternate-Leg Bounding (ALB) plyometric warm-up (10 total bounds, 5 per leg), selected as a PAPE stimulus due to its horizontal, unilateral mechanics that replicate squash recovery movements [5]. Speed was assessed via the 10 m Sprint Test and agility via the Modified Agility T-Test [4]. Paired-samples t-tests examined within-condition changes, while an independent-samples t-test compared improvement scores between

conditions ($\alpha = .05$). Cohen's d effect sizes were calculated for all comparisons.

III. RESULTS AND DISCUSSION

Normality was confirmed via Shapiro–Wilk tests ($p > .05$). Within-condition results are summarised in Table I.

TABLE I
PRE AND POST WARM-UP RESULTS

Measure	Pre (s)	Post (s)	p-value
10 m Sprint – tSW	2.24±0.32	2.05±0.22	.002*
10 m Sprint – ALB	2.24±0.32	2.08±0.25	.064
Agility – tSW	6.43±0.65	5.98±0.51	<.001**
Agility – ALB	6.43±0.65	5.94±0.48	<.001**

$p < .05$; ** $p < .001$.

The TSW produced statistically significant improvements in both 10 m sprint time ($t(19) = 3.57$, $p = .002$, $d = 0.80$) and agility ($t(19) = 6.29$, $p < .001$, $d = 1.41$). The ALB protocol significantly improved agility ($t(19) = 4.56$, $p < .001$, $d = 1.41$) but the sprint improvement did not reach significance ($t(19) = 1.97$, $p = .064$, $d = 0.44$). No significant between-condition differences were observed for sprint ($p = .762$) or agility improvement ($p = .775$), indicating comparable overall benefits from both protocols.

The TSW's superior sprint benefit is consistent with the specificity principle, as ghosting directly rehearses the short-distance accelerations and decelerations characteristic of squash match play [1]. The ALB protocol's near-significant sprint trend aligns with PAPE frameworks, where the potentiation-fatigue balance at the six-minute recovery interval may have limited statistical expression [2]. The large agility effects observed under both conditions support the view that any structured, dynamic warm-up can acutely enhance multidirectional movement readiness in adolescent athletes [4], consistent with prior youth plyometric priming research [5].

IV. CONCLUSIONS

Both the TSW and ALB plyometric warm-ups acutely enhanced agility in adolescent squash players, with no statistically significant difference between conditions. The TSW provided more consistent benefits across both speed and agility outcomes and remains the recommended default for pre-competition preparation. A brief ALB sequence is a viable alternative when agility priming is the priority or when time is severely constrained.

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The Effect of Foam Rolling and Massage Gun Therapy on Upper Limb Muscle Soreness in Rugby Players

Julia Zulaikha Zulkifli¹, Mardiana Mazaulan^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Raja Nurul Jannat Raja Hussain¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mardiana9840@uitm.edu.my

Keywords: Foam Rolling, Massage Gun Therapy, Upper-Limb Muscle Soreness, Rugby Players, Shoulder Range of Motion, Pain Intensity

I. INTRODUCTION

Rugby is a physically demanding contact sport that places considerable stress on the upper body through high-impact collisions, pushing, and repetitive ball handling. Delayed onset muscle soreness (DOMS), characterised by post-exercise muscle pain, stiffness, tenderness, and reduced range of motion, may impair subsequent training participation, athletic performance, and muscle recovery. Effective recovery strategies are therefore important for rugby players to maintain performance and support recovery. Foam rolling and massage gun therapy are two recovery methods commonly used in sport and fitness settings. Foam rolling is a self-myofascial release technique that applies sustained pressure to soft tissue and has been shown to reduce muscle soreness and improve flexibility. Massage gun therapy applies mechanical percussion to targeted muscle areas and may increase blood circulation, reduce muscle stiffness, and provide analgesic effects. Although both techniques are widely used for post-exercise recovery, direct comparisons of foam rolling and massage gun therapy for upper-limb muscle soreness in rugby players remain limited. Therefore, this study aimed to evaluate the effectiveness of foam rolling and massage gun therapy in reducing delayed onset muscle soreness and improving upper-limb recovery among rugby players.

II. METHODS

A. Subjects

Six male rugby players trained from the Under-19 (U19) team of Tunku Mahkota Ismail Sports School participated in this study. Participants were randomly divided into two intervention groups: the Massage Gun (MG) group ($n = 6$) and the Foam Rolling (FR) group ($n = 6$). All participants provided written informed consent prior to participation, to ensure their voluntary participation in this study. The inclusion criteria for this study were male high school rugby players who were physically fit at the time of testing, had comparable training backgrounds, and were free from upper-limb musculoskeletal injuries for at least three months prior to the study.

Participants were excluded if they had a history of shoulder or arm surgery within the previous year or had sustained a recent or current upper-limb injury within the last three months.

B. Instrumentation

Numerical Pain Rating Scale (NPRS)

Pain intensity was measured before and after the intervention using the Numerical Pain Rating Scale (NPRS). The NPRS allows for within-subject and between-group comparisons (e. g., massage gun versus foam roller) and is a 10-point scale ranging from 0 (no pain) to 10 (worst pain imaginable). The NPRS was appropriate to assess pain reduction in this study because of its ease of use, reliability, and suitability for physically active people.

Shoulder flexion

Shoulder flexion was assessed to evaluate shoulder mobility due to its importance in rugby performance. Range of motion was measured using a goniometer while participants raised the arm forward and upward with the elbow extended and the body upright. Measurements were recorded before and after the intervention to determine changes in shoulder mobility following foam rolling or massage gun therapy.

C. Procedure

Before the intervention, baseline measurements were taken, including measuring shoulder flexion range of motion (ROM) and measuring pain using the Numerical Pain Rating Scale (NPRS). Participants played a standard rugby match to induce muscle discomfort. Afterwards, they were divided into two groups. Group B received massage gun therapy (one set of 30 seconds at 40 Hz per muscle area), while Group A performed foam rolling (three sets of 60 seconds per muscle group). Immediately following treatment, post-intervention assessments were taken to assess any improvement in shoulder mobility and discomfort. At 24, 48, and 72 hours, follow-up assessments were conducted to track recovery over time.

D. Statistical Analysis

This study employed a quasi-experimental between-group design with repeated measures. Repeated measures ANOVA were used for statistical analysis. The design was selected to determine the effects of foam rolling on muscle soreness, determine the effects of massage gun therapy on muscle soreness, and compare the effectiveness of both techniques. The aim was to assess the extent to which foam rolling and massage gun therapy supported upper-limb rehabilitation in rugby players.

Prior to analysis, the dataset was screened for missing or inconsistent values, and basic data cleaning procedures were performed. Statistical analyses were conducted using JAMOVI software (version 2.3.28). Group comparisons were conducted to determine whether the players' recovery was significantly affected by the rehabilitation technique, the pre- and post-intervention scores of each group (foam rolling and massage gun) were compared using repeated-measures ANOVA. This test helped in determining whether the therapy resulted in statistically significant changes in muscle soreness and range of motion.

III. RESULTS AND DISCUSSION

The results demonstrated a significant effect of both the Foam Rolling (FR) and Massage Gun (MG) interventions on pain reduction and shoulder flexion range of motion across the time points (pre-, 24-, 48-, and 72- hours post-intervention). Further analysis revealed that the foam rolling group showed greater reductions in pain scores and greater improvements in shoulder flexion compared with the massage gun group, although both interventions produced improvements. These findings suggest that each intervention may provide specific benefits depending on the targeted outcome, highlighting the importance of selecting recovery techniques based on the desired effect on upper-limb performance and recovery.



Fig. 1 Mean Value of Pain Scale between Group FR and Group MG

Figure 1 shows differences in mean pain scores for the right and left sides between the two groups. The foam rolling group recorded lower mean scores on both sides (left = 4.62, right = 4.54) compared with the massage gun group (left = 5.62, right = 5.66),

indicating better pain reduction with foam rolling because lower scores represent less pain. Figure 2 shows that the foam rolling group achieved higher range of motion scores (left = 148.25, right = 148.25) compared with the massage gun group (left = 138.25, right = 132.25). These results indicate that foam rolling was more effective in improving shoulder range of motion.

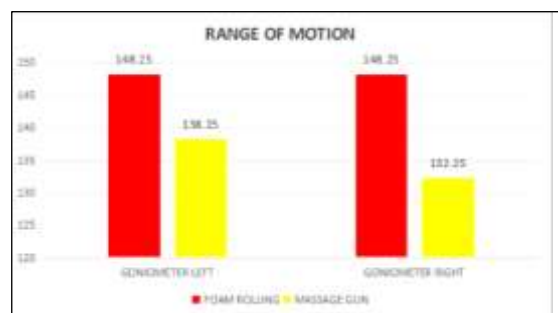


Fig. 2 Mean Value of Pain Scale between Group FR and Group MG

IV. CONCLUSIONS

Based on this study, both foam rolling and massage gun therapy showed significant effects in reducing delayed onset muscle soreness and improving upper-limb range of motion. Overall, both interventions improved recovery, but foam rolling produced better outcomes, particularly for right-side pain reduction and shoulder range of motion improvements across 72 hours.

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The Differences Between Flat Sole and Cushioning Sole Footwear on Change-of-Direction Skill Performance Among Futsal Players with Chronic Ankle Injuries

Khairul Ikhwan Zamri^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2023696382@uitm.edu.my

Keywords: Flat Sole Footwear; Cushioning Sole Footwear; Change of Direction; Chronic Ankle Instability; Futsal Players

I. INTRODUCTION

Change of direction (COD) ability is a critical performance component in futsal, requiring rapid acceleration, deceleration, and directional control. Players with chronic ankle instability (CAI) frequently demonstrate impaired proprioception and neuromuscular deficits. Footwear design, particularly sole structure, may influence ankle stability, joint loading and force transmission during COD tasks. However, limited evidence directly compares flat sole and cushioning sole futsal footwear among injured populations in Malaysia. This study aimed to determine whether significant differences exist in COD performance between flat sole and cushioning sole footwear among futsal players with chronic ankle injuries.

II. METHODS

A crossover experimental design was employed. Ten male recreational futsal players (age: 21.6 ± 1.26 years) with confirmed chronic ankle instability (based on the Cumberland Ankle Instability Tool) participated. Each completed the Agility t-test under two footwear conditions: flat sole and cushioning sole futsal shoes. Three trials per condition were performed with two-minute rest intervals and the average completion time was recorded. A 24-hour washout period separated the testing sessions. Data were analysed using paired-samples t-test with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

Descriptive analysis indicated faster COD performance in the flat sole condition (9.37 ± 0.13 s) compared with the cushioning sole condition (11.10 ± 0.23 s). Paired-samples t-test revealed a statistically significant difference between footwear conditions, $t(9) = -17.9$, $p < .001$. The results demonstrate that participants completed the Agility t-test significantly faster when wearing flat sole futsal shoes. The improved performance observed in the flat sole condition may be attributed to enhanced proprioceptive feedback and more efficient foot-ground interaction. Reduced midsole cushioning likely enhanced proprioceptive feedback and force transmission during rapid directional movements,

whereas increased cushioning may dampen plantar sensory input and delay mechanical responsiveness. These findings highlight the importance of biomechanical suitability in footwear selection, particularly among athletes managing chronic ankle instability.

TABLE I
MEAN TIME AGILITY TIME

	N	Mean	Sd
Flat Sole (Seconds)	10	9.37	0.130
Cushion Sole (Seconds)	10	11.1	0.233

TABLE II
PAIRED SAMPLE T-TEST

	t	df	p
Time (Flat) - Time (Cushion)	-17.9	9.00	<.001

IV. CONCLUSIONS

Flat sole futsal shoes significantly improved change-of-direction performance compared with cushioning sole shoes among players with chronic ankle instability. Sole structure plays a critical role in agility execution, particularly among populations with compromised ankle stability.

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Green Space Exposure and Mental Well-Being Among Hutan Bandar MBIP, Mutiara Rini Visitors

Mohamad Amirul Soufi Rosli¹, Hasmiza Abdul Majeed^{1*}, Wahidah Tumijan¹, Rozita Abdul Latif¹,
Mohammad Adzly Rajli¹, & Azman Ahmad Tajri¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: hasmiza@uitm.edu.my

Keywords: Green Space Exposure, Mental Health, Well-being, Urban Environment, Recreational Visitors

I. INTRODUCTION

Mental health and well-being are frequently discussed topics today. Many people experience mental health and well-being issues arising from factors such as the COVID-19 pandemic, the integration of and adaptation to new technologies, and social and economic pressures. In response to this concern, studies have shown that green spaces are widely associated with psychological well-being, particularly through their capacity to reduce stress and promote positive mood and well-being [1][2]. Therefore, a better understanding of the correlates of green space exposure and mental well-being among people is needed. Recognising this situation, the present study aims to investigate the relationship between green space exposure and mental well-being among recreational visitors. By exploring this relationship, the research aims to inform targeted interventions that support healthy behaviour in a unique environment.

II. METHODS

A quantitative, cross-sectional survey design was employed in this study. A total of 384 responses were collected using convenience sampling, targeting adult park visitors aged 18 years and above at Hutan Bandar MBIP, Mutiara Rini. Data collection was conducted through a self-administered QR-code online questionnaire distributed on-site during peak weekend hours. The instrument comprised a demographic section, a green space exposure inventory [3], and the validated 14-item Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) to measure positive mental health [4]. Data were analysed using SPSS version 26. Descriptive statistics were used to profile the respondents and determine baseline exposure levels, while Pearson product-moment correlation was applied to test the relationship between the exposure variables (frequency and duration) and the dependent variable (psychological well-being) at a significance level of $p < 0.05$.

III. RESULTS AND DISCUSSION

The demographic profile showed a strong predominance of working adults, with 79.7% of the

384 respondents being employed. Regarding exposure patterns, 31.8% of visitors frequented the park "once or more per week", and the average visit duration was notably high at 166.7 minutes. The WEMWBS instrument demonstrated excellent internal reliability ($\alpha = 0.915$). Respondents exhibited a moderate-to-high level of positive mental health, with a total mean score of 55.89 out of 70.

The Pearson correlation analysis yielded a significant, moderate positive relationship between the frequency of park visits and mental well-being ($r = 0.446$, $p < 0.001$). This finding supports the hypothesis that regular interactions with nature contribute to cumulative resilience against mental health issues. For urban residents in Johor, the habit of visiting the park, whether daily or weekly, appears to strengthen resilience against stress. This consistency likely fosters a sense of routine and predictability, which are key components of emotional stability.

Conversely, no significant relationship was found between visit duration and mental well-being ($r = -0.010$, $p = 0.847$). For this specific demographic of Malaysian working adults, the consistency of nature exposure, reflected by the habit of visiting, was more strongly associated with psychological well-being than the intensity of exposure, reflected by length of stay.

IV. CONCLUSIONS

This study concludes that in high-density and high-stress urban environments, habitual interaction with nature is more important for psychological sustainability than prolonged visits. Consequently, local councils and urban planners should prioritise accessibility enhancements, such as improved lighting and pedestrian pathways, to encourage daily, routine park use rather than focusing solely on weekend leisure tourism amenities.

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Combined Effects of Kinesio Taping and Proprioceptive Neuromuscular Facilitation (PNF) Stretching on Hamstring Flexibility in Recreational Football Players

Mohamad Azri Haikal Halim¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹,
Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Hamstring Flexibility, Kinesio Taping, Proprioceptive Neuromuscular Facilitation (PNF), Recreational Football Play

I. INTRODUCTION

Hamstring flexibility is an important component of physical fitness and plays a crucial role in football performance, particularly in sprinting, kicking, and rapid changes of direction. Reduced hamstring flexibility may increase the risk of muscle strain and decrease athletic performance. Various interventions have been used to improve flexibility, including proprioceptive neuromuscular facilitation (PNF) stretching and Kinesio Taping (KT). Previous studies have reported that PNF stretching is effective in improving hamstring flexibility [1], while the application of Kinesio Taping, particularly when combined with other modalities, may further enhance muscle extensibility [2][3]. The reliability of hamstring flexibility assessment using the Active Knee Extension (AKE) test has also been well established [4].

Although both methods are commonly used in sports rehabilitation and conditioning, limited studies have investigated the combined effects of KT and PNF stretching on hamstring flexibility, particularly among recreational football players. Therefore, the purpose of this study was to examine the effects of PNF stretching and the combination of KT with PNF on hamstring flexibility compared to a control group.

II. METHODS

This study employed a pretest-posttest experimental design. A total of 12 male recreational football players aged between 18 and 25 years were recruited using purposive sampling and randomly assigned to three groups: PNF stretching, KT combined with PNF, and control. The intervention was conducted three times per week for four weeks. Hamstring flexibility was measured using the Active Knee Extension (AKE) test and the Sit-and-Reach test before and after the intervention period. Data were analysed using descriptive statistics and inferential analysis to determine within- and between-group differences.

III. RESULTS AND DISCUSSION

The Shapiro–Wilk test confirmed that the data were normally distributed ($p > .05$), satisfying the assumption of normality. A two-way repeated-measures ANOVA showed a significant effect of time on hamstring flexibility for both the Active Knee Extension (AKE) and Modified Sit-and-Reach tests ($p < .001$). Significant time $\times$ group interactions were also found for both measures (AKE: $p = .003$; Sit-and-Reach: $p < .001$), indicating that flexibility changes differed between groups. In addition, significant group differences were observed for both tests. Post hoc analysis (Bonferroni-adjusted) revealed that the KT+PNF group demonstrated significantly greater improvements compared to the Control group in both AKE and Sit-and-Reach performance. The KT+PNF group also showed greater improvement than the PNF group in the AKE test. No significant differences were found between the Control and PNF groups.

These results suggest that combining Kinesio Taping with PNF stretching leads to greater improvements in hamstring flexibility compared with stretching alone. The finding is consistent with previous studies reporting that PNF stretching significantly improves hamstring flexibility compared with conventional approaches [1] and that flexibility outcomes are further enhanced when Kinesio Taping is combined with stretching interventions [2]. The greater improvements observed in the KT+PNF group may be attributed to the neuromuscular facilitation effect of PNF, together with the proprioceptive support provided by Kinesio Taping.

TABLE I
DIFFERENCES IN HAMSTRING FLEXIBILITY BETWEEN GROUPS

Outcome	Analysis	Effect	F (df)	p-value
AKE test	RM-ANOVA	time	F(1,9) = 45.5	< .001
		time × group	F(2,9) = 11.7	.003
		Group	F(2,9) = 19.1	< .001
	Post Hoc (Bonferroni)	Kt+PNF vs Control	—	.004
		Kt+PNF vs PNF	—	< .001
		Control vs PNF	—	.770
Sit-and-Reach test	RM-ANOVA	time	F(1,9) = 288.1	< .001
		time × group	F(2,9) = 72.9	< .001
		Group	F(2,9) = 5.51	.027
	Post Hoc (Bonferroni)	Kt+PNF vs Control	—	.036
		Kt+PNF vs PNF	—	.102
		Control vs PNF	—	1.000

IV. CONCLUSIONS

In conclusion, both PNF stretching and KT combined with PNF were effective in improving hamstring flexibility, with the combined intervention showing greater effectiveness. These findings suggest that integrating taping techniques with stretching protocols may benefit football players by improving flexibility and potentially reducing injury risk. Future research should consider larger sample sizes and longer intervention periods to further investigate long-term effects.

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Comparison of Massage Gun Therapy and PNF Stretching on Agility and Flexibility Among University-Level Athletes

Mohamad Khairulazeem Mamat^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: ajim.46mat@gmail.com

Keywords: Massage Gun, PNF Stretching, Agility, Flexibility

I. INTRODUCTION

Agility and flexibility are essential for athletes, especially in sports that require rapid changes of direction and full range of motion. While PNF stretching has been widely used to improve flexibility, the effects of massage gun therapy on both agility and flexibility remain underexplored. This study aimed to compare the effects of massage gun therapy and PNF stretching on agility and flexibility among university athletes.

II. METHODS

A total of 42 university athletes participated in the study, with 21 athletes assigned to each group. The massage gun therapy group received treatment using a massage gun applied to major lower-body muscle groups for 2 minutes per group, three times per week over six weeks. The PNF stretching group performed hold-relax stretching on the same muscle groups for 30 seconds per stretch, three times per week for six weeks. Agility was assessed using the T-Test, and flexibility was evaluated using the Sit-and-Reach Test. All measurements were taken before and after the intervention.

III. RESULTS AND DISCUSSION

Both groups showed significant improvements in agility and flexibility ($p < .001$). The massage gun therapy group showed an 18.0% improvement in agility, from 13.3 $\pm$ 0.81 s to 10.9 $\pm$ 0.84 s, and a 6.6% increase in flexibility, from 42.6 $\pm$ 7.17 cm to 45.4 $\pm$ 6.65 cm. The PNF stretching group showed a 17.4% improvement in agility, from 13.2 $\pm$ 0.82 s to 10.9 $\pm$ 0.81 s, and a 10.6% improvement in flexibility, from 42.4 $\pm$ 7.21 cm to 46.9 $\pm$ 6.51 cm. Between-group comparisons revealed that the massage gun therapy group showed significantly greater improvement in agility ($p < .001$), while flexibility improvements were similar between groups ($p = .450$).

TABLE I
SUMMARY OF PRE-TEST AND POST-TEST

Test	Group	Pre-Test Mean $\pm$ SD	Post-Test Mean $\pm$ SD	% Improvement
Agility t-test (s)	Massage Gun Group	13.3 $\pm$ 0.81	10.9 $\pm$ 0.84	18.0%
	PNF Stretching Group	13.2 $\pm$ 0.82	10.9 $\pm$ 0.81	17.4%
Sit-and-Reach (cm)	Massage Gun Group	42.6 $\pm$ 7.17	45.4 $\pm$ 6.65	6.6%
	PNF Stretching Group	42.4 $\pm$ 7.21	46.9 $\pm$ 6.51	10.6%

TABLE II
INDEPENDENT SAMPLE T-TEST

Variable	t(df)	P-value	MD	Cohen's
Agility t-test (s)	- 9.22(40)	<.001	-2.35	-2.846
Sit-and-Reach (cm)	- 0.70(40)	0.486	-1.43	-0.217

IV. CONCLUSIONS

Massage gun therapy appears to be a more effective intervention for improving agility among university athletes, while both massage gun therapy and PNF stretching are equally effective in enhancing flexibility. These findings suggest that massage gun therapy may be a useful addition to warm-up routines, especially for athletes seeking to enhance agility.

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Confidence Levels Among Athletes Returning to Sport After Acute Ankle Sprain

Mohamad Noor Izzuddin Zailan¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹, Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Confidence Level, Psychological Readiness, Acute Ankle Sprain, University Athletes, Return to Sport, IPRRS

I. INTRODUCTION

Ankle sprains are among the most common musculoskeletal injuries in sports involving rapid changes of direction, such as futsal, football, basketball, and netball [1]. Although physical rehabilitation is often emphasised, psychological readiness, particularly confidence, also plays a crucial role in safe return to sport [2]. However, most studies have focused on surgical or elite athletes, leaving a gap in understanding non-surgical university athletes with acute ankle sprains [3]. In Malaysia, high-risk sports expose student-athletes to frequent ankle injuries, yet psychological assessment is rarely integrated into rehabilitation [4]. Recent models, such as PAASS, highlight multidimensional recovery, but short-term psychological readiness remains underexplored [5]. Therefore, this study aimed to measure confidence levels, compare weekly variations, and examine their relationship with return-to-sport status among university athletes.

II. METHODS

Twelve college athletes aged between 18 and 25 years who had sustained an acute ankle sprain within the previous four weeks were recruited from sporting activities. Demographic data were collected using Google Forms, and confidence was measured weekly over four weeks using the Injury Psychological Readiness to Return to Sport Scale (IPRRS) distributed via WhatsApp. Data were analysed using Jamovi software. Descriptive statistics, including mean and standard deviation, were used to summarise the data, while repeated-measures ANOVA was used to evaluate changes over time. Pairwise comparisons were performed, with the significance level set at $p < .05$.

III. RESULTS AND DISCUSSION

Confidence levels gradually increased across the four weeks of rehabilitation, with the lowest scores recorded in Week 1, when athletes were most susceptible to fear of re-injury and self-doubt. Repeated-measures ANOVA showed a significant difference across weeks ($p < .05$), indicating improved psychological readiness over time [2]. These results suggest that psychological assessment should be included in the rehabilitation process, alongside physical recovery [2]. The Injury

Psychological Readiness to Return to Sport Scale (IPRRS) is a practical tool for monitoring confidence and supporting a more holistic recovery approach that considers both physical and psychological aspects [5][7].

TABLE I
PAIRWISE COMPARISON

Comparison	Mean (M)	Standard Deviation (SD)	p-value
Week 1 → Week 2	12.5 → 171.0	22.6 → 114.0	.015
Week 2 → Week 3	171.0 → 296.0	114.0 → 98.8	
Week 3 → Week 4	296.0 → 500.0	98.8 → 128.0	
Week 4	500.0		

Confidence increased significantly between Week 1 and Week 2 ($p < .001$) and between Week 2 and Week 3 ($p < .001$). Although the increase between Week 3 and Week 4 was less pronounced, it remained significant ($p = .015$), suggesting continued improvement with a plateau effect towards the final phase of recovery.

IV. CONCLUSIONS

This study identifies confidence as an important predictor of safe return to sport among athletes recovering from acute ankle sprain. Although the findings were limited by the small sample size and short observation period, they provide useful information on short-term psychological recovery and highlight the need to integrate mental readiness with physical rehabilitation. The findings indicate that confidence increases steadily during the early phases of recovery, supporting the use of tools such as the IPRRS to monitor psychological preparedness. Future studies should include larger and more diverse samples, longer follow-up periods, and mixed-methods designs to strengthen external validity and provide a more integrated understanding of the interaction between physical and psychological factors in return-to-sport decision-making.

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Exercise and Sarcopenia: An Umbrella Review of Evidence Synthesis

Mohamad Sahil¹, & Adam Feizrel Linoby^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: linoby@uitm.edu.my

Keywords: Sarcopenia, Resistance Training, Protein Supplementation, Exercise Adherence, Umbrella Review

I. INTRODUCTION

Badminton is a high-intensity sport requiring explosive movements, rapid directional changes, and strong psychological composure. Among the physical attributes essential to performance, agility, defined as the capacity to change direction rapidly without loss of balance, is considered a critical determinant of competitive success [1]. Speed, agility, and quickness (SAQ) training, including plyometric exercises, has gained prominence in badminton conditioning because it directly replicates match-specific movement demands [2]. Beyond physical performance, psychological factors such as confidence play a significant role in athletic outcomes, particularly under competitive pressure. Despite this, most research has examined physical and psychological outcomes separately. This study addressed that gap by investigating the dual effects of a structured three-week plyometric training programme on both agility and sport-confidence among amateur badminton players.

II. METHODS

This umbrella review included systematic reviews and meta-analyses of structured exercise in adults ≥ 60 years diagnosed with sarcopenia (EWGSOP/AWGS). Six databases (2000–June 2025) and grey literature were searched without language limits. Dual screening, extraction, and AMSTAR-2 appraisal were conducted. Outcomes were harmonized and re-pooled using random-effects meta-analysis and meta-regression; heterogeneity, publication bias, and certainty (GRADE) were assessed. This umbrella review included systematic reviews and meta-analyses of structured exercise in adults aged 60 years and above diagnosed with sarcopenia using EWGSOP or AWGS criteria. Six databases from 2000 to June 2025 and grey literature were searched without language limits. Dual screening, extraction, and AMSTAR-2 appraisal were conducted. Outcomes were harmonised and re-pooled using random-effects meta-analysis and meta-regression. Heterogeneity, publication bias, and certainty of evidence using GRADE were also assessed.

III. RESULTS AND DISCUSSION

Support systems and facilitating conditions are central to effective sarcopenia management because many interventions are built on standard care and health education, which often serve as the control condition in trials and as the practical foundation in real-world care. Their impact matters at a population level because sarcopenia is increasingly treated as a public health issue that requires clear activity targets, including moderate-to-vigorous physical activity, to support healthy ageing [2]. Outcomes also depend strongly on environmental setting, with higher sarcopenia prevalence in nursing homes and hospitals than in community-dwelling older adults. Frailty and nutritional status within each setting therefore shape how well support systems work, even though most research still focuses on community populations [4]. At the system level, government programmes and professional societies provide infrastructure and evidence-based guidelines, and major organisations emphasise regular physical activity and muscle strengthening as essential components of healthy ageing [4].

The Critical Role of Support Systems and Facilitating Conditions

Support systems and facilitating conditions largely determine whether combined nutrition and exercise strategies translate into meaningful improvements in sarcopenia outcomes. Because nutrition and resistance training work through separate physiological mechanisms, combining protein or targeted amino acids, such as leucine, with resistance training has a clear rationale for producing additive gains in muscle mass and strength. Exercise may also re-sensitise older muscle to protein intake, allowing a larger share of ingested protein to be used for de novo muscle protein synthesis. However, results are not uniform across studies because benefits often depend on who is being treated. Effects are more evident in clearly diagnosed sarcopenic individuals and in people with low habitual protein intake, while many studies fail to separate these groups clearly from healthier participants.

Duration is another key facilitator. Evidence suggests that increases in muscle mass are more consistently observed when combined programmes extend beyond 24 weeks, whereas shorter

interventions of 8 to 12 weeks show mixed and sometimes insufficient evidence for sustained changes in muscle mass, strength, or physical performance. Nutritional support also involves how protein is delivered, rather than total quantity alone. An even distribution across meals, approximately 25 to 30 g per meal, appears important for optimising muscle protein synthesis. Protein consumed close to resistance training, ideally within 24 hours, can also enhance the anabolic response. Finally, the setting and quality of professional support influence adherence, which is often the limiting factor in older adults. Practical, sustainable training prescriptions, such as moderate-intensity resistance training twice per week, can improve strength and physical performance without the added burden of higher weekly frequencies that do not consistently provide extra benefit.

Older adults often struggle to sustain high-frequency resistance training over time, so understanding barriers to participation and factors that support long-term adherence is central to using exercise as a practical strategy to prevent or slow sarcopenia. At present, programmes designed specifically for sarcopenic individuals are not standardised. As sarcopenia becomes more recognised in clinical practice, practical guidelines are needed to prevent or slow its progression. Exercise professionals and clinicians play a central role by prescribing training frequencies and intensities that match an older person's functional capacity, and many studies reinforce behaviour change through structured education and health sessions. However, targeted support remains difficult because there is still no universally accepted diagnostic criterion for sarcopenia, and clearer thresholds would strengthen both clinical decision-making and research on how physical activity protects muscle.

Nutrition should also be optimised beyond total daily protein because timing and distribution influence muscle protein synthesis. Evidence supports spreading intake evenly across meals, aiming for about 25 to 30 g of protein per meal, and consuming protein close to training, with approximately 60 minutes post-exercise often linked to a strong anabolic response. Support plans should also adapt to limitations and comorbidities by using options such as seated or standing whole-body vibration for people with disabilities, longer combined protein and resistance programmes for obesity, and safer modes such as elastic bands when machines are not suitable.

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Use of Health Technologies by Older Adults with Chronic Disease: An Umbrella Review of Evidence Synthesis

Mohamad Shahrul Irfan Kahar¹, & Adam Feizrel Linoby^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: linoby@uitm.edu.my

Keywords: Umbrella Review, Health Technology, Older Adults, Chronic Disease

I. INTRODUCTION

Population aging is increasing chronic disease burden and the need for long-term care, with adults aged ≥ 65 projected to rise from 10% in 2022 to 16% by 2050 [1] and multimorbidity already common [1][2]. Digital health technologies, including telemedicine, mHealth apps, wearables, and remote monitoring, may improve outcomes such as physical activity, psychological distress, and autonomy [3][4], yet adoption and sustained use among older adults remain inconsistent [5]. Barriers repeatedly cluster into five domains, socioeconomic, health-related, dispositional, technology-related, and social factors [1], with limited technical literacy (17%), low motivation (10%), cost (8%), and privacy/security concerns most frequently reported, alongside age-related functional limitations and limited clinician or family support [3][6][5]. Facilitators include perceived usefulness and ease of use (TAM/UTAUT), co-design, accessible design features, and ongoing training and technical support [2][6][7], but adoption also varies by socioeconomic status, gender, and rurality, risking widened disparities [5]. Because existing systematic reviews are fragmented and inconsistently report equity variables, an umbrella review is needed to consolidate the most consistent barriers, facilitators, and implementation strategies influencing adoption and sustained use in older adults with chronic diseases [1][5][3].

II. METHODS

This umbrella reviews synthesised evidence from systematic reviews and meta-analyses on **digital health technology adoption among older adults ($\geq 60/\geq 65$) with chronic diseases**, focusing on barriers, facilitators, equity factors, and implementation strategies, and was reported using **PRISMA 2020** with a prospectively registered protocol. Guided by a five-domain barrier framework and interpreted using **TAM/UTAUT**, **COM-B**, and **PROGRESS-Plus** [2][5][1], searches were conducted in **MEDLINE/PubMed**, Embase, CINAHL, Scopus, Web of Science, PsycINFO, and CDSR using terms for older adults, chronic disease, digital health (telehealth, mHealth, wearables, remote monitoring), and review filters. Two reviewers screened and extracted data, appraise review quality with **AMSTAR 2**, manage

overlap using a citation matrix and **CCA**, and synthesize findings primarily narratively, adding quantitative summaries only when comparable and without double counting; certainty was assessed with **GRADE** where feasible. Results of umbrella review

Adoption of digital health technologies (telehealth, mHealth, wearables, remote monitoring) among older adults with chronic diseases is constrained by intersecting barriers spanning socioeconomic, health-related, dispositional, technology-related, and social domains [1][5][3]. Cost and infrastructural access remain persistent constraints for seniors on fixed incomes, including device and data-plan affordability and limited broadband access, which reinforces the digital divide [1][3]. Health-related limitations such as impaired vision/hearing, reduced dexterity, and cognitive decline reduce usability and increase abandonment risk, especially when multimorbidity makes technology feel like an added burden [1][5][6]. Dispositional barriers include low perceived need, anxiety about making mistakes, fear of fraud, and concerns about stigma and loss of dignity [3][1][5]. Usability problems, difficult login procedures, unreliable connectivity, and false alarms amplify low digital literacy, which appears frequently in evidence syntheses as a dominant barrier theme [3][1].

Facilitators consistently align with perceived usefulness and ease of use, commonly framed through TAM and UTAUT, where sustained engagement increases when older adults see direct benefits to core health tasks and minimal complexity [2][6]. Social influence and clinical endorsement matter because trusted healthcare recommendations and family support increase confidence, initiation, and continued use, including in rural settings where community “digital champions” can reduce pressure on clinicians [1][5]. Evidence also links digital interventions to meaningful outcomes, including reduced psychological distress and improved autonomy, and meta-analytic evidence indicates small but significant improvements in moderate-to-vigorous physical activity among older adults living alone [3][4]. Across conditions, interventions frequently target heart failure and atrial fibrillation via telemonitoring and apps, diabetes via connected glucose monitoring and adherence tools, and neurological disorders via assistive devices and AI

agents, although cognitive and sensory impairments can still limit effective use [2][5].

Implementation is strongest when technologies are co-designed with older adults, caregivers, and clinicians to prevent age-mismatch in design assumptions and to ensure fit with clinical workflows [6][5]. Practical design choices, such as large buttons, high-contrast displays, and voice-enabled interaction, plus early adoption before functional decline, improve usability and learning [6][1]. Equity-sensitive deployment is required because adoption differs by gender, income, and rurality, so broadband access, culturally tailored training, and hybrid care models help ensure technology supplements rather than replaces human care [5]. Overall, the literature supports a taxonomy spanning self-management, assisted care, supervised care, and continuous monitoring, and it suggests that engagement improves when users receive repeated training and ongoing technical support that sustains confidence over time [6].

III. CONCLUSIONS

This umbrella review shows that digital health technologies, including telehealth, mobile applications, wearables, and remote monitoring, can support chronic disease management and independent living among older adults, but adoption and sustained use remain inconsistent. Across the included evidence syntheses, barriers repeatedly cluster around digital literacy, usability and reliability problems, affordability and access constraints, privacy concerns, and limited clinical or family support, while facilitators are linked to perceived usefulness and ease of use, age-friendly design, co-design, and ongoing training and technical support. The review also indicates that equity factors

such as socioeconomic status, rurality, and gender influence uptake, yet these variables are inconsistently reported across studies, limiting firm subgroup conclusions. Overall, the findings suggest that improving outcomes will require user-centred and equity-sensitive implementation that strengthens access, builds capability, and integrates digital tools into trusted care relationships.

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The Acute Effect of Ballistic vs Stretching on Vertical Jump and Linear Sprint Performance Among UiTM Negeri Sembilan Football Players

Muhamad Aiman Hakim Nordin¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Ballistic, Stretching, Vertical jump

I. INTRODUCTION

Warm-up stretching can acutely influence explosive performance in football. Yet, recent studies often contrast static stretching with general dynamic warm-ups rather than directly comparing static and ballistic stretching under controlled conditions. Evidence is also limited for university footballers in Malaysia. This study examines the acute effects of ballistic versus static stretching on two match-relevant indicators, vertical jump height and linear sprint speed, among UiTM Negeri Sembilan football players.

II. METHODS

Twenty-eight male UiTM Negeri Sembilan players (18–25 years) were purposively recruited, screened (PAR-Q), and randomly assigned to ballistic ($n=14$) or static stretching ($n=14$) groups in a pre-test–post-test design. Vertical jump (Vertec; best of 3) and 30 m sprint (stopwatch; best of 2) were assessed pre and immediately post-stretching under standardised conditions. Data were analysed in Jamovi (alpha 0.05).

III. RESULTS AND DISCUSSION

Ballistic stretching produced larger acute gains in vertical jump than static stretching. Jump height increased by 4.64 cm ($SD = 1.95$) after ballistic stretching compared with 1.21 cm ($SD = 1.19$) after static stretching, yielding a significant between-group difference, $t(26) = 5.63$, $p < .001$, with a large effect size (Cohen's $d = 2.13$).

For the 30 m sprint, ballistic stretching improved speed more than static stretching. Sprint time decreased by 0.156 s ($SD = 0.021$) after ballistic stretching, while static stretching showed minimal change ($M = -0.004$ s, $SD = 0.016$). Because normality was violated, the Mann-Whitney test indicated a significant difference ($U = 0.00$, $p < .001$) with a very large effect.

IV. CONCLUSIONS

Among UiTM Negeri Sembilan football players, ballistic stretching elicited significantly greater acute improvements in vertical jump height and 30 m sprint performance than static stretching. These findings support using ballistic stretching in pre-activity warm-ups when the goal is to maximize immediate power and speed outputs relevant to football match demands.

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Comparison of Attacking Strategies Through Set-Pieces Between Johor Darul Ta'zim and Urawa Red Diamonds in The AFC Champions League 2022

Muhamad Izal Aidil Mohd Zain¹, Muhammad Alif Aiman Mohd Ali¹, Norhazman Noorhisham¹, Nur Allysha Hani Mohd Fakrul Hadi¹, Muhammad Syazwan Harull Anuar¹, Mohd Azzat Adnan¹, & Muhamad Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Set-Pieces, Attacking Strategies, Performance Analysis, AFC Champions League, Football Tactics

I. INTRODUCTION

Set pieces have become an important part of modern football because they provide teams with structured opportunities to create scoring chances from planned situations. In elite competitions, matches are often decided by small margins, and set pieces such as corner kicks, free kicks, and throw-ins can influence the result [1]. Among these situations, corner kicks are especially important because they allow teams to deliver the ball directly into dangerous areas near the goal, increasing the chance of shots, rebounds, and defensive errors [2]. Although open-play goals remain important, set-pieces continue to play a major role in goal scoring and match outcomes at the highest level [3]. However, much of the existing research has focused on European football, while tactical patterns and set-piece effectiveness in elite Asian competitions remain less explored [4]. Therefore, this study aimed to compare the attacking strategies and effectiveness of set-pieces between Johor Darul Ta'zim (JDT) and Urawa Red Diamonds (URD), with a focus on how both teams used these situations to create goal-scoring opportunities.

II. METHODS

Comparative quantitative design was used in this study through systematic notational analysis. A total of 13 official matches from the 2022 AFC Champions League were analysed. This included six matches involving Johor Darul Ta'zim (JDT), six matches involving Urawa Red Diamonds (URD), and one head-to-head match between both teams. All set-piece situations were identified and coded according to set-piece type and selected performance indicators. These indicators included attacking outcomes such as shots on target, shots off target, and other set-piece results. Descriptive statistics were used to summarise the frequency and distribution of set-piece outcomes. Inferential analysis was then conducted using the chi-square test of independence in Jamovi software to determine whether there were significant differences in set-piece outcomes between JDT and URD.

III. RESULTS AND DISCUSSION

Table 1 presents the distribution of set-piece shot outcomes between Johor Darul Ta'zim (19 shots) and Urawa Red Diamonds (27 shots). Both teams showed similar set-piece patterns, with only minor differences in the frequency of shots on target and shots off target.

TABLE I
CONTINGENCY TABLE OF SET-PIECE SHOOTING OUTCOMES

		Shot On Target	Shot Off Target	Total
JDT	Observed	9	10	19
	Expected	9.09	9.91	19.0
	% within row	47.4%	52.6%	100.0%
URD	Observed	13	14	27
	Expected	12.91	14.09	27.0
	% within row	48.1%	51.9%	100.0%
Total	Observed	22	24	46
	Expected	22	24	46
	% within row	47.8%	52.2%	100.0%

TABLE II
CONTINGENCY CHI SQUARE TEST OF INDEPENDENCE

	Value	df	p
χ^2	0.00272	1	0.958
Likelihood ratio	0.00272	1	0.958
N	46		

As shown in Table 2, Chi-square analysis showed no significant association between team shooting and set-piece results ($\chi^2 = 0.0027$, $p > 0.05$), indicating that the observed frequency difference was minimal. As shown in Table 2, the chi-square analysis showed no significant association between team and set piece shooting outcome ($\chi^2 = 0.0027$, $p > 0.05$), indicating that the observed frequency difference was minimal.

TABLE III
EFFECT SIZE (PHI AND CRAMER'S V)

Cramer's V values	0.00769
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The findings showed no significant relationship between team identity and set-piece effectiveness. The almost identical distribution of outcomes between JDT and URD suggests that both teams produced similar levels of attacking success from set-piece situations. This result indicates that set-piece effectiveness was not strongly influenced by whether the set-piece was performed by JDT or URD. This interpretation is further supported by the very low phi and Cramer's V values of 0.00769, indicating a negligible effect size. Although both teams may differ in playing philosophy, squad profile, and tactical style, the statistical result suggests that team identity alone did not explain the success or failure of set-piece outcomes. From a tactical perspective, this finding suggests that set-piece success at the elite Asian level depends more on execution quality than on team identity. Set pieces require accurate delivery, well-timed attacking movement, effective blocking or screening, strong aerial ability, and quick reactions to second balls. Previous research on elite football also shows that successful attacking outcomes are influenced by technical, tactical, and spatial factors rather than a single factor such as team identity [2].

This work highlights the importance of how attacking situations are created and finished within specific pitch areas. The present findings also align with research on corner-kick performance indicators in elite football. Fernández-Hermógenes et al. [3] analysed elite corner kicks and defined successful corners as those ending in a shot. Their study emphasised situational and behavioural factors, such as delivery type, attacking organisation, and player movement, as key elements linked to successful corner-kick outcomes. This supports the idea that the quality of set-piece organisation and execution matters more than the team taking the set-piece. The similarity between JDT and URD may also reflect the high tactical standard of the AFC Champions League. At this level, teams are generally well prepared defensively. Defenders are organised, marking systems are structured, and goalkeepers are trained to manage crosses and aerial threats. As a result, set-piece situations often become highly contested moments. Even when a team wins a corner or free kick, the chance of producing a shot on target depends on small details such as delivery accuracy, timing of the run, attacking positioning, and the ability to win the first or second contact. Therefore, the insignificant chi-square result should not be interpreted as evidence that set pieces are unimportant. Instead, it suggests that both teams showed comparable effectiveness in these situations. Set-pieces remain tactically important because they

provide structured opportunities to create shots, especially in matches where open-play chances are limited. The main issue is not whether JDT or URD used set-pieces, but how well each team executed the tactical plan during those moments.

Overall, this study suggests that set-piece effectiveness in elite Asian football should be examined through more detailed performance indicators. Future analyses should include delivery zone, delivery type, number of attackers in the penalty area, defensive marking system, first contact outcome, second-ball recovery, and final shot quality. These indicators would provide a clearer explanation of why some set-pieces lead to meaningful attacking opportunities while others fail to threaten the opponent's goal. This study concluded that there was no significant difference in set-piece effectiveness between Johor Darul Ta'zim and Urawa Red Diamonds in the 2022 AFC Champions League. Both teams showed similar tactical efficiency in creating goal-scoring opportunities through set-pieces. These findings contribute to performance analysis in Asian football by highlighting the need to examine execution quality and detailed tactical indicators rather than team identity alone.

Overall, this study suggests that set-piece effectiveness in elite Asian football should be examined through more detailed performance indicators. Future analysis should include delivery zone, type of delivery, number of attackers in the penalty area, defensive marking system, first contact outcome, second-ball recovery, and final shot quality. These indicators would provide a clearer explanation of why some set-pieces lead to meaningful attacking opportunities while others fail to threaten the opponent's goal.

IV. CONCLUSIONS

This study concluded that there was no significant difference in set-piece effectiveness between Johor Darul Ta'zim and Urawa Red Diamonds in the 2022 AFC Champions League. Both teams showed similar tactical efficiency in creating goal-scoring opportunities through set pieces. This finding makes a meaningful contribution to the performance of Asian football

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Comparison of Attacking and Defending Styles Between Top Three and Bottom Three Teams in The UEFA Champions League 2023/24

Muhammad Adam Aqasha Osmi Junaidi¹, Muhamad Noor Mohamed¹, Mohd Aizzat Adnan¹, & Muhamad Safiq Bin Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: Match Analysis, Performance Indicators, Attacking Style, Defending Style, UEFA Champions League

I. INTRODUCTION

Performance analysis plays an important role in understanding how teams achieve success in elite football competitions [1]. Modern match analysis allows coaches and researchers to objectively evaluate team performance using performance indicators such as possession, passes, goals, attempts on target, tackles, blocks, and clearances [2][3]. In high-level tournaments such as the UEFA Champions League (UCL), small differences in attacking and defending styles may influence match outcomes [4]. However, limited research has directly compared the attacking and defending performance indicators of top-performing and bottom-performing teams within the same competition season. Therefore, this study aimed to compare the attacking and defending styles of the top three and bottom three teams in the UEFA Champions League season using selected performance indicators.

II. METHODS

This study employed a quantitative notational analysis design. Match performance data were collected from selected UEFA Champions League 2023/24 matches involving the top three and bottom three teams. The data source was considered reliable based on previous studies [3][4]. Three matches were analysed for each team. Performance indicators included possession, passes, goals, attempts on target, ball recoveries, tackles, blocks, and clearances. The data were processed and analysed using Jamovi statistical software. Descriptive statistics were used to summarise team performance, while independent samples t-tests were conducted to compare differences between top-performing and bottom-performing teams.

III. RESULTS AND DISCUSSION

The results of the current study are presented in Table 1. The top three teams demonstrated higher mean values for possession and passes compared with the bottom three teams, reflecting greater control of match play [4][5]. The top teams also recorded higher attacking output in terms of goals and attempts on target [6]. In contrast, the bottom

three teams showed higher values in selected defensive indicators such as blocks and clearances, suggesting that they spent more time defending under pressure [5]. Statistical analysis revealed significant differences in possession, passes, and blocks between the two groups, while other indicators showed no significant differences. These findings suggest that successful teams tend to dominate ball possession and build-up play, whereas lower-performing teams rely more on reactive defensive actions [6]. The results provide practical insights for coaches and analysts in understanding tactical differences between higher- and lower-performing teams in elite football.

TABLE I
COMPARISON OF SELECTED PERFORMANCE INDICATORS
BETWEEN THE TOP THREE AND BOTTOM THREE TEAMS IN UEFA
CHAMPIONS LEAGUE 2023/24

Indicator	Top 3 Teams (Mean ± SD)	Bottom 3 Teams (Mean ± SD)	p-value
Possession (%)	50.44 ± 7.04	41.44 ± 8.26	0.024*
Passes completed	460.11 ± 108.04	316.33 ± 92.32	0.008*
Goals	2.11 ± 1.17	1.11 ± 1.27	0.101
Attempts	5.33 ± 2.18	3.56 ± 2.51	0.128
Ball recoveries	36.00 ± 7.78	38.44 ± 8.4	0.531
Tackles	17.00 ± 2.18	14.22 ± 4.02	0.087
Blocks	2.89 ± 1.17	5.67 ± 3.67	0.046*
Clearances	12.22 ± 4.66	16.33 ± 8.09	0.205

IV. CONCLUSION

This study highlights clear differences in selected attacking and defending performance indicators between top-performing and bottom-performing teams in the UEFA Champions League 2023/24 season. The findings emphasise the importance of possession-based play and structured attacking build-up for team success, while lower-performing teams tend to exhibit higher defensive workloads.

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The Effect of Music Tempo on Aerobic Performance Among Under-12 Swimmers

Muhammad Adam Khairul Anwar¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹,
Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana
Mazaulan¹, Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Music Tempo, Aerobic Performance, Under-12 Swimmers, MSST, Heart Rate, Ergogenic Aid

I. INTRODUCTION

Music has been widely recognised as a powerful tool in sports and exercise settings, commonly used to boost motivation, mood, and performance [1]. Among its key elements, tempo measured in beats per minute (BPM) plays a crucial role in influencing physiological and psychological responses. Fast tempo music (>120 BPM) is associated with increased arousal and motivation, while slow tempo music (<80 BPM) promotes relaxation and reduced anxiety [1].

Most existing research has focused on adults participating in land-based sports such as running and cycling [2][3]. Swimming differs significantly due to water resistance, breath control demands, and altered sound perception underwater [4]. Children under 12 are at a distinct developmental stage, exhibiting heightened sensitivity to rhythm and greater variability in effort and attention compared with adults [5][6]. Despite this, limited research exists on how music tempo affects aerobic performance in young swimmers. This study addresses that gap using the 10-Meter Multistage Shuttle Swim Test (MSST), an aquatic-specific progressive endurance test guided by auditory cues.

II. METHODS

A quasi-experimental crossover design was employed with 15 Under-12 swimmers (mean age = 10.2 years; minimum 2 years competitive experience). Participants completed three testing sessions in fixed order: (1) no music, (2) slow tempo music (80–90 BPM), and (3) fast tempo music (130–140 BPM), with one full day of rest between each session to minimise fatigue and carryover effects.

Testing was conducted in a standard 25-metre indoor pool with two cone markers placed 10 metres apart. Music was delivered via waterproof bone-conduction headphones at a consistent volume, using lyric-free instrumental tracks [4]. Aerobic performance was measured by maximum MSST level achieved; post-exercise heart rate (HR) was recorded immediately after each condition. Data were analysed using repeated-measures ANOVA with Bonferroni post hoc comparisons in Jamovi.

Normality was confirmed via Shapiro-Wilk test ($p > 0.05$ for all conditions). Statistical significance was set at $p < 0.05$, with effect sizes reported as partial eta squared (η^2).

III. RESULTS AND DISCUSSION

Descriptive results showed that swimmers achieved the highest mean MSST level under fast tempo music ($M = 7.13$, $SD = 0.38$), compared with no music ($M = 6.89$, $SD = 0.39$) and slow tempo music ($M = 6.89$, $SD = 0.36$). Post-exercise HR was also highest following fast tempo music ($M = 168.60$ BPM), compared with no music ($M = 161.07$ BPM) and slow tempo music ($M = 157.87$ BPM), as summarised in Table I.

TABLE I
VERTICAL JUMP PERFORMANCE RESULTS (CM)

Condition	MSST M (SD)	HR M (BPM)	HR SD
No Music	6.89 (0.39)	161.07	5.46
Slow (80–90 BPM)	6.89 (0.36)	157.87	4.94
Fast (130–140 BPM)	7.13 (0.38)	168.60	4.65

Note. M = Mean; SD = Standard Deviation.

Repeated measures ANOVA revealed a statistically significant main effect of music tempo on MSST performance, $F(2, 28) = 16.62$, $p < 0.001$, $\eta^2 = 0.54$ (large effect). Post hoc Bonferroni comparisons confirmed that fast tempo music produced significantly higher MSST performance than no music ($p < 0.001$, mean diff. = 0.24 levels) and slow tempo music ($p = 0.001$, mean diff. = 0.24 levels). No significant difference was observed between no music and slow tempo music ($p = 1.000$).

Heart rate analysis similarly yielded a significant main effect, $F(2, 28) = 26.45$, $p < 0.001$, $\eta^2 = 0.65$. Post hoc analysis showed significantly elevated HR following fast tempo music versus both no music ($p < 0.001$) and slow tempo music ($p < 0.001$), with no significant HR difference between no music and slow tempo ($p = 0.085$). Strong positive correlations between MSST performance and post-exercise HR

were observed across all conditions ($r = 0.65\text{--}0.72$, $p < 0.01$).

These findings align with the psychophysiological framework of Karageorghis and Priest [1], which links fast music to increased arousal, sympathetic activation, and enhanced motor synchronisation. Results are consistent with [2] and [3], extending their findings from adult land-based settings to a younger aquatic population. The absence of benefit from slow tempo music likely reflects its parasympathetic, calming effect being unsuitable for maximal aerobic effort [3]. Notably, 80% of participants performed best under fast tempo music, suggesting a consistent pattern across individual variability.

IV. CONCLUSIONS

Fast tempo music (130–140 BPM) significantly enhances aerobic performance and physiological exertion in Under-12 swimmers, while slow tempo music provides no measurable benefit over no music during maximal aerobic testing. The large effect sizes ($\eta^2 = 0.54\text{--}0.65$) support the practical utility of fast tempo music as a simple, non-invasive, and cost-effective ergogenic aid. Coaches are encouraged to incorporate fast tempo music during interval and endurance training sets, reserving slow tempo music for warm-up, cool-down, or recovery phases. Future research should include larger randomised samples, individual music preference controls, and

longitudinal designs to further validate these findings.

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Comparative Analysis of Reaction Time and Decision-Making Among Goalkeepers of Different Playing Levels During Penalty Kicks

Muhammad Alif Aiman Mohd Ali¹, Ahmad Ariff Razali¹, Nur Allysha Hani Mohd Fakrul Hadi¹,
Muhamad Izal Aidil Mohd Zain¹, Muhammad Mukhriz Jalani¹, Noor Azila Azreen Md Radzi¹, &
Muhamad Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Reaction Time, Decision-Making, Goalkeeper Performance, Goalkeeper Level, Penalty Kick

I. INTRODUCTION

Penalty kicks are important moments in football because they can determine the result of a match. For goalkeepers, this situation is challenging because they have less than one second to react after the ball is kicked. Within this short period, the goalkeeper must observe the kicker, decide the direction of the shot, and dive quickly. Reaction time and decision-making are therefore important skills for saving penalty kicks. Goalkeepers must react quickly and make accurate decisions. Previous studies explain that skilled players are usually better at reading body movements, using visual cues, and making quick decisions during sport situations [1][2].

In penalty kicks, the goalkeeper must read cues from the penalty taker, such as body position, approach angle, and kicking-leg movement. The interaction between the goalkeeper and penalty taker influences the chance of success for both players [3]. Skilled soccer players are also better at using visual search strategies, which helps them make better decisions during play [4]. Goalkeeper performance also involves reactive agility, meaning that the goalkeeper must respond to unpredictable movement rather than move quickly in a planned direction only. Trecroci et al. [5] stated that change-of-direction speed and reactive agility are different because reactive agility includes perception and decision-making. Video-based analysis can measure goalkeeper reaction time in a practical way. Kinovea® has been shown to be reliable for analysing human movement when compared with a three-dimensional motion system [6]. Therefore, this study aimed to compare reaction time and decision-making performance between experienced and less-experienced goalkeepers during penalty kicks.

II. METHODS

This study employed a quasi-experimental research design. A total of 20 male goalkeepers ($N=20$) participated in the study and were divided into two groups: university goalkeepers and amateur goalkeepers. Each goalkeeper faced 10 penalty kicks in a controlled field setting. All testing sessions were recorded using a video camera. Reaction time was

measured from the moment the ball was kicked until the goalkeeper-initiated movement. Decision-making performance was evaluated based on whether the goalkeeper dived in the correct direction of the penalty kick. The video recordings were analysed using Kinovea software. The collected data were analysed using descriptive statistics and independent-samples t-tests to compare reaction time and decision-making performance between the university and amateur goalkeeper groups.

III. RESULTS AND DISCUSSION

The results showed differences in reaction time and decision-making performance between university and amateur goalkeepers during penalty kicks. Playing experience may help goalkeepers react faster and select the correct direction more consistently. One possible explanation is that experienced goalkeepers are better at anticipation. They may not wait until the ball is kicked but instead read early cues from the penalty taker, such as body movement, approach angle, and kicking-leg action. This supports previous research showing that skilled athletes are better at using early information to predict subsequent actions [1]. Decision-making performance among goalkeepers also supports studies on expertise in sport. [2] explained that experienced players make better decisions because they have more practice, stronger pattern recognition, and greater match exposure. [4] also found that skilled soccer players use better visual search behaviours when making decisions. The findings further show that penalty saving is not only about diving speed.

A goalkeeper must perceive the cue, decide quickly, and move in the correct direction. This is related to reactive agility, which includes both movement and decision-making [5]. The findings are also consistent with Noël et al. [3], who explained that penalty kicks involve an interaction between the goalkeeper and penalty taker. Overall, this study suggests that structured experience and realistic penalty training may improve reaction time and decision-making during penalty kicks. Training should include reading body cues, reacting to

different shot directions, and making quick decisions under pressure. Video tools such as Kinovea may also be useful for analysing reaction time and movement performance in practical training settings [6].

A. Normality Test

TABLE I
NORMALITY TEST

	W	p
Average Rt	0.970	0.753
Accuracy Dm	0.944	0.280

B. Reaction Time

TABLE II
NORMALITY TEST AVERAGE REACTION TIME

Group	N	Mean	SD	SE
University	10	246	8.44	2.67
Amateur	10	257	5.91	1.87

C. Decision-Making

TABLE III
ACCURACY OF DECISION MAKING

	Group	N	Mean	SD	SE
Accuracy Dm	University	10	44.0	9.66	3.06
	Amateur	10	69.0	8.76	2.77

IV. CONCLUSIONS

This study concluded that goalkeepers with higher playing experience demonstrated better performance in penalty situations compared to less-experienced goalkeepers. The experienced goalkeepers recorded faster reaction times and showed better decision-making accuracy when responding to penalty kicks. These findings indicate that successful penalty saving does not depend only on physical speed. It also requires anticipation, visual cue recognition, and quick decision-making. Therefore, goalkeeper training should include both physical reaction drills and cognitive-based activities, such as reading the penalty taker's body movement, predicting shot direction, and responding under time pressure. Overall, the study supports the importance of experience and structured training in

improving goalkeeper performance. Future studies should involve a larger sample size, include goalkeepers from different competition levels, and examine other factors such as visual search behaviour, anticipation ability, and diving technique to provide a deeper understanding of penalty-saving performance.

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Exercise As a Core Treatment for Depression: An Umbrella Review Synthesizing Evidence on Efficacy, Modality, Dose–Response, and Sustainability

Muhammad Alimsyah Danial Abdul Karim^{1*}, & Adam Feizrel Linoby¹

¹*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia*

**Corresponding author: 2022845062@uitm.edu.my*

Keywords: Depression, Exercise Therapy, Umbrella Review, Dose–Response, AMSTAR 2

I. INTRODUCTION

Depression remains a leading contributor to global disability, with high relapse rates and limitations associated with pharmacotherapy, including adverse effects and partial remission. Exercise has emerged as a promising non-pharmacological treatment; however, existing evidence remains fragmented across modalities, dosage parameters, and methodological quality. Most meta-analyses aggregate heterogeneous exercise interventions, limiting clarity regarding optimal modality, dose–response patterns, and long-term sustainability. Furthermore, few umbrella reviews systematically appraise methodological quality using standardised tools. This study aims to synthesize systematic reviews and meta-analyses to evaluate the overall efficacy of exercise for depression, compare modalities, examine dose–response relationships, and assess sustainability of effects.

II. METHODS

An umbrella review was conducted, including systematic reviews and meta-analyses published between 2010 and 2025 that examined exercise-only interventions for unipolar depression. Eligible reviews reported outcomes using validated depression scales. Three primary modalities were analysed: aerobic, resistance, and mind-body exercise. Searches were performed across PubMed, Scopus, Web of Science, Ovid MEDLINE, and ProQuest. Extracted data included pooled effect sizes, heterogeneity, follow-up duration, and exercise dosage parameters, including frequency, intensity, duration, and MET-minutes. Methodological quality was assessed using AMSTAR 2, and evidence certainty was evaluated using GRADE.

III. RESULTS AND DISCUSSION

Across included reviews, exercise demonstrated consistent moderate-to-large reductions in depressive symptoms, with effect sizes comparable to first-line antidepressant treatments for mild-to-moderate depression. All modalities produced significant improvements. Aerobic exercise was most extensively studied, while resistance training showed strong effects in populations with comorbid physical conditions. Mind-body modalities demonstrated

competitive efficacy and high adherence rates in several network meta-analyses. Dose–response analyses suggest optimal outcomes with 3–5 sessions per week, 45–60 minutes per session at moderate-to-vigorous intensity. Evidence indicates a curvilinear relationship, with diminishing returns at excessively high volumes. Long-term follow-up data remain limited; while benefits persist up to 6–12 months in several studies, attenuation occurs without sustained participation. Adherence, social engagement, and intrinsic motivation appear central to relapse prevention. Methodological appraisal revealed variability in review quality, though higher-quality syntheses consistently support exercise as an effective intervention.

IV. CONCLUSIONS

Exercise demonstrates robust antidepressant efficacy across modalities and populations, supporting its integration as a core component of depression treatment. Moderate, structured programmes yield optimal outcomes, with flexibility in modality selection based on individual preference and context. Future research should prioritise direct modality comparisons, standardised dose reporting, and long-term follow-up beyond one year to strengthen clinical translation.

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Relationship Between Fan Attendance Support and Motivation Level Among Archery Athletes

Muhammad Ammar Mohammad Amin¹, & Wahidah Tumijan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: wahidah06@uitm.edu.my

Keywords: Motivation, Archery, SDT, ARSQ, University Student Athletes

I. INTRODUCTION

Motivation is a crucial psychological component that influences athletes' determination, performance, and general well-being in sport. According to self-determination theory (SDT), motivation ranges from highly self-determined forms, such as intrinsic enjoyment, to more controlled forms influenced by external factors [1]. Motivation is important for maintaining training and competition in individual precision sports such as archery, where concentration, emotional control, and self-regulation are essential. The presence of spectators is one contextual element that may influence motivation. Depending on how athletes perceive it, fan attendance can be seen as recognition and encouragement or as evaluative pressure [2]. Although motivation has been widely examined, insufficient research has investigated how fan attendance affects motivation among university archers. Previous research has shown that audiences may influence emotional responses and attention during performance [3]. However, how this phenomenon affects motivation levels remains unclear. Therefore, this study investigated how archery athletes at SUKIPT 2024 perceived fan attendance support and how this related to their motivation levels.

II. METHODS

A quantitative cross-sectional survey design was used to investigate the relationship between perceived fan attendance support and motivation among SUKIPT 2024 archery athletes. The target population comprised student-athletes who were officially registered for the SUKIPT 2024 archery events. A sample of 124 athletes was determined using Krejcie and Morgan's sampling table. Two standardised instruments were used to gather data: the Sport Motivation Scale II (SMS-II) to measure motivation levels and the Athletes' Received Support Questionnaire (ARSQ) to measure perceived support. The online questionnaire also included demographic questions. Responses were gathered during a single data collection period. Fan attendance support and motivation levels were analysed using descriptive statistics, and the relationship between the two variables was tested using Pearson correlation analysis.

III. RESULTS AND DISCUSSION

A. Athletes Received Support and Motivation

The findings showed that athletes perceived a moderate level of support from fan attendance, but this support was not associated with motivation level ($r = 0.045$, $p = 0.622$). This finding suggests that received support may not be a reliable indicator of self-determined motivation [3]. Fan attendance support may also be perceived as evaluative pressure rather than encouragement, which may disrupt concentration in precision sports [3]. Self-determination theory states that social environments must provide autonomy support to enhance motivation [1]. Therefore, the psychological meaning of fan attendance may reduce its direct influence on athletes' motivation.

TABLE I
RELATIONSHIP BETWEEN FAN ATTENDANCE SUPPORT AND MOTIVATION

		Total Fan Attendance Support
Sport Motivation Scale – II (SMS-II)	r	0.045
	df	122
	p	0.622

IV. CONCLUSIONS

This study found that fan attendance support did not have a direct impact on archery athletes' motivation. Although athletes perceived moderate spectator support, their motivation appeared to originate more from internal factors and training-related experiences than from fan presence.

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Comparison Between Wearing Kinesiology Tape and Rigid Tape on Agility and Muscular Endurance Among Football Athletes

Muhammad Arif Zulkifli^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022605254@student.uitm.edu.my

Keywords: Kinesiology Tape, Rigid Tape, Agility, Muscular Endurance, Football

I. INTRODUCTION

Performance and injury prevention are important considerations in football. Kinesiology tape (KT) and rigid tape (RT) are commonly used by athletes to support performance and joint stability. KT is characterised by its elasticity, which allows dynamic movement and may enhance proprioception, whereas RT is non-elastic and is mainly used for joint immobilisation and mechanical support. Although both tapes are popular, debate remains regarding which type is more appropriate for high-performance sports such as football. Therefore, this study aimed to compare the acute effects of wearing KT and RT on agility and muscular endurance among amateur football players.

II. METHODS

A crossover repeated-measures experimental design was conducted involving 15 male amateur football athletes aged 20-27 years. Participants completed two functional tests: the 505 Agility Test and the Lateral Jump Test. Each participant performed the tests under two conditions: (1) wearing kinesiology tape and (2) wearing rigid tape. To avoid carry-over effects, a washout period of 24 to 48 hours was implemented between the two testing sessions. Data were analysed using Jamovi (Version 2.3). The paired-samples t-test was used for normally distributed data, while the Wilcoxon signed-rank test was applied for non-normal data to determine differences between the two conditions.

III. RESULTS AND DISCUSSION

The results indicated a significant difference in performance between the two taping conditions. For agility, participants recorded a significantly faster time when wearing KT ($M = 2.45 \pm 0.16$ s) than when wearing RT ($M = 2.50 \pm 0.16$ s), with $p < .001$. Similarly, for muscular endurance, the number of repetitions in the Lateral Jump Test was significantly higher with KT ($M = 56.53 \pm 9.05$ repetitions) than with RT ($M = 50.93 \pm 9.11$ repetitions), with $p < .001$.

TABLE I
COMPARISON OF AGILITY AND MUSCULAR ENDURANCE
BETWEEN KT AND RT

		Statistic	df	P	Mean Difference
Kinesiology Tape	Rigid Tape	25.7120	14.0	<.001	5.5333
				<.001	5.5000

Table 1 shows that kinesiology tape significantly enhanced both agility and muscular endurance among amateur football athletes compared with rigid tape.

IV. CONCLUSIONS

This study concludes that kinesiology tape (KT) produced better agility and muscular endurance performance among amateur football athletes than rigid tape (RT). The elasticity of KT likely allows a fuller range of motion while providing neurosensory feedback, both of which are important for rapid changes of direction and sustained muscular contractions. In contrast, the mechanical restriction of RT may limit the fluid movements required in football. Coaches and sports therapists are therefore encouraged to consider KT as a supportive strategy to optimise athletic performance.

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AI Chatbot in Healthcare: An Umbrella Review of Evidence Synthesis

Muhammad Ariq Izzuddin Abdul Jalil^{1*}, & Adam Feizrel Linoby¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022453526@student.uitm.edu.my

Keywords: AI Chatbots; Healthcare; Umbrella Review; Evidence Synthesis; Transparency and Safety

I. INTRODUCTION

AI chatbots are increasingly used in healthcare, yet evidence remains fragmented across populations, conditions, and implementation contexts. Key gaps include limited inclusivity and low-resource representation, weak workflow and electronic health record (EHR) integration, inconsistent engagement, and uneven evaluation standards for safety, privacy, and cost-effectiveness. This umbrella review synthesises evidence to identify success factors for adoption and to appraise study quality, transparency, and whether user satisfaction aligns with clinical outcomes.

II. METHODS

We conducted an umbrella review following PRISMA 2020. Three databases (PubMed, Web of Science, and Scopus) were searched from inception to 31 January 2026 with no language restrictions. Peer-reviewed systematic reviews and meta-analyses on ChatGPT or comparable large language model (LLM) chatbots in healthcare were included. Titles, abstracts, and full texts were screened, data were extracted into structured tables, and findings were synthesised narratively by theme.

III. RESULTS AND DISCUSSION

Across reviews, effectiveness signals were generally promising but heterogeneous: 77% (23/30) of studies reported positive or mixed outcomes, with one synthesis noting $a > 20\%$ improvement in treatment compliance ($p = .04$). Benefits appeared more consistent for depressive symptoms than for anxiety or well-being, while evidence for sustained glycaemic control remained preliminary. Acceptability was often high, yet sustained engagement was limited. A large prospective sample reported 94% satisfaction but only 31% retention, suggesting that early positive user perceptions do not ensure continued use. Reported barriers included limited understanding, repetitive dialogues, voice recognition and error-handling issues, and weak integration with care processes and EHRs.

Safety and governance concerns were prominent despite limited direct evaluation. Reviews highlighted hallucinations, reliability limits, bias,

privacy and security risks, and medico-legal accountability issues. Proposed mitigations converged on expert-in-the-loop models, clinician oversight for core clinical content, explicit escalation pathways, and stronger regulatory and validation frameworks. Methodological quality and transparency constrained confidence. Reporting was inconsistent; 99.3% of evaluations involved closed-source LLMs, 65% used subjective success definitions, and 14 of 15 empathy studies used non-validated measures. Many studies had small samples ($19/31 < 100$) and design limitations, limiting replicability and comparability across syntheses.

IV. CONCLUSIONS

Evidence syntheses suggest that healthcare chatbots can improve selected outcomes and are initially well accepted, but effects are heterogeneous and long-term engagement is inconsistent. Safety, privacy, and accountability remain under-evaluated, while methodological weaknesses limit confidence. Future work should prioritise rigorous, transparent trials and implementation studies with validated measures and clear risk controls.

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Acute Effects of Foam Rolling on Sprinting Performance and Agility Among UiTM Negeri Sembilan Football Players

Muhammad Asyraf¹, & Mohd Aizzat Adnan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: mohda5782@uitm.edu.my

Keywords: Foam Rolling, Speed, Agility, Football Performance

I. INTRODUCTION

Foam rolling is widely used as a self-myofascial release technique to enhance flexibility, reduce muscle stiffness, and improve physical readiness in athletes. Despite its popularity in warm-up routines, evidence regarding its acute effects on performance outcomes such as sprinting and agility remains inconclusive, particularly among Malaysian university athletes. This study aimed to examine the acute effects of foam rolling on 20 m sprint performance and agility among UiTM Negeri Sembilan football players.

II. METHODS

This study employed a quantitative one-group pre-test and post-test design to examine the acute effects of foam rolling on performance. A total of 16 male varsity football players aged 18-25 years participated in the study. Participants first completed pre-test measurements for 20 m sprint performance and agility. They then performed a standardised foam rolling protocol targeting major lower-limb muscle groups, including the quadriceps, hamstrings, calves, and gluteal muscles. Immediately after the intervention, post-test measurements were conducted using the same procedures. Data were analysed using paired-samples t-tests to determine differences between pre-test and post-test performance. Effect sizes were calculated using Cohen's *d*, with significance set at $p < .05$.

III. RESULTS AND DISCUSSION

The results indicated a statistically significant improvement in 20 m sprint performance following foam rolling, $t(15) = 3.49$, $p < .05$. Mean sprint time improved from 3.21 s ($SD = 0.177$) to 3.18 s ($SD = 0.177$), with a mean difference of 0.026 s. The effect size was large (Cohen's $d = 0.87$), indicating a practically meaningful improvement in linear sprint performance. In contrast, no significant difference was observed in agility performance, $t(15) = 0.48$, $p = .642$. The mean difference was minimal (0.008 s), and the effect size was small (Cohen's $d = 0.119$). These findings indicate that foam rolling did not meaningfully enhance multidirectional movement performance.

The findings suggest that foam rolling may positively influence linear sprint performance but has

limited impact on agility. The improvement in sprint performance may be attributed to reduced muscle stiffness, increased tissue compliance, improved blood flow, and enhanced neuromuscular readiness, all of which contribute to more efficient force production during acceleration. In contrast, agility is a complex skill requiring neuromuscular coordination, rapid deceleration, reactive strength, and central nervous system involvement. Foam rolling primarily affects soft tissue properties and may not sufficiently stimulate the neural and coordinative components required for multidirectional movements. These results indicate that foam rolling may be more beneficial for tasks involving linear acceleration than for tasks requiring complex movement patterns.

IV. CONCLUSIONS

This study demonstrates that an acute foam rolling intervention significantly improves 20 m sprint performance among UiTM Negeri Sembilan male varsity football players, with a large practical effect. However, foam rolling does not significantly enhance agility performance. Therefore, foam rolling may be an effective supplementary warm-up strategy for optimising linear sprint performance but should not be used as the sole method for improving agility.

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Gender Differences in Exercise Motives Among UiTM S3 Negeri Sembilan Students

Muhammad Daniel Shahrin¹, & Wahidah Tumijan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: wahidah06@uitm.edu.my

Keywords: Exercise Motivation, Gender Differences, Exercise Motivations Inventory (EMI-2), University Students, Physical Activity, UiTM Seremban 3

I. INTRODUCTION

Physical inactivity remains a major public health concern, particularly among university students who often experience a decline in physical activity upon entering higher education. Despite the well-established physical and psychological benefits of regular exercise, many university students struggle to maintain consistent participation because of competing academic commitments, time constraints, and lifestyle adjustments [1][2]. Understanding the underlying reasons that motivate students to exercise is therefore essential for promoting sustained engagement in physical activity within the university setting.

Exercise motivation is a multidimensional construct that includes health-related, psychological, social, and performance-oriented motives. The Exercise Motivations Inventory-2 (EMI-2) provides a comprehensive framework to assess these diverse motivational dimensions. Previous research indicates that health-related motives are consistently endorsed as important reasons for exercising across both males and females, suggesting that health improvement and illness prevention motives tend to be shared in many populations. However, studies also demonstrate that gender differences often emerge at the level of specific motivational domains rather than overall motivation. Males frequently report higher endorsement of intrinsic and performance-related motives, such as enjoyment, challenge, and fitness development, including strength and endurance, while females tend to report stronger weight management motives [3][4]. Empirical evidence examining these differences within the context of UiTM Seremban 3 remains limited. Therefore, this study aimed to identify dominant exercise motives and examine gender differences among undergraduate students at UiTM Seremban 3 to inform more relevant and gender-sensitive campus physical activity strategies.

II. METHODS

A quantitative cross-sectional study was conducted among 400 undergraduate students at UiTM Seremban 3 aged 18 to 25 years. Participants completed a self-administered questionnaire that included demographic items and the Exercise Motivations Inventory-2 (EMI-2). Descriptive

statistics were computed to identify dominant exercise motives, and an independent-samples t-test was used to examine gender differences. Statistical significance was set at $p < .05$.

III. RESULTS AND DISCUSSION

The students reported high exercise motivation across the 14 EMI-2 subscales. The highest-rated motives were Ill-Health Avoidance (male: $M = 4.15$, $SD = 0.76$; female: $M = 4.08$, $SD = 0.62$) and Positive Health (male: $M = 4.10$, $SD = 0.73$; female: $M = 4.14$, $SD = 0.75$). Strength and Endurance was also highly endorsed (male: $M = 4.10$, $SD = 0.69$; female: $M = 3.96$, $SD = 0.66$), followed by Enjoyment (male: $M = 4.09$, $SD = 0.76$; female: $M = 3.92$, $SD = 0.68$). This suggests that UiTM Seremban 3 students mainly exercise to maintain health, prevent illness, improve fitness, and enjoy the activity.

TABLE I
DESCRIPTIVE ANALYSIS OF EXERCISE MOTIVATION INVENTORY (EMI-2)

	Gender	N	Mean	SD
Stress Management	Male	204	4.00	0.707
	Female	196	4.03	0.636
Revitalisation	Male	204	4.05	0.719
	Female	196	4.01	0.666
Enjoyment	Male	204	4.09	0.758
	Female	196	3.92	0.675
Challenge	Male	204	4.05	0.705
	Female	196	3.84	0.616
Social Recognition	Male	204	3.93	0.759
	Female	196	3.93	0.663
Affiliation	Male	204	4.08	0.758
	Female	196	3.95	0.728
Competition	Male	204	4.09	0.749
	Female	196	3.97	0.675
Health Pressures	Male	204	3.93	0.723
	Female	196	3.85	0.670

Ill-Health Avoidance	Male	204	4.15	0.755
	Female	196	4.08	0.620
Positive Health	Male	204	4.10	0.734
	Female	196	4.14	0.746
Weight Management	Male	204	3.85	0.765
	Female	196	4.00	0.680
Appearance	Male	204	4.07	0.712
	Female	196	4.02	0.549
Strength & Endurance	Male	204	4.10	0.689
	Female	196	3.96	0.663
Nimbleness	Male	204	4.05	0.666
	Female	196	3.94	0.661

TABLE II
INDEPENDENT SAMPLES T-TEST

	STATISTIC	DF	P
Stress Management	-0.5296	398	0.597
Revitalisation	0.4636	398	0.643
Enjoyment	2.3779 ^a	398	0.018
Challenge	3.1458	398	0.002
Social Recognition	-0.0501	398	0.960
Affiliation	1.8251	398	0.069
Competition	1.7691	398	0.078
Health Pressures	1.2320	398	0.219
Ill-Health Avoidance	1.0185 ^a	398	0.309
Positive Health	-0.4923	398	0.623
Weight Management	-2.0972 ^a	398	0.037
Appearance	0.8541 ^a	398	0.394
Strength & Endurance	1.9954	398	0.047
Competition	1.5849	398	0.114

Results showed significant differences in four EMI-2 subscales: Enjoyment ($p = .018$), Challenge (p

$= .002$), Strength and Endurance ($p = .047$), and Weight Management ($p = .037$). Male students scored higher in enjoyment-, challenge-, and strength/endurance-related motives, whereas female students scored higher in weight management. This pattern suggests that males are relatively more driven by intrinsic and performance-based motives, while females place greater emphasis on weight control, which is consistent with prior research on gendered exercise motives [3][4]. No significant differences were found for the remaining subscales ($p > .05$), indicating that many motives, particularly health-related motives, are broadly shared across genders.

IV. CONCLUSIONS

UiTM Seremban 3 students showed generally high exercise motivation, mainly driven by health and fitness motives, including ill-health avoidance, positive health, strength and endurance, and enjoyment. Gender differences were selective: males scored higher in enjoyment, challenge, and strength/endurance, while females scored higher in weight management. These findings support the need for inclusive, motivation-based campus programmes with gender-sensitive elements where appropriate.

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Effect of Exercise and Physical Activity in Autism: An Umbrella Review of Evidence Synthesis

Muhammad Fahmi Mohd Nizam^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022498598@student.uitm.edu.my

Keywords: Autism Spectrum Disorder, Physical Activity, Exercise Intervention, Umbrella Review, Implementation Moderators

I. INTRODUCTION

Physical activity is increasingly recommended to support social, behavioural, and health outcomes in youth with autism spectrum disorder (ASD), yet evidence remains uneven across contexts and delivery conditions. This umbrella review synthesizes review-level findings on how environment, facilitator training, family support, and individual versus group formats moderate intervention effectiveness, and translates evidence into practical design implications to improve real-world feasibility, scalability, and sustainability of programs.

II. METHODS

An umbrella review will be conducted following PRISMA guidance. Systematic reviews and meta-analyses on exercise/physical activity interventions for autistic children and adolescents will be searched in PubMed, Scopus, and Web of Science (2010–2026). Two reviewers will screen, extract outcomes and moderator details (setting, facilitator training, family involvement, delivery format), and appraise review quality using AMSTAR 2. Findings will be synthesized narratively with evidence-strength mapping.

III. RESULTS AND DISCUSSION

Across existing reviews, improvements are most consistently reported for social communication, stereotyped behaviours, and physical fitness when sessions are structured, enjoyable, and delivered in low-stimulation, predictable environments. Programs led by trained facilitators and supported by caregivers show stronger adherence and larger functional gains, while group formats appear to benefit social practice but require careful sensory and behavioural management. Implementation synthesis indicates that sustained effects depend on dosage progression, individualized goals, and integrating activities into school or community routines. Promising strategies include brief facilitator training packages, parent-mediated home reinforcement, and hybrid individual-to-group pathways. However, evidence is limited by modality narrowness, underrepresentation of females and older ages, and scarce mechanistic and long-term follow-up data, constraining personalization and scalability.

IV. CONCLUSIONS

Review-level evidence suggests exercise can meaningfully support social-behavioural outcomes in youth with ASD, especially when contextual moderators are addressed. Future programs should standardize facilitator preparation, leverage family involvement, and optimize delivery formats to balance individual needs with social exposure, while expanding modality diversity and long-term evaluation for sustainable implementation.

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Comparative Acute Effects of Static and Dynamic Stretching on Jumping Performance in Sprinter Athletes

Muhammad Hafiz Kamal Rohaizat¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Static Stretching, Dynamic Stretching, Vertical Jump, Sprinter Athletes, Explosive Performance

I. INTRODUCTION

Stretching is a fundamental element of warm-up protocols in athletic training, used to optimise muscle readiness, improve joint mobility, and minimise injury risk. Two widely practised modalities are static stretching (SS), where a muscle is held in a lengthened position, and dynamic stretching (DS), involving active, movement-based exercises through the full range of motion [1]. Sprinting demands explosive lower-limb power and neuromuscular coordination. Vertical jump height is a well-established indicator of lower-body explosive power and correlates strongly with sprint acceleration [2]. Despite extensive research, limited evidence compares the acute effects of SS and DS among adolescent sprinter athletes aged 14–17 years, who may respond differently because of their developing neuromuscular systems. This study investigated and compared the acute effects of both protocols on vertical jump performance in this under-represented population.

II. METHODS

A within-subject crossover experimental design was employed. Twenty-one male sprinter athletes aged 14–17 years (mean age = 15.6 ± 1.12 years; height = 164.4 ± 6.47 cm; body weight = 53.7 ± 6.40 kg) were recruited via purposive sampling. Sample size was determined using G*Power 3.1.9.7 (paired-samples t-test; $d_z = 0.65$; $\alpha = 0.05$; power = 0.80; $n = 21$).

Two testing sessions were conducted with a minimum 48-hour rest between sessions. Each session began with a 5-minute standardised general warm-up before the assigned stretching protocol. The SS protocol required 20-second holds for quadriceps, hamstrings, calves, and glutes (twice per side). The DS protocol consisted of two sets of high knees, butt kicks, walking lunges, and leg swings over a 10-metre distance. Immediately after stretching, participants performed three maximal countermovement vertical jumps using the Vertec system, and the best of three trials (cm) was recorded. Data were analysed using Jamovi 2.6.26. Descriptive statistics, Shapiro–Wilk normality tests, paired-

samples t-tests within each condition, and an independent-samples t-test between conditions were performed. Statistical significance was set at $p < .05$.

III. RESULTS AND DISCUSSION

Normality testing confirmed all data were normally distributed ($p > .05$), justifying parametric analysis. Results are summarised in Table I.

TABLE I
VERTICAL JUMP PERFORMANCE RESULTS (CM)

Condition	Pre M (SD)	Post M (SD)	t (df)	p
Dynamic	38.9 (3.40)	46.1 (3.51)	-51.9 (20)	<.001
Static	38.9 (3.40)	41.2 (3.39)	-16.3 (20)	<.001
DS vs SS	—	Δ -4.90 cm	-4.61 (40)	<.001

Note. M = Mean; SD = Standard Deviation. Cohen's $d = -1.42$ for between-group

Dynamic stretching produced a significantly greater improvement in vertical jump height (pre: 38.9 cm $\rightarrow$ post: 46.1 cm; $\Delta = +7.2$ cm) compared to static stretching (pre: 38.9 cm $\rightarrow$ post: 41.2 cm; $\Delta = +2.3$ cm). Both improvements were statistically significant ($p < .001$). The independent-samples t-test confirmed post-test DS performance was significantly higher than SS, $t(40) = -4.61$, $p < .001$, with a large effect size (Cohen's $d = -1.42$). These findings are consistent with literature showing that DS enhances explosive power by increasing muscle temperature, neural drive, and neuromuscular activation, thereby optimising stretch-shortening cycle efficiency [3][4]. The significant improvement following SS, contrary to findings suggesting performance impairment, may reflect the short hold duration (20 s), which evidence suggests does not hinder power output when performed within a complete warm-up [3]. The superiority of DS also supports comparative studies in sport-specific populations [5].

IV. CONCLUSIONS

Both stretching protocols produced significant acute improvements in vertical jump performance among male adolescent sprinter athletes. Dynamic stretching was significantly more effective (+7.2 cm vs. +2.3 cm). Dynamic stretching should therefore be prioritised in pre-activity warm-up routines for youth sprinters to optimise explosive lower-body performance, while static stretching remains suitable for flexibility maintenance or cool-down. These findings provide age-specific, evidence-based guidance for coaches and sports practitioners in youth track and field settings.

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Virtual and Augmented Reality for Physical Function in Rehabilitation: An Umbrella Review of Evidence Synthesis

Muhammad Hafizuddin Md Shah^{1*}, & Adam Feizrel Linoby¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2023858426@uitm.edu.my

Keywords: Virtual Reality, Augmented Reality, Physical Rehabilitation, Umbrella Review, Neuroplasticity

I. INTRODUCTION

Virtual and augmented reality are increasingly integrated into rehabilitation to enhance physical function through immersive, interactive training. Despite numerous systematic reviews, inconsistencies in outcomes, heterogeneity, limited long-term data, and sparse safety reporting hinder definitive conclusions. This umbrella review synthesizes existing evidence to evaluate overall effectiveness, identify moderating factors, and assess personalization strategies influencing functional recovery and engagement in rehabilitation populations.

II. METHODS

An umbrella review was conducted following PRISMA guidelines. Eleven databases, including MEDLINE, EMBASE, CINAHL, CDSR, CENTRAL, Web of Science, Scopus, and IEEE Xplore, were searched from inception to May 2025. Eligible studies were systematic reviews and meta-analyses of VR/AR interventions targeting physical function. Methodological quality was appraised using AMSTAR 2, and evidence certainty was graded with GRADE. Random-effects re-analyses were performed where feasible.

III. RESULTS AND DISCUSSION

Synthesised evidence demonstrated generally positive but methodologically inconsistent effects of VR/AR on physical function. Improvements in gait, balance, and upper-limb performance were frequently reported, with some exceeding clinical significance thresholds. However, most outcomes were graded low to moderate certainty due to short follow-up, small samples, and substantial heterogeneity. Immersive VR showed stronger and more consistent functional gains than marker-based AR, particularly in neurological populations. Dose-response patterns suggested moderate-to-high session frequency and cumulative hours improved outcomes, though optimal parameters remain undefined. Baseline severity, age, and neurological diagnosis influenced responsiveness, with milder impairments demonstrating greater durability.

Personalized VR/AR interventions enhanced engagement, adherence, and task persistence through adaptive difficulty and feedback. Tailored programmes demonstrated superior motor gains and improved psychosocial indicators, including motivation and self-efficacy. Emotional relevance and goal alignment strengthened participation, suggesting personalization is a critical mediator of both functional and behavioural rehabilitation outcomes.

IV. CONCLUSIONS

Virtual and augmented reality demonstrate promising yet methodologically constrained benefits for physical rehabilitation. Immersive modalities, adequate dosing, and personalized delivery enhance functional and psychosocial outcomes. However, low-to-moderate evidence certainty, short follow-ups, and inconsistent safety reporting limit definitive guidance. Rigorous, theory-driven, long-term trials are essential to establish durable clinical value.

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Acute Effects of a High-Protein Breakfast on Attention and Satiety Among University Students

Muhammad Hazim Aiman Ramlan¹, Nurul Ain Abu Kasim¹, & Muhamad Safiq Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: High-Protein Breakfast, Attention, Satiety, University Students, Cognitive Performance

I. INTRODUCTION

Breakfast intake has long been considered an important component of daily nutritional adequacy and optimal cognitive functioning [1][2]. Among different breakfast compositions, high-protein breakfasts have gained increasing research attention due to their potential to enhance satiety and sustain cognitive concentration throughout the morning [3][4]. University students are particularly vulnerable to breakfast omission because of academic workload and time constraints, which may negatively affect attention, memory, and appetite regulation [1]. Although the relationship between breakfast intake, cognition, and satiety has been explored in previous studies, limited research has directly examined the acute effects of a high-protein breakfast compared with breakfast omission among young adults [4][5]. Therefore, the aim of this study was to determine the acute effects of a high-protein breakfast on attentional performance and perceived satiety compared with no breakfast among university students.

II. METHODS

A total of 34 university students voluntarily participated in the study. The experiment was conducted as a within-subject crossover design, in which each student completed both the high-protein breakfast condition and the no-breakfast, fasted condition. A three-day washout period was used to minimise carry-over effects between conditions. The high-protein breakfast consisted of approximately 30 to 35 g of protein. Under the fasted condition, students skipped breakfast before testing. All testing sessions were conducted in the morning. Acute effects were examined by assessing cognitive performance and satiety approximately 60 minutes after the high-protein breakfast or after an equivalent fasting period in the no-breakfast condition.

The Stroop Test was administered as an assessment of attention, while the Visual Analogue Scale was used to assess satiety. All tests were performed in the morning at the same time points after either consuming breakfast or remaining fasted, allowing the immediate effects of each condition to be observed. All tests were administered at 30, 60, 120, 180, and 240 minutes after the breakfast and no-breakfast conditions.

Data were analysed using SPSS. Paired-samples t-tests were conducted to compare attention and satiety scores between the high-protein breakfast and no-breakfast conditions, with the significance level set at $p < .05$.

III. RESULTS AND DISCUSSION

Table I presents the results of paired-samples t-tests comparing attention scores at baseline and after 30, 60, 120, 180, and 240 minutes in each experimental condition. Under the high-protein breakfast condition, statistically significant changes in attention scores were found at all post-baseline intervals ($p < .001$). The highest mean difference was observed at the 120-minute interval, indicating the strongest improvement in attentional performance compared with baseline. These findings are consistent with previous research demonstrating that high-protein breakfast consumption can enhance cognitive concentration during the late morning period [4][5].

TABLE I
PAIRED-SAMPLES T-TEST RESULTS FOR ATTENTION SCORES

Condition	Time	Mean $\pm$ SD	t	df	p-value
High-Protein Breakfast	Baseline - 30 Minutes	-10.58 $\pm$ 9.71	-6.352	33	< .001
	Baseline - 60 Minutes	-14.60 $\pm$ 8.02	-10.61	33	< .001
	Baseline - 120 Minutes	-17.81 $\pm$ 8.49	-12.23	33	< .001
	Baseline - 180 Minutes	-14.44 $\pm$ 9.56	-8.81	33	< .001
	Baseline - 240 Minutes	-13.63 $\pm$ 9.86	-8.06	33	< .001
No-Breakfast	Baseline - 30 Minutes	-10.68 $\pm$ 10.37	-6	33	< .001
	Baseline - 60 Minutes	-15.91 $\pm$ 10.17	-9.12	33	< .001
	Baseline - 120 Minutes	-18.30 $\pm$ 8.10	-13.17	33	< .001
	Baseline - 180 Minutes	-15.37 $\pm$ 8.53	-10.51	33	< .001
	Baseline - 240 Minutes	-14.02 $\pm$ 9.04	-9.04	33	< .001

Significant level set at $p < .05$

A similar temporal trend was observed in the no-breakfast condition, with attention scores also showing significant changes compared with baseline at all time points ($p < .001$). Such within-condition improvements may reflect practice effects or natural

fluctuations in alertness over time, as reported in breakfast cognition studies involving repeated cognitive testing [1]. However, it is important to note that these analyses reflect only within-condition time effects and do not directly address the primary hypothesis concerning between-condition differences in attentional performance between the high-protein and no-breakfast groups.

TABLE II
PAIRED-SAMPLES T-TEST RESULTS FOR SATIETY SCORES

Condition	Time	Mean $\pm$ SD	t	df	p-value
High-Protein Breakfast	Baseline - 30 Minutes	-4.54 $\pm$ 2.60	-10.18	33	< .001
	Baseline - 60 Minutes	-3.54 $\pm$ 2.37	-8.7	33	< .001
	Baseline - 120 Minutes	-1.76 $\pm$ 2.36	-4.35	33	< .001
	Baseline - 180 Minutes	-1.15 $\pm$ 2.42	-2.76	33	0.009
	Baseline - 240 Minutes	-1.99 $\pm$ 3.06	-0.379	33	0.707
No-Breakfast	Baseline - 30 Minutes	0.18 $\pm$ 1.36	0.789	33	0.436
	Baseline - 60 Minutes	0.10 $\pm$ 2.00	0.279	33	0.782
	Baseline - 120 Minutes	-0.29 $\pm$ 2.77	-0.619	33	0.54
	Baseline - 180 Minutes	1.02 $\pm$ 3.31	1.8	33	0.081
	Baseline - 240 Minutes	2.79 $\pm$ 2.90	5.6	33	< .001

Significant level set at $p < .05$

Table II presents the paired-samples t-test results for satiety scores across time points within each condition. In the high-protein breakfast condition, satiety scores were significantly higher at 30, 60, 120, and 180 minutes compared with baseline ($p < .05$), with no significant difference at 240 minutes, suggesting a gradual attenuation of the satiety response over time. These findings align with established evidence indicating that high-protein breakfasts enhance short-term satiety through hormonal and appetite-regulation mechanisms [3][4].

In contrast, the no-breakfast condition did not demonstrate significant increases in satiety during the earlier time points. A significant difference emerged only at 240 minutes ($p < .001$), likely reflecting increased hunger sensations over prolonged fasting. This pattern is consistent with literature showing that breakfast omission is associated with reduced early-day satiety and increased appetite later in the morning [1][3].

Overall, the results indicate that high-protein breakfast consumption elicited a stronger and more immediate satiety response compared with no breakfast, supporting previous findings on protein-induced appetite control [3][5]. Although attentional performance improved over time in both conditions, not statistically significant between-condition

differences were observed. This finding partially contrasts with some prior studies reporting cognitive advantages of breakfast consumption [2][4], suggesting that the acute cognitive benefits of a high-protein breakfast may depend on task sensitivity, participant characteristics, or study design.

IV. CONCLUSIONS

The findings of the present study indicate that a high-protein breakfast significantly enhanced subjective satiety but had a weaker effect on attentional performance among university students. Although attention scores showed slight improvements under the high-protein condition compared with no breakfast, these differences were not statistically significant. This pattern is consistent with previous research demonstrating stronger effects of dietary protein on appetite regulation than on cognitive outcomes [1][3]. Fullness ratings remained elevated across all postprandial intervals following the high-protein breakfast, supporting evidence that protein intake promotes sustained satiety through hormonal and neural appetite-control mechanisms [4][5]. While cognitive improvements were not statistically confirmed, the observed trend suggests potential benefits that warrant further investigation [2]. Overall, these findings highlight that breakfast composition, particularly protein content, plays a more critical role in appetite regulation than in short-term attentional enhancement.

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The Effectiveness of Plyometric Training on Lower Limb Strength as A Protective Factor Against ACL Injury Among Amateur Badminton Players

Muhammad Izwan Ikhmal Mohd Hassan¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹, Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Plyometric Training, Lower-Limb Strength, ACL Injury Prevention, Standing Long Jump, Amateur Badminton Players

I. INTRODUCTION

Anterior cruciate ligament (ACL) injuries are common in sports that require explosive jumping, rapid directional changes, and sudden deceleration, including badminton [2]. Amateur badminton players are particularly vulnerable due to inadequate lower-limb strength and limited access to structured injury prevention programmes [3]. Poor neuromuscular control and insufficient muscular strength around the knee joint may increase the risk of non-contact ACL injuries during dynamic movements such as jumping and landing [4]. Plyometric training has been widely recognised as an effective method to improve lower-limb explosive strength, enhance neuromuscular control, and potentially reduce injury risk [1]. However, research specifically focusing on amateur badminton players remains limited [5]. Therefore, this study aimed to determine the effectiveness of a six-week plyometric training programme in improving lower-limb strength as a protective factor against ACL injury among amateur badminton players.

II. METHODS

A randomised controlled trial (RCT) pre-test and post-test design was employed. Ten amateur badminton players aged between 18 and 25 years were recruited and randomly assigned into an experimental group ($n = 5$) and a control group ($n = 5$). The experimental group underwent a structured six-week plyometric training programme, while the control group continued with routine badminton training. Lower-limb explosive strength was assessed using the Standing Long Jump (SLJ) test during pre-test and post-test sessions. Data were analysed using Jamovi statistical software. Descriptive statistics were calculated to summarise participant characteristics. Paired-samples t-tests were used to examine within-group changes, and independent sample t-tests were conducted to compare post-test differences between groups. Statistical significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results indicated a statistically significant improvement in SLJ performance within the experimental group, increasing from 151 ± 32.7 cm to 169 ± 32.9 cm ($p < 0.001$). The control group also demonstrated significant improvement, increasing from 159 ± 22.8 cm to 163 ± 22.9 cm ($p < 0.001$). However, post-test comparison between groups showed no statistically significant difference ($p = 0.730$), although the experimental group recorded a higher mean score. This finding suggests that while plyometric training effectively improved lower-limb strength within the intervention group, it did not produce a significantly greater improvement compared with routine badminton training over the six-week period. The improvements observed in both groups may be attributed to the explosive nature of badminton itself, which involves repetitive jumping, lunging, and rapid directional movements that stimulate lower-limb strength development [2]. Additionally, the small sample size and short intervention duration may have limited the ability to detect significant between-group differences. Nevertheless, enhanced lower-limb strength is associated with improved knee joint stability and neuromuscular control, which are important components in ACL injury prevention [4]. Therefore, plyometric training may still be considered a beneficial conditioning strategy for amateur badminton players.

IV. CONCLUSIONS

In conclusion, a six-week plyometric training programme significantly improved lower-limb strength among amateur badminton players. However, no significant difference was observed between the experimental and control groups at post-test. Although plyometric training demonstrated positive within-group effects, routine badminton training alone may also contribute to lower-limb strength improvements. Future studies should involve larger sample sizes, longer intervention durations, and additional injury-related measures to provide stronger evidence regarding the

effectiveness of plyometric training as an ACL injury prevention strategy.

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Effects of Plyometric Training on The Agility and Psychological Well-Being of Amateur Badminton Players

Muhammad Lutfan Asmawi¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹,
Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana
Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Plyometric Training, Agility, Confidence, Amateur Badminton Players, Psychological Well-Being

I. INTRODUCTION

Badminton is a high-intensity sport requiring explosive movements, rapid directional changes, and strong psychological composure. Among the physical attributes essential to performance, agility, defined as the capacity to change direction rapidly without loss of balance, is considered a critical determinant of competitive success [1]. Speed, agility, and quickness (SAQ) training, including plyometric exercises, has gained prominence in badminton conditioning because it directly replicates match-specific movement demands [2]. Beyond physical performance, psychological factors such as confidence play a significant role in athletic outcomes, particularly under competitive pressure. Despite this, most research has examined physical and psychological outcomes separately. This study addressed that gap by investigating the dual effects of a structured three-week plyometric training programme on both agility and sport-confidence among amateur badminton players.

II. METHODS

This study employed a true experimental pre-test and post-test randomised design with 12 male amateur badminton players (mean age: 23.2 ± 0.72 years; mean BMI: 21.7 ± 2.60 kg/m²). Participants were purposively selected and divided equally into an experimental group ($n = 6$) and a control group ($n = 6$). Eligibility required active participation at university, club, or community level, no history of major injury, and no prior structured plyometric training within six months. G*Power analysis confirmed the adequacy of this sample size.

The experimental group underwent a three-week plyometric training programme (3 sessions/week) comprising side-to-side ankle hops, standing jumps, lateral cone hops, and barrier jumps, alongside routine badminton training. The control group continued only their regular badminton training. Agility was assessed using the Agility T-test (in seconds), and psychological well-being was measured using the Trait Sport-Confidence Inventory (TSCI; Vealey, 1986), scored from 13 to 117. Both tests were administered at pre-test and post-test.

Statistical analyses including Shapiro–Wilk normality tests, Paired Sample t-tests, and Independent Sample t-tests were performed using Jamovi at a significance level of $p < .05$.

III. RESULTS AND DISCUSSION

Normality was confirmed for all variables using the Shapiro–Wilk test ($p > .05$). Table I presents the pre- and post-test descriptive statistics for both groups.

TABLE I
PRE- AND POST-TEST AGILITY (S) AND CONFIDENCE (TSCI)
SCORES BY GROUP

Variable	Group	Pre M±SD	Post M±SD	t	p
Agility (s)	Plyometric	12.80±1.1 9	10.50±1.5 3	13. 6	<.00 1
	Control	13.00±0.8 9	13.65±0.8 5	3.3 1	.021
Confidence (TSCI)	Plyometric	40.50±6.1 2	99.83±2.8 6	- 23. 9	<.00 1
	Control	37.50±3.0 2	79.33±7.3 4	- 12. 3	<.00 1

*All paired t-tests $df = 5$. * $p < .05$; ** $p < .001$.

Paired sample t-tests revealed that the experimental group demonstrated a significant improvement in agility ($t(5) = 13.6$, $p < .001$), with agility time decreasing from 12.80 ± 1.19 s to 10.50 ± 1.53 s. Confidence scores increased substantially from 40.50 ± 6.12 to 99.83 ± 2.86 ($t(5) = -23.9$, $p < .001$). The control group showed no meaningful changes in agility and a comparatively modest rise in confidence. Independent samples t-tests confirmed that the experimental group outperformed the control group significantly on both post-test agility ($t(10) = -2.34$, $p = .042$) and post-test confidence ($t(10) = 7.19$, $p < .001$). These findings align with previous literature demonstrating plyometric training's effectiveness in enhancing neuromuscular coordination and reactive strength [3]. Improved physical performance likely triggered gains in perceived competence and self-efficacy, resulting in elevated confidence levels [4].

This study demonstrates that a three-week plyometric training programme significantly enhanced both agility and sport-confidence among amateur badminton players, outperforming conventional training alone. These findings underscore the value of integrating plyometric exercises into badminton conditioning to achieve holistic athlete development. Future research should consider larger and more diverse samples, longer intervention periods, and the inclusion of additional physical and psychological variables to further validate these outcomes.

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Lower-Limb Kinematics During Instep Kicking Between Adolescent and College Rugby Players

Muhammad Mukhriz Jalani¹, Nur Allysha Hani Mohd Fakrul Hadi¹, Norhazman Noorhisham¹, Ahmad Ariff Razali¹, Muhamad Izal Aidil Mohd Zain¹, Raja Nurul Jannat Raja Hussain¹, & Muhamad Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Instep Kicking, Lower Limb Kinematics, Rugby Biomechanics, Adolescents, College Athletes

I. INTRODUCTION

Instep kicking is an important technical skill in rugby because it contributes to place kicking, clearance kicking, and territorial play. The skill requires coordinated movement of the hip, knee, and ankle to generate ball speed while maintaining kicking accuracy. Kicking performance depends on a proximal-to-distal sequence, where force is transferred from the larger proximal segments to the distal segments before ball contact. This pattern has been well described in soccer kicking biomechanics, where effective kicking involves coordinated approach, support-leg placement, hip motion, knee extension, and foot-ball contact mechanics [1]. Although soccer kicking has been widely studied, rugby kicking has received less biomechanical attention. Rugby place kicking is a sport-specific skill because the kicker must control both distance and accuracy under different match demands.

Recent rugby research has shown that lower-limb biomechanics may differ across skill levels, suggesting that technical proficiency influences how players coordinate the kicking limb during performance [2]. This issue is especially important when comparing adolescent and college players, as younger athletes may still be developing musculoskeletal strength, neuromuscular control, and movement consistency. Adolescent rugby players may show different kicking patterns from college players because of differences in growth, maturation, training exposure, and technical experience. These factors may influence joint angles, segment coordination, kicking velocity, and movement control during instep kicking. Despite this, direct comparisons of lower-limb kinematics between adolescent and college rugby players remain limited. Therefore, this study aimed to examine and compare lower-limb kinematic variables during instep kicking between adolescent and college rugby players.

II. METHODS

A quasi-experimental, between-groups design was employed. Male adolescent rugby players (14–17 years) and male college rugby players (18–21 years), all right-foot dominant and with at least one year of playing experience, participated in the study. Instep kicking trials were recorded using a fixed two-

dimensional camera positioned in the sagittal plane. Kinematic analysis was conducted using Kinovea software to measure hip, knee, and ankle joint angles at key kicking events, including stand foot contact, ball contact and follow-through. Statistical analysis was performed using Jamovi software.

Descriptive statistics (mean and standard deviation) were calculated for all variables. Data normality was assessed using the Shapiro–Wilk test ($p < 0.05$). Due to violations of normality for most variables, Mann–Whitney U tests were used for group comparisons, while one normally distributed variable was analysed using an independent-samples t -test. Effect sizes were calculated using rank-biserial correlation (r_{rb}) for non-parametric tests and Hedges' g for the t -test.

III. RESULTS AND DISCUSSION

Descriptive statistics and group comparisons for lower-limb kinematic variables are presented in Table I. Shapiro–Wilk tests indicated that most variables deviated from normal distribution in both adolescent and college groups, justifying the use of non-parametric analyses. Significant differences were observed between groups for several kinematic parameters. Significant differences were identified between adolescent and college rugby players for several lower-limb kinematic variables during instep kicking (Table I). Ball contact timing differed significantly between groups, with college players demonstrating longer ball contact durations compared to adolescents. Knee flexion angle at ball contact and ankle flexion angle at stand foot contact were also significantly different between groups. No significant difference was observed for ankle flexion angle at follow-through ($p > 0.05$).

TABLE I
LOWER LIMB KINEMATIC VARIABLES DURING INSTEP KICKING

Variable	(Mean $\pm$ SD)	
	College	Adolescents
Ball Contact (ms)	116.65 $\pm$ 80.33	24.46 $\pm$ 8.81
Knee Flexion at Ball Contact ($^{\circ}$)	152.89 $\pm$ 20.81	174.93 $\pm$ 22.51
Ankle Flexion at Stand Foot Contact ($^{\circ}$)	171.86 $\pm$ 32.49	144.68 $\pm$ 13.06
Ankle Flexion at Follow-Through ($^{\circ}$)	133.54 $\pm$ 15.31	126.18 $\pm$ 10.93

Note: Values are presented as mean $\pm$ standard deviation. Group comparisons were performed using Mann-Whitney U tests for non-normally distributed variables and an independent-samples *t*-test for one normally distributed variable.

The findings showed that college rugby players demonstrated greater knee and ankle flexion than adolescent players during instep kicking. This suggests that college players may have more developed lower-limb coordination, likely due to greater training experience, stronger neuromuscular control, and higher technical maturity. In kicking actions, the hip, knee, and ankle must work together in a coordinated sequence to transfer force from proximal to distal segments. Therefore, greater joint flexion may reflect a more effective preparation and execution pattern during the kicking movement.

Overall, the results suggest that college rugby players demonstrate more advanced lower-limb kinematic patterns during instep kicking, particularly through greater knee and ankle flexion. These findings highlight the importance of technical training that focuses on lower-limb coordination, knee control, ankle positioning, and force transfer during kicking. For adolescent players, coaches should emphasise progressive kicking drills, strength

development, and movement control to support more efficient technique development and reduce potential injury risk.

IV. CONCLUSIONS

This study showed that adolescent and college rugby players differed significantly in several lower-limb kinematic variables during instep kicking. At key kicking events, college athletes showed increased knee and ankle flexion, indicating more effective movement patterns associated with experience and physical maturity. These findings provide coaches and practitioners with biomechanical insights for improving kicking performance and reducing injury risk among younger rugby players.

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The Differences Between Flat Sole and Cushioning Sole Footwear on Shielding Skill Performance Among Futsal Players with Chronic Ankle Instability

Muhammad Norazmin Ahmad Nawawi¹, & Mardiana Mazaulan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: mardiana9840@uitm.edu.my

Keywords: Chronic Ankle Instability (Cai), Futsal, Flat Sole, Cushioning Sole, Dynamic Balance, Y-Balance Test

I. INTRODUCTION

Chronic ankle instability (CAI) is a common condition among futsal players due to repetitive ankle sprains and inadequate rehabilitation. CAI is associated with impaired proprioception, reduced neuromuscular control, and decreased postural stability, which may negatively affect sport-specific performance. In futsal, shielding is a critical skill that requires dynamic balance, lower-limb coordination, and the ability to maintain stability under pressure. Footwear is a controllable external factor that may influence balance performance. Flat sole footwear is believed to enhance proprioceptive feedback due to minimal cushioning, whereas cushioning sole footwear provides shock absorption but may reduce sensory input from the playing surface. Despite the growing interest in footwear design, limited research has examined its effect on dynamic balance performance among futsal players with CAI. Therefore, this study aimed to compare the effects of flat sole and cushioning sole footwear on dynamic balance performance among recreational futsal players with chronic ankle instability.

II. METHODS

Ten male recreational futsal players aged between 20 and 24 years with a history of chronic ankle instability participated in this study. Participants were recruited using purposive sampling. All participants were physically active, free from acute lower-limb injuries, and provided informed consent prior to participation. Dynamic balance was assessed using the Y-Balance Test (YBT). Participants performed reach tasks in three directions: anterior, posteromedial, and posterolateral. Reach distances were measured in centimeters and normalized to leg length. The YBT is a reliable and valid tool for assessing dynamic postural control in individuals with ankle instability.

A crossover design was employed. Each participant completed the Y-Balance Test under two footwear conditions: flat sole and cushioning sole. The order of testing was randomised to minimise learning effects. A 24-hour washout period was provided between sessions. Participants performed three trials in each direction for both conditions, and the mean scores were used for analysis. Data were

analysed using JAMOV software. Descriptive statistics (mean and standard deviation) were calculated for all variables. Normality was assessed using the Shapiro–Wilk test. A paired-samples t-test was conducted to compare dynamic balance performance between flat sole and cushioning sole conditions. The significance level was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results demonstrated significant differences in dynamic balance performance between the footwear conditions. Participants achieved significantly greater reach distances when wearing flat sole footwear compared with cushioning sole footwear in all three directions. Significant differences were observed in the anterior direction ($p < 0.001$), posteromedial direction ($p < 0.001$), and posterolateral direction ($p < 0.001$). These findings indicate that flat sole footwear provided superior dynamic balance performance among futsal players with chronic ankle instability

TABLE I
COMPARISON BETWEEN FLAT AND CUSHIONING ANTERIOR

		statistic	df	p
Flat	Cushioning	26.3	9	<.001

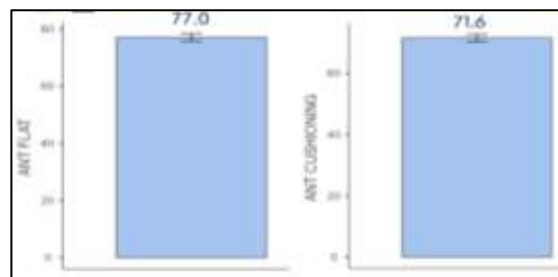


Fig. 1 Mean Value of Flat and Cushioning on Anterior

Figure 1 showed an independent-samples t-test was conducted to compare the anterior (ANT) Y-Balance Test scores between the cushioning sole and flat sole conditions. The results showed a statistically significant difference between the two conditions, t

(18) = -3.20 , $p = 0.005$. The mean difference between groups was -5.47 , indicating that participants wearing flat sole footwear achieved higher anterior reach scores compared to those wearing cushioning sole footwear. Therefore, the null hypothesis was rejected.

TABLE II
COMPARISON BETWEEN FLAT AND CUSHIONING ON
POSTEROMEDIAL

		statistic	df	p
Flat	Cushioning	12.3	9	<.001

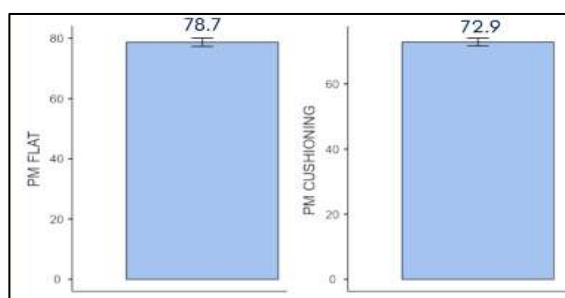


Fig. 2 Mean Value of Flat and Cushioning on Posteromedial

Figure 2 showed an independent-samples t-test was conducted to compare the posteromedial (PM) Y-Balance Test scores between the cushioning sole and flat sole conditions. The analysis revealed a statistically significant difference between the two conditions, $t(18) = -3.19$, $p = 0.005$. The mean difference was -5.85 , indicating that participants wearing flat sole footwear demonstrated higher posteromedial reach performance compared to those wearing cushioning sole footwear. Hence, the null hypothesis was rejected.

TABLE III
COMPARISON BETWEEN FLAT AND CUSHIONING ON
POSTEROLATERAL

		statistic	df	p
Flat	Cushioning	20.2	9	<.001

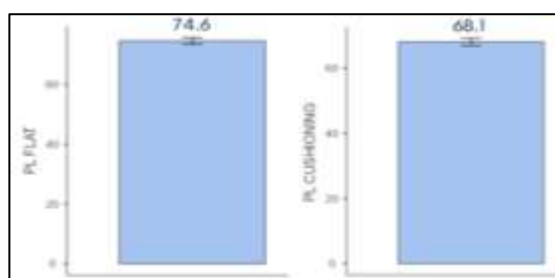


Fig. 3 Mean Value of Flat and Cushioning on Posterolateral

Figure 3 showed an independent-samples t-test was conducted to compare the posterolateral (PL) Y-Balance Test scores between the cushioning sole and flat sole conditions. The results demonstrated a statistically significant difference between the two conditions, $t(18) = -4.17$, $p < 0.001$. The mean difference was -6.52 , indicating that participants wearing flat sole footwear achieved significantly higher posterolateral reach scores compared to those wearing cushioning sole footwear. Therefore, the null hypothesis was rejected.

The findings suggest that flat sole footwear may enhance proprioceptive feedback and improve neuromuscular control, which are essential for maintaining postural stability in individuals with CAI. Minimal cushioning allows greater sensory input from the ground, facilitating joint position awareness and balance control. In contrast, excessive cushioning may dampen sensory feedback, potentially reducing dynamic stability. These results align with previous literature indicating that footwear characteristics influence postural control and functional performance.

IV. CONCLUSIONS

This study concluded that footwear sole design significantly influenced dynamic balance performance among futsal players with chronic ankle instability. Flat sole footwear was found to be more effective in enhancing dynamic balance compared with cushioning sole footwear. These findings provide practical implications for athletes, coaches, and rehabilitation professionals in selecting appropriate footwear during training and return-to-play phases.

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Effectiveness of FIFA 11+ Warm-Up on Ankle Range of Motion Among National-Level Football Referees

Muhammad Nur Haziq Saiful Aizar¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹, Yusandra Md Yusof¹ & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: FIFA 11+, Ankle Range of Motion, Weight Bearing Lunge Test, Football Referees, Injury Prevention

I. INTRODUCTION

Football referees are exposed to high physical demands during competitive matches, including repeated sprints, sudden stops, accelerations, and multidirectional running [1]. These biomechanical stresses place considerable load on the lower limbs, especially the ankle joint. Reduced ankle range of motion (ROM), particularly dorsiflexion, has been linked to impaired movement efficiency and balance performance and may increase the risk of ankle sprains [2]. Although the FIFA 11+ warm-up programme has become a widely implemented evidence-based injury prevention strategy in football players [3], limited research has focused on its efficacy among football referees. Referees represent an understudied but physically demanding population within sports science research [4]. Therefore, this study aimed to assess the effectiveness of a four-week FIFA 11+ warm-up programme on ankle ROM among national-level football referees in Malaysia.

II. METHODS

A true experimental pre-test and post-test control group design was used. Ten male national-level football referees (mean age = 26 years) were recruited based on the inclusion criteria and stratified into an intervention group ($n = 5$) and a control group ($n = 5$). The intervention group followed the FIFA 11+ warm-up programme three days per week for four weeks, while the control group continued their usual warm-up routine. Ankle dorsiflexion ROM was evaluated using the Weight-Bearing Lunge Test (WBLT), a valid and reliable measure of functional ankle mobility. Data were analysed using Jamovi statistical software. Descriptive statistics were calculated. Paired-samples t-tests were used to evaluate within-group changes, and independent-samples t-tests were used to compare post-test differences between groups. Statistical significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results showed a statistically significant improvement in ankle ROM in the intervention group after the four-week FIFA 11+ programme ($p < 0.001$). Although the control group also showed a

slight increase ($p = 0.009$), the magnitude of change was substantially smaller. Post-test comparisons showed a significant difference between the intervention and control groups ($p = 0.016$), indicating that the FIFA 11+ warm-up programme was more effective than the usual warm-up routine in improving ankle ROM. The observed improvements may be attributed to the neuromuscular, balance, and proprioceptive components embedded in the FIFA 11+ protocol. These exercises likely increase ankle joint stability and dorsiflexion mobility. The findings support existing literature on the effectiveness of the FIFA 11+ and extend this evidence to match officials.

IV. CONCLUSIONS

In conclusion, the FIFA 11+ warm-up programme had a significant positive effect on ankle ROM among national-level football referees. The intervention was more effective than the traditional warm-up routine. These results support the use of a structured neuromuscular warm-up programme before matches and referee training to aid performance and potentially reduce ankle injury risk. Future studies should involve larger samples, a more diverse group of referees, and longer intervention durations.

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The Effect of Physical Activity on Stress Levels Among Multimedia University Students

Muhammad Syazwan Harull Anuar¹, Norhazman Noorhisham¹, Muhammad Alif Aiman Mohd Ali¹,
Ahmad Ariff Razali¹, Nur Allysha Hani Mohd Fakrul Hadi¹, Hasmiza Abd Majeed¹, & Muhamad
Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Physical Activity, Stress, University Students, Walking, Malaysia

I. INTRODUCTION

University students often experience high levels of stress due to academic workload, examinations, financial concerns, social adjustment, and the transition to independent adult life. Stress occurs when students perceive that academic or personal demands exceed their ability to cope, as explained in the stress appraisal and coping model by [1]. If stress is not managed effectively, it may contribute to anxiety, depression, reduced academic performance, poor sleep, and lower overall well-being. Previous studies have shown that depression, anxiety, and stress are common among university students, highlighting the need to identify practical strategies that support student mental health [2][3]. Physical activity is one potential protective factor against stress. [4] defined physical activity as any bodily movement produced by skeletal muscles that results in energy expenditure. Regular physical activity and exercise may help reduce stress by improving mood, regulating physiological arousal, and supporting healthier coping responses. Earlier research has suggested that exercise may influence brain monoamines and stress-related behavioural responses, which may partly explain its positive effect on anxiety, depression, and stress sensitivity [5][6]. [7] also recommends regular physical activity and reduced sedentary behaviour to support physical and mental health.

Despite these benefits, many university students remain physically inactive because of busy schedules, fatigue, academic pressure, and prolonged screen-based learning. Sedentary behaviour, such as sitting for long periods, has also become a growing concern. [8] described excessive sitting as a distinct health risk, while [9] reported an association between sedentary behaviour and increased risk of anxiety. This suggests that both low physical activity and high sedentary time may influence students' psychological well-being. In Malaysia, research examining the relationship between physical activity and stress among university students remains limited. Understanding this relationship is important because university students face increasing academic and lifestyle demands. Therefore, this study aims to examine the relationship between physical activity and stress among Malaysian university students. This

study may help provide evidence for promoting active lifestyles as a practical approach to improving student mental health and stress management.

II. METHODS

This study used a survey with 200 full-time university students, mostly aged 20 to 30. Two tools were used: the International Physical Activity Questionnaire (IPAQ) to measure exercise frequency and duration, and the Perceived Stress Scale (PSS) to assess stress levels. Data were collected through an online questionnaire after students gave informed consent. The data were analysed using statistical tests to identify associations between physical activity and stress.

III. RESULTS AND DISCUSSION

The findings show that most participants were young adult university students aged 20 to 30 years. Most were male bachelor's degree students and year 3 students. This group may face common university stressors such as assignments, examinations, time pressure, and lifestyle changes. These factors have been linked with stress and anxiety among students [2][3]. Most students were not highly active. Many did vigorous or moderate exercise only one to two days per week. This may happen because students are busy, tired, or less motivated to exercise. Physical activity is important because it helps improve health and well-being [4][7]. The results showed that vigorous and moderate exercise was not significantly related to stress. This means higher-intensity exercise was not clearly associated with lower stress in this study. This may be because students did not exercise regularly enough to gain mental health benefits. Regular exercise has been linked with better mood and lower stress [5][6]. Walking was the only activity related to lower stress. This indicates that simple daily movement may help students manage stress better. Walking is easy to do, does not need equipment, and fits naturally into student life, such as walking to class, the library, or the hostel. Many students also spent long hours sitting. However, sitting time was not significantly related to stress in this study. Although too much sitting is generally linked with health concerns [8][9], stress among students may also depend on other factors such as

workload, sleep, coping style, and social support. Overall, the study suggests that walking may be the most practical physical activity for reducing stress among university students. Universities should encourage simple activities such as walking breaks, active movement between classes, and campus walking programmes to support student mental health.

TABLE I
CORRELATION BETWEEN PHYSICAL ACTIVITY, SITTING TIME,
AND STRESS

VARIABLE	CORRELATION WITH STRESS	P- VALUE
VIGOROUS PHYSICAL ACTIVITY FREQUENCY	-0.012	0.872
MODERATE PHYSICAL ACTIVITY FREQUENCY	-0.080	0.250
WALKING TIME	-0.177	0.012
SITTING TIME	0.106	0.136

This table shows how different types of physical activity and sitting time relate to students' stress levels. The results indicate that walking more is linked to lower stress, while vigorous and moderate exercise frequency, as well as sitting time, do not have a significant effect on stress in this group. This suggests that walking may be the most effective activity for reducing stress among university students.

IV. CONCLUSIONS

This study concludes that physical activity plays an important role in stress management among university students in Malaysia. Although vigorous and moderate exercise was not significantly related to stress, walking showed a meaningful association with lower perceived stress. This suggests that simple and consistent activities may be more practical and beneficial for students than structured or high-intensity exercise. The findings also indicate that students may understand the benefits of physical activity but still face barriers such as academic workload, fatigue, limited time, and low motivation. Therefore, universities should promote physical activity in a way that fits students' daily routines. Walking routes, active breaks, campus walking programmes, and easy access to recreational spaces may help students become more active without adding extra pressure. Overall, walking appears to be an accessible and realistic strategy to support student mental health. Future health promotion programmes should focus on flexible, low-cost, and routine-based physical activity to help students manage stress more effectively.

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Relationship Between Social Media Use and Anxiety Among Sports Students

Muhammad Zakwan Zukhri¹, Hasmiza Abdul Majeed^{1*}, Wahidah Tumijan¹, Rozita Abdul Latif¹,
Mohammad Adzly Rajli¹, & Azman Ahmad Tajri¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: hasmiza@uitm.edu.my

Keywords: Social Media Use, Mental Health, Anxiety, Sports Students, University Students

I. INTRODUCTION

University students appear to have a high prevalence of anxiety, indicating an increased mental health burden in this population. In view of this growing concern, it is crucial to examine its specific effects on vulnerable groups, such as university sports students. Exploratory research has identified that social media can affect student-athletes' mental health [1]. Recognising this situation, the present study aimed to further investigate the interplay between social media use and anxiety among sports students. By identifying levels of social media use and anxiety and examining their relationship, this study provides insights into how social media use is linked with anxiety in this specific population.

II. METHODS

This study used a quantitative correlational research design. The study involved 121 respondents comprising sports students enrolled at UiTM Seremban 3 Campus. Social media use was measured using the Social Media Use Scale (SMUS) [2], while anxiety was assessed using the General Anxiety Disorder-7 (GAD-7) [3]. These instruments were used to measure the studied variables among the target population. Data were analysed using SPSS software, with descriptive statistics used to summarise responses and Pearson correlation used to examine the relationship between social media use and anxiety.

III. RESULTS AND DISCUSSION

The overall level of social media use was analysed using descriptive statistics. The data analysis showed that the mean score for social media use was 3.87, with a standard deviation of 1.44. This finding indicates considerable variation in usage patterns among students, with some reporting minimal use and others reporting heavy and frequent use. In terms of anxiety, the mean score was 0.90, with a standard deviation of 0.66. Although the mean anxiety score was relatively low, the variability of scores indicates that some students experienced higher anxiety symptoms. This variation highlights the need to identify variables associated with elevated anxiety levels and supports the relevance of examining social media use as a possible contributing factor.

The correlation analysis indicated a statistically significant relationship between social media use and anxiety, with a correlation coefficient of $r = .484$ and a significance value of $p < .01$. This finding indicates that higher social media use was associated with higher reported anxiety levels among sports students. The strength of the correlation can be interpreted as moderate, suggesting a meaningful relationship that warrants attention. The moderate correlation suggests that social media use is not the only factor associated with anxiety, but it remains an important factor. Sports students who balance academic demands with training and competition may experience increased anxiety when viewing the social or sporting success of their peers online. In addition, time spent online may reduce rest and recovery time. This situation may contribute to anxiety and emotional exhaustion. Overall, excessive social media use appears to be a risk factor for increased anxiety among sports students.

IV. CONCLUSIONS

The current study provides empirical evidence that social media use is strongly linked with anxiety among sports students. The psychological implications of social media use in this group highlight the need to incorporate digital behaviour into student well-being initiatives. The findings indicate the need to promote healthy digital habits among university students, particularly those involved in sports programmes. Universities should also consider implementing digital wellness and mental health awareness programmes to enhance students' well-being.

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Effect of Strength and Conditioning on Skill-Related Fitness in Archery: A Systematic Review

Nabil Shafie¹, & Muhammad Zulqarnain Mohd Nasir^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: zulqarnain9837@uitm.edu.my

Keywords: Archery; Strength and Conditioning; Scapular Stability; Core Stability; Shooting Accuracy

I. INTRODUCTION

Precision sports such as archery require integrated neuromuscular control, postural stability, and psychological regulation to sustain consistent shooting performance. This review synthesises evidence on how structured strength and conditioning (S&C) interventions affect skill-related fitness components, including power, balance, coordination, reaction time, and muscular endurance, and whether these changes transfer to shooting accuracy, endurance, and injury prevention.

II. METHODS

This systematic literature review followed PRISMA principles. Databases were searched for studies published between 2008 and 2023 that addressed S&C interventions in archery. Duplicates and irrelevant records were removed, and full texts were screened by two reviewers with third-party adjudication. The final evidence base comprised controlled interventions and observational studies that met predefined PICOS criteria. Intervention characteristics, including modality, duration, and frequency, were extracted alongside outcome measures such as shooting scores, draw stability, balance, grip strength, and reaction time. Methodological quality was assessed, and narrative synthesis emphasized transferability to on-range performance.

III. RESULTS AND DISCUSSION

The included studies were generally small and short term but consistently showed directional benefits from structured S&C. Combined programmes, involving general resistance training and sport-specific drills, produced larger and more

transferable gains than isolated modalities. Scapular and shoulder stabilization interventions improved dynamic shoulder control and reduced micro-instability during the draw and hold phases, correlating with tighter shot groupings. Core stability and balance work reduced postural sway and supported steadier aim under fatigue, although direct transfer to competition scores varied across studies. Coaches should individualise load, monitor fatigue, and embed conditioning without disrupting finely tuned motor patterns.

IV. CONCLUSIONS

Well-structured S&C regimens, particularly those combining general resistance work with archery-specific drills, improve muscular endurance, postural stability, and several markers linked to shooting accuracy. However, larger, longer, and ecologically valid trials are needed to produce definitive, population-specific guidelines and confirm long-term injury-prevention effects.

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Relationship Between Peer's Social Support and Physical Activity Participation Among Youth

Noor Diyanah Habdul Latif¹, & Wahidah Tumijan^{1*}

¹*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia*

*Corresponding author: wahidah06@uitm.edu.my

Keywords: Peer's Social Support, Physical Activity Participation, Youth

I. INTRODUCTION

Physical inactivity among youth can lead to major health issues such as obesity and mental illness. 80% of adolescents fail to meet physical activity guidelines, making this a critical health issue both globally and nationally [1]. Previous studies mainly focused on high school students, without examining how peer's social support influences physical activity among youth in higher or different educational backgrounds [2]. As young people grow, they begin to rely more on their peers than their parents [3]. Understanding this transition is important for developing effective interventions.

II. METHODS

This study used a quantitative cross-sectional correlational design. A total of 406 Malaysian youth aged 18 to 24 years participated in the study using snowball sampling. Data were collected through a self-administered questionnaire comprising the Malay Version of the Social Support Scale for Exercise (peer-related items) and the International Physical Activity Questionnaire (IPAQ) Malay Version – Short Form. Descriptive statistics were used to determine levels of peer's social support and physical activity participation. Pearson correlation analysis was conducted using Jamovi software to examine the relationship between the variables.

III. RESULTS AND DISCUSSION

A. To Assess the Level of Peer's Social Support Among Youth

The mean score for peer social support was 41.40 ($SD = 13.20$), indicating that the overall level of peer social support among youth was moderate. This suggests that although peer support is present, its level varies across social contexts and developmental stages [4].

B. To Assess the Level of Physical Activity Participation Among Youth

The mean total physical activity participation was 3005.00 MET-minutes per week ($SD = 2154.00$), indicating a moderate level of participation according to the IPAQ classification. This suggests engagement primarily in daily routines and recreational activities rather than sustained vigorous exercise. Such patterns are consistent with previous findings indicating that peer support may indirectly influence adolescents'

physical activity by enhancing self-efficacy and enjoyment [5].

C. To Examine the Relationship Between Peer's Social Support and Physical Activity Participation Among Youth

The Pearson correlation indicated a strong positive and statistically significant relationship between peers' social support and physical activity participation ($r = 0.790$, $p < .001$), suggesting that adolescents with higher perceived peer support engaged in greater levels of physical activity. These findings are consistent with previous research indicating that peer support is positively associated with physical activity participation among adolescents. [6].

TABLE I
RELATIONSHIP BETWEEN PEERS SOCIAL SUPPORT AND
PHYSICAL ACTIVITY PARTICIPATION AMONG YOUTH

Total Physical Activity	
Total Peer Social Support	0.790***

Note. *** $p < .001$. $N = 406$

IV. CONCLUSIONS

Based on the findings, youth experienced moderate levels of peer social support, which may not be fully used to enhance health-related behaviours. Physical activity participation among youth was also moderate, indicating room for increased engagement. Importantly, a strong positive relationship was found between peer social support and physical activity participation, suggesting that peer support is an important social factor associated with higher levels of physical activity participation.

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The Acute Effect of Plyometric Exercise on Speed and Agility Performance Among Youth Hockey Players

Norazieah Anis Azainee¹, Raja Nurul Jannat Raja Hussain^{1*}, Noor Azila Azreen Md Radzi¹,
Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mohd Aizzat Adnan¹, Mardiana
Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: nuruljannat@uitm.edu.my

Keywords: Plyometric Exercise, Alternate-Leg Bounding, Sprint Performance, Agility, Youth Hockey Players

I. INTRODUCTION

Field hockey demands explosive sprinting and rapid changes of direction, making speed and agility critical performance attributes, especially among youth players. Plyometric training encompassing stretch-shortening cycle movements such as jumps and bounds has been widely recognised for developing explosive power [1]. Post-activation performance enhancement (PAPE) describes a transient neuromuscular state following high-intensity conditioning activity that can potentiate subsequent muscle contractile function, potentially boosting sprint and agility outputs [2]. Alternate-leg bounding (ALB), a horizontal plyometric movement closely mirroring sprinting mechanics, may offer sport-specific advantages over a generalized dynamic warm-up [3]. Despite growing evidence in adult and track-based populations, research on acute plyometric warm-up effects in Malaysian youth hockey players remains scarce. This study examined whether ALB incorporated into a pre-session warm-up significantly improves 10-meter sprint and Illinois Agility Test performance in female youth hockey players.

II. METHODS

A true experimental randomised crossover design was employed. Twenty female youth hockey players aged 14–16 years (M age = 13.8 ± 1.01 yrs; height = 153 ± 4.74 cm; weight = 48.4 ± 6.80 kg) from school/district-level programmes in Malaysia participated. Sample size was determined via G*Power 3.1 a priori analysis ($d_z = 0.76$, $\alpha = 0.05$, power = 0.80; minimum $n = 16$). Each participant completed two randomised sessions: (1) a plyometric warm-up using ALB five bounds per leg; and (2) a standard dynamic hockey warm-up (jogging, high knees, butt kicks, arm circles, leg swings, walking lunges). A 48-hour washout period separated sessions. Performance was assessed immediately post warm-up using the 10 m sprint test (linear acceleration) and the Illinois Agility Test (change-of-direction ability), both timed by the same trained assessor. Normality was assessed via Shapiro–Wilk. Parametric paired-samples t-tests were used for sprint

data ($W = 0.933$, $p = 0.174$); Wilcoxon signed-rank and Mann–Whitney U tests were applied to agility data ($W = 0.841$, $p = 0.004$).

III. RESULTS AND DISCUSSION

Table I presents the within-condition and between-condition performance outcomes.

TABLE I
SPRINT AND AGILITY PERFORMANCE

Test	Plyometric (ALB)	Normal Warm-up
10 m Sprint Pre (s)	2.42 ± 0.23	2.42 ± 0.23
10 m Sprint Post (s)	2.28 ± 0.25	2.45 ± 0.22
Statistic	$t(19) = 1.77$	$t(19) = -0.53$
p-value	0.092	0.603
Illinois Pre (s)	18.5 ± 0.95	18.5 ± 0.95
Illinois Post (s)	18.1 ± 1.13	18.8 ± 0.96
Statistic	$W = 170$	$W = 46.5$
p-value	0.014*	0.030*
Between cond. Illinois	$U = 88.0$, $p = 0.003^*$	

* $p < 0.05$; $\pm$ SD.

The plyometric warm-up did not produce a statistically significant improvement in 10 m sprint performance ($p = 0.092$), supporting the null hypothesis (H_{01}). This aligns with [4], who reported no acute sprint benefit following low-volume plyometric protocols. Short-distance acceleration relies heavily on initial neuromuscular coordination and may require greater plyometric stimulus intensity or volume to elicit PAPE in adolescent athletes. Individual variability in biological maturity and plyometric familiarity among youth players may also reduce the acute response.

Conversely, agility performance improved significantly following ALB ($W = 170$, $p = 0.014$), and the plyometric condition was significantly superior to the normal warm-up between conditions ($U = 88.0$, $p = 0.003$), leading to rejection of H_{02} and H_{04} . The multi-directional demands of the Illinois Agility Test rapid deceleration, re-acceleration, and lateral movement closely parallel the stretch-shortening cycle mechanics activated during

bounding. [5][6], who reported enhanced change-of-direction performance following plyometric priming.

IV. CONCLUSIONS

A single session of alternate-leg bounding as a warm-up significantly improved agility ($p = 0.014$) but did not significantly enhance 10 m sprint performance ($p = 0.092$) among female youth hockey players. These findings support incorporating ALB in pre-competition warm-up routines to optimise immediate agility readiness. Future research should examine optimal plyometric volumes, include male athletes, and explore additional performance variables such as reaction time and repeated sprint ability to broaden generalizability.

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Acute Effects of Energy Drink Consumption on Recreational Athletes Among UiTM Seremban 3 Students

Norhazman Noorhisham¹, Muhammad Syazwan Harull Anuar¹, Ahmad Ariff Razali¹, Muhammad Alif Aiman Mohd Ali¹, Nur Allysha Hani Mohd Fakrul Hadi¹, Nurul Ain Abu Kassim¹, & Muhamad Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Energy Drink, Reaction Time, Recreational Athletes, Caffeine, MOART

I. INTRODUCTION

Energy drink consumption is common among young adults and recreational athletes who want to improve alertness, focus, and exercise performance. Most energy drinks contain caffeine, carbohydrates, taurine, and other ingredients that may stimulate the central nervous system and influence physical and cognitive performance [1][2]. Reaction time, movement time, and total response time are important in sport because athletes must react quickly, make fast decisions, and execute movements efficiently. Caffeine has been shown to influence reaction time mainly through improved attention rather than direct motor effects [3]. Previous studies also reported that energy drink intake may improve short-term performance, reaction time, and perceptual responses, although the findings are not always consistent [4][5]. Recent evidence also suggests that commercial energy drinks may acutely affect exercise performance, but safety and individual responses should be considered, especially among young and recreational populations [6]. Local evidence remains limited, particularly among Malaysian university students and recreational athletes. Therefore, this study aimed to examine the acute effect of energy drink consumption on reaction time, movement time, and total time among recreational athletes at Universiti Teknologi MARA (UiTM) Seremban 3.

II. METHODS

This study used a quasi-experimental within-subject crossover design. A total of 36 recreational athletes aged 19 to 25 years were recruited through purposive sampling. Participants were physically active at least three times per week and had no medical conditions affecting performance. Each participant completed two conditions, namely energy drink consumption (Extrajoss 300 ml) and placebo consumption, separated by a seven-day washout period. Reaction time, movement time, and total time were measured using the Multi-Operational Apparatus for Reaction Time (MOART). Pretest and posttest measurements were taken for both conditions, with the assigned drink consumed 60 minutes before posttesting. Data were analysed using

Jamovi. Descriptive statistics, Shapiro–Wilk normality tests, paired-samples t-tests, and Wilcoxon signed-rank tests were used where appropriate. Statistical significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The Shapiro–Wilk normality test indicated that reaction time, movement time, and total time data in the energy drink condition violated the assumption of normality ($p < 0.05$). Consequently, the Wilcoxon signed-rank test was applied for inferential analysis. In contrast, the placebo group demonstrated normal data distribution, allowing the use of paired-sample t-tests.

TABLE I
NORMALITY TEST (SHAPIRO-WILK)

Group	Variable	W	p-value
Energy drink	Reaction time	0.883	0.029
Energy drink	Movement time	0.889	0.037
Energy drink	total time	0.834	0.005
Placebo	Reaction time	>0.90	>0.05
Placebo	Movement time	>0.90	>0.05
Placebo	total time	>0.90	>0.05

TABLE II
DESCRIPTIVE TABLE

Group	Variable	Pretest Mean (SD)	Post-test Mean (SD)
Energy drink	Reaction time (s)	0.409(0.202)	0.191(0.042)
Energy drink	Movement time (s)	0.496(0.250)	0.216(0.044)
Energy drink	total time (s)	0.916(0.413)	0.407(0.067)
Placebo	Reaction time (s)	Stable	Stable
Placebo	Movement time (s)	Stable	Stable
Placebo	total time (s)	Stable	Stable

The results showed significant reductions in reaction time, movement time, and total time after energy drink consumption ($p < 0.001$). This indicates that acute energy drink intake improved both perceptual processing and movement execution among recreational athletes.

TABLE III
INFERENTIAL ANALYSIS

Group	Variable	test used	test value	p-value
Energy drink	Reaction time	Wilcoxon	W= 171	<0.01
Energy drink	Movement time	Wilcoxon	W= 166	<0.01
Energy drink	total time	Wilcoxon	W= 171	<0.01
Placebo	Reaction time	Paired t-test	t	>.05
Placebo	Movement time	Paired t-test	t	>.05
Placebo	total time	Paired t-test	t	>.05

Descriptive findings also showed lower mean times and reduced variability after energy drink consumption, suggesting faster and more consistent performance. In contrast, the placebo condition showed no significant changes, indicating that the improvements were likely due to the energy drink rather than learning effects or expectancy. The significant reductions in reaction time, movement time, and total time after energy drink consumption indicate acute improvements in perceptual and motor response performance among recreational athletes. This suggests that participants responded faster, moved more quickly, and completed the task in a shorter time. This improvement may be due to caffeine, which is commonly found in energy drinks and can stimulate the central nervous system, increasing alertness and attention. [3] explained that caffeine improves reaction time mainly by enhancing attention. This finding is also supported by [4], who reported that energy drink intake can improve reaction time and short-term performance. The placebo condition showed no significant improvement, suggesting that the changes were likely caused by the energy drink rather than practice or repeated testing. The lower variability after energy drink consumption also indicates that participants performed more consistently. Overall, energy drinks may help recreational athletes in activities that require quick responses and fast movement. However, the effect is short-term and should be interpreted carefully because it may depend on

caffeine dose, individual tolerance, and health condition [1][2][6].

IV. CONCLUSIONS

This study concluded that acute consumption of a commercial energy drink significantly improved reaction time, movement time, and total time among recreational athletes. These findings suggest that energy drinks may provide short-term benefits for activities that require quick responses and fast movement execution. However, the effects were acute and should not be interpreted as long-term performance improvement. Athletes should consume energy drinks with caution, especially due to possible health and cardiovascular effects. Future studies should examine different dosages, longer-term effects, and larger samples from different athletic populations.

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A Comparison Between Action Video Game Players and Non-Players on Working Memory Abilities

Nur Ain Abd Ghani¹, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mardiana Mazaulan¹, Maisarah Shari², & Noor Azila Azreen Md Radzi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: azila_azreen7172@uitm.edu.my

Keywords: Video Gaming, Gamers, Non-Gamers, Verbal Working Memory, Visual-Spatial Working Memory, Cognitive Performance

I. INTRODUCTION

Working memory is a fundamental component of higher-order cognitive functioning. It enables the temporary storage and manipulation of information required for learning, problem-solving, and decision-making [1]. The system includes verbal working memory, which processes language and numerical information, and visual-spatial working memory, which supports visual and spatial processing. Attention plays a critical role in maintaining and updating relevant information during cognitive tasks [2]. Action video games place high demands on attention, rapid information processing, and simultaneous management of multiple stimuli, all of which are closely related to working memory [3]. Although some studies report cognitive benefits associated with action video game play, findings remain inconsistent, particularly for verbal working memory. In addition, many studies do not clearly distinguish between game genres or specific working memory components [4]. Therefore, the present study aimed to compare verbal and visual-spatial working memory performance between action video game players and non-players.

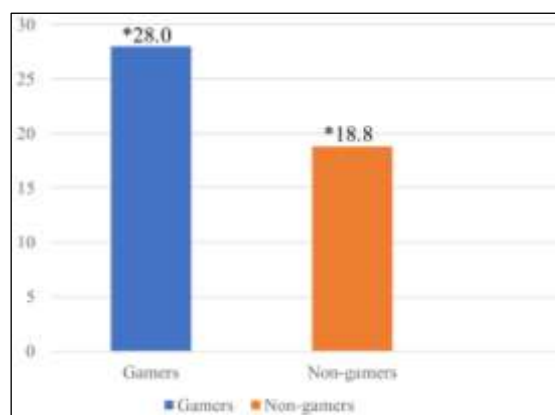
II. METHODS

A total of 42 male participants aged between 18 and 25 years were recruited for this study, comprising 21 action video game players and 21 non-players. Participants were screened before enrolment using a video game experience questionnaire. Individuals were classified as gamers if they reported playing video games for at least 1 hour per day, 5 days per week, for a minimum of 1 year. Weekly gaming duration was further assessed using a self-report multiple-choice questionnaire with five response options ranging from none or less than 1 hour to 4 hours or more per day on weekdays. Participants who did not meet these criteria were assigned to the non-gamer group. All participants reported being free from cognitive and physical impairments. Working memory performance was assessed using two standardised measures. Verbal working memory was evaluated using the Digit Span Test, while visual-spatial working memory was measured using the

Corsi Block Tapping Test. Each test was administered with two trials under standardised conditions. independent samples t-tests were performed to compare verbal and visual-spatial working memory performance between gamers and non-gamers.

III. RESULTS AND DISCUSSION

Figure 1 indicates that gamers ($M = 28.0$) achieved significantly higher scores than non-gamers ($M = 18.8$) on the verbal working memory task ($p < 0.05$), demonstrating a clear group difference. This finding suggests that regular engagement in action video games is associated with an enhanced ability to recall and manipulate verbal information.

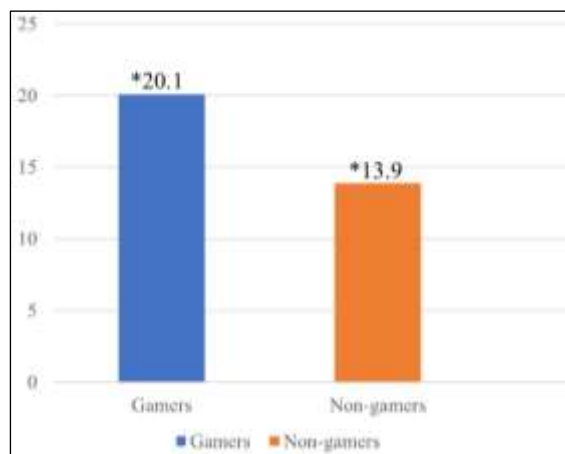


* $p < 0.05$

Fig. 1. Comparison of mean verbal working memory scores between gamers and non-gamers

One plausible explanation relates to the cognitive demands inherent in action video games. These games require players to follow complex instructions, process auditory cues, and retain sequences of objectives in real time. Such demands may strengthen the central executive component of working memory, particularly attentional control and information updating processes. In addition, frequent multitasking and rapid attentional shifts during gameplay may promote cognitive flexibility and more efficient encoding strategies. These adaptations may transfer to improved performance on verbal

working memory measures such as the Digit Span Test. This interpretation aligns with previous research reporting that action video game players demonstrate superior attentional control and faster cognitive processing, both of which are linked to enhanced memory performance [3][5].



* $p < 0.05$

Fig. 2. Comparison of mean visual-spatial working memory scores between gamers and non-gamers

Similarly, Figure 2 shows that gamers ($M = 20.1$) outperformed non-gamers ($M = 13.9$) on the visual-spatial working memory task ($p < 0.05$). This finding indicates stronger spatial information processing and manipulation among gamers. Action video games often require navigation through complex environments, tracking multiple moving objects, and making rapid spatial decisions under time constraints. These repeated demands may enhance visual attention, spatial awareness, and the ability to update spatial representations. Improved reaction time and hand-eye coordination developed through gameplay may also support more efficient spatial processing. This pattern aligns with previous research reporting enhanced visual attention and visual-spatial working memory among action video game players [4].

IV. CONCLUSIONS

The findings indicate that experience with action video games is associated with enhanced core cognitive functions, particularly working memory across both verbal and visual-spatial domains. These results suggest that repeated exposure to cognitively demanding gaming environments may contribute to improvements in attentional control, information updating, and memory processing efficiency. Future research should include larger and more diverse samples to improve generalisability. Longitudinal and experimental designs are also needed to determine whether gaming experience directly enhances cognitive performance and to examine the long-term stability of these effects.

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The Relationship Between Warm-Up Exercises and Physical Performance Among Recreational Athletes

Nur Akmal Firdaus Wahid¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹,
Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Warm-Up Intention, Perceived Physical Performance, Recreational Athletes, Pearson Correlation, Cross-Sectional Survey, UiTM Student

I. INTRODUCTION

Warm-up exercises are widely recognized as an essential component of physical activity and sports participation. Proper warm-up routines are believed to enhance muscle readiness, increase blood circulation, improve flexibility, and reduce the risk of injury [1][2]. In recreational sports settings, warm-up practices are often influenced by individual intention and perceive importance rather than structured performance protocols [3]. Previous studies have suggested that warm-up activities may positively influence physical performance by improving physiological and psychological readiness [4][5]. However, limited evidence exists regarding the relationship between warm-up intention and perceived physical performance among recreational athletes, particularly within Malaysian university populations. Therefore, this study aimed to examine the relationship between warm-up intention and perceived physical performance among recreational athletes at Universiti Teknologi MARA (UiTM) Seremban.

II. METHODS

A quantitative cross-sectional survey design was employed in this study. A total of 360 UiTM Seremban students who actively participated in recreational sports were recruited. The sample size was determined using the Krejcie and Morgan [6] table based on an estimated population of approximately 6,000 students. Data were collected using a structured self-report questionnaire adapted from the Intention for Warm-Up among Children and Adolescents Scale [7], modified to suit recreational athletes. The questionnaire consisted of items measuring warm-up intention and perceived physical performance using a Likert scale format. Data were analysed using JAMOV software. Descriptive statistics were calculated to determine mean and standard deviation values. Pearson correlation analysis was conducted to examine the relationship between warm-up intention and perceived physical performance. Statistical significance was set at $p < .05$.

III. RESULTS AND DISCUSSION

The findings indicated that the mean score for warm-up intention was 3.45 ($SD = 0.53$), reflecting a moderate level of agreement among respondents regarding the importance of performing warm-up exercises. Meanwhile, the mean score for perceived physical performance was 4.29 ($SD = 0.59$), suggesting that most participants reported high levels of perceived performance during recreational sports activities.

TABLE I
RELATIONSHIP BETWEEN WARM UP AND PHYSICAL PERFORMANCE

	Statistic	Physical Performance
Warm-up Intention	Pearson's r	0.164
	df	283
	p-value	0.006

Pearson correlation analysis revealed a statistically significant but weak positive relationship between warm-up intention and perceived physical performance ($r = 0.164$, $p = 0.006$). Although the relationship was significant, the strength of the correlation indicates that warm-up intention contributes only minimally to perceived physical performance. These findings suggest that while individuals who demonstrate stronger intentions to perform warm-up exercises tend to report better perceived physical performance, other factors such as fitness level, training frequency, motivation, and psychological readiness may also influence performance outcomes [4]. Overall, the study highlights the importance of promoting consistent warm-up practices among recreational athletes to enhance physical preparedness and exercise confidence. Future research may explore additional variables that contribute to performance improvements in recreational sports settings.

IV. CONCLUSIONS

This study concludes that there is a statistically significant but weak positive relationship between warm-up intention and perceived physical performance among recreational athletes at UiTM

Seremban. Although participants reported moderate warm-up intention and high perceived performance, the findings suggest that warm-up intention alone is not a strong predictor of performance, as physical performance is influenced by various factors such as fitness level, training experience, motivation, and injury history. Therefore, warm-up should be viewed as an important preparatory practice, and future research should include objective performance measures and experimental designs to better examine its direct effects.

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Differences in Ground Reaction Force (GRF) Between Unipedal and Bipedal Shooting Stance Among UiTM Seremban 3 Netball Players

Nur Allysha Hani Mohd Fakrul Hadi¹, Norhazman Noorhisham¹, Muhammad Mukhriz Jalani¹, Ahmad Ariff Razali¹, Muhammad Alif Aiman Mohd Ali¹, Muhamad Safiq Saiful Annur¹, & Muhamad Noor Mohamed^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: muhamad_noor@uitm.edu.my

Keywords: Ground Reaction Force, Netball Shooting, Unipedal Stance, Bipedal Stance, Force Plate

I. INTRODUCTION

Netball is a high-intensity sport that involves repeated jumping, landing, cutting, passing, and shooting. Goal shooting is one of the most important skills in netball because successful shooting depends on technical accuracy, body control, and lower-limb stability. Previous research has shown that netball shooting involves specific kinematic patterns, and differences in skill level may influence shooting technique [1]. During shooting, players may use either a unipedal, single-leg stance, or a bipedal, double-leg stance. These stance positions may affect balance, stability, and ground reaction force. A unipedal stance reduces the base of support and places greater load on one limb, while a bipedal stance allows force to be distributed across both limbs. This is important because high ground reaction force and poor lower-limb control have been linked with injury risk in university-level netball players [2]. Although previous studies have examined netball shooting technique and lower-limb loading, limited research has directly compared ground reaction force between unipedal and bipedal shooting stances. Therefore, this study aimed to compare vertical ground reaction force during unipedal and bipedal shooting stances among university netball players. The findings may help coaches and athletes understand which stance places greater mechanical demand on the lower limbs.

II. METHODS

This study used a quantitative cross-sectional within-subject design. Four female netball shooters from UiTM Seremban 3 participated in the study. All participants played in the goal attack or goal shooter position and were right-leg dominant. Ground reaction force data were collected using an AMTI HF400-600 force plate. Each participant performed shooting trials using both unipedal and bipedal stances. The order of stance conditions was controlled to reduce testing bias. Vertical ground reaction force (Fz) was recorded and processed using AMTI NetForce/BioAnalysis software. The data were trimmed to a steady-state two-second window from 1.0 to 3.0 seconds. Ground reaction force values

were normalised to body weight (BW) to allow comparison between participants. The main variables analysed were mean Fz and peak Fz. Mean Fz represented average vertical loading during the shooting stance, while peak Fz represented the highest vertical force produced during the stance phase. Descriptive statistics were used to report mean and standard deviation. The Shapiro–Wilk test was used to check normality. A paired-samples t-test was then used to compare peak ground reaction force between unipedal and bipedal shooting stances. Statistical significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

Mean Fz remained near static equilibrium (approximately 1.00 BW) for both stances, indicating similar average vertical loading during the steady-state shooting phase. In contrast, peak GRF differed between conditions. The unipedal stance showed higher peak Fz (1.025 ± 0.012 BW) compared with the bipedal stance (1.015 ± 0.008 BW). The Shapiro–Wilk test confirmed normal distribution for peak GRF (unipedal: $p = 0.612$; bipedal: $p = 0.151$). The paired-samples t-test revealed a significant difference in peak GRF between stances, $t(3) = 2.85$, $p = 0.046$, mean difference = 0.010 BW. The higher peak force during the unipedal stance reflects increased mechanical demand on the supporting limb due to the reduced base of support, requiring greater neuromuscular stabilisation. The bipedal stance distributes load across both limbs, resulting in lower peak force fluctuations and improved mechanical stability for shooting.

TABLE I
NORMALIZED GRF (BW) DURING STEADY-STATE SHOOTING PHASE

Variable	Stance	Mean	SD
Mean Fz (BW)	Unipedal	1.000	0.007
Mean Fz (BW)	Bipedal	1.001	0.005
Peak Fz (BW)	Unipedal	1.025	0.012
Peak Fz (BW)	Bipedal	1.015	0.010



Fig. 1 Peak GRF (BW) comparison between unipedal and bipedal shooting stances (mean $\pm$ SD).

The findings show that both unipedal and bipedal shooting stances produced mean vertical ground reaction force close to 1.00 BW. This indicates that the players maintained stable body-weight support during the steady-state phase of shooting. In other words, both stances allowed the shooters to control their body position before releasing the ball. This is important in netball because accurate shooting requires balance, postural control, and stable lower-limb positioning. A past study highlighted that netball goal shooting involves specific kinematic demands, and differences in body control are important for shooting performance. Although the average loading was similar between stances, the significant difference in peak GRF shows that unipedal and bipedal stances created different mechanical demands [1]. The higher peak GRF in the unipedal stance suggests that single-leg shooting places greater load on the supporting limb. This occurs because body weight is supported mainly by one leg, with a smaller base of support and greater demand for balance control. As a result, the ankle, knee, and hip must work harder to stabilise the body during shooting. This finding is consistent with others finding, who reported that single-leg and double-leg landing tasks create different lower-limb kinetic demands [3]. In contrast, the bipedal stance spreads the load across both legs, producing lower peak force and better mechanical stability. From an injury prevention perspective, this is important because higher ground reaction force and poor lower-limb kinematics have been linked with lower-extremity injury risk in university-level netball players [2]. Therefore, players who frequently use unipedal shooting should include balance training, lower-limb strengthening, and neuromuscular control exercises in their training programme.

IV. CONCLUSIONS

This study concluded that shooting stance significantly influenced peak ground reaction force among UiTM Seremban 3 netball players. Although mean vertical force remained close to 1.00 BW in both stances, the unipedal stance produced

significantly higher peak GRF than the bipedal stance. These findings suggest that the bipedal stance provides a more stable base for shooting, while the unipedal stance places greater mechanical demand on the supporting limb. Therefore, netball players who frequently use single leg shooting should include balance training, lower-limb strengthening, and neuromuscular control exercises to improve stability and reduce injury risk.

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First and foremost, I would like to express my deepest gratitude to Allah SWT for His blessings, guidance, strength, and opportunity throughout my academic journey and in completing this research project. I would like to extend my sincere appreciation to my supervisor, Muhamad Noor Mohamed, for his continuous guidance, support, patience, and valuable advice throughout the completion of this study. His constructive feedback, encouragement, and willingness to share knowledge greatly assisted me in improving the quality of this research. My appreciation also goes to Universiti Teknologi MARA (UiTM), the Faculty of Sports Science and Recreation, and all lecturers and staff members who provided knowledge, assistance, and support during my studies. Their contributions have played an important role in my academic development. Special thanks are also extended to all participants involved in this study for their cooperation, time, and commitment. Their willingness to take part in this research made the data collection process possible. I would also like to express my heartfelt gratitude to my family and friends for their endless support, prayers, understanding, and encouragement throughout this journey. Finally, I would like to thank everyone who contributed directly or indirectly to the completion of this research project. Every form of assistance, support, and encouragement is sincerely appreciated.

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Comparison of Shooting in FIFA World Cup Qatar 2022 Between Winning and Losing Teams

Nur Atiqah Farhana Zamili¹, Muhamad Noor Mohamed¹, Mohd Aizzat Adnan¹, & Muhamad Safiq Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: Shooting Effectiveness, Goal Scoring, Performance Indicators, FIFA World Cup 2022, Football Analysis

I. INTRODUCTION

Shooting performance is a key indicator influencing match outcomes in elite football [1][2]. In high-intensity tournaments such as the FIFA World Cup Qatar 2022, small differences in offensive efficiency may determine progression or elimination, particularly during knockout stages where competitive pressure is elevated [3][4]. Therefore, identifying shooting indicators that distinguish winning and losing teams is essential for understanding match success at the highest competitive level [1].

II. METHODS

This study employed a quantitative causal-comparative design. The population comprised teams competing in the knockout stage (Round of 16 to Final) of the FIFA World Cup Qatar 2022. Secondary data were obtained from official FIFA match reports. These methods are supported by previous studies [1][2]. The measured variables were timing of goals, total shots, shots on target, shot accuracy, shot origin (inside and outside the penalty box), and conversion rate. Data were analysed using descriptive statistics and independent samples t-tests in SPSS, with significance set at $p < .05$.

III. RESULTS AND DISCUSSION

Only goals scored and conversion rate showed significant differences between groups. This indicates that match success in the knockout stage was strongly influenced by finishing efficiency rather than shooting frequency [5][7]. Although both groups produced comparable numbers of total shots and shots on target, winning teams demonstrated superior ability to convert scoring opportunities [6][7]. These findings are consistent with recent evidence indicating that technical-tactical efficiency in goal-scoring actions is a stronger determinant of match outcome than overall shooting volume in elite competitions [5].

No significant differences were observed in shot accuracy or shot origin between winning and losing teams, indicating that the quantity and spatial distribution of attempts alone were insufficient to explain match outcomes [6][7]. While previous research has highlighted the importance of spatial and technical indicators in creating scoring

opportunities, these variables alone do not consistently discriminate successful from unsuccessful teams in high-level competitions [6]. Instead, the present findings suggest that match success during knockout stages may be more strongly influenced by finishing efficiency and the capacity to capitalise on decisive moments under pressure [5][7].

TABLE I
SHOOTING PERFORMANCE DIFFERENCES BETWEEN WINNING AND LOSING TEAM

Variables	Mean $\pm$ SD		p-value
	Winning Teams	Losing Teams	
Goals Scored	2.67 $\pm$ 0.72	0.87 $\pm$ 0.52	<.001*
Total Shots	15.47 $\pm$ 5.28	14.20 $\pm$ 4.91	.504
Shots on Target	6.73 $\pm$ 2.60	5.27 $\pm$ 2.05	.104
Shot Accuracy (%)	43.54 $\pm$ 11.84	37.68 $\pm$ 12.11	.211
Shot Inside Penalty Box	9.87 $\pm$ 3.89	8.93 $\pm$ 3.45	.488
Shot Outside Penalty Box	5.60 $\pm$ 2.41	5.27 $\pm$ 2.17	.699
Conversion Rate (%)	18.36 $\pm$ 6.44	6.12 $\pm$ 4.18	<.001*

*Significant level at $p < .05$

This interpretation aligns with contemporary performance analysis research demonstrating that elite match outcomes are frequently determined by marginal gains in offensive efficiency rather than overall shooting frequency [5]. In tightly contested tournaments, particularly during elimination rounds, teams often generate comparable numbers of attempts; however, the ability to convert high-quality chances in critical phases of the match becomes the distinguishing factor [7]. Therefore, the findings reinforce the notion that efficiency-based indicators, such as goal conversion rate, may provide greater explanatory value than volume-based metrics when evaluating success at the highest competitive level [5][6].

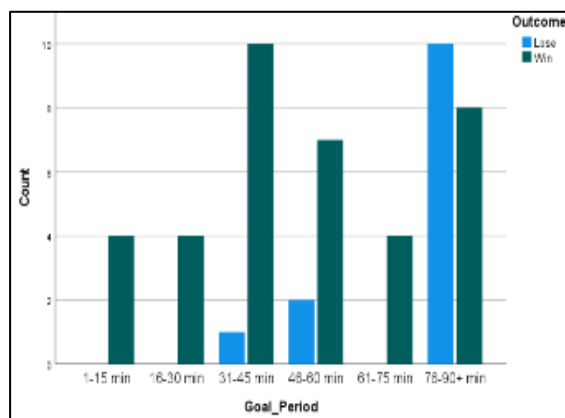


Fig. 1 Distribution of goals across six match periods for winning and losing teams

In terms of goal timing (see Figure 1), winning teams recorded a higher frequency of goals during the later stages of the match, particularly in the second half. This pattern is consistent with research indicating that decisive goals in elite tournaments are frequently scored in the final phases of play, where physical fatigue, tactical adjustments, and psychological pressure become more pronounced [7]. The ability to score during these critical periods may reflect superior game management, endurance capacity, and situational awareness [5].

Moreover, knockout-stage matches often demand sustained concentration and strategic adaptation, with successful teams demonstrating greater composure and efficiency under high-pressure conditions [5][6]. Late goals may therefore represent not only physical superiority but also enhanced tactical flexibility and mental resilience, characteristics commonly associated with high-performing teams in elite competitions [7].

IV. CONCLUSIONS

Goal conversion efficiency was a more decisive factor than shooting quantity in determining match

outcomes. Although shooting frequency and location were similar between groups, winning teams showed superior finishing effectiveness. These findings highlight the importance of clinical execution and composure under pressure in elite elimination matches.

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A Comparative Analysis of Reaction Time and Problem-Solving Abilities Between Action Video Game Players and Non-Players

Nur Shafika Abu Bakar¹, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Mardiana Mazaulan¹, Maisarah Shari², & Noor Azila Azreen Md Radzi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: azila_azreen7172@uitm.edu.my

Keywords: Action Video Games, Reaction Time, Problem-Solving Ability, MOART, Tower of Hanoi, Cognitive Performance

I. INTRODUCTION

Video gaming has become increasingly prevalent among university students, particularly action video games (AVGs) such as First-Person Shooter (FPS) and Multiplayer Online Battle Arena (MOBA). Action video games require rapid perceptual processing, selective attention, and quick motor responses, which may influence cognitive functioning [1]. Previous studies have consistently reported faster reaction times among gamers compared to non-gamers due to enhanced stimulus response efficiency and visual processing speed [1]. However, findings regarding higher-order executive functions such as problem-solving remain inconsistent. While some evidence suggests potential improvements in cognitive flexibility [2], other researchers argue that gaming benefits may be limited to perceptual domains rather than strategic planning abilities [3]. Therefore, this study aimed to compare reaction time and problem-solving ability between action video game players and non-gamers among Malaysian university students.

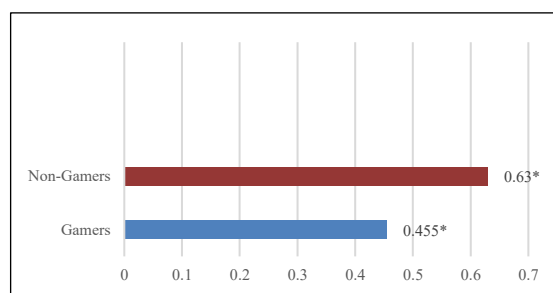
II. METHODS

This study included 42 male participants aged between 18 and 25 years, comprising 21 action video game players and 21 non-players. Participants were screened before enrolment using a video game experience questionnaire. Individuals were classified as gamers if they reported playing video games for at least 1 hour per day, 5 days per week, for a minimum of 1 year. Weekly gaming duration was further assessed using a self-report multiple-choice questionnaire with five response options ranging from none or less than 1 hour to 4 hours or more per day on weekdays. Participants who did not meet these criteria were assigned to the non-gamer group. All participants reported being free from cognitive and physical impairments. Reaction time was measured using the Multi-Operational Apparatus for Reaction Time, while problem-solving ability was assessed using a computerised Tower of Hanoi task. Each assessment was administered in two trials under standardised conditions. independent samples t-tests were conducted to compare reaction time and

problem-solving performance between gamers and non-gamers.

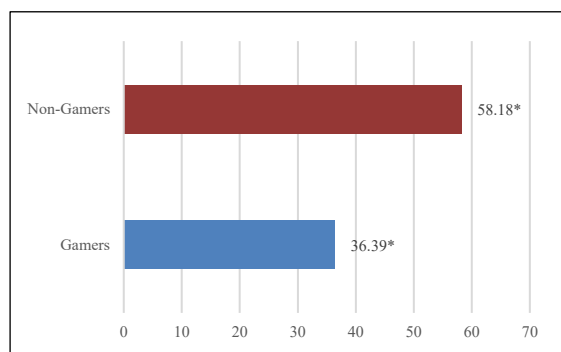
III. RESULTS AND DISCUSSION

The results showed that gamers exhibited a lower mean reaction time of 0.455 seconds compared with 0.630 seconds among non-gamers ($p < 0.05$). This finding indicates faster responses to visual stimuli among gamers, reflecting enhanced perceptual processing speed and response efficiency. In terms of problem-solving performance, gamers achieved a lower mean completion time of 36.39 seconds on the Tower of Hanoi task, whereas non-gamers required 58.18 seconds on average ($p < 0.05$). The longer completion time among non-gamers suggests reduced efficiency in strategic planning and sequential reasoning. These differences indicate superior cognitive processing and problem-solving performance among action video game players.



* $p < 0.05$

Fig. 1 Comparison between gamers and non-gamers in reaction time



* $p < 0.05$

Fig. 2 Comparison between gamers and non-gamers in problem-solving ability

The observed differences in cognitive performance between gamers and non-gamers highlight the domain-specific effects of action video game engagement. Gamers exhibited faster reaction times, which may be attributed to repeated exposure to fast-paced visual stimuli requiring rapid attentional shifts and immediate motor responses. Such gameplay continuously engages the perceptual and visuomotor systems, likely enhancing processing speed and stimulus-response efficiency over time [1]. Gamers also completed the problem-solving task more quickly than non-gamers, suggesting greater efficiency in strategic planning and sequential reasoning under the present task conditions. The Tower of Hanoi task requires deliberate strategy formulation and inhibition of impulsive responses, and the findings suggest that action video game experience may be associated with more efficient task completion in this sample [3]. Collectively, these findings indicate that cognitive benefits associated with action video games may extend to both speed-

based perceptual-motor processes and selected executive functions. This pattern underscores the importance of distinguishing between different cognitive domains when evaluating the effects of video game experience.

IV. CONCLUSIONS

In conclusion, action video game players demonstrated significantly faster reaction times and shorter problem-solving completion times compared with non-gamers. These findings indicate that action video game engagement is associated with enhanced speed-based perceptual-motor processing and more efficient performance on the Tower of Hanoi task. The results contribute to the growing body of literature highlighting the domain-specific cognitive effects of video gaming among university students. Future research should incorporate longitudinal designs and broader cognitive assessments to further clarify the causal mechanisms underlying these differences.

ACKNOWLEDGMENT

The author thanks UiTM Seremban 3 FSR students for their participation and extends deep gratitude to Noor Azila Azreen Md Radzi for her supervision.

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Differences in Attention Abilities Between Action Video Game Players and Non-Players

Nurain Farhanah Saiful Azli¹, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹,
Muhamad Safiq Saiful Annur¹, Maisarah Shari², & Noor Azila Azreen Md Radzi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, MALAYSIA

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: azila_azreen7172@uitm.edu.my

Keywords: Action Video Games, Sustained Attention, Executive Function, Trail Making Test, Cognitive Performance

I. INTRODUCTION

Action video games (AVGs), such as first-person shooter (FPS) and multiplayer online battle arena (MOBA) games, are fast-paced and cognitively demanding. They require players to process multiple visual stimuli, make rapid decisions, and switch tasks efficiently. Previous studies [1][2] suggest that AVG players may outperform non-players in visual attention, selective attention, and information processing speed. However, existing findings on the cognitive effects of action video games remain inconsistent, and empirical studies directly comparing attention performance between action video game players and non-players remain limited [2][3]. Therefore, this study aimed to compare sustained attention and executive function between male AVG players and non-players among university students using the Trail Making Test (TMT).

II. METHODS

A total of 42 male university students aged 18 to 25 years from Universiti Teknologi MARA (UiTM) Seremban 3 were recruited for this study. The sample consisted of gamers ($n = 21$) and non-gamers ($n = 21$), selected through purposive sampling based on predefined inclusion and exclusion criteria. Participants were required to be healthy and free from neurological disorders. Gamers were required to play FPS or MOBA games, such as Mobile Legends or PUBG, for at least one hour per week, while non-gamers had no regular exposure to action video games. Sustained attention and executive function were assessed using the Trail Making Test Part A (TMT-A) and Part B (TMT-B), respectively. Completion time in seconds was recorded, with lower scores representing better performance. All participants volunteered, provided informed consent, and were allowed to withdraw from the study at any time. Data were analysed using an independent t-test in SPSS, with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results indicated that action video game players performed significantly better than non-players on both attention tasks. Gamers took significantly less time to complete both TMT-A and TMT-B compared with non-gamers ($p < 0.05$),

indicating better sustained attention and executive function. As shown in Fig. 1, gamers demonstrated better performance in tasks measuring sustained attention (TMT-A) and executive function (TMT-B).

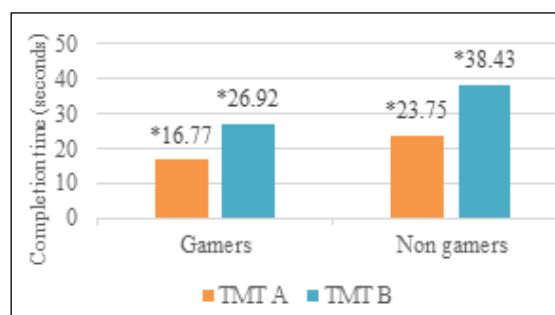


Fig. 1. Mean completion time (seconds) for TMT-A and TMT-B between gamers and non-gamers (* $p < 0.05$).

Gamers had a mean completion time of 16.77 s ($SD = 1.84$) on TMT-A compared with 26.92 s ($SD = 1.66$) for non-gamers. On TMT-B, gamers completed the task in 23.75 s ($SD = 2.14$), whereas non-gamers took 38.43 s ($SD = 2.27$), indicating enhanced sustained attention and executive function among action video game players.

The better performance of gamers in TMT-A and TMT-B can be explained by the fast-paced and cognitively challenging nature of action video games. These games require players to remain focused on multiple visual stimuli and switch tasks efficiently, which directly trains sustained attention and executive function. Previous research has reported that habitual gamers may show enhanced attentional resources and improved task-switching abilities compared with non-gamers [1][2][4]. The difference may be attributed to non-gamers having less exposure to fast-moving visual stimuli and cognitively demanding environments requiring sustained attention and executive function, which are commonly trained through action video game play [1][4].

IV. CONCLUSIONS

The results showed that male action video game players performed significantly better than non-action video game players in sustained attention and executive function. The findings suggest that action

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video gaming may provide cognitive benefits for players. Future studies should include participants from different age groups, genders, and game genres to improve generalisability.

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Effectiveness of Balance Training on Ankle Range of Motion (ROM) Among Youth Silat Athletes

Nurkhaleda Syamimi Razman @ Mohd Zuhdi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022477768@student.uitm.edu.my

Keywords: Balance Training, Ankle ROM, Silat Athletes, Injury Prevention, Stork Balance Test

I. INTRODUCTION

Ankle injuries remain one of the most common musculoskeletal problems among young Silat athletes, largely due to the sport's explosive movements, repetitive kicking, and rapid changes in direction. Although balance training has been widely used to improve proprioception and reduce lower limb injuries in sports like soccer and basketball, very little research has examined its effect specifically in Silat. This traditional Malay martial art involves unique footwork patterns that place high demands on ankle stability and postural control. The gap in sport-specific evidence becomes even more concerning when considering youth athletes aged 13 to 17, whose neuromuscular coordination is still developing, putting them at greater risk of injury. This study aimed to determine whether a four-week balance training program could improve ankle range of motion and balance among youth Silat athletes in a controlled setting.

II. METHODS

A true experimental design with pre-test and post-test measurements was used in this study. Ten youth Silat athletes from Sekolah Sukan Malaysia Terengganu (SSMT) aged between 13 and 17 years old were recruited. All participants were actively training in Silat and free from any lower limb injuries at the time of the study. They were randomly assigned into two groups: an intervention group ($n = 5$) that underwent a four-week balance training program in addition to their regular Silat training, and a control group ($n = 5$) that continued with only their regular Silat sessions. The four-week intervention was conducted three times per week, with each session lasting between 30 to 40 minutes. The balance training program was adapted from previous research and progressively increased in difficulty. Exercises included single-leg stance, dynamic balance drills, and unstable surface training using mats and balance discs. Ankle range of motion was measured using the Weight Bearing Lunge Test (WBLT), while balance was assessed using the Stork Balance Test. Measurements were taken at baseline and immediately after the four-week period. Data were analyzed using Jamovi software, with paired sample T-Tests used to compare within-group differences and independent T-Tests to compare

between-group differences. Statistical significance was set at $p < .05$.

III. RESULTS AND DISCUSSION

Balance performance was assessed using the Stork Balance Test before and after the four-week intervention period. Table I presents the comparison of pre-test and post-test scores for both the intervention and control groups.

TABLE I
BALANCE PERFORMANCE

Variable	N	Mean	SD	Minimum
Stork Pre (Right)	10	8.60	1.35	6
Stork Post (Right)	10	11.30	2.41	8
Stork Pre (Left)	10	8.00	1.56	6
Stork Post (Left)	10	9.90	2.77	6

The intervention group showed significant improvements in balance for both legs following the four-week training program. The right leg improved by 2.70 seconds ($p = .001$), while the left leg improved by 1.90 seconds ($p = .032$). The control group also showed significant improvement in the right leg ($p = .035$) with a mean difference of 2.44 seconds, but no significant change was observed in the left leg ($p = .374$). When comparing between groups, the intervention group performed significantly better than the control group in post-test balance score for both legs, confirming that the improvements were due to the training program rather than regular Silat practice alone.

Ankle range of motion was measured using the Weight Bearing Lunge Test (WBLT) before and after the intervention. Table II presents the pre-test and post-test results for both groups.

TABLE II
ANKLE RANGE OF MOTION

Variable	N	Mean	SD	Minimum
WBLT PRE (RIGHT)	10	7.95	2.19	4.50
WBLT POST (RIGHT)	10	8.55	2.01	5.00
WBLT PRE (LEFT)	10	6.43	2.46	4.00
WBLT POST (LEFT)	10	8.40	1.96	5.00

For ankle range of motion, the intervention group demonstrated a statistically significant improvement in the left ankle ($p = .018$) with a mean difference of 1.97 cm. The right ankle also showed improvement (mean difference = 0.60 cm) but did not reach statistical significance ($p = .089$). The control group showed no significant changes in either ankle (right ankle $p = .678$; left ankle $p = .842$). These findings indicate that regular Silat training without specific intervention does not contribute to improvements in ankle range of motion.

The main finding of this study is that four weeks of balance training significantly improved balance performance among youth Silat athletes, but only partially improved ankle range of motion. These results align with previous research showing that proprioceptive training enhance postural control by improving neuromuscular coordination and joint stability. The significant improvement in balance for both legs within the intervention group, and the between-group difference favouring the intervention group, support the effectiveness of structured balance exercises in a sport-specific context.

The improvement in the control group's right leg balance was unexpected, though not entirely surprising. Regular Silat training involves weight-shifting movements and single-leg stance during kicks, which may naturally challenge balance to some extent. However, the absence of significant improvement in the left leg suggests that without targeted intervention, balance adaptations may not transfer symmetrically.

Regarding ankle range of motion, the significant improvement only in the left ankle raises interesting questions. It is possible that the left ankle, being the non-dominant limb for most participants, had more room for improvement compared to the right ankle, which may already be more stable and mobile due to daily functional use. Another explanation is that four weeks may not be sufficient to produce measurable changes in joint flexibility, as improvements in range of motion often require longer intervention periods. These findings are consistent with studies on other martial arts, where balance improvements occurred faster than changes in joint mobility.

Several limitations should be acknowledged. The small sample size limits the generalizability of the findings, and the short intervention duration may not have been adequate to detect all possible adaptations. The use of the Stork Balance Test, while practical, measure static balance rather than dynamic balance, which may be more relevant to Silat performance. Future studies should consider larger samples, longer intervention periods, and dynamic balance assessments such as the Y-Balance test.

IV. CONCLUSIONS

This study provides evidence that a four-week balance training program can significantly improve

balance among youth Silat athletes, though its effects on ankle range of motion may be limited. The intervention group showed clear improvements in both legs compared to the control group, suggesting that balance exercises should be incorporated into regular Silat training enhance stability and potentially reduce injury risk. However, for coaches aiming to improve ankle flexibility as well, longer training periods may be required. These findings contribute to the limited body of knowledge on injury prevention strategies specifically tailored for Silat, offering practical guidance for coaches, trainers, and sports science practitioners working with young athletes in traditional martial arts.

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Comparison Between Types of Shoes on Balance Among Recreational Netball Players

Nurul Aida Saadon¹, Noor Azila Azreen Md Radzi¹, Madiana Mazaulan¹, Raja Nurul Jannat Raja Hussain¹, & Muhamad Safiq Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: Balance, Footwear, Surface Type, Netball, BESS

I. INTRODUCTION

Balance is a fundamental requirement in netball, a sport characterised by rapid directional changes, jumping, landing, and sudden stops. Maintaining postural stability during these high-demand movements is critical for both performance enhancement and injury prevention [1]. Despite its popularity among young women in Malaysia and the wider Commonwealth, recreational netball players are rarely advised on appropriate footwear selection and often prioritise comfort, cost, or aesthetics over biomechanical suitability [2].

Footwear design plays a significant role in modulating balance by affecting cushioning, heel height, lateral support, and proprioceptive feedback [3][4]. Running shoes are primarily engineered for forward locomotion and shock absorption, whereas netball shoes are designed for multidirectional movement with superior lateral stability, forefoot support, and traction. Surface compliance is another critical factor, as unstable surfaces such as foam pads reduce proprioceptive input, thereby increasing postural demand and impairing balance performance [3].

Although several studies have examined footwear effects on balance across different sports [3][5], research specifically addressing recreational female netball players remains limited. Most existing literature focuses on elite athletes or male-dominated sports, making direct comparisons to recreational female netballers problematic [2]. This study therefore aimed to determine whether shoe type (running vs. netball) affects balance performance, and to determine whether surface type (firm vs. foam) affects balance performance among recreational female netball players.

II. METHODS

This study employed a quasi-experimental research design. Purposive sampling was used to recruit 20 female recreational netball players aged 18–30 years ($M \pm SD$: 23.00 $\pm$ 1.30 years) from two locations: Universiti Teknologi MARA (UiTM) Kampus Seremban and a community netball court in Felda Tenang. Inclusion criteria required participants to be active recreational netball players (minimum once per week) with no recent lower-limb injuries,

musculoskeletal conditions, or medication use that could affect balance. A G*Power analysis based on an effect size of Cohen's $d = 0.55$ at $\alpha = 0.05$ confirmed the adequacy of $n = 20$. Participants were divided into two groups of ten: the running shoe group (Adidas Galaxy 6) and the netball shoe group (Asics Netburner Professional). Balance was assessed using the Balance Error Scoring System (BESS), which evaluates static postural stability through six conditions combining three stances (double-leg, single-leg, and tandem) on two surface types (firm and foam). Errors, including eye opening, stepping, falling, and lifting the hands from the hips, were counted over a 20-second trial per condition, with a maximum of 10 errors per condition. Higher BESS error scores indicate poorer balance performance.

Data normality was confirmed using the Shapiro-Wilk test (firm = $p > .059$, foam = $p > .614$), and homogeneity of variance was verified using Levene's test (firm = $p > .308$; foam = $p > .353$). An independent samples t-test compared BESS scores between shoe groups on each surface, while paired samples t-tests compared firm versus foam performance within each shoe group. All analyses were conducted in SPSS and Jamovi at $\alpha = 0.05$.

III. RESULTS AND DISCUSSION

A summary of the results is presented in Table 1. The independent samples t-tests revealed no significant difference in balance performance between running shoes ($M \pm SD = 3.20 \pm 2.94$) and netball shoes ($M \pm SD = 3.10 \pm 2.18$) on the firm surface, $t(18) = 0.086$, $p = .932$. Similarly, no significant difference was found on the foam surface between running shoes ($M \pm SD = 8.00 \pm 2.54$) and netball shoes ($M \pm SD = 7.20 \pm 2.74$), $t(18) = 0.677$, $p = .507$. These results indicate that shoe type did not significantly affect static balance performance in recreational netball players, regardless of surface condition.

These findings align with research suggesting that the functional advantages of sport-specific footwear may be more pronounced during dynamic, sport-specific tasks, such as cutting, landing, and pivoting, than during static balance assessments [1]. Furthermore, recreational players may not possess

the advanced neuromuscular control required to capitalise on the biomechanical differences between shoe types [6]. It is also recognised that modern running and netball shoes both provide sufficient cushioning and structural support for fundamental balance tasks, thereby reducing between-shoe differences in static conditions [3][5].

In contrast, surface type demonstrated a highly significant effect on balance performance. Paired samples t-tests showed that both the running shoe group (firm: $M = 3.20$, foam: $M = 8.00$, $p < .001$) and the netball shoe group (firm: $M = 3.20$, foam: $M = 7.20$, $p < .001$) committed significantly more errors on the foam surface. These results are consistent with established evidence that unstable surfaces impair somatosensory input, thereby increasing neuromuscular demand and postural sway [3][4].

TABLE 1
BESS ERROR SCORE BY SHOES AND SURFACE TYPES

Condition	Shoe Type	Mean $\pm$ SD	p-value
Firm Surface	Running Shoes	3.20 $\pm$ 2.94	.932
	Netball Shoes	3.10 $\pm$ 2.18	
Foam Surface	Running Shoes	8.00 $\pm$ 2.54	.507
	Netball Shoes	7.20 $\pm$ 2.74	
Firm vs. Foam (Running)	Running Shoes	3.20 vs. 8.00	< .001*
Firm vs. Foam (Netball)	Netball Shoes	3.20 vs. 7.20	< .001*

*Significant level, $p < .05$

The results support previous findings that unstable surfaces increase postural demand due to reduced somatosensory feedback [3]. From a practical perspective, this suggests that coaches should focus more on balance training on unstable surfaces than on relying solely on footwear selection. Progressive unstable surface training, such as foam pads or balance discs, may help improve balance performance [3][4].

IV. CONCLUSIONS

This study found no significant difference in static balance performance between running shoes and netball shoes among recreational netball players. However, surface type significantly affected balance performance, with foam surfaces resulting in poorer stability. These findings indicate that surface compliance plays a more important role than shoe type in influencing static postural stability in this population. Coaches and practitioners are encouraged to include progressive unstable surface training in their programmes to enhance balance and reduce injury risk [3][4]. Future research should include larger sample sizes and dynamic balance assessments to further understand the influence of footwear and surface type in netball performance.

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Relationship Between Explosive Strength, Speed, and Agility Among UiTM Negeri Sembilan Football Players

Nurul Alia Syuhana Zakaria¹, Mohd Aizzat Adnan^{1*}, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹,
Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: mohda5782@uitm.edu.my

Keywords: Explosive Strength, Speed, Agility, Football Performance

I. INTRODUCTION

Football is a high-intensity intermittent sport that involves repeated sprinting, rapid acceleration, and frequent changes of direction. Explosive strength, defined as the ability to produce maximal force in minimal time, is commonly regarded as an important determinant of sprint and agility performance [1]. However, previous findings have reported inconsistent relationships between explosive strength and performance-related variables. Therefore, this study aimed to examine the relationship between explosive strength, speed, and agility among UiTM Negeri Sembilan football players.

II. METHODS

A quantitative cross-sectional correlational design was employed. A total of 26 male football players aged 19-25 years were selected using purposive sampling. Explosive strength was assessed using the Standing Broad Jump (SBJ), speed was measured using the 30 m sprint test, and agility was evaluated using a 10 m agility shuttle test. Each participant performed three trials per test, and the best score was recorded. Data were analysed using Pearson's correlation coefficient (r) via Jamovi software.

III. RESULTS AND DISCUSSION

A weak and non-significant relationship was observed between explosive strength and speed ($r = -0.294$, $p > 0.05$). This suggests that SBJ was not significantly associated with 30 m sprint time. Although explosive strength may contribute to early acceleration, sprint performance over 30 meters is also influenced by running mechanics and neuromuscular coordination [2]. Therefore, explosive strength alone may not adequately predict sprint performance.

Explosive strength showed a very weak and non-significant relationship with agility ($r = -0.134$, $p > 0.05$). This indicates that lower-body explosive power was not a significant determinant of agility performance. Given that agility involves change-of-direction technique, balance, and coordination, performance outcomes are influenced by multiple interacting factors rather than explosive strength alone [3].

TABLE I
RELATIONSHIP BETWEEN EXPLOSIVE STRENGTH WITH SPEED
AND AGILITY

		30 m sprint test (s)	10 m agility shuttle test (s)
SBJ (m)	Pearson's r	-0.294	-0.134
	p-value	0.153	0.524

IV. CONCLUSIONS

Explosive strength was not a significant predictor of speed or agility among UiTM Negeri Sembilan football players. These findings highlight the importance of adopting a holistic training approach that integrates sprint mechanics, change-of-direction technique, and neuromuscular coordination rather than relying solely on explosive strength development. Future research should examine specific sprint phases and involve larger samples to further clarify this relationship.

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A Comparison of Skill-Related Fitness Components Between UiTM Football and Rugby Players

Nurul Anatasya Abdullah¹, Mohd Aizzat Adnan¹, Noor Azila Azreen Md Radzi¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Raja Nurul Jannat Raja Hussain¹, Mardiana Mazaulan¹, & Maisarah Shari²

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: mohd5782@uitm.edu.my

Keywords: SRF Components, Agility, Balance, Speed, Rugby Players, Football Players, UiTM

I. INTRODUCTION

Skill-related fitness (SRF) components, including agility, speed, power, balance, coordination, and reaction time, are critical determinants of athletic performance in field sports such as football and rugby. Although both sports are physically demanding, they differ substantially in playing style and physical contact intensity. Football emphasises rapid changes in direction and sustained sprinting, whereas rugby often prioritises absolute strength and stability during physical confrontations such as scrums. Despite their popularity, limited comparative data are available on the specific SRF profiles of university-level athletes in Malaysia. This study aimed to address this gap by comparing these six SRF components between football and rugby players at UiTM Seremban.

II. METHODS

This study used a non-experimental, cross-sectional research design. A total of 46 male student-athletes (23 football players and 23 rugby players) aged 18 to 25 years participated. Purposive sampling was used to select active representatives of university teams. Six standardised tests were employed: Illinois Agility Test (agility), 30 m Sprint (speed), Standing Broad Jump (power), Stork Stand (balance), Wall Toss (eye-hand coordination), and Nelson Hand Reaction Test (reaction time). Data were analysed using descriptive statistics and independent samples t-tests via Jamovi (Version 2.5), with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

Normality was confirmed for all variables via the Shapiro–Wilk test ($p > .05$). The results revealed significant differences in five of the six tested components, with football players demonstrating superior performance in most categories (Table I). Football players recorded significantly better agility times ($p < .001$) and faster reaction times ($p = .003$). They also showed significantly greater lower-body power ($p < .001$), static balance ($p < .001$), and coordination ($p < .001$). No significant difference was found in 30 m sprint speed ($p = .318$), indicating

similar explosive acceleration capabilities. Superior agility and balance among football players may be attributed to frequent single-leg support and multidirectional movement demands.

TABLE I
COMPARISON OF SKILL-RELATED FITNESS (SRF) PERFORMANCE SCORES BETWEEN FOOTBALL AND RUGBY PLAYERS

Variable	Group	Mean	SD	t	p
Agility (s)	Football	14.92	0.58	-5.94	<.001
	Rugby	16.86	0.41		
Power (m)	Football	2.59	0.18	3.97	<.001
	Rugby	2.36	0.21		
Balance (s)	Football	34.27	3.24	5.71	<.001
	Rugby	27.30	4.87		
Coordination (hits)	Football	29.17	2.57	6.63	<.001
	Rugby	23.61	3.10		
Reaction time (s)	Football	0.19	0.02	-3.12	.003
	Rugby	0.21	0.02		
Speed (s)	Football	4.46	0.23	-1.01	.318
	Rugby	4.54	0.31		

*All independent t-tests $df = 5$. * $p < .05$; ** $p < .001$.

Independent samples t-tests revealed that the football group demonstrated significantly superior performance in agility ($t(29.39) = -5.94, p < .001$), with faster times (14.92 ± 0.60 s) than the rugby group (16.86 ± 1.45 s). Significant differences were also found in explosive power, where football players achieved greater distances in the standing broad jump (2.59 ± 0.18 m) than rugby players (2.36 ± 0.21 m; $t(44) = 3.97, p < .001$). Furthermore, the football group outperformed the rugby group in static balance (34.27 ± 3.24 s vs. 27.30 ± 4.87 s; $t(44) = 5.71, p < .001$) and eye-hand coordination (29.17 ± 2.57 hits vs. 23.61 ± 3.10 hits; $t(44) = 6.63, p < .001$).

Football players also exhibited significantly faster reaction times (0.19 ± 0.02 s) than rugby players (0.21 ± 0.02 s; $t(44) = -3.12, p = .003$), while no meaningful difference was observed in 30 m sprint speed ($p = .318$). These findings align with previous literature suggesting that sport-specific demands,

such as frequent multidirectional sprinting in football, lead to more refined neuromuscular synchronisation and agility. In addition, the superior jump and agility performance in the football group may be attributed to a more favourable power-to-weight ratio compared with the significantly heavier rugby group (64.52 ± 6.73 kg vs. 79.70 ± 14.36 kg; $p < .001$).

IV. CONCLUSIONS

The study concludes that sport-specific demands lead to a more refined SRF profile in football players compared to rugby players at the university level. These findings suggest that coaching staff should implement specialized conditioning programs to address the specific physiological gaps identified in each sport to optimize performance.

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Effect of Physical Exercise on E-sports Performance: A Systematic Review of Training Regimens and Outcomes

Nurul Narina Natasha Aripin¹, & Muhammad Zulqarnain Mohd Nasir^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: zulqarnain9837@uitm.edu.my

Keywords: Physical Exercise, Esports, Training Regimens, Cognitive Function, Performance Enhancement

I. INTRODUCTION

E-sports have evolved into a competitive industry with increasing recognition of the role physical exercise plays in enhancing player performance. Despite its importance, the impact of structured physical activity on esports performance has not been thoroughly standardised or evaluated.

II. METHODS

This systematic review synthesizes studies published from 2010 to May 2025, focusing on physical training interventions (aerobic, resistance, HIIT, mobility, etc.) and their effects on esports performance metrics like reaction time, cognitive abilities, and psychological resilience. The review adheres to PRISMA 2020 guidelines and incorporates studies that meet predefined eligibility criteria.

III. RESULTS AND DISCUSSION

This systematic review evaluated the impact of physical exercise on esports performance by examining various training regimens, including HIIT, strength training, and aerobic conditioning. The results indicate that physical exercise significantly improves cognitive and physical performance in esports athletes.

Acute exercise interventions, especially HIIT, have been shown to improve cognitive functions critical for esports, such as reaction time, decision-making, and accuracy. For example, de Las Heras et al. (2020) demonstrated that a 15-minute HIIT session improved accuracy by 75% in League of Legends. Similarly, Mancı et al. (2024) observed that sprint exercises enhanced cognitive control, specifically improving accuracy in Go/No-go tests.

Chronic exercise regimens, like six-week HIIT programmes, led to sustained performance improvements. [3] found that six weeks of HIIT increased flicking accuracy by 16.4% and improved decision-making by 10.5%, demonstrating the importance of consistent training for long-term cognitive and physical gains.

Physical exercise promotes neuroplasticity, enhancing cognitive functions. Studies reveal that exercise boosts the release of neurochemicals like BDNF, which support brain function [1]. These changes contribute to faster decision-making and

improved reaction times, essential for esports success.

Exercise also enhances mental resilience, helping athletes manage stress and fatigue. [2] found that physical training improved focus under pressure, while [3] highlighted improvements in mental toughness and stress management after HIIT interventions. These psychological benefits are crucial for sustaining performance during intense gaming sessions.

While the evidence is promising, there is a lack of standardized training protocols and a predominance of short-term studies. Future research should focus on long-term interventions, use objective performance measures, and include more diverse sample populations to improve the applicability of findings across genders and esports disciplines.

IV. CONCLUSIONS

Physical exercise, particularly when integrated with mental training techniques, is a promising approach for optimizing esports performance. Future research should focus on standardised training protocols, long-term studies, and exploring neurocognitive mechanisms.

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The Interplay Between Self-Efficacy and Anxiety Among Student-Athletes

Nurul Syamila Zakri¹, Hasmiza Binti Abdul Majeed^{1*}, Rozita Abdul Latif¹, Wahidah Tumijan¹,
Mohammad Adzly Rajli¹, & Azman Ahmad Tajri¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: hasmiza@uitm.edu.my

Keywords: Self-Efficacy, Well-Being, Anxiety, Student Athletes, University Students

I. INTRODUCTION

The growing pressure faced by student-athletes to excel both academically and in sports has brought mental health concerns, particularly anxiety, into sharper focus. One key psychological factor that influences how athletes respond to anxiety is self-efficacy. Previous studies have reported a significant link between self-efficacy and anxiety [1][2]. Therefore, a better understanding of the correlates of self-efficacy and anxiety among student-athletes is needed. Recognising this situation, the present study aimed to further investigate the interplay between self-efficacy and anxiety among student-athletes. By exploring this relationship, this study aims to inform targeted interventions to support students' healthy behaviour within a unique academic and sporting environment.

II. METHODS

This study employed a quantitative, cross-sectional research design using a survey approach. The population consisted of 130 student-athletes from Universiti Tun Hussein Onn Malaysia. Data were collected using a structured questionnaire consisting of demographic information, the General Self-Efficacy Scale (GSE) [3], and the Generalized Anxiety Disorder-7 (GAD-7) [4]. Descriptive statistics, including mean, frequency, and percentage, were used to determine levels of self-efficacy and anxiety. Spearman's rho correlation analysis was conducted using SPSS to examine the relationship between self-efficacy and anxiety.

III. RESULTS AND DISCUSSION

The findings indicated that most UTHM student-athletes reported moderate to high-levels of self-efficacy. A total of 53.1% of respondents fell into the moderate self-efficacy category. The mean score for moderate self-efficacy was 3.34, with a standard deviation of 0.35. In addition, 45.4% of respondents showed a high-level of self-efficacy, with a mean score of 3.80 and a standard deviation of 0.11. These findings suggest that most student-athletes felt reasonably confident in their ability to manage challenges, perform well, and cope with difficult situations. In terms of anxiety, the results showed that most respondents experienced minimal anxiety, with 62.3% of student-athletes classified under this

category. The mean score for minimal anxiety was 2.58, with a standard deviation of 0.95, indicating low anxiety symptoms among most respondents.

Correlation analysis revealed a very weak positive relationship between self-efficacy and anxiety ($r = .034$), which was not statistically significant ($p = 0.697$, $p > 0.05$). Thus, the null hypothesis was not rejected. The absence of a significant relationship suggests that anxiety among student-athletes may be influenced by other factors, such as academic workload, injury, social support, and coping strategies, rather than self-efficacy alone.

IV. CONCLUSIONS

The present study concludes that although UTHM student-athletes generally exhibit positive psychological profiles with moderate to high self-efficacy and low anxiety, there is no significant relationship between self-efficacy and anxiety among UTHM student-athletes. The findings provide useful baseline data for university administrators, coaches, and counsellors in monitoring student-athletes' mental health. Future studies should investigate a broader range of psychological and environmental influences and examine the effectiveness of interventions, such as mental skills training and stress management programmes, to better enhance the well-being of student-athletes.

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The Relationship Between Sleep Quality and Stress Level Among Student-Athletes

Raja Nur Shuhada Raja Abdul Rahman^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: 2022835704@uitm.edu.my

Keywords: Sleep Quality, Stress Level, Student-Athletes

I. INTRODUCTION

Sleep is a fundamental biological process that supports physical recovery, cognitive functioning and emotional regulation. Sleep is critical for student-athletes, who must balance academic demands with athletic demands. However, the demands of training schedules, competitions, examinations and assignment deadlines may create a stressful lifestyle that affects sleep patterns. Previous literature has shown a two-way relationship between sleep and stress. This means that a lack of sleep makes an individual more susceptible to stress, while a stressful lifestyle can result in poor sleep quality. However, there is a lack of evidence in Malaysia. Therefore, this study aimed to examine the level of sleep quality, the level of stress and the relationship between sleep quality and stress level among student-athletes at Universiti Teknologi MARA (UiTM) Seremban 3.

II. METHODS

The research design of this study was descriptive cross-sectional correlational research. The respondents of the research comprised 92 student athletes between the ages of 18 and 25 years. The research employed purposive sampling as the approach to recruiting the respondents. The researcher used an online questionnaire to collect data through Google Forms. The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality, while the Perceived Stress Scale (PSS-10) was used to measure stress levels. Descriptive statistics were used to identify the overall levels of sleep quality and stress. Since the data did not show normality, Spearman's rank correlation was used to determine the relationship between the two variables. The significance level was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The descriptive statistics for total sleep quality among the 92 student-athletes showed a mean score of 7.73 with a median of 5.00, indicating that overall sleep quality was poor since the average score exceeded the PSQI cut-off of 5. The standard deviation of 6.29 shows considerable variability in responses, suggesting that while some athletes reported relatively good sleep, many others experienced severe disturbances. The Shapiro-Wilk test ($W = 0.798$, $p < .001$) confirmed that the data were not normally distributed, which highlights the

presence of skewness in sleep quality scores. This result implies that a substantial proportion of athletes struggle with irregular sleep patterns, delayed sleep onset or frequent interruptions, all of which negatively affect recovery and performance.

The descriptive statistics for total stress levels among the 92 student athletes. The mean score was 21.2 with a median of 21.0 indicating that most respondents experienced moderate to high levels of perceived stress. The standard deviation of 4.76 shows that while stress levels varied across individuals, the majority clustered around the moderate range. The Shapiro- Wilk test ($W = 0.824$, $p < .001$) confirmed that the data were not normally distributed, suggesting that stress scores were skewed with some athletes reporting particularly high stress. This reflects the dual pressures of academic deadlines and athletic commitments that student athletes face which can contribute to elevated stress levels.

The correlation matrix examining the relationship between sleep quality (PSQI) and stress levels (PSS) among student athletes. The results show a Spearman's rho value of 0.746 ($p < .001$, $df = 90$) indicating a very strong positive correlation between the two variables. This means that higher stress scores were significantly associated with poorer sleep quality providing strong empirical support for the study's hypothesis. The findings confirm that stress is a substantial contributing factor to poor sleep quality, highlighting the critical role of psychological stress in shaping sleep patterns.

IV. CONCLUSIONS

This research has been able to prove that the sleep quality and stress level are significant concerns to student athletes. From the findings of the research, it was clear that most student athletes experienced poor quality of sleep with a moderate to high stress level. The findings of the research can be attributed to the harsh realities that student athletes must face in that they not only have to focus on their academic activities but also on their training as athletes. From the findings of the research, it was clear that student athletes who did not get enough sleep did not experience this

condition in isolation but with a certain level of stress as well. More importantly, the very strong positive relationship that was noted in the research findings between the stress level and the quality of sleep proved that the two variables were interlinked in one way or the other. From the research findings, it was clear that student athletes who experienced higher levels of stress were likely to experience a poor quality of sleep. The results of this research also underscore the importance of considering both sleep quality and stress management as intertwined issues that require attention and care. It is essential that both universities and coaches are aware of the dual demands that student athletes face and provide proper strategies that promote better sleep and coping mechanisms for stress as well as a more balanced approach in their academic and training schedules. This is crucial in order for universities to play a vital part in improving the well-being of student athletes.

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Influence of Distance Manipulation on Shooting Kinematics and Accuracy Among Intermediate Basketball Players

Shahrul Izzuan Mohd Sabri¹, Raja Nurul Jannat Raja Hussain¹, Muhamad Noor Mohamed¹, Muhamad Safiq Saiful Annur¹, Maisarah Shari², & Noor Azila Azreen Md Radzi^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: azila_azreen7172@uitm.edu.my

Keywords: Distance Manipulation, Shooting Kinematics, Shoulder Angle, Basketball Accuracy, Intermediate Players

I. INTRODUCTION

Shooting accuracy in basketball is strongly influenced by biomechanical coordination across the upper-limb kinetic chain. As shooting distance increases, greater force production and refined proximal to distal sequencing are required to maintain optimal ball trajectory and release velocity [1][2]. Previous biomechanical investigations have shown that skilled players redistribute mechanical demand across the shoulder, elbow, and wrist joints when shooting from longer distances [1]. However, limited research has examined how intermediate-level players adapt their joint mechanics under increased distance constraints, particularly using accessible two-dimensional motion analysis tools. Understanding these adaptations is important because intermediate athletes are still refining movement consistency and joint coordination. Therefore, this study aimed to examine the influence of distance manipulation on shooting kinematics and shooting accuracy among intermediate-level basketball players.

II. METHODS

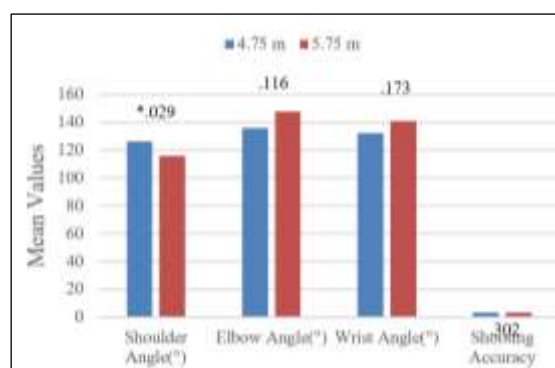
This study employed a quantitative within-subject experimental design to examine differences in free throw performance across two shooting distances. Six male intermediate-level basketball players aged between 18 and 24 years were recruited through purposive sampling. All participants had a minimum of two years of competitive playing experience. Eligibility criteria required participants to be free from upper-limb injury within the previous six months. Individuals with current musculoskeletal injury were excluded from participation.

Each participant performed free throws at two distances, 4.75 m and 5.75 m. Kinematic variables, including shoulder, elbow, and wrist angles during the ball release phase, were recorded using a two-dimensional video analysis approach. A smartphone camera was positioned perpendicular to the sagittal plane to capture movement. Video recordings were analysed using Kinovea motion analysis software. Shooting accuracy was assessed using a six-point outcome-based scoring system ranging from 0 to 5 [3]. A score of 0 was assigned for a complete miss,

defined as an air ball. A score of 1 was given for a shot that contacted the backboard and rebounded out of the basket. A score of 2 was awarded for a shot that contacted the rim and rebounded out. A score of 3 represented a shot that contacted the backboard and entered the basket. A score of 4 was assigned for a shot that contacted the rim and entered the basket. A score of 5 represented a clean basket without contact with the rim or backboard. Each participant completed 10 attempts at each distance, yielding a maximum possible score of 50 points per condition. Paired-samples t-tests were conducted to examine differences in kinematic variables and shooting accuracy between the two shooting distances.

III. RESULTS AND DISCUSSION

Figure 1 demonstrates clear biomechanical adjustments in response to increased shooting distance. A statistically significant reduction in shoulder angle was observed from 126.35° at 4.75 m to 116.02° at 5.75 m ($p = .029$), indicating greater shoulder flexion at the longer distance.



* $p < 0.05$

Fig. 1 Comparison between two distance conditions on shooting kinematics and accuracy

This finding suggests that intermediate players relied heavily on proximal joint contribution to generate the additional force required for increased release velocity. Previous research has indicated that greater shooting distances demand enhanced segmental coordination across the kinetic chain to maintain optimal ball trajectory and velocity [1]. However, when coordination efficiency is not fully

developed, athletes may compensate through increased activation of proximal joints, particularly the shoulder complex [1][2]. Additionally, increased shooting distance has been shown to alter upper-limb coordination patterns, emphasizing shoulder involvement as a primary regulator of release mechanics [2]. These findings align with the present results, suggest that intermediate players may adopt a shoulder-dominant strategy when faced with greater mechanical demands.

In contrast, although elbow angle increased from 135.90° to 147.60° and wrist angle increased from 132.25° to 141.07° , these changes were not statistically significant ($p > .05$). The absence of significant distal joint adaptation may indicate limited redistribution of mechanical demand across the elbow and wrist segments. From a biomechanical perspective, efficient long-distance shooting typically requires a coordinated proximal-to-distal sequencing pattern to maximise energy transfer and movement efficiency [4]. The current findings suggest that such coordination may not yet be fully developed in intermediate-level players. Instead of redistributing force progressively across joints, participants appeared to depend primarily on shoulder-generated torque.

Interestingly, shooting accuracy did not significantly decline with increased distance ($p = .302$), despite the greater mechanical demand. These findings suggest that proximal compensation was adequate to preserve short-term performance outcomes. However, continued reliance on shoulder-dominant movement strategies may reduce mechanical efficiency and increase movement variability over time, particularly under fatigue. Proficient shooters demonstrate a more balanced distribution of joint contributions and controlled release mechanics, whereas less skilled players exhibit greater movement variability and stronger proximal dominance during the shooting motion [3].

Collectively, the findings highlight a developmental distinction in shooting mechanics.

While intermediate players can maintain performance accuracy, their biomechanical adaptation to longer distances appears less refined compared to elite coordination models. These results reinforce the importance of technical training interventions aimed at enhancing distal joint synchronization to improve overall shooting efficiency and long-term consistency.

IV. CONCLUSIONS

Distance manipulation significantly influenced shoulder kinematics but did not significantly affect elbow angle, wrist angle, or shooting accuracy among intermediate-level basketball players. The findings indicate that intermediate athletes primarily adapt to increased shooting distance through proximal joint compensation rather than coordinated redistribution across the entire kinetic chain. This study contributes to the understanding of developmental differences in basketball shooting biomechanics and supports the practical application of low-cost two-dimensional video analysis for performance assessment in applied sports settings.

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Effect of Strength and Conditioning on Skill-Related Fitness Among Men Futsal Players: A Systematic Literature Review

Siti Hawa Adawiyah Mohamadia¹, & Muhammad Zulqarnain Mohd Nasir^{1*}

¹*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia*

**Corresponding author: zulqarnain9837@uitm.edu.my*

Keywords: *Futsal, Strength and Conditioning, Agility, Skill-Related Fitness, Systematic Review, Neuromuscular Training*

I. INTRODUCTION

Futsal is a high-intensity indoor sport characterised by repeated accelerations, rapid changes of direction, and continuous technical involvement within a confined playing area. Unlike outdoor football, futsal imposes unique neuromuscular and physiological demands due to its smaller court size, faster tempo, and harder playing surface. These characteristics require players to develop high levels of skill-related fitness components such as agility, speed, power, balance, coordination, and reaction time. Despite these differences, many conditioning programmes applied to futsal athletes are adapted directly from outdoor football models, which may not fully address the sport's specific demands.

Recent research highlights the growing interest in strength and conditioning (S&C) interventions as tools to enhance performance and reduce injury risk in intermittent sports. However, findings in futsal remain fragmented due to variations in training modalities, testing protocols, and participant characteristics. Additionally, inconsistent methodological quality across studies makes it difficult for coaches and practitioners to identify the most effective conditioning strategies for young futsal players.

II. METHODS

A systematic review methodology was adopted following structured search and screening procedures. Relevant studies were identified through electronic databases using predefined keywords related to futsal, strength and conditioning, and skill-related fitness. Inclusion criteria required experimental or quasi-experimental studies involving futsal players exposed to structured S&C interventions with pre- and post-intervention outcomes. A total of 12 studies involving 327 participants met the eligibility criteria. Interventions ranged from four to twelve weeks, typically consisting of two to three weekly training sessions. Programmes included resistance training, plyometrics, speed and agility drills, and combined training models. Study quality was evaluated using standard appraisal frameworks, and findings were synthesised narratively due to methodological heterogeneity.

III. RESULTS AND DISCUSSION

Many reviewed studies demonstrated significant improvements in agility following structured strength and conditioning interventions. Players consistently showed faster change-of-direction performance in post-tests compared to baseline assessments. These improvements were linked to multidirectional plyometric drills and neuromuscular training that enhanced eccentric strength and intermuscular coordination. Recent sport science literature highlights that sport-specific plyometric and agility-based conditioning improves braking ability and directional efficiency in small-sided sports [5][6]. These findings support the role of targeted S&C programmes in improving agility performance among futsal players.

Moderate improvements in balance and coordination were observed across several interventions, particularly those integrating core stability and proprioceptive exercises. Enhanced postural stability and improved motor control were reported in studies incorporating unstable surface training and neuromuscular control drills. Recent evidence suggests that neuromuscular training improves sensorimotor integration and dynamic stability in team sports [3]. However, variability in effect sizes across studies suggests that longer intervention periods may be required to achieve substantial improvements in balance and coordination among futsal players.

Speed and power demonstrated the most consistent improvements across the reviewed literature. Players exhibited faster sprint times and enhanced explosive performance in vertical jump and repeated sprint-tests following S&C interventions. These adaptations are commonly associated with increased lower-limb strength and improved rate of force development resulting from resistance and plyometric training. Recent systematic reviews confirm that combined strength–plyometric training significantly enhances sprint acceleration and explosive power in intermittent sport athletes [3][4]. Given the high-intensity intermittent demands of futsal, improvements in speed and power are critical for repeated sprint performance and match transitions.

Reaction time showed smaller, yet meaningful improvements compared with other fitness components. Studies incorporating reactive agility

drills and perceptual-motor training reported faster responses to visual stimuli following training interventions. These adaptations are likely influenced by improvements in neuromuscular readiness and perceptual-cognitive processing. Emerging research indicates that integrating cognitive-motor training with physical conditioning enhances decision-making speed and responsiveness in fast-paced sports [1][2] However, the limited number of futsal-specific studies highlights the need for further research focusing on perceptual training in indoor team sports.

Despite increasing interest in strength and conditioning (S&C) for futsal, several gaps remain in the literature. Many studies focus on general team-sport athletes rather than futsal-specific populations, limiting sport-specific applicability. Additionally, previous research often examines isolated performance components, with limited integrative evidence on how S&C programmes influence multiple attributes, such as agility, coordination, and power, simultaneously. Most interventions are also short term, providing insufficient insight into long-term adaptations. Furthermore, there is a lack of research involving Asian futsal players, reducing regional relevance. Therefore, this study addresses these gaps by evaluating the effects of a structured S&C programme on multiple performance components among futsal players.

IV. CONCLUSIONS

This systematic review demonstrates that strength and conditioning interventions can improve key skill-related fitness components among male futsal players, particularly agility, speed, and power. However, evidence remains limited for balance, coordination, and reaction time due to insufficient data. Future research should employ larger samples, longer intervention periods, and standardised testing protocols to strengthen the evidence base and support the development of futsal-specific conditioning guidelines.

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Notational Analysis of The Technical Characteristics of Lee Zii Jia from the Quarter-Final to Final Matches at The Sathio Group Australian Open 2024

Siti Nadzratul Kanan¹, Muhamad Noor Mohamed¹, Mohd Aizzat Adnan¹, & Muhamad Safiq Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: Badminton, Notational Analysis, Performance Analysis, Performance Indicators

I. INTRODUCTION

Badminton is one of the most dynamic and challenging racket sports in the world and requires a specific combination of physical ability, technical skill, tactical intelligence, and psychological strength from its athletes. At the elite level, the difference between winning and losing is often determined by small variations in technical performance and tactical execution. Notational analysis provides a structured approach to recording and interpreting match data, including performance indicators and success and error rates. This method helps coaches, sport analysts, and researchers gain deeper insights into the factors that contribute to success on the court [1]. Notational analysis has also helped identify trends and strategies that differentiate top performers from their peers [2]. In addition, performance analysis is an important subdiscipline of sport science that assesses sport performance through objective data to inform practitioner decision-making [3].

The objective of this study was to identify and compare the frequencies and effectiveness of technical characteristics between Lee Zii Jia and his opponents. This study conducted a notational analysis of Lee Zii Jia's performances from the quarter-final to the final match of the Sathio Group Australian Open 2024 by examining eight performance indicators: serve, smash, drive, clear, drop, lob shot, net shot, and net kill.

II. METHODS

A purposive sampling technique was used to select the matches for this study, comparing Lee Zii Jia with his opponents. Three matches from the quarterfinal, semi-final, and final were analysed. This study used a notational analysis method to compare technical characteristics. The key technical characteristics analysed were serve, smash, drive, clear, drop, lob, net shot, and net kill. The videos were obtained from the official BWF YouTube channel and analysed using Nacsport software.

III. RESULTS AND DISCUSSION

A non-parametric Mann-Whitney U test was used to analyse the data. This test was used to determine whether there were significant differences in

technical characteristics (serve, smash, drive, drop, clear, lob, net shot, and net kill) between Lee Zii Jia and his opponents.

TABLE I
COMPARISON OF PERFORMANCE INDICATORS BETWEEN PLAYERS

	Mean Rank	p
Serve successful	33	.523
Serve unsuccessful	31.5	.169
Smash successful	37	.79
Smash unsuccessful	19.5	.057
Drop successful	12	.013*
Drop unsuccessful	23.5	.118
Clear successful	39.5	.965
Clear unsuccessful	31	.402
Drive successful	32.5	.506
Drive unsuccessful	40.5	1.00
Lob successful	25	.185
Lob unsuccessful	19.5	.063
Net shot successful	30.5	.401
Net shot unsuccessful	32	.47
Net kill successful	27	.214

Note = significant level was set at $p < 0.05^*$

Table 1 shows the comparison results using Mann-Whitney statistical analysis. The results showed that only one technical characteristic, successful drop shots, was significantly different ($p = .013$), while the other technical characteristics were not significant ($p > .05$). The findings revealed that winning players used lob and net shots more frequently. Their numbers of serves and smashes were similar to those of their opponents. The greater mean number of lobs among winning players (51.44 vs. 43) suggests the strategic use of high, deep shots

to reset rallies and move opponents to the rear court. This may create advantages in court positioning and time, helping the winning player regain control and prepare for offensive moves [4].

In contrast, losing players appeared to perform more drop shots, implying a more defensive or reactive game plan under sustained pressure. This trend supports the theory that sustained offensive pressure compresses the opponent's tactical options, forcing lower-risk play characterised by shorter and safer strokes [5]. Such behaviour is consistent with performance analysis research showing that rally construction in elite men's singles is strongly influenced by court positioning and shot selection, with longer rallies dominated by neutral and control strokes such as clear, lob, and net shots [6][7].

Furthermore, previous studies have observed that lobs and net play have important roles in long rallies, with a high proportion of strokes performed from the rear and front court to manipulate space and fatigue the opponent [4][5]. Overall, these findings highlight the importance of technical consistency in lob and net shots, rather than smash frequency alone, as a possible key determinant of winning performance in high-level men's singles badminton.

IV. CONCLUSIONS

This study indicates that successful performance in elite men's singles badminton is more strongly influenced by technical consistency and tactical precision than by reliance on high-power attacking strokes such as smashes alone. Most stroke efficacy variables, such as success rates for smashes and net kills, did not show large differences between winning and losing players. However, successful drop shots contributed to performance differences. Lee Zii Jia demonstrated stronger performance in successful

drop shots, suggesting that accuracy and tactical precision are important for achieving victory.

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Comparison Between Compression Socks and Normal Socks on Comfort Level and Sports Performance Among Sport Practitioners

Siti Nurulhuda Ahmad Jani^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022615982@student.uitm.edu.my

Keywords: Compression Socks, Sports Performance, Comfort Level, Bleep Test, Tropical Climate, University Athletes

I. INTRODUCTION

The use of compression socks has become popular among sports enthusiasts and athletes because of the assumption that they may improve athletic performance and comfort during physical exercise. These garments apply graduated pressure to the lower legs, which may theoretically enhance blood circulation, reduce muscle vibration, and support proprioception. However, scientific evidence supporting these claims remains inconclusive and inconsistent. This uncertainty is further complicated by the fact that most published research has been conducted in temperate regions. Less is known about the use of compression socks in tropical environments such as Malaysia, where ambient temperature and humidity may influence both comfort and performance outcomes.

II. METHODS

A randomised crossover experimental design was employed, allowing each participant to serve as their own control and thereby minimizing inter-individual variability. Nineteen physically active university students ($n=19$) aged between 21 and 25 years were recruited for the study. All participants met the inclusion criteria of running at least three times per week and being free from cardiovascular disease symptoms, as confirmed by the Physical Activity Readiness Questionnaire (PAR-Q).

The six-week experimental procedure was systematically structured into distinct phases. Following recruitment and baseline testing, participants underwent two intervention phases: wearing Decathlon KIPRUN 900 compression socks (providing 20-25 mmHg graduated compression) and wearing Decathlon RUN900 Mid normal running socks. A one-week washout period was implemented between phases to eliminate potential carry-over effects. During each phase, participants completed the Multistage Fitness Test (Bleep Test) three times per week to assess aerobic performance, followed immediately by a comfort level questionnaire adapted from previous studies, which measured thermal comfort, tactile comfort, and fit comfort using a Likert scale.

Data were analysed using Jamovi statistical software. Descriptive statistics summarised

demographic characteristics and performance outcomes, while paired sample t-tests were employed to determine significant differences between sock conditions for both performance and comfort variables.

III. RESULTS AND DISCUSSION

A total of 19 physically active university students aged between 21 and 25 years participated in this randomised crossover study. All participants completed both experimental conditions: wearing compression socks and wearing normal socks during the Multistage Fitness Test (Bleep Test). Descriptive statistics were computed for both performance and comfort level outcomes under each condition.

TABLE I
DESCRIPTIVE STATISTICS FOR BLEEP TEST PERFORMANCE

Variable	<i>M</i>	<i>SD</i>	<i>n</i>
Normal Socks	5.3	0.922	19
Compression Socks	5.99	0.909	

The descriptive statistics indicated that participants recorded a higher mean Bleep Test score when wearing compression socks ($M = 5.99$, $SD = 0.909$) than when wearing normal socks ($M = 5.30$, $SD = 0.922$). Conversely, comfort ratings were slightly higher for normal socks ($M = 3.69$, $SD = 0.477$) than for compression socks ($M = 3.54$, $SD = 0.545$), suggesting that normal socks were perceived as slightly more comfortable during exercise.

A paired-samples t-test was conducted to determine whether the observed difference in Bleep Test performance between sock conditions was statistically significant. The results showed that compression socks produced higher performance scores, but the difference was not statistically significant, $t(18) = -1.92$, $p = .071$. The normality test for the difference scores was non-significant ($W = 0.934$, $p = .201$), indicating that the assumption of normality was not violated and that a parametric test was appropriate. A second paired-samples t-test was conducted to compare self-reported comfort levels between the two sock conditions. The analysis showed no statistically significant difference in comfort ratings, $t(18) = 1.44$, $p = .167$, indicating that perceived comfort did not differ significantly

between compression and normal socks. Normality was again met (Shapiro–Wilk $W = 0.965$, $p = .662$). Notably, compression socks showed greater variability in comfort scores ($SD = 0.545$) and a lower minimum rating, suggesting that although average ratings were comparable, some participants experienced greater discomfort when wearing compression socks.

This study compared compression socks and normal socks in terms of comfort level and sports performance among university sport practitioners in Malaysia's tropical climate. The findings showed no statistically significant differences between the two sock types for either dependent variable. The performance results are consistent with the inconclusive evidence in the literature. Although participants achieved a higher mean Bleep Test score when wearing compression socks ($M = 5.99$) than when wearing normal socks ($M = 5.30$), the difference was not statistically significant ($p = .071$). This near-significant result may indicate a possible performance effect of compression socks, which might be detected with a larger sample. This interpretation is partly consistent with past study who reported improved running performance when wearing compression socks.

The comfort findings provide important tropical-specific insight. The absence of a significant difference between sock types ($p = .167$), together with the slightly lower mean comfort rating for compression socks, suggests that compression sportswear in a tropical climate may create a warmer and more humid microclimate, contributing to thermal discomfort. The comfort ratings for compression socks were also more variable ($SD = 0.545$) than those for normal socks ($SD = 0.477$), indicating individual differences in response to compression. These findings may be interpreted using the climate mediation perspective suggested by [4] In Malaysia's thermal environment, the thermal penalty of compression garments may offset any potential biomechanical or circulatory benefit, which may explain why the performance effect was not statistically significant and why comfort ratings favoured normal socks.

Several limitations should be considered. The sample size of 19 participants was statistically acceptable but relatively small, which may have limited the ability to detect small effect sizes. Although the Bleep Test is a validated field test, it may not fully represent sport-specific performance outcomes. In addition, the subjective measurement of comfort may introduce response bias.

IV. CONCLUSIONS

Overall, this study found no statistically significant difference in comfort or performance between compression socks and normal socks among university athletes. Although compression socks

produced slightly higher performance scores, the difference was not statistically significant. Comfort levels also did not differ significantly between sock types, and no relationship was observed between performance and comfort. These findings suggest that compression and normal socks do not substantially influence comfort or performance among active young adults in Malaysia's tropical environment. Therefore, the choice between compression and normal socks may be based on personal preference rather than expected improvements in comfort or performance.

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The Effect of Caffeine, Glucose, and Combined Caffeine-Glucose Mouth Rinsing on Vertical Jump Performance Among Male Amateur Volleyball Players

Wan Amirul Aidid Wan Nazari^{1*}, & Adam Linoby Feizrel Linoby¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2022615662@student.uitm.edu.my

Keywords: Mouth Rinsing, Vertical Jump, Caffeine, Glucose, Volleyball, Placebo, Stimulation, Ergogenic

I. INTRODUCTION

Mouth rinsing stimulates oral receptors that activate brain regions associated with motor control and performance enhancement. Carbohydrate and caffeine mouth rinsing have been shown to improve strength and muscular performance without ingestion [1]. Caffeine, even at very low to moderate doses, has demonstrated significant ergogenic effects on vertical jump performance [2]. Additionally, combining caffeine with other ergogenic aids may enhance performance through complementary mechanisms [3]. Therefore, this study investigated whether caffeine, glucose, or their combination via mouth rinsing could improve vertical jump height among male amateur volleyball players.

II. METHODS

Twelve male amateur volleyball players aged 18–25 years participated in four testing sessions using a randomised repeated-measures design. The conditions were placebo, glucose (6.4%), caffeine (1.2%), and caffeine–glucose (1.2% + 6.4%), each separated by a 48-hour washout period. Participants rinsed 25 mL of solution for 10 seconds before performing three countermovement jumps on a Vertec device, which measures vertical jump height.

III. RESULTS AND DISCUSSION

Table 1 shows a steady increase in jump height from placebo to caffeine–glucose. The mean jump height improved from 31.9 ± 1.80 cm (placebo) to 32.5 ± 1.76 cm (glucose), 33.8 ± 1.77 cm (caffeine), and 34.7 ± 1.59 cm (caffeine–glucose). The improvement observed in the caffeine condition supports previous findings that caffeine enhances explosive performance [2]. The modest increase in the glucose condition is consistent with evidence that carbohydrate mouth rinsing can stimulate central drive and improve muscular performance [1].

A significant main effect of condition was found, $F(3, 33) = 336.0$, $p < 0.001$, $\eta^2_p = 0.968$, suggesting that approximately 96.8% of the variance in vertical jump performance was explained by the experimental condition, reflecting a very strong treatment effect. (Table 2). The caffeine–glucose combination produced the greatest improvement, suggesting a possible additive effect, similar to findings where

caffeine combined with another ergogenic substance enhanced muscular performance [3].

TABLE I
DESCRIPTIVE ANALYSIS

	Placebo (cm)	Glucose (cm)	Caffeine (cm)	Caffeine– Glucose (cm)
N	12	12	12	12
Mean	31.9	32.5	33.8	34.7
Standard deviation	1.80	1.76	1.77	1.59
Minimum	28.4	29.7	30.4	31.5
Maximum	35.1	35.9	36.7	37.4

TABLE II
WITHIN SUBJECT EFFECT

	Sum of Squares	df	Mean Square	F	p	η^2_p
CONDITION	56.34	3	18.7785	336	<.001	0.968
Residual	1.85	33	0.0560			

IV. CONCLUSIONS

Both caffeine and caffeine–glucose mouth rinses significantly improved vertical jump height compared with placebo and glucose alone. The combined rinse yielded the greatest performance gain, likely due to complementary effects on central stimulation and motivation. Mouth rinsing offers a simple, safe, and effective non-ingestive method to enhance explosive power in amateur volleyball players.

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The Interplay Between Time Management and Academic Achievement Among Sport Students

Yasmin Nur Hani Asmadi¹, Hasmiza Abdul Majeed^{1*}, Mohammad Adzly Rajli¹, Wahidah Tumijan¹,
Rozita Abdul Latif¹, & Azman Ahmad Tajri¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus,
Malaysia

*Corresponding author: hasmiza@uitm.edu.my

Keywords: Time Management, Academic Achievement, Gpa, Sport Students, University Students

I. INTRODUCTION

Life as a university sports student is challenging, as students must manage multiple roles involving their studies, curriculum activities, and participation in various academic and sports programmes. In view of this situation, they are at risk of experiencing several negative outcomes, including poor academic performance and academic burnout. One way to address this issue is through effective time management. A past study reported a significant relationship between undergraduate students' time management behaviour and academic performance [1]. Recognising that time management is important for interventions aimed at enhancing students' academic performance, the present study aimed to examine the relationship between time management behaviour and academic performance among sports students, a group exposed to multiple-role stress. The results may assist in planning better support strategies to promote students' academic success.

II. METHODS

The present study employed a quantitative correlational design. A total of 167 undergraduate sports students from FSR Seremban 3 volunteered to participate in this study. Time management behaviour was measured using the Time Management Questionnaire (TMQ) by Britton and Tesser (1991) [2]. Academic achievement was measured using Grade Point Average (GPA). Data analysis involved descriptive statistics, including frequency, percentage, mean, and standard deviation. Spearman's rho correlation test was used to measure the relationship between time management and academic achievement among FSR Seremban 3 sports students.

III. RESULTS AND DISCUSSION

Descriptive analysis showed that most students had a moderate level of time management (56.3%), indicating that while they possessed some organisational and planning skills, there remained room for improvement in optimising their time use. A substantial proportion, 60 students (35.9%), reported a low level of time management, suggesting challenges in effectively managing academic and athletic responsibilities, which may affect academic performance. Only 13 students (7.8%) exhibited a

high-level of time management, reflecting strong skills in planning, prioritising, and executing tasks efficiently. For the three dimensions of time management, the mean scores were moderate: setting goals and priorities ($M = 3.33$, $SD = 0.73$), time allocation ($M = 3.36$, $SD = 0.65$), and long-range planning ($M = 3.25$, $SD = 0.54$). The differences across the three dimensions were not substantial.

Most respondents, 83 students (49.7%), had a high GPA, indicating that they performed well academically despite the pressures of sport and academic work. A further 68 students (40.7%) had a moderate GPA, suggesting adequate academic performance with potential for improvement through stronger time management skills. The low GPA category comprised only 16 students (9.6%), indicating that a small minority may be underperforming academically and may require specialised attention.

The Spearman correlation coefficient between time management and academic performance was -0.048 , with a significance value of $p = 0.534$. This outcome indicates a very weak and statistically insignificant negative relationship between time management and academic performance among FSR Seremban 3 sports students. This finding highlights those other more dominant factors, such as motivation, study skills, and self-discipline, may also influence students' achievement.

IV. CONCLUSIONS

This study emphasises that time management is not the sole or primary factor determining academic achievement among sports students. These findings imply that higher education institutions should not focus student development programmes solely on time management skills. Instead, a more holistic approach is recommended, including stress management training, academic motivation enhancement, and structured academic guidance.

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Gender Differences in Burnout Levels Among University Student-Athletes: A Comparative Study

Zaidatul Asyura Md Yusof¹, Noor Azila Azreen Md Radzi¹, Mardiana Mazaulan¹, Raja Nurul Jannat Raja Hussain¹, & Muhamad Safiq Bin Saiful Annur^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: msafiq@uitm.edu.my

Keywords: Athlete Burnout, Gender Differences, University Student-Athletes

I. INTRODUCTION

University student-athletes must balance academic demands with competitive sport participation, exposing them to increased psychological and physical stress that may contribute to burnout [1][2]. Athlete burnout is conceptualised as a multidimensional syndrome consisting of emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation [3]. International research has reported gender differences in burnout experiences, with variations observed in emotional exhaustion and sport devaluation across male and female athletes [4]. However, empirical evidence within the Malaysian university sport context remains limited. The absence of localised gender-specific data constrains the development of targeted psychological support interventions for student-athletes. Therefore, this study aimed to examine gender differences in burnout levels among university student-athletes at UiTM Seremban 3, Negeri Sembilan, Malaysia.

II. METHODS

A quantitative cross-sectional comparative design was used. Participants were 80 university student-athletes (38 females and 42 males) aged 18–25 years selected through purposive sampling. Burnout levels were assessed using the Athlete Burnout Questionnaire (ABQ), which measures emotional exhaustion, reduced sense of accomplishment, and sport devaluation using a 5-point Likert scale. Data were analysed using Jamovi software. Descriptive statistics were computed to determine burnout levels, and independent samples t-tests were conducted to examine gender differences at a significance level of 0.05.

III. RESULTS AND DISCUSSION

Female student-athletes demonstrated slightly higher mean scores than males across all burnout dimensions. A statistically significant gender difference was identified only in reduced sense of accomplishment ($p = 0.046$), indicating that female athletes experienced stronger feelings of inefficacy and unmet achievement in sport. Similar gender-related trends have been reported in previous burnout research, where female athletes often report higher perceptions of reduced accomplishment compared

with males [4]. No significant gender differences were found for emotional exhaustion or sport devaluation, suggesting comparable fatigue levels and sport attitudes between genders, a pattern also observed in some collegiate athlete populations [6].

These findings suggest that gender differences in burnout among Malaysian university student-athletes may be dimension-specific rather than global. The higher reduced sense of accomplishment among females may relate to greater self-evaluative tendencies and perceived performance pressures documented in athlete burnout literature [1]. Conversely, similar levels of exhaustion and sport devaluation indicate that academic and training demands may affect male and female athletes similarly within the university sport environment [2].

TABLE I
GENDER DIFFERENCES IN ATHLETE BURNOUT DIMENSION

	Gender	N	M	SD	<i>t</i>	<i>p</i>
Reduced Sense of Accomplishment	Female	38	2.92	0.714	2.03	.046*
	Male	42	2.60	0.678		
Emotional Exhaustion	Female	38	2.93	0.926	0.5	.622
	Male	42	2.83	0.932		
Sport Devaluation	Female	38	2.75	0.939	1.08	.288
	Male	42	2.52	0.962		

IV. CONCLUSIONS

This study found that female university student-athletes reported a significantly higher reduced sense of accomplishment than males, while emotional exhaustion and sport devaluation showed no gender differences. The findings highlight the importance of gender-sensitive psychological support in university sports, particularly interventions aimed at strengthening perceived competence and achievement among female athletes. This research provides localised evidence on athlete burnout in Malaysian higher education and supports the development of targeted mental health strategies for student-athletes.

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Comparison of Stress Level Between Student-Athletes and Non-Student-Athletes in UiTM Seremban 3

Zulaikha Mustazam¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹,
Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Stress Level, Perceived Stress, Student-Athlete, Non-Student-Athlete, UiTM

I. INTRODUCTION

Stress is a psychological response that occurs when individuals perceive that environmental demands exceed their coping abilities. University students commonly experience stress due to academic workload, examinations, time constraints, and social responsibilities. Student-athletes may also encounter additional stressors, such as training commitments, competitions, performance expectations, injuries, and pressure from coaches.

Previous studies have reported mixed findings regarding stress levels between student-athletes and non-student-athletes. Some research suggests that sports participation serves as a protective factor against stress, while other studies indicate that dual academic-athletic roles increase psychological burden. Therefore, this study aimed to compare perceived stress levels between student-athletes and non-student-athletes in UiTM Seremban 3.

II. METHODS

This study employed a descriptive survey design to compare perceived stress levels between student-athletes and non-student-athletes at Universiti Teknologi MARA (UiTM) Seremban 3. A total of 350 respondents were selected through purposive sampling. Perceived stress was measured using the Malaysian Perceived Stress Scale (M-PSS-10). Data were analysed using descriptive statistics and an independent-samples t-test, with significance set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The overall mean perceived stress score among respondents was $M = 16.0$ ($SD = 3.99$), indicating a moderate level of perceived stress among students at University Teknologi MARA (UiTM) Seremban 3. Student-athletes recorded a mean stress score of $M = 14.6$ ($SD = 3.49$), whereas non-student-athletes recorded a higher mean score of $M = 18.8$ ($SD = 4.02$). However, the independent-samples t-test revealed that the difference in perceived stress levels between the two groups was not statistically significant ($p > 0.05$).

Although non-student-athletes demonstrated a higher mean stress score descriptively, the absence of statistical significance indicates that both groups

experienced comparable levels of stress. This suggests that stress among university students may be influenced more by academic workload, personal responsibilities, and transitional life challenges than by athletic involvement alone. While student-athletes face additional sport-related demands such as training commitments and performance expectations, sports participation may also provide psychological benefits, including stress relief and social support. Therefore, involvement in competitive sports does not necessarily result in significantly higher or lower perceived stress levels compared with non-student-athletes.

TABLE I
DESCRIPTIVE OF STRESS LEVEL

	Athlete status	N	Mean	SD	SE	p
TOTAL	Non-Student Athlete	123	18.8	3.40	0.306	0.001
	Student Athlete	227	14.6	3.49	0.231	0.001

Table I shows the perceived stress scores for student-athletes and non-student-athletes. Student-athletes ($n = 227$) recorded a mean score of 14.6 ($SD = 3.49$), while non-student-athletes ($n = 123$) recorded a higher mean score of 18.8 ($SD = 4.02$). Although non-student-athletes recorded a higher mean score descriptively, the independent-samples t-test indicated that the difference in perceived stress levels between the two groups was not statistically significant ($p > 0.05$).

IV. CONCLUSIONS

This study concluded that there was no significant difference in perceived stress levels between student-athletes and non-student-athletes in UiTM Seremban 3. Both groups experienced moderate levels of stress. The findings suggest that stress management interventions should be implemented for all students, regardless of athletic status. Institutional support programmes focusing on mental health awareness, stress management strategies, and academic-life balance are recommended to enhance students' overall well-being and performance.

The findings suggest that stress management interventions should be implemented for all students, regardless of athletic status. Institutional support programmes focusing on mental health awareness, stress management strategies, and academic-life balance are recommended to enhance students' overall well-being and performance.

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Comparison Between Student-Athletes and Non-Student-Athletes on Time Management and Academic Performance

Zulaikha Mustazam¹, Aizzat Adnan¹, Adam Linoby¹, Razif Sazali¹, Muhammad Zulqarnain¹,

Yusandra Md Yusof¹, & Muhammad Amrun Haziq Abidin^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: amrun@uitm.edu.my

Keywords: Time Management, Academic Performance, Student-Athlete, UiTM

I. INTRODUCTION

Time management plays a significant role in determining academic success in higher education. Student-athletes must balance academic responsibilities with structured training and competition schedules, which may influence how they manage their time compared with non-student-athletes. This study aimed to compare time management skills and academic performance between student-athletes and non-student-athletes, and to examine the relationship between time management and academic performance among undergraduate students at UiTM Seremban 3.

II. METHODS

This study used a quantitative causal-comparative research design. A total of 204 undergraduates aged 18 to 25 years participated in the study. The questionnaire comprised demographic information, self-reported CGPA, and the Time Management Questionnaire (TMQ) by Britton and Tesser (1991). Group comparisons were conducted using independent-samples t-tests, while Pearson correlation analysis was used to measure the relationship between the variables. Statistical analysis was conducted using Jamovi software.

III. RESULTS AND DISCUSSION

This study examined whether time management and academic performance differed between student-athletes and non-student-athletes. The findings are presented according to the objectives of the study. Student-athletes ($M = 3.51$, $SD = 0.47$) demonstrated significantly higher time management skills than non-student-athletes ($M = 3.25$, $SD = 0.58$), $t(202) = -3.51$, $p < .001$. However, no significant difference was found in academic performance between student-athletes ($M = 2.81$, $SD = 0.45$) and non-student-athletes ($M = 2.79$, $SD = 0.41$), $t(201) = -0.456$, $p = .649$. A significant positive correlation was found between time management and academic performance, $r(202) = .315$, $p < .001$.

The results showed that student-athletes had significantly higher time management skills than non-student-athletes. Training routines and competitive commitments may encourage structured scheduling, discipline, and goal-setting patterns [1].

Similarly, previous work indicates that student-athletes develop adaptive time management strategies to manage both academic and athletic demands [2]. Although the two groups differed in time management skills, there was no significant difference in academic performance. This suggests that sport participation does not negatively influence academic performance when effective self-regulation strategies are used. In addition, the significant positive relationship between time management and academic performance is consistent with previous literature showing that systematic planning and priority setting are associated with academic achievement [3].

TABLE I
DESCRIPTIVE OF TIME MANAGEMENT

	Athlete status	N	Mean	SD	W	p
TM	NSA	113	3.25	0.581	0.946	0.001
	SA	91	3.51	0.471	0.942	0.001

Table I shows the descriptive statistics for time management. Non-student-athletes ($N = 113$) recorded a mean score of 3.25 and a standard deviation of 0.581, indicating moderate variation in responses. Student-athletes ($N = 91$) recorded a higher mean score of 3.51 and a standard deviation of 0.471, indicating slightly more consistent responses than non-student-athletes. The Shapiro-Wilk test indicated significant results for both groups ($W = 0.946$ for non-student-athletes and $W = 0.942$ for student-athletes), with $p < .001$, which was lower than the significance level ($\alpha = .05$).

TABLE II
DESCRIPTIVE OF ACADEMIC PERFORMANCE

	Athlete status	N	Mean	SD	W	p
CGPA	NSA	113	2.79	0.411	0.503	0.001
	SA	91	2.81	0.445	0.591	0.001

Table 2 presents the descriptive statistics for academic performance based on athlete status. Non-student-athletes ($n = 113$) recorded a mean academic performance score of 2.79, with a median score of 3.00. Student athletes ($n = 91$) recorded a slightly higher mean score of 2.81, with the same median score of 3.00. These findings indicate a similar overall level of academic performance between both groups. The Shapiro-Wilk normality test showed non-normal distributions for both groups, as the p -values were below the significance level of $\alpha = .05$.

TABLE III
PEARSON CORRELATION MATRIX

		CGPA
TMQ	Pearson's r	0.315
	df	202
	p -value	<.001
	N	204

Table III presents the Pearson correlation analysis between time management and academic performance. The results showed a significant positive relationship between time management and academic performance, $r(202) = .315$, $p < .001$. This indicates that better time management was associated with higher academic performance. The relationship was moderate in strength.

IV. CONCLUSIONS

The findings of this study indicate that student-athletes demonstrated significantly higher time management ability than non-student-athletes, but there was no significant difference in academic

performance between the two groups. These results suggest that sport participation does not negatively affect academic performance when time management is effectively maintained. In addition, the positive relationship between time management and academic performance highlights the importance of organisation and prioritisation among university students. These findings support the implementation of institutional support programmes to strengthen time management skills and facilitate academic achievement.

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The Role of Outdoor Recreation Program in Mental Health Among Hikers at Wawasan Hill, Puchong, Selangor

A'afy Syaabani Kuzaini¹, Aida Roha Abdul Rasid^{1*}, & Radzliana Radzuwan¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: aidaroha@uitm.edu.my

Keywords: Outdoor Recreation, Mental Health, Depression, Anxiety, Stress

I. INTRODUCTION

Mental health issues like depression, anxiety, and stress are notably increasing, including in Malaysia. Nature-based interventions, particularly outdoor activities such as hiking, may enhance psychological well-being by providing physical activity, social engagement, and exposure to nature. This study focused on the effects of outdoor recreation programs on hikers at Wawasan Hill, Puchong, Selangor, with objectives to identify key factors of outdoor experiences, assess levels of depression, anxiety, and stress among hikers, analyze gender differences in mental health, and explore the connection between outdoor recreation and mental health outcomes.

II. METHODS

A structured questionnaire was distributed via Google Form to hikers at Wawasan Hill as part of this study's quantitative research approach, and 296 valid responses were obtained. Three elements comprised the instrument: the Depression Anxiety Stress Scale (DASS-21), a 21-item Recreation Experience Preference (REP) scale, and a demographic profile. The data was analyzed using SPSS Version 31, which used Pearson chi-square analysis to examine the association between outdoor recreation programs and mental health, an independent t-test for gender differences, and descriptive statistics to summarize factors.

III. RESULTS AND DISCUSSION

A. Outdoor Recreations Programs

Achievement recorded the highest mean score ($M = 4.24$, $SD = 0.752$), followed by skill development ($M = 4.18$, $SD = 0.734$), family togetherness ($M = 4.04$, $SD = 0.830$), social recognition ($M = 3.87$, $SD = 0.865$), and escaping family ($M = 3.83$, $SD = 0.883$). These findings indicate that hikers primarily engage in outdoor recreation for personal accomplishment and skill enhancement rather than avoidance motives.

B. Mental Health

For depression, 35.1% of hikers were normal, while 64.9% faced varying degrees of severity. Anxiety was more pronounced, with 39.9% reporting extremely severe levels, making it the leading mental health issue. Stress levels were predominantly normal (35.8%) to moderate (32.1%), indicating

hiking may positively influence stress management compared to depression and anxiety.

C. Gender Differences in Mental Health

An independent t-test indicated no significant difference in mental health scores between male ($M = 4.02$, $SD = 0.672$) and female hikers ($M = 4.06$, $SD = 0.753$), $p > 0.05$, suggesting gender does not significantly influence mental health outcomes among hikers at Wawasan Hill.

D. Outdoor Recreation Programs-Mental Health Relationship

Pearson chi-square analysis found no significant relationship ($p < 0.001$) between outdoor recreation program and mental health scores. Despite the psychological benefits of outdoor recreation, mere participation may effectively reduce depression, anxiety, or stress without structured or therapeutic programming.

TABLE I
OUTDOOR RECREATION PROGRAMS – MENTAL HEALTH
RELATIONSHIP

		MENTAL HEALTH
RECREATION EXPERIENCE PREFERENCE (REP)	PEARSON CHI-SQUARE SIGNIFICANT (2-TAILED)	<0.001 1.000 296

IV. CONCLUSIONS

This study emphasizes outdoor recreation's role in personal achievement and skill development for hikers. Despite high anxiety levels, stress is managed better. No significant gender differences or strong links between outdoor programs and mental health were discovered, indicating that while hiking is beneficial, structured interventions may be necessary for psychological enhancements. The research enhances the understanding of outdoor recreation's impact on community mental health in urban Malaysia.

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The Relationship Between Service Quality and Customer Satisfaction Among Visitors at KOMBES Stadium Panasonic, Shah Alam

Adib Syahmi Eyanto Dsyam Asmady¹, Nur Hani Syazwani Bakri^{1*}, Umami Kalthum Mohd Mokhtar¹, Siti Aida Lamat¹, & Muhammad Wafi A. Rahman¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: hanisyazwani@uitm.edu.my

Keywords: Service Quality, Customer Satisfaction, SERVQUAL, Sports Facilities, KOMBES Stadium Panasonic

I. INTRODUCTION

In a competitive sports industry, service quality in terms of physical facilities and intangible interactions with staff is a major antecedent of customer loyalty [1]. Perceived quality and atmospheric factors are key determinants of visitor satisfaction and behavioural intentions at *Kompleks Belia dan Sukan* (KOMBES) Stadium Panasonic [2][3]. Additionally, it is also necessary to comprehend how demographic differences affect these perceptions to maximize service delivery to ensure long-term patronage [4].

II. METHODS

This study adopts a quantitative correlational research design to examine the relationship between service quality and customer satisfaction. A cross-sectional survey method was employed, using a structured questionnaire to collect data from stadium visitors. This design is suitable for identifying patterns, relationships, and statistical associations between variables. The questionnaire is adapted from a study by Salsabila [5] for Section B and from a study by Yoshida [6] for Section C.

III. RESULTS AND DISCUSSION

A. Service Quality

Positive perceptions of service quality in all five domains at KOMBES Stadium were noted by the visitors. Empathy had the highest mean value of 3.97. Reliability and Tangibility had similar values, indicating the visitors' satisfaction with the facility's operation.

B. Customer Satisfaction

High (77.8%) and moderate (22.2%) satisfaction levels confirm that the stadium's service standards consistently meet or exceed visitor expectations.

C. Relationship Between Service Quality and Customer Satisfaction

The result of the statistical analysis shows a positive and significant relationship between service quality and customer satisfaction ($r = 0.619$, $p < 0.001$). The factors are well-maintained equipment

for training and the cleanliness of the facility, which create a pleasant environment and instil confidence in customers [7][8]. Additionally, the competitive pricing of KOMBES Stadium Panasonic acts as a value-added tool for customers, ensuring that they perceive the service quality as matching their investment [9].

However, these findings are contrary to institutional settings where service dimension factors like physical facilities and staffing do not make any impact. For example, in a study carried out at Universiti Kebangsaan Malaysia, it was found that only assurance and empathy were found to be significant drivers of satisfaction, whereas other factors like physical infrastructure were found to be insignificant [10]. It is evident that although KOMBES can take advantage of its physical environment and pricing, service dimension factors may vary depending upon the sporting context.

TABLE I
PEARSON CORRELATION ANALYSIS

Variable	Service Quality	Customer Satisfaction
Service Quality	-	
Pearson Correlation		0.619
Sig. (2 tailed)		< 0.001
n		108
Customer Satisfaction	-	-
Pearson Correlation	0.619	
Sig. (2 tailed)	< 0.001	
n	108	-

IV. CONCLUSIONS

The results obtained indicate that the customers visiting the KOMBES Stadium have high satisfaction, with the service quality domains having a positive correlation with the overall experience of the visitors to the stadium. Although the highest score was obtained in the aspect of empathy and responsiveness, the lower score obtained in the aspect of physical reliability indicates an important aspect to be improved in the operations of the stadium.

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Exploring The Usage of Artificial Intelligence and Academic Performance Among Students at the Faculty of Sports Science and Recreation (FSR) UiTM Seremban 3

Alif Farhan Jasrie Arman Sany¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, Siti Aida Lamat¹ & Mohamad Firdaus Ahmad^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: firdaus466@uitm.edu.my

Keywords: Artificial Intelligence (AI) Usage, Academic Performance, Availability, Complexity, Functionality

I. INTRODUCTION

This study investigates the impact of artificial intelligence (AI) usage and academic performance among students at the Faculty of Sports Science and Recreation (FSR), UiTM Seremban 3. It explores how AI tools such as ChatGPT, Grammarly, Quill Bot, and Microsoft Copilot influence learning efficiency, confidence, and academic outcomes. The research also considers students' perceptions of AI availability, functionality, and complexity, while addressing concerns about overreliance and ethical boundaries.

II. METHODS

A quantitative research design was employed using a structured questionnaire distributed to 363 students via Google Form. The instrument consisted of 29 items across three domains (availability, functionality, complexity) and academic performance measures. Data were analysed using descriptive statistics and multiple linear regression via Jamovi 2.6.26 software to determine the predictive effect of AI usage on academic performance.

III. RESULTS AND DISCUSSION

A. Artificial Intelligence Usage

The results for AI usage among students at the Faculty of Sports Science and Recreation (FSR) UiTM Seremban 3 showed a mean score of 4.28 ($SD = 0.692$). This indicates a very high level of AI adoption in academic tasks such as writing, editing, and information retrieval. The relatively small standard deviation suggests that responses were closely clustered around the mean, reflecting a consistent perception among students.

B. Academic Performance

The findings for academic performance revealed a mean score of 4.23 ($SD = 0.678$). This demonstrates that students generally reported a very high level of academic achievement, with AI tools contributing to improved confidence, efficiency, and learning outcomes. The low standard deviation indicates limited variability in responses, suggesting that most

students shared similar views regarding their academic performance.

C. Artificial Intelligence Usage on Academic Performance

Regression analysis confirmed that AI usage has a statistically significant effect on academic performance, with $R^2 = 0.74$, $p < 0.001$. This means that AI usage explains 74% of the variance in academic performance, a strong predictive relationship. Among the three domains measured, availability emerged as the strongest predictor, followed by complexity and functionality. The findings support the research hypothesis, demonstrating that AI usage significantly influences academic performance.

TABLE I
MULTIPLE REGRESSION ANALYSIS OF THE IMPACT OF
ARTIFICIAL INTELLIGENCE USAGE DOMAINS TOWARDS
ACADEMIC PERFORMANCE

Model	Unstandardized Coefficient	Standardized Coefficient	t	Sig.
	B	Beta		
Intercept	0.65	-	5.52	0.001
Availability	0.42	0.46	7.73	0.001
Functionality	0.18	0.20	3.46	0.001
Complexity	0.24	0.25	5.55	0.001
R ²	0.74			
Significant	0.001			

IV. CONCLUSIONS

This study highlights the significant effect of artificial intelligence (AI) usage on academic performance among students at the Faculty of Sports Science and Recreation (FSR), UiTM Seremban 3. Both variables were perceived at a very high level, showing that students view AI tools positively and believe these technologies support their studies. Regression analysis confirmed that AI usage has a significant impact on academic performance, suggesting that responsible integration of AI contributes to improved learning outcomes.

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The Relationship Between Mental Toughness Level and Demographic Factors Among Final Camp Students of the Faculty of Sports Science and Recreation, UiTM Seremban 3 Campus

Amir Harith Hilmi Mohamad Hizam¹, Muhammad Wafi A. Rahman^{1*}, Nur Hani Syazwani Bakri¹, Siti Aida Lamat¹, Mohamad Firdaus Ahmad¹, & Nur Syazwani Zulaikha Safwan²

¹*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia*

²*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia*

*Corresponding author: wafiarahman@uitm.edu.my

Keywords: Important Factors of Mental Toughness, Mental Toughness level, Outdoor Participation, University Students, UiTM Seremban 3

I. INTRODUCTION

Mental toughness is the inner strength that allows individuals to remain calm, confident, and focused under pressure. While it has been extensively studied in sports, its role in adventure-based learning environments remains underexplored in the Malaysian context. This study investigates the level of mental toughness and its relationship with demographic factors among Final Camp students at UiTM Seremban 3. The research focused on seven dimensions of the Adventure-based Mental Toughness Inventory (AbMTI): self-confidence, motivation, coping skills, focus, challenge, control, and commitment.

II. METHODS

This study utilized a quantitative, non-experimental research design. A purposive sampling technique was used to select 157 Final Camp students from the Faculty of Sports Science and Recreation (FSR). Data were collected using a structured questionnaire comprising demographic information and the 38-item AbMTI. The instrument demonstrated excellent internal consistency in a pilot study, with Cronbach's Alpha values ranging from 0.967 to 0.974. Statistical analysis was conducted using JAMOVI software, employing descriptive statistics (mean and standard deviation), Chi-square tests for relationships, and Welch's One-Way ANOVA for group differences.

III. RESULTS AND DISCUSSION

A. Important Factors of Mental Toughness

To identify mental toughness levels, descriptive analysis was conducted. Results showed a "very high" overall level, with Self-Confidence, Motivation, and Commitment recording the highest mean scores ($M = 4.33$). While Focus was the lowest ($M = 4.27$), it still reflected a high degree of agreement. These findings suggest that students are

psychologically well-prepared for the Final Camp, with internal drive and confidence being their most dominant strengths.

B. Mental Toughness Level

Descriptive analysis showed a "very high" mental toughness level ($M = 4.31$, $SD = 0.377$). These results indicate that respondents possess exceptional psychological resilience with high consistency in their responses. This suggests that the Final Camp environment successfully fosters a uniform level of mental strength among students, regardless of individual differences.

C. Outdoor Participation and Mental Toughness

Chi-square results showed no significant relationship between outdoor activity frequency and mental toughness ($p = .142$). This indicates that mental toughness levels are uniform across participants, suggesting that the intensive nature of the Final Camp itself drives resilience more than prior experience.

TABLE I
CHI SQUARE TEST OUTPUT

Test	Value	df	p
χ^2	6.90	4	0.142
N	152		

D. Difference of Mental Toughness in Terms of Age

A Welch's one-way ANOVA was conducted to examine differences in mental toughness based on age. Results showed no significant difference across age groups ($p = 0.581$), indicating that mental toughness levels are uniform. Contrary to expectations, younger students were as mentally tough as older ones, suggesting that factors like training environment and exposure to challenges influence resilience more than age itself.

TABLE II
ONE WAY ANOVA TEST OUTPUT

Variable	F	df1	df2	p
Mental Toughness	0.572	2	10.3	0.581

IV. CONCLUSIONS

Final Camp students at UiTM Seremban 3 generally show a very high level of mental toughness, especially in terms of self-confidence and motivation. The results also show that age and frequency of outdoor activities do not significantly affect their mental toughness. This indicates that the structured and challenging learning environment in the Faculty of Sports Science and Recreation (FSR) may play a key role in shaping students' resilience.

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The Relationship Between Financial Literacy and Spending Habits Among FSR Students

Amira Fathanah Damia Mohd Ariff¹, Mohammad Adzly Rajli^{1*}, Rozita Abdul Latif¹,
Nur Hani Syazwani Bakri¹, Umami Kalthum Mohd Mokhtar¹, Siti Aida Amat¹, & Azlina Zid²

¹Faculty of Sport Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Shah Alam Campus, Selangor Darul Ehsan, Malaysia

*Corresponding author: adzly6672@uitm.edu.my

Keywords: Financial Literacy, Spending Habits, Financial Education, Financial Socialization, University Students

I. INTRODUCTION

Financial literacy is important for students. Students must manage their own money. They need to pay for fees and daily needs. They also spend money on online shopping. If they do not have good financial knowledge, they may spend too much money. In Malaysia, many young people have money problems. Living costs are higher now. It is also easy to use credit. FSR students may have unstable income in the future. For example, they may work as coaches or freelancers. This study aims to determine the level of financial literacy among FSR students. It also looks at their spending habits. Lastly, it studies the relationship between financial literacy and spending habits.

II. METHODS

This study employed a quantitative research method using a Google Form survey and collected data from 326 students at UiTM Seremban 3. Data were analysed using descriptive analysis and inferential analysis (Spearman Correlation) to examine the relationship between Financial Literacy and Spending Habits Among FSR Students.

III. RESULTS AND DISCUSSION

A. Financial Literacy

The findings indicate that the overall level of Financial Literacy among FSR students is moderate. Financial Education recorded the highest mean score ($M = 3.17$, $SD = 1.19$), followed by Financial Attitude ($M = 2.95$, $SD = 1.20$) and Financial Socialization ($M = 2.88$, $SD = 1.18$).

TABLE I
DESCRIPTIVE ANALYSIS

B. Spending Habits

Financial Literacy Dimension	Mean	Standard Deviation (SD)
Financial Education	3.17	1.19
Financial Attitude	2.95	1.20
Financial Socialization	2.88	1.18

Spending habits were also found to be at a moderate level ($M = 3.15$, $SD = 1.09$), suggesting that students demonstrate relatively balanced financial behaviour.

TABLE II
DESCRIPTIVE ANALYSIS OF SPENDING HABITS AMONG FSR STUDENTS

	Mean	Standard Deviation (SD)
Spending Habits	3.15	1.09

C. Financial Literacy and Spending Habits

Spearman correlation analysis revealed a very weak and non-significant relationship between overall financial literacy and spending habits ($r = 0.075$, $p = 0.174$). However, financial socialization showed a statistically significant positive relationship with spending habits ($r = 0.249$, $p < .001$), while financial education and financial attitude were not significant. These findings suggest that social influences such as family and peers play a more important role in shaping students' spending behaviour compared to financial knowledge alone.

TABLE III
CORRELATION BETWEEN FINANCIAL LITERACY AND SPENDING HABITS

		Spending Habits
Financial Literacy	Spearman's r	0.075***
	P value	0.174
	N	326

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IV. CONCLUSIONS

In conclusion, both financial literacy and spending habits among FSR students are moderate. Financial knowledge alone does not significantly influence spending habits. Instead, social influence is a stronger factor affecting how students manage their

money. Therefore, universities should focus not only on financial knowledge but also on behavioural and social aspects when designing financial education programs.

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Exploring The Motivational Factor Influencing Spectator Attendants at The Malaysia Men's Football Match at Stadium National Bukit Jalil

Amirul Aqil Syahrizal¹, & Muhammad Asraf Zulzali^{1*}

¹Faculty of Sport Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: asrafzulzali@uitm.edu.my

Keywords: Spectator Attendants, The Motivational Factor, Loyalty Fans, Malaysian Football

I. INTRODUCTION

This aim is to explore the motivational factors influencing spectator attendance at the Malaysia Men's football match at Stadium National Bukit Jalil. Football in Malaysia is not only a popular sport but also serves as a cultural and economic driver where fan engagement shapes match atmosphere, team performance, and club revenue. Despite various initiatives to promote sport participants' declining attendance, there is a need to understand key motivational factors such as entertainment loyalty and social interaction.

II. METHODS

This study employed a quantitative research method using a Google Form survey distributed to 370 spectator attendants at Stadium National Bukit Jalil. Data were analysed using descriptive statistics and Pearson correlation to predict the motivational factors influencing spectator attendants at Stadium National Bukit Jalil.

III. RESULTS AND DISCUSSION

A. The Motivational Factor

The results show that the motivational factor with the highest mean score was FOE ($M = 4.19$), FOEST ($M = 4.15$), and FOG ($M = 4.09$). These results suggest that fans are primarily motivated by the enjoyment and excitement of the match, the personal sense of pride and identity gained from supporting their team, and the social connection formed through shared experience with other supporters.

TABLE I
THE MOTIVATIONAL RESULT

Factor	Mean	SD
Entertainment	4.19	0.839
Self-Esteem	4.15	0.880
Group	4.09	0.783
Eustress	4.04	0.841
Escape	3.98	0.952
Aesthetics	3.88	0.929

B. Sport Fandom

The sport fandom analysis shows that the mean score was 3.91, indicating that spectators generally demonstrate a strong level of attachment and

enthusiasm toward Malaysian football. The relatively high score reflects consistent emotional investment and loyalty among fans, suggesting that fandom plays a significant role in sustaining attendance and engagement. The reliability value of 0.961 further confirms that the measurement is highly consistent, reinforcing the importance of fandom as a key motivational driver for spectators.

TABLE II
SPORT FANDOM RESULT

Influenced spectator	Mean	SD
Sport Fandom	3.91	0.991

C. Person Correlation Between the Motivational Factor and Sport Fandom

The table shows that the motivational factor and sport fandom have a strong and positive relationship with a Pearson correlation coefficient of 0.817 based on a sample of 370 respondents. The value reflects a very strong association, meaning that as motivational factors increase, sport fandom also rises significantly. The correlation is statistically significant at $p < .001$, confirming that the result is highly reliable and not likely due to chance. In addition, the findings suggest that the motivational factor plays a crucial role in shaping and strengthening sport fandom among the participants.

TABLE III
PEARSON CORRELATION

		Motivational Factor
Sport Fandom	Person Correlation	0.817
	Sig. (2-tailed)	< 0.001
	N	370

IV. CONCLUSIONS

This study concludes that spectator attendance at Malaysia Men's football matches at the Stadium National Bukit Jalil is strongly influenced by entertainment, self-esteem, and group involvement, while family influence plays a lesser role. The

significant positive relationship between motivational factors and sport fandom highlights the importance of enhancing match day experience through strategies that foster loyalty, social interaction, and emotional engagement. These findings not only enrich the literature in the field of sport management but also provide practical implications for football clubs, event organizers, and policymakers in Malaysia to strengthen fan culture and sustain spectator attendance.

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Understanding The Barriers to Physical Activity Participation Among Employees at KBS Putrajaya

Arif Adam Nor Azman¹, Aida Roha Abdul Rasid^{1*}, & Radzliyan Radzuwan¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: aidaroha@uitm.edu.my

Keywords: Barriers, Physical Activity, Employees

I. INTRODUCTION

This study examined physical activity participation among employees at KBS Putrajaya and explored whether barriers influence their involvement in physical activity. Physical activity was essential for maintaining physical and mental health, yet many working adults struggle to remain active due to work commitments and lifestyle factors.

II. METHODS

This study employed a quantitative design involving employees at KBS Putrajaya. Data were collected using a structured questionnaire, including the International Physical Activity Questionnaire (IPAQ) to measure physical activity levels. The barriers were measured using items from the Barriers to Being Active Questionnaire (BBAQ) developed by the Centers for Disease Control and Prevention (CDC). Statistical analyses, including descriptive statistics and chi-square test, were conducted using SPSS to examine relationships between variables.

III. RESULTS AND DISCUSSION

A. Barriers to Physical Activity Participation

Findings showed that barriers among employees were generally low. However, the most reported barriers were lack of energy ($M = 2.60$, $SD = 0.867$), followed by lack of willpower ($M = 2.58$, $SD = 0.862$) and lack of time ($M = 2.45$, $SD = 0.804$). These results suggest that personal and motivational factors slightly influence participation in physical activity among employees.

B. Physical Activity Participation Level

Analysis of physical activity levels indicated that 48.5% of employees achieved high physical activity levels, while 20.3% were moderately active and 31.1% were classified as having low physical activity levels. Although many employees were active, a considerable proportion still demonstrated insufficient participation.

C. Gender Differences in Physical Activity Participation

An independent samples t-test revealed a significant difference in physical activity participation between male and female employees,

with male employees showing higher participation levels ($t(239) = 3.047$, $p = 0.003$).

D. Relationship Between Barriers and Physical Activity Participation

The chi-square test indicated no significant relationship between barriers and physical activity participation ($\chi^2 = 0.361$, $p = 0.064$). This suggests that barriers did not significantly determine employees' participation levels.

TABLE I
RELATIONSHIP BETWEEN BARRIERS AND PHYSICAL ACTIVITY

Variable	Statistic	PA Level
Barriers	Pearson Chi Square	0.361
	Sig. (2-tailed)	0.064
	N	241

IV. CONCLUSIONS

In conclusion, the study found that most employees demonstrated moderate to high levels of physical activity, although a considerable proportion still showed low participation. Barriers were generally low, and no significant relationship was found between barriers and participation levels. These findings highlight the importance of workplace initiatives to further encourage consistent physical activity among employees.

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The Relationship Between Social Media Marketing and Sports Consumers's Online Shopping Behaviour: A Study Among Shopee Users in The Youth Market

Aziman Qhalish Rafee^{1*}, & Razif Sazali¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan, Seremban Campus, Malaysia

*Corresponding author: 2023438132@student.uitm.edu.my

Keywords: Social Media Marketing, Online Shopping Behaviour, Sports Consumers, Shopee, Youth Market

I. INTRODUCTION

The rapid development of e-commerce platforms and the increasing use of social media among youth have significantly changed consumer purchasing patterns. In the context of the sports industry, social media not only functions as a promotional medium, but also becomes a two-way interaction tool that can influence consumer attitudes and purchasing behavior. This study aims to examine the relationship between social media marketing and online purchasing behavior of sports consumers among Shopee users in the youth market [1].

This study focuses on the dimensions of social media marketing activities such as entertainment, interaction, trendiness, customization, and word-of-mouth communication that are believed to influence purchasing decisions. The main hypothesis of the study is to determine whether there is a significant relationship between consumer experience with social media marketing and online purchasing behavior of sports consumers.

II. METHODS

This study uses a quantitative approach in the form of a descriptive survey. A total of 120 student athletes from UiTM Seremban 3 who are 18 years old and above and have experience buying sports products through Shopee were selected as respondents. A simple random sampling method was used to ensure that each athlete has an equal chance of being selected. The study instrument consists of three parts. A Demographic profile. B, Social media marketing (13 items), C, Online purchasing behavior of sports consumers (21 items).

III. RESULTS AND DISCUSSION

The findings of the study show that there is a significant positive relationship between social media marketing and online purchasing behavior of sports consumers. The interaction dimension was identified as the most dominant factor in influencing purchase decisions, emphasizing the importance of two-way communication between brands and consumers. Interactive content such as question-and-answer sessions, instant feedback, and the involvement of influencers and sports athletes increase brand trust and credibility. In addition,

promotional elements and messages that trigger emotions such as "limited stock" and "flash sale" also influence impulsive purchases among youth. This study supports the theory that strategic social media marketing activities can shape consumers' positive attitudes and increase purchasing propensity.

TABLE I
RELATIONSHIP ANALYSIS

Social Media Marketing		
Sport consumer's	Pearson's r	0.005
online shopping	Df	148
behaviour	p-value	< 0.954

The correlation matrix provided details the relationship between social media marketing and sport consumer's online shopping behaviour. Each correlation contains the correlation coefficient (Pearson's r), degrees of freedom (df), and p-value, all of which contribute to understanding the strength, direction and statistical significance of the relationship between the variables.

Here, the correlation coefficient (Pearson's r) between the overall mean social media marketing and the overall mean sport consumer behaviour is 0.005, indicating a very strong positive correlation. It may indicate that social media marketing influences sport consumer's online shopping behaviour because the more intensively social media marketing is used, the higher the sports consumer's online shopping behaviour on the Shopee platform. A total of 148 is considered as the number of degrees of freedom (df) for this correlation since 148 pieces of information are independent to obtain the correlation. This value is more than the recommended value and provides strength to the study and its findings, ensuring that the results are valid and not random. In fact, the p-value associated with this correlation is less than 0.001, reflecting the statistical significance of this correlation. In practical terms, sellers and marketers on the Shopee platform need to emphasize content that is engaging, interactive, and tailored to the needs of youth to increase brand loyalty and online sales.

IV. CONCLUSIONS

In conclusion, this study proves that social media marketing plays an important role in influencing online purchasing behavior of sports consumers among youth. The elements of interaction and active involvement are the main factors that contribute to purchasing decisions. This study provides important implications for digital marketers in the sports industry to develop marketing strategies that are more focused on user engagement and two-way communication. From an academic perspective, this study contributes to the existing literature on digital consumer behavior and opens up space for further research in the field of sports marketing and e-commerce.

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The Relationship of Coach Leadership Style on Athletes' Performance Among Student Athletes KARISMA UiTM Seremban 3

Firdaus Zulkifli¹, & Azman Ahmad Tajri^{1*}

¹Faculty of Sports Science and Recreation, University Technology MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: azmantajri@uitm.edu.my

Keywords: Coach Leadership Style, Athletes' Performance, Student-Athletes

I. INTRODUCTION

Athletes need technical instruction, tactical advice, and emotional support from coaching leadership to motivate, perform, and grow. Research shows that democratic leadership, training and instruction, positive feedback, and social support improve athletes. Negative leadership may decrease motivation and achievement. Coaching effectiveness is crucial in Malaysia's competitive university sports environment, especially for student-athletes competing in KARISMA, MASUM, SUKMA, and the SEA Games. This study uses the Revised Leadership Scale for Sport to examine how KARISMA student-athletes at UiTM Seremban 3 perform in relation to their coach's leadership style.

II. METHODS

This quantitative study utilised a correlational research design. A total of 158 KARISMA student-athletes from UiTM Seremban 3 were chosen to be respondents. The Revised Leadership Scale for Sport (RLSS) was used to collect data on how athletes thought their coaches led them. The scale looked at things like democratic behaviour, autocratic behaviour, training and instruction, positive feedback, and social support. The Athlete's Subjective Performance Scale (ASPS) was used to measure how well the athletes did. Descriptive statistics and Pearson correlation analysis were used to look at the data that had been gathered to find out how coach leadership style and athlete performance were related.

III. RESULT AND DISCUSSION

A. Coach Leadership Style

Table I showed that Autocratic Behaviour had the highest mean (2.81), followed by Democratic Behaviour (2.45). The mean scores for Social Support (2.04), Positive Feedback (1.73), and Training & Instruction (1.59) were lower. This shows that coaches generally utilise an autocratic style of leadership, which puts more emphasis on control and authority than on support and teaching. The lower grades in feedback and training instructions show that less attention is being paid to athlete involvement and motivational assistance.

TABLE I
DESCRIPTIVE OF COACHING LEADERSHIP STYLE

Variable	Mean	Std. Deviation (SD)	Rank
Autocratic Behavior	2.81	0.953	1
Democratic Behavior	2.45	0.895	2
Social Support	2.04	0.670	3
Positive Feedback	1.73	0.599	4
Training & Instruction	1.59	0.437	5

B. Athletes' Performance

According to Table II, the level of success of the athletes is moderate with a mean score of 7.93 and a standard deviation of 1.51. Given this number, the athletes' performance is quite good, but not quite at a high or excellent level. In terms of physical training, psychological support, or the way the coach leads, this means that there is time for improvement.

TABLE II
DESCRIPTIVE OF ATHLETES PERFORMANCE

Variable	Mean	Std. Deviation (SD)	Level
Athletes Performance	7.93	1.51	Moderate

C. Relationship between Coach Leadership Style and Athletes' Performance

Table III shows a strong association ($r = -0.200$, $p = 0.012$, $p < 0.05$) between coach leadership style and athlete performance. Though small, the relationship is negative. Growing leadership style scores reduce performance. Our correlation is weak yet statistically significant. This implies that coach leadership affects more than athlete performance. Personal motivation, discipline, academic pressure, and environment may also matter. This shows that a bad leadership style can hinder performance.

TABLE III
CORRELATION BETWEEN COACH LEADERSHIP STYLE AND
ATHLETES' PERFORMANCE

Variable		Athletes' Performance
Coach's Leadership Style	Pearson's r	-0.200*
	df	156
	p-value	0.012
	N	158

IV. CONCLUSIONS

This study accomplished its goals. The majority of UiTM Seremban 3 coaches used autocratic leadership. Moderate athletic performance. This study also indicated a weak negative link between coach leadership style and athlete performance. This suggests that leadership affects performance but is not the primary factor. This suggests that university athletes require a more balanced and responsive leadership style to improve performance.

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The Relationship Between Service Quality in Sports Facility And Users' Revisit Intention at Bubble Sports Complex Cheras

Hanan Amnani Hanafi¹, Mohammad Adzly Rajli^{1*}, Rozita Abdul Latif¹, Hasmiza Abdul Majeed¹,
Wahidah Tumijan¹, Azman Ahmad Tajri¹, & Siti Aida Lamat¹

¹Faculty of Sports Science and Recreation, University Technology MARA, Seremban Campus, Negeri Sembilan,
Malaysia

*Corresponding author: adzly6672@uitm.edu.my

Keywords: *SERVQUAL, Service Quality, Sports Facility, Facility User, Revisit Intention*

I. INTRODUCTION

Kementerian Belia dan Sukan (KBS) may well suggest that national initiatives such as Visi Sukan Negara 2030 (VSN2030) could demonstrate significant empirical support for promoting healthy lifestyles through well-equipped sporting hubs supported by professional management. Moreover, the important evidence indicates that service quality might indicate a critical role in shaping user satisfaction, loyalty, and organizational sustainability, particularly within sports facilities where user experience influences behavioural outcomes. Thus, revisit intention may show users' likelihood of returning, which affects long-term viability. However, findings could indicate limitations in project approvals remain under the 12th Malaysia Plan. Additionally, evidence may suggest challenges in facility development and maintenance highlight key concerns for Malaysia's sports facility sector.

II. METHODS

This study employed a quantitative research method using a Google Form survey and collected data from 401 users at the Bubble Sports Complex in Cheras. Data were analysed using descriptive analysis and inferential analysis (Pearson Correlation), to examine the relationship between Service Quality on Sports Facility and Users' Revisit Intention at Bubble Sports Complex, Cheras.

III. RESULTS AND DISCUSSION

A. *SERVQUAL - Service Quality on Sports Facility*

The results indicate the most prevailing dimension of the service quality is "Empathy" with the highest mean of 4.15 ($SD = 0.66$). This finding may suggest that users highly appreciated attention, care, and understanding demonstrated by staff at the Bubble Sports Complex Cheras.

TABLE I
PREVAILING DIMENSION OF THE SERVICE QUALITY AT BUBBLE
SPORTS COMPLEX CHERAS

SERVQUAL Dimension	Mean	Standard Deviation (SD)
Empathy	4.15	0.660
Assurance	4.10	0.672
Reliability	4.08	0.709
Responsiveness	4.08	0.681
Tangibility	4.05	0.707

B. *Users' Revisit Intention*

The results of the overall level of users' revisit intention at Bubble Sports Complex, Cheras showed a mean score of 4.16 ($SD = .768$). The findings may demonstrate that users have a strong likelihood of revisiting the facility.

TABLE II
OVERALL LEVEL OF USERS' REVISIT INTENTION AT BUBBLE
SPORTS COMPLEX CHERAS

	Mean	Standard Deviation (SD)
Revisit Intention	4.16	0.768

C. *SERVQUAL - Service Quality on Sports Facility and Users' Revisit Intention*

The results of the relationship between Service Quality on Sports Facility and Users' Revisit Intention indicates a strong, positive, and statistically significant relationship between SERVQUAL and revisit intention ($r = 0.799$, $p < 0.001$). The findings confirm that service quality has a significant relationship with revisit intention among users at Bubble Sports Complex Cheras. Therefore, the research objective to examine the significant relationship between service quality on sports facilities and revisit intention is successfully achieved.

TABLE III
CORRELATION OF SERVICE QUALITY ON SPORTS FACILITY AND
USERS' REVISIT INTENTION

		Revisit Intention
SERVQUAL	Pearson's r	0.799***
	Sig. (2-tailed)	<0.001
	N	401

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IV. CONCLUSIONS

In conclusion, the significant empirical findings could indicate that users rated service quality at Bubble Sports Complex Cheras positively, with all five SERVQUAL dimensions achieving high mean scores across key indicators. Moreover, the results may suggest that Empathy emerged as the most influential factor, indicating that staff attentiveness and professionalism play an important role in shaping user perceptions. However, all service

quality dimensions might indicate strong positive relationships with revisit intention, supporting study hypotheses.

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Relationship Between Physical Activity Level and Sleep Quality Level Among UiTM Seremban 3 Students

Ihsan Md Nazri¹ & Umami Kalthum Mohd Mokhtar^{1*}, Nur Hani Syazwani Bakri¹, Muhammad Wafi A. Rahman¹ & Mohamad Firdaus Ahmad¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: ummikalthum@uitm.edu.my

Keywords: Gender Differences, Physical Activity, Sleep Quality, University Students

I. INTRODUCTION

Physical activity has been recognized as an important factor in maintaining overall health and well-being among university students [1]. However, despite regular exercise participation, many students continue to report poor sleep quality [2]. Sleep quality is a crucial determinant of cognitive performance, emotional regulation, and academic achievement. This study examines sleep quality, assesses physical activity levels, and explores their relationship among university students, with particular attention to gender differences, in order to inform health promotion and student wellness strategies.

II. METHODS

This quantitative study investigated the relationship between physical activity and sleep quality among UiTM Seremban 3 students. Data were collected from 207 students using the IPAQ-SF and PSQI questionnaires. Participants were selected through simple random sampling, and demographic data were also gathered. Statistical analysis, including Chi-square and Independent t-test, was conducted to examine the relationships and gender differences. This approach allowed a clear understanding of how physical activity relates to students' sleep quality.

III. RESULTS AND DISCUSSION

TABLE I
FREQUENCIES OF PHYSICAL ACTIVITY LEVEL

	Frequency (n)	Percentage (%)
Low	103	49.8%
Moderate	64	30.9%
High	40	19.3%

The majority of UiTM Seremban 3 students reported low physical activity (49.8%), followed by moderate (30.9%) and high (19.3%) levels. This suggests that many students may not meet recommended PA guidelines. As noted in previous studies, reductions in physical activity and increases in sedentary behaviour during lifestyle disruptions

indicate a general trend of decreased activity across populations [3].

TABLE II
FREQUENCIES OF SLEEP QUALITY LEVEL

	Frequency (n)	Percentage (%)
Good sleep quality (≤ 5)	115	55.6%
Poor sleep quality (> 5)	92	44.4%

The results of this study show that a majority of UiTM Seremban 3 students had good sleep quality (55.6%), while 44.4% experienced poor sleep quality. This indicates that almost half of the students may struggle to maintain adequate sleep. Similar findings have been reported in university students using the PSQI, with around 45.1% experiencing poor sleep quality [4].

TABLE III
GENDER DIFFERENCES IN SLEEP QUALITY AMONG UiTM SEREMBAN 3 STUDENTS

	Group	N	Mean (SD)	t	p
SQ SCORE	Female	105	5.32 (3.42)	0.333	0.739
	Male	102	5.19 (2.42)		

Results from the Independent t-test showed no significant difference in sleep quality between female ($M = 5.32$, $SD = 3.42$) and male students ($M = 5.19$, $p = 0.739$), indicating that gender does not influence sleep quality among UiTM Seremban 3 students. The lack of a gender gap may indicate that both male and female students face similar academic and lifestyle pressures at university. Prolonged periods of university life often involve schedules such as late-night studying, which can affect sleep quality for both genders [5].

TABLE IV
RELATIONSHIP BETWEEN PHYSICAL ACTIVITY LEVEL AND SLEEP
QUALITY LEVEL AMONG UiTM SEREMBAN 3 STUDENT

	Value	df	p
χ^2	1.13	2	0.570
N	207		

A Chi-square test indicated that physical activity level and sleep quality were not significantly associated ($\chi^2 (2) = 1.13, p = 0.570$). University students often experience academic stress, irregular lifestyles, and prolonged sitting, which may reduce the positive effects of physical activity on sleep [6]. These findings highlight the need for a comprehensive approach to improve sleep quality through physical activity combined with sleep hygiene, stress management, and behavioural strategies.

IV. CONCLUSIONS

This study examined physical activity, sleep quality, their relationship, and gender differences among UiTM Seremban 3 students. Results showed varying levels of physical activity and sleep quality, indicating that academic workload and study habits influence health behaviours. No significant association was found between physical activity and sleep quality, and no gender differences were observed. These findings suggest that lifestyle and academic factors may have a stronger impact on sleep than exercise or gender. Promoting balanced time management, healthy study habits, and integration of physical activity with rest is essential to enhance student well-being and academic performance.

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The Relationship Between Physical Activity Level and Academic Performance Level Among FSR Students at UiTM Seremban 3

Maryam Ahmad Sabri¹, Nur Hani Syazwani Bakri^{1*}, Muhammad Wafi A. Rahman¹, Mohamad Firdaus Ahmad¹, & Umami Khalid Mohd Mokhtar¹

¹Faculty of Sport Science and Recreation, Universiti Teknologi Mara (UiTM), Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: hanisyazwani@uitm.edu.my

Keywords: Physical Activity Level, Academic Performance, University Students, IPAQ, CGPA

I. INTRODUCTION

Physical activity (PA) has always been synonymous with well-being and health [1]. To their well-known health consequences, it is broadly recognized that physical activity is favorably related to cognitive development, brain health and, consequently, academic achievement among children and adolescents [1]. There were several health advantages to being physically active, whether at a moderate or vigorous level. Other than that, 81% of teenagers aged 11 to 17 and 28% of adults aged 18 to 64 years had been reported that they do not engage in enough physical activity [2]. Furthermore, students who exercised at least three times a week had considerably higher Cumulative Grade Point Average (CGPA), average CGPA 3.2 than those who were physically inactive average CGPA is 2.7 [3]. Therefore, this study aimed to examine the relationship between physical activity level and academic performance level among FSR at UiTM Seremban 3.

II. METHODS

This study implied quantitative correlational research design to identify relationship between physical activity levels and academic performance level. The International Physical Activity Questionnaire (IPAQ) can be used to assess student's physical activity level, while the Academic Performance Scale (APS) can be used to assess their academic performance level based on 5 points of likert scale that consist of 8 items. Data were analysed using JAMOVI software, while the Chi-square tests was applied to examine the relationship between the two variables.

III. RESULTS AND DISCUSSION

A. Physical Activity Level

Majority of respondents demonstrated a high level of physical activity (78.1%), while 11.4% reported moderate and 10.5% reported low physical activity levels.

B. Academic Performance Level

For academic performance, 68.1% of the students achieved an excellent level, 24.9% achieved good

performance, and 6.9% demonstrated moderate academic performance.

C. Relationship Between Physical Activity Level and Academic Performance Level

The Chi-square analysis revealed a statistically significant relationship between physical activity level and academic performance level ($\chi^2 = 34.6, p < 0.001$). Students with higher levels of physical activity were more likely to demonstrate excellent academic performance compared to those with moderate or low physical activity levels. According to [4], the researcher confirm that the amount of physical activity is related to academic performance that is consonant. The researcher has recently been noted to have strong positive correlations within medical students and other college students and elementary school students in various region of the world. They found that the likelihood of good GPA scores (3.00 – 4.00) was two times more in HEPA active students than in non-HEPA active students. This implies that the threshold level of physical activity to attain improved grades is HEPA active.

TABLE I
CHI-SQUARE TEST

Physical Activity Level	Score Academic Performance			Total	p
	Excellent	Good	Moderate		
High	207	66	9	282	0.001
Moderate	23	11	7	41	
Low	16	13	9	38	
Total	246	90	25	361	

IV. CONCLUSIONS

In conclusion, this study demonstrated a significant relationship between physical activity level and academic performance among FSR students at UiTM Seremban 3. Higher levels of physical activity were associated with better academic performance. The findings highlighted the importance of promoting active lifestyles within university settings as part of strategies to support students' academic success and overall well-being. Future research is recommended to include students

from other faculties and to utilise objective measures of physical activity for more comprehensive analysis.

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Exploring the Relationship Between Perceived Restorativeness of Natural Environment and Stress at Gunung Pulai

Mohamad Azhar Hakim Jamal¹ & Muhammad Asraf Zulzali^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Malaysia

*Corresponding author: asrafzulzali@uitm.edu.my

Keywords: Perceived Restorativeness, Perceived Stress, Natural Environment

I. INTRODUCTION

Natural environments are increasingly recognised for their role in supporting psychological restoration and stress-related wellbeing. However, empirical evidence on how perceived restorativeness relates to perceived stress in Malaysian natural recreation settings remains limited, particularly at the level of specific restorativeness dimensions. Guided by Attention Restoration Theory (ART), this study aimed to identify the level of perceived restorativeness among visitors at Gunung Pulai, identify the level of perceived stress, and examine the relationship between perceived restorativeness and perceived stress.

II. METHODS

This study employed a quantitative cross-sectional correlational design. Data were collected through an on-site survey involving 120 visitors at Gunung Pulai, Johor. The questionnaire consisted of three sections: demographic profile, the Perceived Restorativeness Scale (PRS), and the Perceived Stress Scale (PSS-10). The PRS measured four domains, namely Being Away, Fascination, Extent, and Compatibility. Descriptive statistics (mean and standard deviation) were used to identify the levels of perceived restorativeness and perceived stress, while Pearson correlation was used to examine the relationship between the variables.

III. RESULTS AND DISCUSSION

The findings indicated that Gunung Pulai was generally perceived as a restorative environment. Among the PRS domains, Being Away recorded the highest mean ($M = 3.53$, $SD = 1.22$), followed by Compatibility ($M = 3.43$, $SD = 1.21$) and Fascination ($M = 3.39$, $SD = 0.865$), while Extent recorded the lowest mean ($M = 2.63$, $SD = 1.10$). The overall level of perceived stress was moderate ($M = 2.09$, $SD = 0.570$).

As shown in Table I, Pearson correlation analysis revealed a significant positive relationship between overall perceived restorativeness and perceived stress ($r = 0.338$, $p < 0.001$). At the domain level, perceived stress was significantly correlated with Being Away ($r = 0.383$, $p < 0.001$), Fascination ($r = 0.236$, $p = 0.010$), and Compatibility ($r = 0.225$, $p = 0.013$), whereas Extent was not significantly related

to stress ($r = 0.053$, $p = 0.564$). These findings suggest that visitors' stress experiences were more closely associated with psychological escape, effortless attention, and person environment fit than with immersion or environmental coherence. This finding also supports the relevance of ART in understanding restorative experience in a natural recreation context.

TABLE I
CORRELATION BETWEEN PERCEIVED RESTORATIVENESS AND PERCEIVED STRESS

Variable	Pearson's r	p-value
PRS Total and Perceived Stress	0.338	< 0.001
Being Away and Perceived Stress	0.383	< 0.001
Fascination and Perceived Stress	0.236	0.010
Extent and Perceived Stress	0.053	0.564
Compatibility and Perceived Stress	0.225	0.013

IV. CONCLUSIONS

In conclusion, this study provides empirical evidence that Gunung Pulai is generally perceived as restorative and that visitors reported a moderate level of stress. The significant positive association between perceived restorativeness and perceived stress indicates that stressed visitors may still perceive strong restorative qualities in the natural setting, particularly in terms of Being Away, Fascination, and Compatibility. The findings contribute to the application of ART in a Malaysian recreation context and suggest that improving site conditions that support psychological escape, effortless attention, and user environment fit may strengthen restorative experiences among visitors.

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Relationship Between Sports Participation and Academic Performance Among Multi-Sport KARiSMA Athletes UiTM Seremban 3

Mohamad Razman¹ & Azman Ahmad Tajri^{1*}

¹Faculty of Sports Science and Recreation, University Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: azmantajri@uitm.edu.my

Keywords: Sports participation, Academic performance, Student-athletes

I. INTRODUCTION

Sports participation plays an important role in students physical, psychological, and academic development. University sports programs such as KARiSMA provide opportunities for students to engage in structured sports activities while pursuing academic studies. However, concerns remain regarding whether active involvement in sports may affect students' academic performance. Some researcher suggests that sports participation improves discipline, time management, and cognitive skills which contribute positively to academic performance. Therefore, this study aimed to determine the sports participation, identify the level of academic performance, and examine the relationship between sports participation and academic performance among multi-sport KARiSMA athletes UiTM Seremban 3.

II. METHODS

This study used a quantitative correlational research design. A total of 158 KARiSMA athletes from UiTM Seremban 3 were selected using purposive sampling. Data were collected using two questionnaires which is the adapted version of Sport Participation Model Questionnaire (SPMQ) to measure sports participation and the Academic Performance Scale (APS) to measure academic performance. The data were analysed using descriptive statistics and Pearson correlation analysis to determine the relationship between sports participation and academic performance.

III. RESULTS AND DISCUSSION

A. Sports Participation

The table I showed the descriptive statistics for sports participation among KARiSMA athletes UiTM Seremban 3. The mean score for sports participation was 3.57 with a standard deviation of 0.42, indicating a generally high level of sports participation among the respondents. The high level of participation suggests that KARiSMA athletes are strongly engaged in sports activities, supported by institutional programs and sports facilities. Active involvement in sports is important for developing

discipline, teamwork, and physical fitness among student-athletes.

TABLE I
DESCRIPTIVE STATISTICS OF SPORTS PARTICIPATION

	Mean	Std. Deviation (SD)
Sports Participation	3.57	0.42

B. Academic Performance

Table II showed the descriptive statistics of academic performance levels among the multi-sport KARiSMA athletes UiTM Seremban 3. The majority of students demonstrated excellent academic performance with 98 respondents (62.0%), followed by good performance with 56 respondents (35.4%), while 4 respondents (2.5%) were categorized as having moderate academic performance. This finding suggests that involvement in sports does not negatively affect academic performance and may contribute positively by improving time management, discipline, and motivation among student-athletes.

TABLE II
DESCRIPTIVE STATISTICS OF ACADEMIC PERFORMANCE

Level of Academic Performance	Frequency (n)	Percentage (%)
Excellent	98	62.0 %
Good	56	35.4%
Moderate	4	2.5%

C. Relationship Between Sports Participation and Academic Performance

Table III showed the results of the correlation analysis between sports participation and academic performance. The results revealed a moderate positive correlation and significant relationship between sports participation and academic performance ($r = 0.372$, $p < 0.001$).

TABLE III
CORRELATION BETWEEN SPORTS PARTICIPATION AND
ACADEMIC PERFORMANCE

		Academic Performance
Sports Participation	Pearson's r	0.372
	p-value	< 0.001
	Frequencies (n)	158

IV. CONCLUSIONS

In conclusion, this study found that KARiSMA athletes demonstrated high sports participation and good academic performance. The results also confirmed a moderate positive and significant relationship between sports participation and academic performance. This indicated that sports participation does not negatively affect academic performance and may support students' academic success when properly balanced. These findings highlight the importance of promoting sports participation among university students while ensuring academic achievement.

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The Relationship Between Perceived Service Quality and Participant Satisfaction Among Kulai Half Marathon 2025

Muhammad Adam Farhat Mohd Fhareezad¹ & Muhammad Asraf Zulzali^{1*}

¹Faculty of Sport Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: asrafzulzali@uitm.edu.my

Keywords: Service Quality, Participant Satisfaction, Kulai Half Marathon 2025, Running Event, Event Management

I. INTRODUCTION

This research investigates the relationship between perceived service quality and participant satisfaction among participants of the Kulai Half Marathon 2025. It aims to determine what is expected of perceived service quality among participants. It also monitors the relationship between how people evaluate the quality of the service and how satisfied they are. This study aims to enhance the understanding of how service quality influences positive event perceptions.

II. METHODS

This study used a quantitative research method using a Google Form survey distributed to 324 participants at the Kulai Half Marathon 2025. Data were analysed using descriptive statistics and inferential statistics, including Pearson correlation to investigate the relationship between perceived service quality and participant satisfaction.

III. RESULTS AND DISCUSSION

A. Perceived Service Quality

The participants who participated in the Kulai Half Marathon 2025 believed that all five service quality dimensions were important, with assurance, responsiveness, and reliability being the most important. Participants rated empathy and tangibility a little lower, which means they valued professionalism, timely help, and reliable services more than physical facilities and personal attention.

B. Participant Satisfaction

The Kulai Half Marathon 2025 participants were very satisfied, with an average score of 4.29 and a low standard deviation of 0.540, which means that most of them had positive experiences. This means that most of the participants' expectations were met, and that satisfaction is very important for evaluating how effectively an event performed, since it has a big effect on whether people will come back and have positive feelings toward the organizers.

C. Perceived Service Quality and Participant Satisfaction

The Pearson correlation analysis highlights an effective and significant positive correlation between service quality and participant satisfaction at the

Kulai Half Marathon 2025, indicated by a correlation coefficient of 0.754 and $p < 0.05$. This means that better service quality is strongly linked to more satisfied participants. The results are reliable because there were 324 participants. They show how important service quality is for making participants' experiences positive, which is useful information for event organizers who want to improve service delivery.

TABLE I
RELATIONSHIP BETWEEN PERCEIVED SERVICE QUALITY AND PARTICIPATION SATISFACTION

		Participant satisfaction
Service Quality	Pearson Correlation	0.754
	Sig	< 0.05
	N	324

Significance level: $p < 0.05$

IV. CONCLUSIONS

The Kulai Half Marathon 2025 received positive feedback in all aspects of service quality. Assurance ($M = 4.34$), responsiveness ($M = 4.28$), and reliability ($M = 4.26$) were the highest scores, showing that participants were satisfied with the event management and service quality. Participant satisfaction was also high ($M = 4.29$, $SD = 0.540$), which means that the event met or exceeded expectations and showed that planning and execution were done well. A strong positive correlation ($r = 0.754$, $p < 0.05$) between service quality and satisfaction shows that services that are well-managed directly lead to participant satisfaction.

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The Relationship Between Screen Time Duration and Physical Activity Level Among Student UiTM Seremban 3

Muhammad Amiele Khairudin¹, Umami Kalthum Mohd Mokhtar^{1*}, Muhammad Wafi A. Rahman¹, Siti Aida Lamat¹, Mohamad Firdaus Ahmad¹, & Aishah Nadirah Mohamed Alauddin¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: ummikalthum@uitm.edu.my

Keywords: Questionnaire For Screen Time of Adolescents (Quest), International Physical Activity Questionnaire (IPAQ)

I. INTRODUCTION

Digital technology has increased screen time among young adults globally [1]. Excessive screen exposure is associated with sedentary behaviour and health risks such as obesity and cardiovascular problems [2]. High screen time may reduce time available for physical activity [3]. Low physical activity levels are linked to poorer physical and psychological health [4]. However, limited studies have examined this relationship among Malaysian university students [3]. Therefore, this study investigated the relationship between screen time duration and physical activity level among UiTM Seremban 3 students.

II. METHODS

This study used a quantitative cross-sectional survey design [5]. A total of 200 UiTM Seremban 3 students participated in the study. Screen time was measured using the Questionnaire for Screen Time of Adolescents (QueST) [6]. Physical activity level was assessed using the International Physical Activity Questionnaire (IPAQ) [7]. Descriptive statistics and Chi-square analysis were used to analyse the data [5].

III. RESULTS AND DISCUSSION

A. Screen Time

Most respondents (99.5%) were classified in the high screen time category based on the QueST instrument. High screen exposure among young adults has been widely reported in previous studies [2] [6]. Prolonged screen engagement is commonly associated with sedentary behaviour [2].

B. Physical Activity

Based on the IPAQ results, 51.0% of respondents demonstrated moderate physical activity levels, followed by 31.5% low and 17.5% high levels. Moderate physical activity contributes to maintaining overall health and fitness [4]. However, low activity levels among young adults remain a public health concern [4].

TABLE I
PHYSICAL ACTIVITY LEVEL

PA Level	Counts	% of Total	Cumulative %
	35	17.5%	17.5%
Low	63	31.5%	49.0%
Moderate	102	51.0%	100.0%

C. Relationship Between Screen Time Duration and Physical Activity Level Among Students UiTM Seremban 3

The Chi-square analysis showed no significant relationship between screen time duration and physical activity level ($\chi^2 = 2.19$, $p = 0.335$). This finding aligns with previous research indicating that screen time does not necessarily reduce moderate-to-vigorous physical activity [8]. Other lifestyle and environmental factors may influence physical activity behaviour among university students [8].

TABLE II
CHI SQUARE VALUE

	Value	df	p
χ^2	2.19	2	0.335
N	200		

IV. CONCLUSIONS

Most UiTM Seremban 3 students reported high screen time and moderate physical activity levels. However, no significant association was identified between the two variables. Further research should examine additional lifestyle factors influencing physical activity behaviour.

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The Effect of Outdoor Participation in Shaping Student Leadership Behaviour During Outdoor Recreation Final Camp UiTM Seremban Campus

Muhammad Amir Akhtar Mohd Razali¹, Muhammad Wafi A. Rahman^{1*}, Siti Aida Lamat¹, Mohamad Firdaus Ahmad¹, & Nur Syazwani Zulaikha Safwan²

¹*Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia*

²*Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia*

*Corresponding author: wafiarahman@uitm.edu.my

Keywords: Outdoor Participation, Leadership Behaviour, Student

I. INTRODUCTION

The purpose of this study is to examine the effect of outdoor participation on the development of student leadership behaviour during the Outdoor Recreation Final Camp at UiTM Seremban 3. This research specifically aims to determine whether engagement in structured outdoor activities contributes to leadership traits such as confidence, responsibility, communication, and decision-making among final-year students.

II. METHODS

The population for this study consists of 109 students from the Faculty of Sports Science and Recreation (FSR) at UiTM Seremban 3 who participated in the Outdoor Recreation Final Camp.

III. RESULTS AND DISCUSSION

A. Outdoor Participation

The results indicate that students demonstrated a high level of outdoor participation across all domains. The highest mean score was recorded for the Stimulation domain ($M = 4.00$, $SD = 0.560$), suggesting that students were highly motivated by exciting and engaging outdoor experiences. Other domains, including Enjoy Nature, Similar and New People, Escape Pressure, and Physical Fitness, also showed high mean scores.

B. Leadership Behaviour

The results showed that students exhibited a high level of leadership behaviour during the outdoor camp. The highest mean score was recorded for the Building Relations domain ($M = 4.01$, $SD = 0.529$), indicating strong interpersonal and teamwork skills among students. Other leadership domains, including Giving and Seeking Information, Influencing People, and Decision Making, also recorded high levels.

C. Outdoor Participation on Leadership Behaviour

The model was found to be statistically significant ($p < 0.05$), indicating that outdoor participation collectively contributes to the prediction of leadership behaviour. The coefficient of determination ($R^2 = 0.85$) shows that approximately

85% of the variance in leadership behaviour can be explained by the outdoor participation factors included in the model, suggesting a strong explanatory power.

TABLE I
REGRESSION FOR OUTDOOR PARTICIPATION ON LEADERSHIP BEHAVIOUR

	Unstandardized	Standardized	t	Sig.
Coefficients				
Intercept	0.38	-	2.52	0.013
Stimulations	0.22	0.24	2.73	0.007
Similar and New People	0.25	0.27	3.12	0.002
Enjoy Nature	0.034	0.038	0.44	0.661
Physical Fitness	0.12	0.131	1.33	0.185
Escape Pressure	0.21	0.23	2.34	0.018
R ²	0.85			
Significant	0.013			

Significant level: 0.05 (2-tailed)

TABLE II
COMPARISON OF OUTDOOR PARTICIPATION BETWEEN MALE AND FEMALE LEADERSHIP BEHAVIOR

Gender	N	Mean (SD)	t	df	p
Male	63	4.09 (0.54)	2.85	107	0.001
Female	45	3.72 (0.94)			

IV. CONCLUSIONS

This study confirms that outdoor participation significantly influences leadership behaviour among FSR students. The findings successfully addressed all research objectives, highlighting the critical role of experiential learning. Regression analysis validated that active engagement in the final camp directly shapes leadership traits. Additionally, a significant gender gap was identified, with male students reporting higher participation levels than females, suggesting that programs should be inclusive of all demographics.

ACKNOWLEDGMENT

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The Impact of Volunteer Management on Event Success in Community Sports Tournaments

Muhammad Amir Haikal Mohd Khairi¹, & Mohd Shariman Shafie^{1*}

Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: shariman_shafie@uitm.edu.my

Keywords: Volunteer Management, Event Success, Community Sports Tournaments, Volunteers, Sports Event Management

I. INTRODUCTION

Community sports tournaments play an important role in promoting healthy lifestyles, strengthening social cohesion, and enhancing community engagement at the grassroots level. In Malaysia, these events are largely dependent on volunteer participation for operational and logistical support. Volunteers assist in areas such as registration, coordination, event operations, and participant management. Therefore, effective volunteer management is considered a crucial element in ensuring smooth event execution and overall event success.

However, previous studies have highlighted that many community sports tournaments face challenges in volunteer recruitment, training, and retention. Poor volunteer management practices may lead to volunteer dissatisfaction, high turnover, and organisational inefficiencies. Despite the acknowledged importance of volunteers, limited empirical research has examined whether volunteer management significantly influences event success in Malaysian community sports tournaments.

Therefore, this study aims to (1) identify the factors of volunteer management in community sports tournaments, (2) determine the level of event success, and (3) examine whether volunteer management influences event success.

II. METHODS

This study employed a quantitative survey research design. The target population consisted of volunteers and volunteer coordinators involved in community sports tournaments within a defined geographic area. A total of 388 respondents participated in this study, exceeding the minimum required sample size of 380 respondents.

The research instrument consisted of three sections. Section A collected demographic information. Section B measured volunteer management based on three dimensions: volunteer recruitment, training and development, and motivation and retention. Section C measured event success using three dimensions: operational efficiency, participant satisfaction, and community impact. All items were measured using a 7-point Likert scale. Descriptive statistics were used to determine the level of volunteer management and event success. Pearson correlation analysis was

conducted to examine the relationship between the variables, while simple linear regression analysis was used to test the predictive influence of volunteer management on event success.

III. RESULTS AND DISCUSSION

The findings revealed that volunteer management was at a moderate level ($M = 4.04$, $SD = 0.599$). Among the three dimensions, volunteer recruitment recorded the highest mean score ($M = 4.07$), followed by training and development ($M = 4.05$), and motivation and retention ($M = 4.02$). These findings indicate that volunteer management practices were present but not fully optimised in community sports tournaments. Similarly, event success was also found to be at a moderate level ($M = 4.10$, $SD = 0.588$), suggesting that community sports tournaments were generally successful but still have room for improvement.

TABLE I
MEAN AND SD

	Mean	SD	Rank
Volunteer Recruitment	4.07	1.019	1
Volunteer Training and Development	4.05	1.018	2
Volunteer Motivation and Retention	4.02	0.988	3
Volunteer Management	4.04	0.599	

TABLE II
MEAN AND SD (CONTINUE)

	Mean	Standard Deviation
Event Success	4.10	0.588

TABLE III
RELATIONSHIP

	Mean Event Success	
Mean Volunteer Management	Person's r	-0.081
	df	386
	p-value	0.111

IV. CONCLUSIONS

In conclusion, this study found that both volunteer management and event success were at moderate levels in community sports tournaments. However, volunteer management did not significantly influence event success in this study context. While volunteer management remains an essential component in event operations, event success appears to be multidimensional and influenced by broader organisational and structural factors.

The findings provide practical insights for event organisers to improve volunteer management practices while also strengthening other critical elements such as strategic planning, resource allocation, and leadership development to enhance overall event success.

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A Comprehensive Study on the Determination Between Social Media Usage and Mental Health Among FSR Student at UiTM Seremban 3

Muhammad Amirul Aliff Khairuddin¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, Mohamad Firdaus Ahmad¹, Mohammad Adzly Rajli¹, & Siti Aida Amat^{1*}

Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Negeri Sembilan, Malaysia

*Corresponding author: sitiaida@uitm.edu.my

Keywords: Social Media Usage, Mental Health, Depression, Anxiety, Stress, University Student

I. INTRODUCTION

Social media has become an integral part of daily life among university students, serving as a primary platform for communication, entertainment, and information sharing. While social media provides various benefits, excessive usage has been associated with psychological concerns such as stress, anxiety, and depression [1]. Teenagers and college students in Malaysia are using social media at much higher rates than they did globally. Young people in Malaysia actively used social media platforms like Facebook, Instagram, Twitter, and TikTok for self-expression, social interaction, and information gathering. Nonetheless, recent research highlights the negative impact of excessive social media use on the mental health of Malaysian teenagers, including increased anxiety and irregular sleep patterns [2].

Therefore, this study aimed to (1) examine the level of social media usage among students in the Faculty of Sports Science and Recreation (FSR), (2) determine the levels of depression, anxiety, and stress, and (3) investigate the relationship between social media usage and mental health among FSR students at UiTM Seremban 3.

II. METHODS

This study employed a quantitative cross-sectional research design. A total of 302 students from the Faculty of Sports Science and Recreation at UiTM Seremban 3 participated in the survey. Descriptive statistics were used to analyze the level of social media usage and mental health status. Mental health was assessed using the Depression, Anxiety, and Stress Scale (DASS-21). Pearson correlation analysis was conducted to determine the relationship between social media usage and mental health variables. Statistical analysis was performed using Jamovi software.

III. RESULTS AND DISCUSSION

A. Demographic Profile of Respondent

A total of 302 students participated in the study, consisting of 57% male and 43% female respondents. Most students were aged between 21 and 23 years. The majority reported spending between five to more than seven hours per day on social media, indicating high engagement levels.

B. Social Media Usage

Table I presents the descriptive statistics for social media usage. The highest mean score was recorded for Convenience ($M = 4.59$, $SD = 0.47$), followed by Information Seeking ($M = 4.51$, $SD = 0.55$) and Entertainment ($M = 4.46$, $SD = 0.55$), all categorized as very high. Social Interaction was high ($M = 3.97$, $SD = 0.71$), while Social Comparison was moderate ($M = 2.91$, $SD = 0.72$). This reflects current digital engagement trends among university students, where social media has become embedded in daily routines [3]. Although high usage may provide informational and social benefits, prolonged exposure may also increase vulnerability to emotional strain depending on the nature of engagement.

TABLE I
DESCRIPTIVE STATISTIC OF SOCIAL MEDIA USAGE

Variable	M	SD	Rank	Level
Convenience	4.59	0.47	1	V. High
Information Seeking	4.51	0.55	2	V. High
Entertainment	4.46	0.55	3	V. High
Social Interaction	3.97	0.71	4	Hight
Social Comparison	2.91	0.72	5	Moderate

C. Mental Health Levels

Table II shows the mean scores for mental health variables. Most respondents were within the normal range based on DASS-21 classification. Among the three domains, Stress recorded the highest mean score ($M = 1.95$), followed by Anxiety ($M = 1.22$) and Depression ($M = 0.82$). This suggests that while overall psychological well-being remains stable, stress may be more sensitive to lifestyle pressures experienced by sport science students, who often balance academic demands with physical training commitments.

TABLE II
MEAN SCORE OF MENTAL HEALTH VARIABLES

Variable	M	Frequency (N)
Stress	1.95	302
Anxiety	1.22	302
Depression	0.82	302

D. Relationship Between Social Media Usage and Mental Health

Pearson correlation analysis revealed a statistically significant but weak positive relationship between social media usage and mental health ($r = 0.12$, $p = 0.04$, $N = 302$). This suggests that although increased social media engagement is associated with slight variations in psychological well-being, its overall impact is relatively small. This finding aligns with prior research indicating that social media effects are often modest and influenced by multiple contextual factors [4]. From a sport education management perspective, these results highlight the importance of promoting digital well-being awareness and mental health support initiatives within sport faculties to ensure balanced student development.

TABLE III
MEAN SCORE OF MENTAL HEALTH VARIABLES

Variables	r	p
Social Media Usage	Pearson's Correlation	0.12*
	p-value	0.04

Note. $p < 0.05$

IV. CONCLUSIONS

In conclusion, this study found a statistically significant but weak relationship between social media usage and mental health among FSR students at UiTM Seremban 3. While most students reported normal levels of depression, anxiety, and stress, increased social media engagement was associated with slight variations in psychological well-being. The findings emphasize the importance of digital awareness and student support initiatives within sport education environments to promote holistic student development.

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The Effect of Social Media Usage on Psychological Well-Being Among UiTM Seremban 3 Students

Muhammad Faris Borhanodin¹ & Rozita Abdul Latif^{*}

¹Faculty of Sport Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

^{*}Corresponding author: rozita.abdlatif@uitm.edu.my

Keywords: Social Media Usage, Psychological Well-Being, UiTM, Seremban 3, Students

I. INTRODUCTION

The aim of this research is to examine the effect of social media usage on psychological well-being among students UiTM Seremban 3. Via age, gender, level education, faculty, current semester, social media platforms use, social media use, bonding and bridging social capital, social isolation, smartphone addiction and psychological well-being.

II. METHODS

This study employed a quantitative research method using a google form survey administered to 437 students at UiTM Seremban 3. Data were analysed using descriptive statistic and inferential statistics, including multiple linear regression, to predict social media usage affect psychological well-being.

III. RESULTS AND DISCUSSION

A. Social Media Usage

Bonding Social Capital ($M = 3.91$, $SD = 0.67$) and Social Media Use ($M = 3.88$, $SD = 0.75$) scored the highest, both in the High category, showing that respondents agreed social media strengthens close ties and is used often. Bridging Social Capital ($M = 3.76$, $SD = 0.78$) also falls in the High category, indicating agreement that social media helps widen networks. Smartphone Addiction ($M = 3.01$, $SD = 0.98$) and Social Isolation ($M = 2.61$, $SD = 1.26$) are in the Moderate category, reflecting mixed views on compulsive use and isolation.

B. Psychological Well-being

The result of psychological well-being. The mean score recorded is 3.51 with a standard deviation of 0.76, indicating moderate levels of psychological well-being among respondents.

C. Effect of Social Media Usage on Psychological Well-Being Among Students UiTM Seremban 3

The results show that social media factors significantly influence psychological well-being. Bonding Social Capital, Bridging Social Capital, and Smartphone Addiction were strong predictors, while Social Media Use had only a weak effect and Social Isolation was not significant. The model explains

52% of the variance in psychological well-being ($R^2 = 0.52$), indicating these factors are important but do not fully account for well-being outcomes. The research hypothesis is supported.

TABLE I
MULTIPLE REGRESSION ANALYSIS OF THE EFFECT OF SOCIAL MEDIA USAGE

MEDIATION MODEL				
Model	Coefficients		t	sig.
	Unstandardized Coefficient	Standardized Coefficient		
	B	Beta		
Intercept	0.47	-	2.85	<0.05
Social Media Use	0.05	0.05	1.13	>0.05
Bonding Social Capital	0.22	0.20	3.90	<0.05
Bridging Social Capital	0.30	0.31	3.90	<0.05
Social Isolation	-0.004	-0.006	-0.14	>0.05
Smartphone Addiction	0.38	0.36	7.88	<0.05
R ²	0.52			
Significant	<0.05			

Significance level: 0.05 (2-tailed)
Dependent Variable: Psychological Well-Being

IV. CONCLUSIONS

This study examined the effect between social media use, smartphone addiction, social isolation, bridging and bonding social capital and psychological well-being among students UiTM Seremban 3. The finding revealed that smartphone addiction and social media usage both showed positive and significant associations with psychological well-being, suggesting that digital platforms, when use purposefully, can serve as important tools for connection, support and emotional resilience.

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The Effect of Performance Appraisal on Employee Performance Among the Ministry of Youth and Sports Putrajaya Employees

Muhammad Hafiz Khusyairi Mohamed Rizar¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, Siti Aida Lamat¹, & Mohamad Firdaus Ahmad^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: firdaus466@uitm.edu.my

Keywords: Performance Appraisal, Employee Performance, Ministry of Youth and Sports, Public Sector, Employee

I. INTRODUCTION

This study aims to determine the effect of performance appraisal on employee performance among the Ministry of Youth and Sports Putrajaya employees. It examines whether performance appraisal enhances employees' performance and productivity. This study also explores employees' perceptions of the appraisal process, including clarity of goals and participation, as well as their self-assessed performance.

II. METHODS

This study employed a quantitative research method using a Google Form survey administered to 241 employees at the Ministry of Youth and Sports, Putrajaya. Data were analysed using descriptive statistics and inferential statistics, including simple linear regression, to predict the effect of performance appraisal on employee performance.

III. RESULTS AND DISCUSSION

A. Performance Appraisal Process

The result of the performance appraisal process indicates that the mean score was 4.12 ($SD = 0.54$). These findings suggest that respondents generally reported a high level of agreement regarding the effectiveness of the performance appraisal process. The relatively small standard deviation indicates that responses were closely clustered around the mean, reflecting a consistent perception among employees.

B. Employee Performance

The result of employee performance showed a mean score of 4.26 ($SD = 0.50$). This indicates a high-level of self-reported performance of employees within the organization. The low standard deviation suggests limited variability in responses, indicating that most employees shared similar views regarding their performance.

C. Performance Appraisal on Employee Performance

The results indicates that performance appraisal has a statistically significant effect on employee performance ($B = 0.60, \beta = 0.65, t = 13.03, p < 0.05$).

The model explains 42% of the variance in employee performance ($R^2 = 0.42$), suggesting that while performance appraisal is an important predictor, it does not fully explain employee performance outcomes. The research hypothesis is supported.

TABLE I
REGRESSION FOR THE EFFECT OF PERFORMANCE APPRAISAL ON
EMPLOYEE PERFORMANCE

Model	Coefficients		t	Sig
	Unstandardized Coefficients	Standardized Coefficients		
	B	Beta		
Intercept	1.79	-	9.32	0.05
Performance Appraisal	0.60	0.65	13.03	0.05
R ²	0.42			
Significant	< 0.05			

Significance Level: 0.05 (2-tailed)

IV. CONCLUSIONS

This study highlights the significant effect of performance appraisal on employee performance among the Ministry of Youth and Sports Putrajaya employees. The findings reveal that both variables were perceived at a high level, indicating that employees view the appraisal process positively and believe that they perform their duties effectively within the ministry. The result from regression analysis confirmed that performance appraisal has a significant effect on employee performance, suggesting that structured and transparent appraisal practices contribute to improved work outcomes at the organizational level.

ACKNOWLEDGMENT

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The Effect of Work-Related Stress on Job Satisfaction Among Employees at Kementerian Belia dan Sukan Putrajaya

Muhammad Harith Mohd Fadhli¹, & Radzliana Radzuwan^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: radzliana@uitm.edu.my

Keywords: Work-related Stress, Job Satisfaction, Public Sector, Ministry of Youth and Sports, Employee

I. INTRODUCTION

This study examines how work-related stress influences job satisfaction among employees at the Ministry of Youth and Sports Putrajaya. Work-related stress is conceptualized as the psychological and physiological responses that arise when job demands exceed an employee's capacity to cope, while job satisfaction mark the degree to which employees feel fulfilled and content with their work.

II. METHODS

This study employed a quantitative research method using a Google Form survey administered to 255 employees at Kementerian Belia dan Sukan Putrajaya. Data were analysed using descriptive statistics and inferential statistics, including simple linear regression, to find the effect of work-related stress on job satisfaction.

III. RESULTS AND DISCUSSION

A. Work-Related Stress

Descriptive analysis revealed high stress levels across all domains. The unpleasant workplace domain recorded the highest mean score ($M = 4.67$, $SD = 0.30$), followed by workplace ($M = 4.60$, $SD = 0.36$), supporting relationships ($M = 4.32$, $SD = 0.69$), and job demand ($M = 4.27$, $SD = 0.81$). These findings indicate that negative workplace experiences are the most dominant stressors among employees.

TABLE I
DESCRIPTIVE ANALYSIS FOR WORK-RELATED STRESS

Variables	Frequency (n)	Mean	SD
Workplace	255	4.60	0.362
Job Demand	255	4.27	0.807
Supporting	255	4.32	0.689
Unpleasant Workplace	255	4.67	0.300

B. Job Satisfaction

Job satisfaction was found to be moderate, with a mean score of 4.47 ($SD = 0.39$). This suggests that employees generally feel positive about their jobs, but satisfaction is not at the highest level. The relatively low standard deviation indicates consistent perceptions across respondents.

TABLE II
DESCRIPTIVE ANALYSIS FOR JOB SATISFACTION

Variable	N	Mean	SD	Level
Job Satisfaction	255	4.47	0.390	Moderately Satisfied

C. Work-Related Stress on Job Satisfaction

Regression analysis confirmed that work-related stress significantly affects job satisfaction. The overall model was statistically significant and explained 45% of the variance in satisfaction. Workplace clarity ($\beta = 0.317$, $p < 0.001$) and job demand ($\beta = 0.277$, $p < 0.001$) emerged as the strongest predictors, followed by supporting relationships ($\beta = 0.237$, $p < 0.001$) and unpleasant workplace experiences ($\beta = 0.177$, $p < 0.001$). These results support the alternate hypothesis and highlight that stress domains are substantial determinants of satisfaction.

TABLE III
REGRESSION FOR EFFECT OF WORK-RELATED STRESS N JOB SATISFACTION

Model	Coefficients		t	Sig.
	Unstandardized Coefficient	Standardized Coefficient		
	B	Beta		
Intercept	0.678	-	2.00	<0.001
Workplace	0.42	0.317	6.08	<0.001
Jon Demand	0.18	0.277	5.18	<0.001
Supporting	0.24	0.237	4.14	<0.001
Unpleasant Workplace	0.229	0.177	3.60	<0.001
R ²	0.450			
Significant	< 0.001			

Significance level: 0.05 (2-tailed)

IV. CONCLUSIONS

This study demonstrates that work-related stress plays a significant role in shaping job satisfaction among employees at the Kementerian Belia dan Sukan Putrajaya. The findings emphasize the importance of addressing stressors through clear communication, fair workload distribution, supportive relationships, and inclusive organizational practices. The study contributes empirical evidence from the Malaysian public sector and offers practical recommendations for managers and policymakers to

foster healthier, more satisfying, and more productive work environments.

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The Relationship Between Physical Activity and Mental Health Among Faculty of Sport Science and Recreation UiTM Seremban 3 Students

Muhammad Izzat Nazarudin¹ & Ummi Kalthum Mohd Mokhtar^{1*}, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, & Mohamad Firdaus Ahmad¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: ummikalthum@uitm.edu.my

Keywords: The International Physical Activity Questionnaire (IPAQ), Depression, Anxiety and Stress Scale (DASS-21)

I. INTRODUCTION

Students in universities experience stress, anxiety, and depression because of both academic and social pressures. Physical activities have been proven to improve moods and reduce psychological distress [1]. However, most students fail to meet the recommended physical activity levels, which has negative effects on mental health [2]. In Malaysia, mental health problems have increased dramatically in recent years, with the prevalence of mental health issues rising from 10% in 1996 to 29% in 2015 [3]. This study was conducted on students from the Faculty of Sport Science and Recreation (FSR), Universiti Teknologi MARA (UiTM) Seremban 3, and its purpose was to explore the relationship between physical activities and mental health in order to provide evidence for better student well-being initiatives.

II. METHODS

This study used a quantitative design with 200 students from the Faculty of Sport Science and Recreation (FSR), UiTM Seremban 3. Physical activity was measured using the International Physical Activity Questionnaire–Short Form (IPAQ-SF), while mental health was assessed with the Depression, Anxiety, and Stress Scale (DASS-21). Data were collected through self-administered questionnaires and analyzed using descriptive statistics and correlation tests to examine the relationship between physical activity and mental health.

III. RESULTS AND DISCUSSION

A. Physical Activity Level

The descriptive statistics from the table below indicate that the majority of students reported a high physical activity level (62.0%, $N = 124$), followed by moderate activity (24.5%, $N = 49$), while only a small proportion had low activity levels (13.5%, $N = 27$).

TABLE I
FREQUENCY

PL	Counts	% of Total	Cumulative %
High	124	62.0%	62.0%
Low	27	13.5%	75.5%
Moderate	49	24.5%	100.0%

B. Mental Health Level

Most students reported being in the normal range for depression, making up over 80% of the sample. Only a small percentage showed mild or moderate symptoms, while a smaller group experienced severe or extremely severe depression. Overall, this indicates that while most students are mentally healthy, a notable minority still face significant challenges that may require attention and support.

TABLE II
FREQUENCY OF DEPRESSION LEVEL

DL	Counts	% of Total	Cumulative %
Normal	161	80.5%	80.5%
Mild	9	4.5%	85.0%
Moderate	11	5.5%	90.5%
Severe	6	3.0%	93.5%
Extremely severe	13	6.5%	100.0%

Most students reported being in the normal range for anxiety (80%), showing no significant symptoms. A small proportion experienced mild (5%) or moderate (5%) anxiety, while fewer students reported severe anxiety (3%). Notably, 7% of students fell into the extremely severe category, indicating that although most students are mentally stable, a meaningful minority face high levels of anxiety that may require support.

TABLE III
FREQUENCIES OF ANXIETY LEVEL

A L	Counts	% of Total	Cumulative %
Normal	160	80.0%	80.0%
Mild	10	5.0%	85.0%
Moderate	10	5.0%	90.0%
Severe	6	3.0%	93.0%
Extremely severe	14	7.0%	100.0%

Most students reported being in the normal range for stress (93%), showing very low levels overall. Only a few experienced mild (0.5%), moderate (2.5%), or severe (1.5%) stress, while 2.5% were in the extremely severe category. This indicates that stress levels among most students are well managed, with only a small minority facing higher stress that may require additional support.

TABLE IV
FREQUENCIES OF STRESS LEVEL

SL	Counts	% of Total	Cumulative %
Normal	186	93.0%	93.0%
Mild	1	0.5%	93.5%
Moderate	5	2.5%	96.0%
Severe	3	1.5%	97.5%
Extremely severe	5	2.5%	100.0%

C. Relationship Between Physical Activity and Mental Health Among FSR Students in UiTM Seremban

All three chi-square tests show significant relationships: depression ($\chi^2 = 39.0$, $df = 8$, $p < 0.001$), anxiety ($\chi^2 = 16.4$, $df = 8$, $p = 0.037$), and stress ($\chi^2 = 29.4$, $df = 8$, $p < 0.001$), indicating that each construct is statistically associated with the variables examined.

TABLE V
 χ^2 TESTS

	Value		
Depression	39.0	8	<0.001
Anxiety	16.4	8	0.037
Stress	29.4	8	<0.001

IV. CONCLUSIONS

Most of the students in UiTM Seremban 3 experienced normal levels of depression, anxiety, and stress, but a small number experienced moderate to extremely severe symptoms. This shows that although most of them are mentally healthy, a small number are experiencing challenges that can influence their lives. This shows how important it is to encourage physical activities and other strategies to boost mental health among university students.

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The Relationship Between Branding and Consumer Loyalty Towards Sport Shoes Among Melawati Run 2026 Participants

Muhammad Uzair Mohd Hamzah¹ & Muhammad Asraf Zulzali^{1*}

¹Faculty of Sport Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: asrafzulzali@uitm.edu.my

Keywords: Branding, Consumer Loyalty, Customer Satisfaction, Brand Image, Melawati Run, Running Event.

I. INTRODUCTION

This study examines the relationship between branding and consumer loyalty towards sport shoes among participants of Melawati Run 2026. The research focuses on three main branding elements, namely product quality, brand image, and customer satisfaction, to understand how these factors influence consumer loyalty. The study aims to identify the level of branding perceptions among participants and to determine whether branding contributes to stronger loyalty towards sport shoe brands. By analysing participants' evaluations and experiences with sport shoe branding, this research seeks to provide a clearer understanding of how branding strategies influence consumer attachment and continued brand preference within a sport event context.

II. METHODS

This study used a quantitative research design to examine the relationship between branding and consumer loyalty among participants of Melawati Run 2026. Data were collected from 240 participants using a structured questionnaire distributed through an online survey. The questionnaire measured product quality, brand image, customer satisfaction, and consumer loyalty using a seven-point Likert scale. The collected data were analysed using Jamovi software, where descriptive statistics and Pearson correlation analysis were applied to examine the relationship between the study variables.

III. RESULTS AND DISCUSSION

A. Branding

The findings show that all branding elements recorded high mean scores among Melawati Run 2026 participants. Brand image achieved the highest mean score (5.94), followed by customer satisfaction (5.88) and product quality (5.64). This indicates that participants placed greater importance on brand perception and reputation when evaluating sport shoe brands, while product quality and satisfaction also remained important considerations in shaping branding perceptions.

B. Consumer Loyalty

Consumer loyalty had a high mean score of 5.73, according to the descriptive analysis, which showed

that respondents were very attached to and committed to the sport shoe brands they currently wear. According to the findings, majority of the participants exhibited favourable brand loyalty, including preference and ongoing support.

TABLE I
THE RELATIONSHIP BETWEEN BRANDING AND CONSUMER LOYALTY

		CONSUMER LOYALTY
BRANDING	PEARSON	0.855
	CORRELATION	
	SIG (2 TAILED)	
	N	
		240

C. Branding and Consumer loyalty

Pearson correlation analysis indicated a strong and significant positive relationship between branding and consumer loyalty ($r = 0.855$, $p < 0.05$, $N = 240$). This result shows that higher branding perception is associated with higher consumer loyalty among Melawati Run 2026 participants. The findings confirm that branding plays an important role in influencing consumers to remain loyal to sport shoe brands.

IV. CONCLUSIONS

Overall, this study demonstrates that branding has a significant impact on Melawati Run 2026 participants' consumer loyalty toward sports shoes. Higher levels of loyalty were a result of respondents' favourable opinions of branding components, specifically brand image, customer satisfaction, and product quality, according to the findings. Positive branding perceptions may encourage consumers to stick with their favorite sport shoe brands, according to the correlation analysis, which also confirmed a strong and significant relationship between branding and consumer loyalty. These findings shows how crucial strong branding are to boosting consumer loyalty in the sports footwear industry.

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Exploring the Impact of Outdoor Recreation Participant Motives on Mental Health Among FSR Students at UiTM Seremban 3

Muhammad Zairie Hosman¹, Muhammad Wafi A. Rahman^{1*}, Nur Hani Syazwani Bakri¹, Siti Aida Lamat¹, Mohamad Firdaus Ahmad¹, & Nur Syazwani Zulaikha Safwan²

¹Faculty of Sport Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

*Corresponding author: wafiarahman@uitm.edu.my

Keywords: Outdoor Recreation Participation Motives, Mental Health, Student

I. INTRODUCTION

The purpose of this study is to explore the motivational factors behind outdoor recreation participation and their impact on mental health outcomes (stress, anxiety, depression) among FSR students at UiTM Seremban 3. This study is designed to investigate if engagement in outdoor recreation contributes to improved mental health and to identify the primary drivers of participation. The findings will provide valuable insight for university counsellors and camp organizers to design effective programs that address student mental health through structured outdoor recreation.

II. METHODS

The population for this study consists of 157 students from the Faculty of Sports Science and Recreation (FSR) at UiTM Seremban 3 who participated in the Outdoor Recreation Final Camp.

III. RESULTS AND DISCUSSION

A. Outdoor Recreation Participation Motives

The finding reveal that students possess strong motivation for engaging in outdoor recreation across all the measured categories. The most prominent driver was found to be Enjoy Nature ($M = 4.73$, $SD = 0.360$), which indicates that the natural surroundings are the main reason students participate. Additionally, factors such as physical Fitness, escape pressure, achievement/stimulation, and similar and new people all recorded high mean values, showing that students have multiple reasons for taking part in these activities.

B. Mental Health Level of FSR Students

The results show that while the most students (92.4%) have normal stress levels, the trends for anxiety and depression are more concerning. The largest group of students fell into the Moderate category for both Anxiety (45.2%) and Depression (45.2%). This indicates that although students are not highly stressed, many are experiencing moderate psychological challenges that should be addressed.

C. Relationship Between Outdoor Recreation Participation Motives and Stress, Anxiety, and Depression Levels

The analysis showed no significant relationship between outdoor recreation participation motives and mental health ($r = 0.04$, $p > 0.05$). This indicates that while students are strongly motivated to participate in outdoor activities, these motives alone do not determine their levels of stress, anxiety and depression.

TABLE I
INDEPENDENT T-TEST FOR GENDER TOWARDS MENTAL HEALTH

Variable	Group	N	Mean (M)	t	DF	p
Mental health	female	42	1.23	-1.19	154	.624
	male	114	1.37 (0.506)			

TABLE II
CORRELATION MATRIX

Variable	Mental health	
Outdoor recreation participation motives	Pearson's r	0.04
	P – value	0.62
	N	157

IV. CONCLUSION

This study confirms that outdoor recreation is a valuable non-clinical tool for improving student mental health. While students are primarily motivated by nature and escaping pressure, the presence of moderate anxiety and depression suggests a need for more structured programs. As no gender differences were found, these benefits are universal, and the university should integrate outdoor recreation into its support strategy for students.

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The Relationship Between Motivational Factors and Future Behaviour Among Volunteers in Putrajaya Pink Ribbon Run 2025

Muhammad Zikry Faris Zamri¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹,
Mohamad Firdaus Ahmad¹, Mohammad Adzly Rajli¹, & Siti Aida Lamat^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: sitiaida@uitm.edu.my

Keywords: Volunteers, Motivation factors, Future behaviour, Sports events, Marathon

I. INTRODUCTION

Volunteers play a critical role in the successful implementation of sport events, particularly charity-based running events that depend heavily on community participation. In sport management, sustaining volunteer involvement is essential, as recurring events require continuous support from experienced and committed individuals. Volunteer motivation has been widely recognized as a primary determinant of participation and commitment in sport contexts [1]. Although prior research has examined motivational factors among sport volunteers, limited studies have specifically explored how these motivations influence future behavioural intention within charity-based running events in Malaysia. Understanding future behaviour is important in volunteer retention, as volunteers who intend to return are more likely to contribute to long-term event sustainability. Therefore, this study aims to [1] identify dominant motivational factors among volunteers in the Putrajaya Pink Ribbon Run 2025, [2] examine the extent of their future behavioural intention, and [3] investigate the relationship between motivational factors and future behaviour intention.

II. METHODS

This study employed quantitative research design. Data were collected through a Google Form survey administered to 31 volunteers who were involved in the Putrajaya Pink Ribbon Run 2025. Volunteer motivation was measured using the Volunteer Motivation Scale for International Sporting Events (VMS-ISE) developed by Bang and Chelladurai (2009). Future behavioural intention was assessed through items measuring the likelihood of continued participation in future sport events. Descriptive statistics were used to identify dominant motivational factors and the level of future behavioural intention. As the data did not fully meet normality assumptions, Spearman's rank-order correlation was conducted to determine the relationship between overall motivational factors (composite score) and future behavioural intention.

III. RESULTS AND DISCUSSION

A. Demographic Profile

The respondents consisted of 31 volunteers, with 19 males (61.3%) and 12 females (38.7%). Most volunteers were aged between 22-25 years (80.6%), followed by 18-21 years and 26-29 years (3.2%) and followed by 30 and above (16.1%). All respondents were Malay (100%). The majority held a bachelor's degree (77.4%). In terms of volunteering experience, 54.8% had volunteered one to three times, while 35.5% had volunteered three to five times, followed by 9.7% had volunteered 7 times and more.

B. To Identify the Motivational Factors That Encourage Individuals to Participate as Volunteer in the Putrajaya Pink Ribbon Run 2025

Descriptive analysis revealed that Love of Sports recorded the highest mean score ($M = 6.19$, $SD = 1.01$), followed by Career Orientation ($M = 6.17$, $SD = 0.84$) and Interpersonal Contact ($M = 6.12$, $SD = 0.86$). Expression of Values ($M = 6.04$, $SD = 0.74$), Personal Growth ($M = 5.90$, $SD = 0.84$), and Patriotism/Community Involvement ($M = 5.68$, $SD = 0.85$) also demonstrated relatively high levels. Extrinsic Rewards recorded the lowest mean score ($M = 4.87$, $SD = 1.41$), indicating that tangible incentives were less influential compared to intrinsic motivations.

The dominance of intrinsic motivations such as loves of sports and career orientation indicates that volunteers were primarily driven by internal interest rather than external rewards. This finding is consistent with previous sport volunteer research showing that this study is given the advantage to everyone know what the preferred motivation that makes the volunteer attract to do the volunteerism activity [2]. Functional motivation theory further suggests that volunteering becomes more sustainable when it fulfills personal values and psychological needs [3].

TABLE I
MOTIVATIONAL FACTORS

	M	SD	Rank
Love of Sports	6.19	1.01	1
Career Orientation	6.17	0.84	2
Interpersonal Contact	6.12	0.86	3
Expression of Values	6.04	0.74	4
Personal Growth	5.90	0.84	5
Patriotism/Community Involvement	5.68	0.85	6
Extrinsic Rewards	4.87	1.41	7

C. To Examine the Extent of Future Behavioural Intention Among Volunteers in the Putrajaya Pink Ribbon Run 2025

The findings indicated a high level of future behavioural intention among volunteers ($M = 5.87$, $SD = 0.99$). The high level of future behavioural intention suggests that volunteers demonstrated a strong likelihood of continued participation in upcoming sport events. In sport management, future behavioural intention is an important indicator of volunteer retention, as returning volunteers contribute to event stability and reduced recruitment costs [1].

TABLE II
DESCRIPTIVE STATISTIC VOLUNTEER FUTURE BEHAVIOUR

Variable	M	SD
Future Behaviour	5.87	0.99

D. To Investigate the Relationship Between Volunteers' Motivational Factors and Their Future Behaviour Intention

Spearman's rank-order correlation analysis revealed a strong positive relationship between overall motivational factors and future behavioural intention ($r_s = 0.71$, $p < 0.005$). This indicates that higher levels of volunteer motivation are associated with stronger intentions to participate in future events. The strong positive correlation between motivational factors and future behavioural intention ($r_s = 0.71$) indicates that higher motivational levels are associated with stronger intentions to continue volunteering. This suggests that when volunteers perceive their experiences as meaningful and rewarding, they are more likely to remain committed. From a sport management perspective, aligning volunteer roles with intrinsic motivational expectations may enhance long-term retention and support the sustainability of recurring charity sport events [4].

TABLE III
SPEARMAN DESCRIPTIVE STATISTIC OF VOLUNTEER MOTIVATIONAL FACTORS AND FUTURE BEHAVIOUR

Variable	1	2
Overall Motivational Factors (Composite Score)	-	
Future Behavior Intention	0.71*	-

Note. $N = 31$. $p < .005$.

IV. CONCLUSIONS

This study found that intrinsic motivations were the dominant drivers among volunteers in the Putrajaya Pink Ribbon Run 2025 and that overall motivational factors were strongly associated with future behavioural intention. The findings highlight the importance of motivational alignment in promoting volunteer retention. For sport event organizers, developing volunteer roles that provide meaningful engagement, personal development opportunities, and value expression may strengthen long-term volunteer commitment and support event sustainability.

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The authors would like to thank the organizing committee of the Putrajaya Pink Ribbon Run 2025 and all participating volunteers for their cooperation and support in this study. In conclusion, this study identifies a significant correlation

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The Impact of Physical Activity on Mental Health Among Students at UiTM Seremban 3

Nur Aisyahirah Abd Wahab¹, Ummi Kalthum Mohd Mokhtar^{1*}, Nur Hani Syazwani Bakri¹, Adzly Rajli¹, & Siti Aida Lamat¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: ummikalthum@uitm.edu.my

Keywords: Physical activity, Mental health, Depression, Stress, Anxiety, University students, UiTM Seremban 3

I. INTRODUCTION

In recent years, mental health issues such as depression, anxiety, and stress have become increasingly prevalent among university students due to academic pressure and sedentary lifestyles. While physical activity (PA) is recognized as a protective factor for mental well-being, empirical evidence within the local university context remains limited. This study investigates the impact of PA on mental health outcomes among students at UiTM Seremban 3.

II. METHODS

This research employed a quantitative, non-experimental cross-sectional survey design. A total of 221 students from UiTM Seremban 3 were selected via simple random sampling. Two validated instruments were used: the International Physical Activity Questionnaire (IPAQ) to categorize PA into low, moderate, and high levels, and the Depression, Anxiety, and Stress Scale (DASS-21) to measure psychological distress. Data were analyzed using descriptive statistics and inferential tests, including Linear Regression and Independent T-tests, to determine the impact of PA and gender differences.

III. RESULTS AND DISCUSSION

The descriptive analysis focused on the distribution of PA levels and the severity of MH symptoms. As shown in Table 1, the majority of the 221 respondents (85.1%) reported high levels of physical activity. Regarding mental health status, most students fell within the "Moderate" range for all three categories. Despite these generally positive figures, university students remain a high-risk group for psychological distress [1] [2].

TABLE I
SCORING SUMMARY FOR PHYSICAL ACTIVITY AND MENTAL HEALTH

Variables	Category	Frequency (n)	Percentage (%)
Physical Activity (IPAQ)	Moderate	33	14.9
	High	188	85.1
Mental Health (DASS-21)			
Depression	Moderate	212	95.9%
Anxiety	Severe	204	91.9%
Stress	Moderate	200	90.5%

A. Impact of Physical Activity on Mental Health

Linear regression analysis was conducted to determine the extent to which mental health variables (depression, anxiety, and stress) predict physical activity levels among the participants. As summarized in Table 2, the analysis revealed that the model was not statistically significant.

The coefficient of determination ($R^2 = 0.0119$) indicates that only approximately 1.2% of the variance in physical activity can be explained by the students' mental health status. Furthermore, all p-values exceeded the standard significance threshold ($p > 0.05$), confirming that mental health variables are not significant predictors of physical activity in this cohort. These results are consistent with findings that suggest university students' activity levels may be more influenced by environmental factors and academic schedules than by their immediate psychological state [3] [4]. Additionally, no significant gender differences were observed in stress ($p = 0.682$), depression ($p = 0.056$) and anxiety factors ($p = 0.575$), indicating a uniform psychological profile across the sample.

TABLE II
LINEAR REGRESSION ANALYSIS OF PHYSICAL ACTIVITY ON
MENTAL HEALTH

Variables	R	R ²	p-value
Depression	0.109	0.00119	0.425
Anxiety	0.109	0.00119	0.428
Stress	0.109	0.00119	0.468

IV. CONCLUSIONS

The study concludes that while students at UiTM Seremban 3 are physically active, this activity does not serve as a significant predictor for depression, anxiety, or stress. It is recommended that the university adopt a holistic wellness framework that integrates physical recreation with psychological interventions and academic stress management.

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A Comprehensive Study on The Correlation of Physical Activity and Sleep Quality Among Employees at KBS Putrajaya

Nur Alia Afifah Mohammad Asri¹, Aida Roha Abdul Rasid^{1*}, & Radzliana Radzuwan¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: aidaroha@uitm.edu.my

Keywords: Physical Activity, Sleep Quality, Employees, Gender, Gender Difference

I. INTRODUCTION

Physical activity and sleep quality play important roles in employees' health and work performance. Low physical activity and sedentary behavior are associated with poor sleep quality and increased fatigue, which may reduce productivity and raise health risks. This study examined physical activity levels, sleep quality, gender differences in sleep quality, and the correlation between physical activity and sleep quality among employees at KBS Putrajaya.

II. METHODS

This quantitative research method study utilized simple random sampling to survey 247 employees at KBS Putrajaya. Data were collected via the International Physical Activity Questionnaire-Short Form (IPAQ-SF) by Craig et al. (2003) and the Pittsburgh Sleep Quality Index (PSQI) by Buysse et al. (1989). Statistical analysis was performed using SPSS version 31, employing descriptive statistics, Independent Samples T-tests, and Pearson's Chi-Square tests.

III. RESULTS AND DISCUSSION

A. Physical Activity Level

The findings showed that the majority of employees demonstrated a moderate level of physical activity. This indicates that although employees are somewhat active, their activity level may still be insufficient to achieve optimal health benefits. The level of physical activity responds from all the respondents. As showed on the table, majority with 123 at 49.8% respondents were on high level of physical activity. While 83 at 33.6% respondents were on moderate level and lastly there were least respondents with 41 at 16.6% were on low level of physical activity.

B. Sleep Quality Level

The results revealed that most employees experienced poor sleep quality. Majority 151 at 61.1% respondents were on poor level of sleep quality and 96 at 38.9% respondents were on good level sleep quality. This suggests that sleep problems remain common among working adults despite

having moderate physical activity levels.

C. Gender Differences in Sleep Quality

The Independent Samples T-test showed sleep quality level between male ($N = 116$, $Mean = 1.34$, $SD = 0.477$) and female ($N = 131$, $Mean = 1.43$, $SD = 0.497$) respondents revealed a non-significant difference. This indicates that sleep quality issues affect both genders similarity within this population.

D. Correlation Between Physical Activity Level and Sleep Quality Level

The Pearson Chi-Square value obtained was $\chi^2 = 0.105$, with a p -value (Sig. 2-tailed) of 0.135. Chi-Square correlation analysis indicated a significant negative correlation between physical activity and sleep quality. This means that higher levels of physical activity are associated with better sleep quality among employees.

TABLE I
CORRELATION BETWEEN PHYSICAL ACTIVITY LEVEL AND SLEEP QUALITY LEVEL

Physical Activity Level		
Sleep	Pearson Chi-Square	0.105
Quality	Significant (2-tailed)	0.135
Level	N	247

III. DISCUSSION

In conclusion, physical activity plays a significant role in improving sleep quality among employees. Workplace health programmes are recommended to encourage regular physical activity and enhance employees' well-being.

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Relationship Between Mental Toughness and Psychological Well-Being Among Majlis Sukan Negeri Terengganu (MSNT) Athletes

Nur Siti Insyira Zolhaimi¹, & Mohd Shariman Shafie^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: shariman_shafie@uitm.edu.my

Keywords: Mental Toughness, Psychological Well-Being, Majlis Sukan Negeri Terengganu Athletes

I. INTRODUCTION

Mental toughness is widely recognized as an essential psychological characteristic that enables athletes to cope effectively with competitive pressure, training demands, and performance expectations. At the state level, athletes from Majlis Sukan Negeri Terengganu (MSNT) are continuously exposed to physical and psychological challenges that may influence their psychological well-being, which includes positive functioning such as self-acceptance, autonomy, environmental mastery, and purpose in life. Although mental toughness has been strongly associated with improved athletic performance, limited research has examined its relationship with psychological well-being among Malaysian state athletes. Therefore, this study aimed to identify the level of mental toughness, determine the level of psychological well-being, and examine the relationship between mental toughness and psychological well-being among MSNT athletes.

II. METHODS

In this study, the quantitative correlational research design was used where 287 MSNT athletes between 15 and 21 years of age were selected through purposive sampling. The instrument used to obtain the data was an online questionnaire, which was delivered via Google Forms. The measure of mental toughness was based on the Sport Mental Toughness Questionnaire (SMTQ), which has confidence, constancy, and control at the expense of psychological well-being which was measured using the Ryff 18-item Psychological Well-Being Scale. The data gathered were analysed with the help of descriptive statistics to find out the levels of both variables and Pearson correlation with the help of a JAMOV software to evaluate the relation between psychological well-being and mental toughness.

III. RESULTS AND DISCUSSION

A. Mental Toughness

MSNT athletes' mental toughness descriptive statistics are shown in Table I. The respondents' mental toughness is moderate, as indicated by their average score of 2.98 and standard deviation of 0.239. This result implies that MSNT athletes have a consistent capacity to manage competition pressure,

stay focused, and persist in times of difficulty. The development of mental toughness may be influenced by coaching, competition experience, and an organised training environment.

TABLE I
RESULT OF MENTAL TOUGHNESS AMONG MAJLIS SUKAN NEGERI TERENGGANU (MSNT) ATHLETES

	Mean (M)	Standard Deviation (SD)
Mental Toughness	2.98	0.239

B. Psychological Well-Being

The descriptive data of MSNT athletes' psychological well-being are shown in Table II. A moderate degree of psychological well-being was indicated by the mean score of 4.51 with a standard deviation of 0.463. This finding implies that, in spite of the challenges of competition, most athletes exhibit balanced emotional functioning and positive psychological adjustment.

TABLE II
RESULT OF PSYCHOLOGICAL WELL-BEING AMONG MAJLIS SUKAN NEGERI TERENGGANU ATHLETES

	Mean (M)	Standard Deviation (SD)
Psychological Well-Being	4.51	0.463

C. Relationship Between Mental Toughness and Psychological Well-Being Among MSNT Athletes

Table III presents the findings of the correlation between mental toughness and psychological well-being. The findings showed that there was a moderate positive and significant correlation between mental toughness and psychological well-being ($r = 0.401$, $p < 0.001$). This suggests that athletes who are more mentally tough report greater psychological well-being. Mental toughness can serve as a safeguarding mental element that boosts resilience, emotional control, and stress response in athletes.

TABLE III
RESULT OF PSYCHOLOGICAL WELL-BEING AMONG MAJLIS
SUKAN NEGERI TERENGGANU ATHLETES

	Mean (M)	Standard Deviation (SD)
Psychological Well-Being	2.98	0.239

IV. CONCLUSIONS

In conclusion, MSNT athletes exhibited moderate levels of mental toughness and psychological well-being, with a confirmed moderate positive relationship between the two. This suggests that enhancing mental toughness could positively impact psychological well-being in athletes. Consequently, coaches, sport psychologists, and administrators are advised to implement structured psychological skills training programs aimed at strengthening athletes' mental resilience and overall well-being.

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Differences in Volunteer Motivation Across Self-Esteem Levels: A Study of Negeri Sembilan Seven Wonders Challenge 2.0

Nurain Shamsur Anuar¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, Mohamad Firdaus Ahmad¹, Mohammad Adzly Rajli¹, & Siti Aida Lamat^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: sitiaida@uitm.edu.my

Keywords: Volunteer Motivation, Self-Esteem, Sports Volunteers, VMS-ISE, RSES, Negeri Sembilan Seven Wonders Challenge 2.0

I. INTRODUCTION

Volunteer involvement plays a critical role in the operational success of sporting events, particularly in community-based sport tourism contexts. Volunteers contribute time, effort, and expertise without financial compensation, making effective volunteer management a strategic priority for sport organizations [1]. Prior research indicates that sport volunteers are driven by diverse motivational factors, including love of sport, career orientation, social interaction, and personal development [2].

Although numerous studies have examined volunteer motivation in mega sport events, limited research has explored how psychological factors such as self-esteem influence motivational differences within small-to-medium sport tourism events. Existing literature largely focuses on demographic predictors, while internal self-concept variables remain underexplored in localized Malaysian sport contexts. Self-esteem, defined as an individual's overall evaluation of self-worth, may shape how volunteer experiences are interpreted, particularly in relation to personal growth and intrinsic satisfaction. Therefore, this study aims to (1) identify dominant motivational factors among volunteers of the Negeri Sembilan Seven Wonders Challenge 2.0 (NS7WC 2.0), (2) determine their self-esteem levels, and (3) examine differences in motivation across self-esteem categories

II. METHODS

This study employed a quantitative, non-experimental design. The population consisted of all registered volunteers of the Negeri Sembilan Seven Wonders Challenge 2.0 (NS7WC 2.0). Based on information provided by the organizing committee, the total number of volunteers was 40 individuals ($N = 40$). Due to the manageable population size, a census sampling approach was adopted, whereby all volunteers were included in the study.

Volunteer motivation was measured using the Volunteer Motivation Scale for International Sporting Events (VMS-ISE), while self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES). Descriptive statistics were used to

summarize demographic characteristics, motivational factors, and self-esteem levels. As normality assumptions were not met, the Kruskal-Wallis H test was conducted to examine differences in motivational factors across self-esteem categories (low, normal, high). Effect size (ϵ^2) was reported to determine the magnitude of differences.

III. RESULTS AND DISCUSSION

A. Demographic Profile

The respondents consisted of 40 volunteers, with 21 males (52.5%) and 19 females (47.5%). Most volunteers were aged between 22–25 years (52.5%), followed by 18–21 years (47.5%). All respondents were Malay (100%). The majority held a bachelor's degree (82.5%) and reported monthly income of RM2,500 and below (92.5%). In terms of volunteering experience, 35% had volunteered three to five times, while 30% had volunteered more than seven times.

B. Motivational Factors

Descriptive analysis indicated that intrinsic motivations were more dominant than extrinsic rewards. Love of sports recorded the highest mean score ($M = 6.13$, $SD = 1.11$), followed by career orientation ($M = 6.04$, $SD = 1.18$) and expression of value ($M = 6.00$, $SD = 1.14$). Extrinsic rewards recorded the lowest mean ($M = 5.05$, $SD = 1.37$). The findings suggest that volunteers were primarily driven by internal interest and personal fulfillment rather than tangible incentives.

The dominance of intrinsic motivation, particularly love of sports and career orientation, supports previous findings that sport volunteers are primarily driven by internal interest and developmental opportunities rather than extrinsic rewards [4]. Young adults often view volunteering as a platform for skill and career development [5], indicating that intrinsic satisfaction was the main driver among NS7WC 2.0 volunteers. The lower emphasis on extrinsic rewards also aligns with Self-Determination Theory, reinforcing that psychological fulfillment is more sustainable than tangible incentives in sport volunteer engagement.

TABLE I
MOTIVATIONAL FACTORS

	M	SD	Rank
Love of Sports	6.13	1.11	1
Career Orientation	6.04	1.18	2
Expression of Value	6.00	1.14	3
Patriotism	5.90	0.95	4
Personal Growth	5.86	1.00	5
Interpersonal Contacts	5.83	1.13	6
Extrinsic Rewards	5.05	1.37	7

C. Self-Esteem Level

The self-esteem analysis showed that 50% of the volunteers showed normal self-esteem, 42.5% expressed low self-esteem, and 7.5% expressed high self-esteem. Although the majority of the volunteers were found to have steady self-perception, a significant number was found to have a reduced self-evaluation. The distribution implies that despite the fact that the majority of volunteers had balanced self-worth, there is a significant number of them who might have doubts about their abilities.

Self-esteem has been considered a significant psychological structure that shapes the competency and social approval judgments of people [6]. Self-esteem-related differences can influence the perceptions of the individuals in terms of their contribution, confidence, and personal development in a volunteer context. Hence, volunteer participation can't be perceived only through the demographic issues, but through the psychological self-images that contribute to participation and experience.

TABLE II
SELF-ESTEEM LEVEL

		Frequency (N)	Percentage (%)
Self-Esteem Level	Low self-esteem	17	42.5
	Normal self-esteem	20	50
	High self-esteem	3	7.5

D. Differences in Motivation Across Self-Esteem Levels

The Kruskal–Wallis H test revealed a statistically significant difference in Personal Growth motivation across self-esteem categories, $\chi^2(2) = 12.80, p = 0.00, \varepsilon^2 = 0.33$, indicating a moderate effect size. Post-hoc analysis using Dunn's test with Bonferroni correction showed significant differences between low and normal ($p = 0.02$) and low and high ($p = .007$) self-esteem groups.

The significant difference in Personal Growth motivation indicates that self-esteem influences how volunteers perceive volunteering as a developmental experience. Individuals with lower self-esteem may view participation as a way to build confidence and

competence, as self-worth shapes perceptions of success and growth [6], whereas those with higher self-esteem may approach volunteering from a more secure perspective. In contrast, no significant difference was found for Extrinsic Rewards, $\chi^2(2) = 0.52, p = 0.77, \varepsilon^2 = 0.01$, suggesting that material incentives are not meaningfully influenced by self-esteem levels. This supports sport volunteer literature indicating that internal satisfaction is generally more influential than external motivators [7], emphasizing the importance of prioritizing developmental and internally rewarding experiences in volunteer management.

TABLE III
DIFFERENCES IN MOTIVATION ACROSS SELF-ESTEEM LEVEL

	χ^2	df	p	ε^2
Personal Growth	12.80	2	0.00	0.33
Extrinsic Rewards	0.52	2	0.77	0.01

* $p < 0.05$ indicates statistically significant difference

IV. CONCLUSIONS

This study demonstrates that intrinsic motivation remains the primary driver of volunteer participation in NS7WC 2.0. While self-esteem did not influence all motivational domains, it significantly affected personal growth motivation. These findings provide practical implications for sport event organizers. Volunteer management strategies should emphasize developmental opportunities, skill-building experiences, mentoring systems, and recognition mechanisms that enhance internal satisfaction. By aligning volunteer roles with intrinsic motivational factors and psychological needs, sport organizations may improve volunteer retention and long-term engagement.

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The Impact of Coaching Behaviour Towards Emotional Intelligence Among Student-Athletes in UiTM Negeri Sembilan

Nurul Ardini Ahmad Sallehein¹, Muhammad Wafi A. Rahman¹, Nur Hani Syazwani Bakri¹, Siti Aida Lamat¹, & Mohamad Firdaus Ahmad^{1*}

¹Faculty of Sports Science and Recreation, Universiti Teknologi Mara, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: firdaus466@uitm.edu.my

Keywords: Coaching Behaviour, Emotional Intelligence, Student-Athletes, University Sports, UiTM Negeri Sembilan

I. INTRODUCTION

This study aims to determine the level of coaching behaviour and emotional intelligence among student-athletes at UiTM Negeri Sembilan and to examine the impact of coaching behaviour towards emotional intelligence. Coaching behaviour goes beyond teaching and involves emotional and psychological impact on the development of the athlete. Emotional intelligence is defined as the ability to understand, regulate and manage emotions effectively especially under pressure.

II. METHODS

The research design of this study was a quantitative cross-sectional study design based on a structured questionnaire sent via Google Form to 109 UiTM Negeri Sembilan student-athletes involved in KARISMA. Data were analyzed using descriptive statistics and inferential statistics using Jamovi software to predict the impact of coaching behaviour on emotional intelligence.

III. RESULTS AND DISCUSSION

A. Coaching Behaviour

The result for coaching behaviour indicates that the mean score was 4.00 ($SD = 0.712$). These findings suggest that respondents generally reported a high level of agreement regarding positive coaching behaviours practiced by their coaches. The standard deviation was fairly small suggesting that student-athletes shared many similar perceptions.

B. Emotional Intelligence

The result of emotional intelligence showed a mean score of 3.97 ($SD = 0.715$). This indicates a high level of emotional intelligence among student-athletes at UiTM Negeri Sembilan. The low standard deviation indicates that there was not a lot of variation in the responses, thus, most student-athletes expressed similar attitudes towards their emotional regulation, awareness and emotional control skills.

C. Coaching Behaviour Towards Emotional Intelligence

The findings show that coaching behaviour statistically influences emotional intelligence, (t

(109) = 11.71, $p < 0.001$). The model shows that 72.2% of the variance of the emotional intelligence ($R^2 = 0.722$) is explained by the coaching behaviour implying that, although coaching behaviour is a significant predictor, there are other factors that could be explain the formation of emotional intelligence. The hypothesis of the research is proven.

TABLE I
REGRESSION CORRELATION FOR THE IMPACT OF COACHING BEHAVIOR TOWARDS EMOTIONAL INTELLIGENCE

	Unstandardized B	Std. Error	t	p
Constant	0.75	0.23	3.26	0.001
Coaching Behaviour	0.82	0.07	11.71	0.001
R ²	0.722			
F	37.4			
Significant	.000			

IV. CONCLUSIONS

The research demonstrates the strong impact of coaching behaviour on emotional intelligence among student-athletes of UiTM Negeri Sembilan. The results have shown that the two variables were highly perceived which means that, student-athletes have a positive view of coaching practices and they have high emotional regulation and awareness. The regression analysis proved the importance of coaching behaviour on emotional intelligence and implied that in a university sport environment, coaching behaviour, which is structured, supportive and consistently practiced, leads to emotional development.

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The author is pleased to recognize the existence of UiTM Negeri Sembilan student-athletes and to add a special note of thanks to the research supervisor for his help, guidance and support throughout the study completion.

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The Relationship Between Work-Life Balance and Job Satisfaction Among Employees at Jabatan Belia dan Sukan Wilayah Persekutuan Kuala Lumpur (JBSN WPKL)

Nurulain Zulaikha Hairol Nizam¹, Nur Hani Syazwani Bakri^{1*}, Nur Syazwani Zulaikha Safwan²

Mohamad Firdaus Ahmad¹ & Mohammad Adzly Rajli¹

*Corresponding author: hanisyazwani@uitm.edu.my

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

²Faculty of Sports Science and Recreation, Universiti Teknologi MARA Shah Alam, Malaysia

Keywords: Work-Life Balance, Job Satisfaction, Public Sector, Sports Organisation, Employee Well-Being

I. INTRODUCTION

Work-life balance (WLB) and job satisfaction (JS) are key factors to assess employee well-being and organisational performance. Sports organisations working in the field of public sectors often subject their staff to unequal timeframes, and event-related pressures, thus, having the potential of interfering with personal life and degrading workplace satisfaction [1]. Subsequently, the current study will look at the connection between WLB and JS in the employees of Malaysia Department of Youth and Sports of the federal territory of Kuala Lumpur (JBSN WPKL).

II. METHODS

The design adopted was a quantitative correlational design. The operationalization of data collection was through the use of structured questionnaires where the Work-life balance Scale [2] and the Spector's Job Satisfaction Survey [3] were used. 83 responses were retrieved, and after data cleaning, 81 valid cases were obtained. To determine the relative amounts of Work-Life Balance (WLB) and Job Satisfaction (JS), descriptive types of statistical methods were used; Pearson product-moment correlation analysis was followed to determine the relationship between these two constructs.

III. RESULTS AND DISCUSSION

A. Work-Life Balance

The employees indicated a moderate amount of WLB, work-personal life enhancement (WPLE) had the highest value ($M = 3.43$) and personal life interference with work (PLIW) the lowest value ($M = 2.44$) [2].

B. Job Satisfaction

Job satisfaction was determined to be moderate-to-high ($M = 3.69$, $SD = 0.518$) consistent with earlier studies that highlighted job characteristic and communication as key predictors [3] [4].

C. Relationship Between Work-Life Balance and Job Satisfaction

The correlation analysis performed by Pearson revealed that there was an important moderate positive correlation between WLB and JS ($r = 0.476$, $p < 0.001$). This indicates that employees who achieve better balance between work and personal life are more likely to report higher levels of job satisfaction.

The current results are consistent with the literature. Stated that workers who are exposed to favourable work-life policies have high levels of satisfaction and engagement [5]. Also established that flexible working practices along with healthy organisational support significantly increase job satisfaction [6]. Comparing the contextual factors in the analysis of the Malaysian context involving the public sector [7] found WLB to have a strong predictive effect on the forecast of JS amongst the government officers, but job stress had an adverse effect.

The current study supports the theoretical model that work-life balance has a positive influence on job satisfaction [2] [3] and hence the null hypothesis (H^0) was rejected. In addition, the results highlight the importance of organizational policy enabling work-life balance, which fits the Social Exchange Theory [8]. As per this theory, the positive affective consequences of organizational fairness and support are reciprocated by the employees, including increased job satisfaction.

TABLE I
PEARSON CORRELATION ANALYSIS

Variable	Job Satisfaction
Work-Life Balance	
Pearson Correlation	0.476
Sig. (2 tailed)	< 0.001
n	79

IV. CONCLUSIONS

The current research provides empirical data revealing that work-life balance has a strong impact on job satisfaction in the employees of a Malaysian sports organization operating in the field of the public sector. The results highlight the importance of

flexible working schedules, conducive managerial decisions, and organizational values that foster the welfare of the employees. Research that is done in future should expand its area of study into other organizations and explore other variables such as stress, type of leadership and organizational support.

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Exploring The Relationship Between Perceived Value and Purchase Intention of Sports Product Among FSR Students in UiTM Seremban

Ridauddin Ridwan Roslan¹, Mohammad Adzly Rajli^{1*}, Prof. Dr Rozita Abdul Latif¹, Hasmiza Abdul Majeed¹, Wahidah Tumijan¹, Azman Ahmad Tajri¹, & Siti Aida Lamat¹

¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Seremban Campus, Negeri Sembilan, Malaysia

*Corresponding author: adzly6672@uitm.edu.my

Keywords: Perceived Value, Purchase Intention, Sports Product, Consumer Behaviour

I. INTRODUCTION

The sports product market in Malaysia has grown alongside rising interest in active lifestyles and athletic apparel. Understanding how perceived value (price, quality, social, emotional) shapes purchase intention among university students helps brands tailor product, pricing, and marketing strategies to increase sales and loyalty. The sports product industry has experienced substantial growth, particularly in emerging markets such as Malaysia, where rising consumer interest in active lifestyles and fashion-forward athletic wear has driven demand.

II. METHODS

This study employed a quantitative research method using a Google Form survey administered to 362 students FSR at UiTM Campus Seremban. Data were analysed using descriptive statistics and inferential statistics, including Pearson Correlation, to find the strong relationship between perceived value and purchase intention.

III. RESULTS AND DISCUSSION

A. Perceived Value

The results indicate the perceived-value dimensions scored highly (*means* = 4.10 – 4.21). Social value recorded the highest mean (4.21), followed by Price value (4.13), with Quality and Emotional value both at 4.10.

TABLE I
MEAN AND SD

Perceive Value Dimension	Mean	Standard Deviation (SD)
Social Value	4.21	0.72
Price Value	4.13	0.74
Quality Value	4.10	0.68
Emotional Value	4.10	0.68

B. Purchase Intention

The results of the overall level of purchase intention of sports product among FSR students at UiTM Campus Seremban showed a mean score of 4.16 (*SD* = 0.71). The findings may demonstrate that users have a strong of purchase the sports product.

C. The Relationship Between Perceived Value and the Purchase Intention of Sports Products Among FSR Students in UiTM Seremban

The results of the relationship between perceived value and purchase intention indicates a strong, positive, and statistically significant relationship between perceived value and purchase intention ($r = 0.85$, $p < 0.05$). The findings confirm that perceived value has a significant relationship with purchase intention among FSR students in UiTM Seremban. Therefore, the research objective to examine the significant relationship between perceived value and purchase intention is successfully achieved.

TABLE II
CORRELATION BETWEEN PERCEIVED VALUE AND PURCHASE INTENTION

		Purchase Intention
Perceived Value	Pearson's r	0.85**
	Sig. (2-tailed)	< 0.05
	N	362

Note. * $p < 0.05$, ** $p < 0.01$

IV. CONCLUSIONS

In conclusion, the perceived value is a key determinant of purchase intention for sports products among FSR students. Practical implications for manufacturers and retailers include prioritizing product quality, maintaining competitive pricing, and leveraging social-value cues (brand image, community, endorsements) in marketing. These strategies are likely to strengthen purchase intention and foster customer loyalty in the university segment.

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From Technique to Coordination: Effective Learning Strategies to Improve Butterfly Stroke Motor Skill Mastery in Elementary School Students (A Systematic Literature Review)

Abiasa Hervianawan^{1*}, Adang Suherman¹, & Muhamad Ervan Kastrena¹

¹Suryakancana University, Indonesia

*Corresponding author: arjunayassin@gmail.com.my

Keywords: Butterfly Stroke; Elementary School; Motor Learning; Learning Models; Systematic Literature Review

I. INTRODUCTION

The butterfly stroke is widely recognized as one of the most technically demanding swimming styles, requiring precise coordination between arm pull, dolphin kick, and rhythmic breathing. At the elementary school level, this complexity often becomes a learning barrier due to children's limited core strength, developing motor coordination, and short attention span. Most empirical studies on butterfly stroke instruction focus on adolescent or adult swimmers, resulting in limited synthesized evidence on pedagogically appropriate learning strategies for younger learners. Therefore, this study aims to systematically review and synthesize empirical evidence on effective and developmentally appropriate learning models to improve butterfly stroke motor skill mastery among elementary school students.

II. METHODS

This study employed a Systematic Literature Review (SLR) guided by the PRISMA framework. Research questions were formulated using the PICO approach:

TABLE I
PICO FRAMEWORK FOR THE SYSTEMATIC LITERATURE REVIEW

Component	Description
Population (P)	Elementary school students participating in swimming lessons or extracurricular programs
Intervention (I)	Modified learning models (part method, game-based learning)
Comparison (C)	Conventional teaching methods or drill-based instruction
Outcome (O)	Improvement in butterfly stroke motor skills (coordination, arm pull, dolphin kick)

Compared with conventional drill-based instruction, these adaptive approaches produced more stable improvements in movement quality and offered safer and more enjoyable learning experiences, supporting learner-centered motor learning principles.

III. RESULTS AND DISCUSSION

The synthesis identified two dominant learning approaches that consistently improved butterfly stroke skill acquisition in elementary school student

TABLE II
SUMMARY OF LEARNING STRATEGIES AND OUTCOMES

Learning Strategy	Key Characteristics	Reported Outcomes
Modified Part-Method	Skill decomposition, progressive integration, focus on dolphin kick and arm pull	Improved coordination, technical accuracy, reduced learning difficulty
Game-Based Learning	Playful tasks, meaningful contexts, learner-centered activities	Increased motivation, engagement, and stable movement quality

IV. CONCLUSIONS

The reviewed evidence indicates that modified learning models, particularly the integration of part-method and game-based learning, are effective and developmentally appropriate strategies for improving butterfly stroke motor skill mastery among elementary school students. These approaches align movement complexity with children's motor development while maintaining learning motivation. Future studies employing longitudinal designs are recommended to strengthen evidence in school-based and extracurricular swimming contexts. Literature searches were conducted using Google Scholar and relevant academic databases for peer-reviewed studies published between 2021 and 2024. Inclusion criteria focused on empirical studies involving elementary-aged participants, instructional interventions targeting butterfly stroke or its key components, and clearly reported motor skill outcomes.

ACKNOWLEDGMENT

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Methods to Improve Shooting Ability in Soccer: A Systematic Literature Review

Alexander Fernandes Musa^{1*}, Ervan Kastrena¹, & Muhamad Syamsul Taufik¹

¹Suryakancana University, Cianjur, Indonesia

*Corresponding Author: 21fmaalexander@gmail.com

Keywords: Shooting ability, Soccer, Training methods, Physical education, Skill improvement

I. INTRODUCTION

This review article aims to identify and analyze various training methods used to improve shooting skills in soccer. The study focuses on the effectiveness of various training approaches in helping students or young players improve shooting accuracy, strength, and decision-making skills. This study is expected to contribute to physical education teachers, coaches, and sports practitioners in implementing shooting training methods that are effective, engaging, and tailored to the characteristics of their students.

II. METHODS

This journal uses the PICO method as a guideline for article screening. PICO (Population, Intervention, Comparison, and Outcomes) is used in this article to ensure the search meets its objectives [1]. The PICO method is one method to facilitate journal reference searches.

III. RESULTS AND DISCUSSION

After conducting an in-depth analysis of all selected articles, the authors identified several articles that met the eligibility criteria to serve as the primary data source for this study. These articles discussed various training methods focused on improving shooting skills in soccer. Some studies focused on target-based shooting drills, others on the use of small-sided games, and others on specific technique drills and match simulations. To provide a clearer picture of the literature screening process, the figure below displays a detailed flowchart of the article selection stages used in this study.

The review results from each article presented in Table 1 show that various learning and training methods are applied in physical education to improve shooting skills in soccer. These articles emphasize the use of structured training methods, such as shooting technique drills, modified games, and both drill-and game-based approaches, designed to develop students' accuracy, strength, and movement coordination. Overall, the research findings indicate that the application of systematic and continuous methods contributes positively to improving shooting skills in soccer among students.

TABLE I
METHOD TO IMPROVE SHOOTING ABILITY IN SOCCER

No	Judul & Nama Penulis	Metode	Hasil
1	The Effectiveness of Training Using Targets on Football Shooting Accuracy	Experimental research with a posttest-posttest design on sports students, using shooting practice targeting the goal as an intervention.	There was a significant improvement in shooting accuracy after training with targets, indicating that this method is effective in enhancing shooting technique skills in soccer players.
2	The Influence of Rhythmic Training on Increasing the Shooting Accuracy	Quantitative experimental research with rhythmic training on 558 players, assessing shooting accuracy before and after the intervention.	Rhythmic training has been shown to significantly improve soccer players' shooting accuracy (significance value 0.000), indicating that this explorative training is effective for developing shooting technique.
3	The Effect Of Spinning Shooting Training Model Management On Shooting Ability in Soccer	Experimental research with a one-group pretest-posttest design on 20 soccer players, using the Spinning Shooting training model (shooting technique with body rotation) over 12 training sessions.	There was a significant improvement in shooting ability after the implementation of the training model, with a p-value of 0.000, indicating that this training model is effective in enhancing players' shooting techniques.

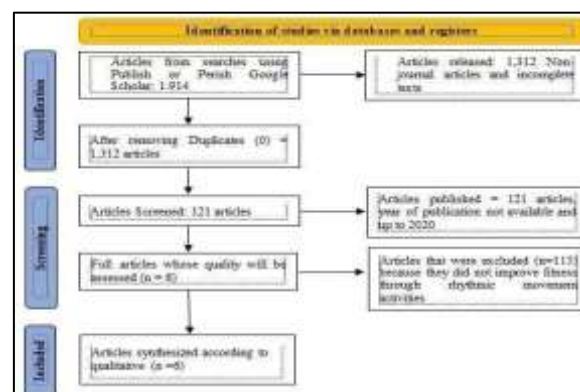


Fig. 1 Prisma Flowchart

IV. CONCLUSION

Based on the reviewed literature, it can be concluded that structured, varied, and game-related training methods significantly improve students' shooting ability in soccer. Integrating technique drills, target practice, and small-sided games is highly recommended in physical education and youth soccer training.

ACKNOWLEDGMENTS

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The Effectiveness of Training Methods in Improving Short-Distance Swimming Performance: Systematic Literature Review

Dede Sulaeman^{1*}, Taupik Rochman¹, & Muhamad Syamsul Taufik¹

¹University of Suryakencana, Cianjur, Indonesia

*Corresponding Author: gurudedesulaeman@gmail.com

Keywords: Swimming, Speed, Training, Exercise, Method

I. INTRODUCTION

Speed is a fundamental determinant of performance in competitive swimming. Consequently, the enhancement of swimming speed becomes a primary focus in the design of training programs, not only for elite athletes but also for novice swimmers who are in the process of developing their foundational technical and physical skills. This study aims to provide a scientific understanding of the most effective training methods based on recent empirical findings, thereby offering a meaningful contribution to the advancement of swimming coaching science, especially for beginner coaches.

II. METHODS

This research uses the PICO (Population, Intervention, Comparison, and Outcome) method to assist the article selection process. Using a PICO-structured form can elicit more detail, result in more complex and specific search strategies, and thus improve precision of retrieval [1]. The use of PICO will make it easier for authors to find relevant references to support the research.

III. RESULTS AND DISCUSSION

Following an in-depth analysis of the selected literature, 9 articles were identified that met all eligibility criteria to serve as the primary data sources for this review. 6 articles investigated in-water training methods, while the remaining 3 articles focused on dryland training methods. To provide a clear overview of the literature screening process, the following figure illustrates the detailed article selection flow.

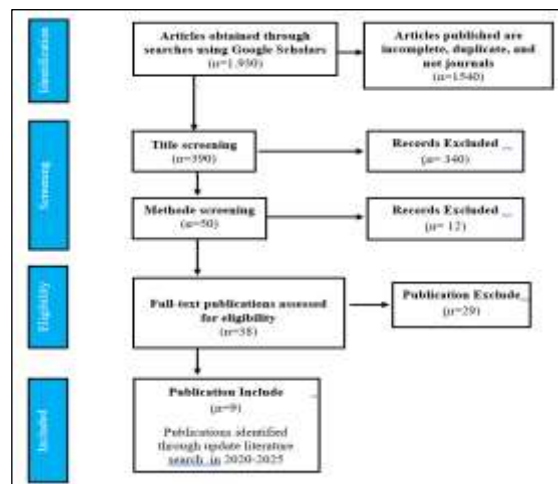


Fig. 1 Prism Flow Diagram

The results of the review of articles included in the inclusion category are presented in Table 1 below, which displays a summary of previous studies on training methods to improve short-distance freestyle swimming speed.

TABLE I
OUTCOME OF METHODS IN IMPROVING SHORT-DISTANCE SWIMMING PERFORMANCE

	Author Name & Year	Results
1	(Permatasari et al., 2025)	Significant improvement ($p=0.018$). Average time decreased by ~5.88 seconds (45.31s → 39.43s). The interval training group outperformed the dry land kicking group.
2	(Kurniawan, 2025)	A very significant improvement ($p=0.000$). The average time decreased by 4.16 seconds (46.36s → 42.20s).
3	(Arsyad et al., 2025)	A very significant improvement ($p=0.000$). The average time decreased by 6.28 seconds (62.41s → 56.13s).
4	(Afif et al., 2024)	Significant improvement ($t=11.265 > t\text{-table}$). Average time decreased by 2.22 seconds.
5	(Nurdin & Marzuki, 2024)	Significant improvement ($p<0.05$). Time decreased by 0.055 seconds (fins group) & 0.045 seconds (paddles group). Both aids were effective.
6	(Yuliana et al., 2021)	Significant improvement ($t=1.51 > t\text{-table}$). Speed increased by 2.93%.
7	(Morakurnia et al., 2024)	Significant improvement ($t=2.98 > t\text{-table}$). Average time decreased by 0.76 seconds.
8	(Kusmita et al., 2022)	A very significant improvement ($p=0.000$). The average time decreased by 1.878 seconds.
9	(Wicaksono & Putri, 2020)	Significant improvement ($p<0.05$). Box Jump is more effective than Burpee, increasing speed by 3.53%.

IV. CONCLUSIONS

Based on a systematic synthesis of nine research articles, it can be concluded that various training methods, both in-water and land-based, have been proven effective in improving 50-meter freestyle swimming speed.

ACKNOWLEDGMENT

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Systematic Review: The Role of Physical Education Teachers and Parents in Implementing Classroom Rules and Procedures to Improve Student Discipline

Dendi Kurniadi^{1*}, Eneng Fitri Amalia¹, & Muhamad Syamsul Taufik¹

¹Universitas Suryakancana, Cianjur, Indonesia

*Corresponding Author: dendikurniadi38@admin.smp.belajar.id

Keywords: Student Discipline, Physical Education Teachers' Parental Involvement, Class Rules, Class Procedures

I. INTRODUCTION

Student discipline is a crucial foundation for creating an effective learning environment, particularly in Physical Education, Sports, and Health, a subject rich in physical activity and potential risks [1]. Consistent implementation of classroom rules and procedures is key to achieving discipline. However, this role cannot be solely the responsibility of Physical Education, Sports, and Health teachers [2].

II. METHODS

This study used a systematic literature review (SLR) with the PRISMA approach, drawing articles from Google Scholar and Crossref via Publish or Perish, guided by the PICO framework. Inclusion criteria: research articles (quantitative, qualitative, or mixed) published in the last 10 years (2014–2024), focused on physical education/primary and secondary schools, and addressing the roles of teachers and parents in relation to discipline. Selection was based on PRISMA guidelines.

implementation of rules and procedures between the school (led by the physical education teacher) and the home (supported by parents). Systematic and communicative collaboration between the two parties creates a robust discipline ecosystem, which ultimately supports the achievement of the holistic goals of physical education: students' physical, cognitive, affective, and social development.

IV. CONCLUSIONS

Improving student discipline in physical education is not a one-person responsibility. Its success depends heavily on the consistent and integrated implementation of rules and procedures between the school (led by the physical education teacher) and the home (supported by parents). Systematic and communicative collaboration between the two parties creates a robust discipline ecosystem, which ultimately supports the achievement of the holistic goals of physical education: students' physical, cognitive, affective, and social development.

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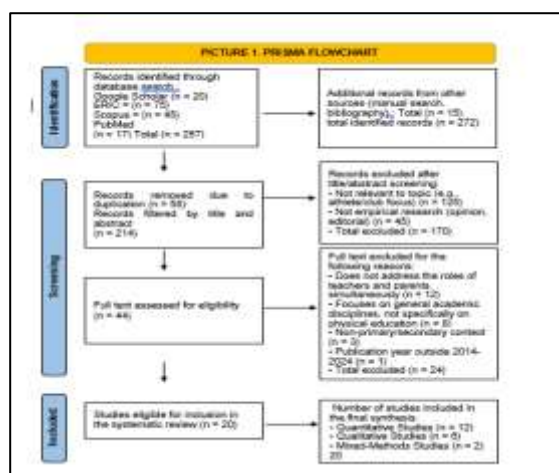


Fig. 1 PRISMA Flow Diagram

III. RESULTS AND DISCUSSION

Based on the PRISMA selection process, four studies published between 2014-2024 in national journals met the inclusion criteria and were analysed. Improving student discipline in physical education is not a one-person responsibility. (4) Its success depends heavily on the consistent and integrated

The Relationship of Body Mass Index to Cardiovascular and Agility: Systematic Literature Review

Krisna Aditiya^{1*}, Eneng Fitri Amalia¹, & Adi Rahadian¹

¹Universitas Suryakancana, Cianjur, Indonesia

*Corresponding author: krisnaaditiya17@guru.smp.belajar.id

Keywords: Indeks massa tubuh, Kesehatan kardiovaskular, Kelincahan, Systematic literature review

I. INTRODUCTION

Health and fitness are crucial aspects of life, and sports play an important role in achieving them. Sports are not only intended as a means to maintain health but have also developed into a realm of competition. In the context of fitness, Body Mass Index (BMI) is one of the anthropometric indicators frequently used to measure nutritional status and health risks related to body weight [Analogy: like the master key to nutritional status]. Non-ideal BMI, whether excessive (overweight or obesity) or insufficient (underweight), can affect various physiological functions and motor performance.

II. METHODS

The data accumulation process was carried out by collecting articles from the Google Scholar and PubMed databases using search tools such as 'Publish or Perish' (for Google Scholar), focusing on articles published from 2015 to 2025. The authors used the PICO method to ensure the search was aligned with their objectives. The authors found a total of 1,200 articles from the initial search. These articles were then processed through a series of data screenings (extraction and filtering) visualized using the PRISMA Flow Diagram.

III. RESULTS AND DISCUSSION

Of the 15 articles analyzed, 10 articles discussed the relationship between BMI and cardiovascular aspects, 3 articles discussed the relationship between BMI and agility, and 2 articles discussed the relationship between all three.

Overall, the analysis of the ten articles confirms that a high Body Mass Index (BMI) has a significant negative impact on both physiological health and motor performance. Increased BMI, particularly in the overweight and obesity categories, not only increases the risk of cardiovascular disorders such as hypertension and decreased VO2MAX due to excessive cardiac workload but also impedes agility due to the large inertia that must be overcome when changing the direction of movement.

TABLE I
OUTCOME

Author and Year (Fictitious)	Main Variables	Results (Fictitious)
(Setyawan, 2024)	BMI & Cardiovascular	There is a strong negative correlation between BMI and VO2max (cardiovascular indicator), with $r = -0.75$.
(Prasetyo et al., 2023)	BMI & Agility	Students with an obesity category BMI had an average T-Test time 1.5 seconds slower compared to normal BMI ($p < 0.01$).
(Wibowo, 2022)	BMI, Cardiovascular, Agility	High BMI significantly affects systolic blood pressure and agility test time, indicating a link between variables.

IV. CONCLUSIONS

Based on the systematic analysis of research articles, it is concluded that Body Mass Index (BMI) has a negative and significant relationship with cardiovascular health and agility capabilities. High BMI (obesity/overweight) is consistently associated with higher cardiovascular risk and lower agility. The implementation of exercise programs in the context of Physical Education must prioritize activities aimed at achieving ideal BMI to optimize students' cardiovascular health and agility performance.

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Systematic Review: The Use of Traditional Sports Games Based on Local Wisdom in Physical Education, Sports, and Health Learning

Lilih Muslihaturohman^{1*}, Adi Rahadian¹, & Taufik Rochman¹

¹Universitas Suryakancana, Cianjur, Indonesia

*Corresponding Author: lilihoppoa3s@gmail.com

Keywords: Traditional Sports Games, Local Wisdom, Learning Outcomes, Physical Education, Sports and Health

I. INTRODUCTION

Physical Education, Sports, and Health (PJOK) learning in Indonesia faces the challenge of not only developing physical competencies but also fostering character values and cultural identity. Traditional sports games (also known as "traditional games" or "folk games"), steeped in local wisdom, offer great potential as relevant, contextual, and meaningful learning resources and media. Purpose: This systematic review aims to identify, synthesize, and analyse empirical evidence regarding the implementation, impact, challenges, and opportunities of traditional sports games based on local wisdom in PJOK learning at various levels of education.

II. METHODS

The review was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method. The literature search was conducted on Google Scholar, ERIC, DOAJ, ScienceDirect, and Sinta (Science and Technology Index) databases with keywords: traditional games, traditional sports, local wisdom, PJOK, physical education, contextual learning, character values. Inclusion criteria: research articles (qualitative, quantitative, mixed-methods, R&D) published between 2018-2026, focused on the Indonesian context, and available in full text.

III. RESULTS AND DISCUSSION

Of the 239 studies identified, 7 met the inclusion criteria. The synthesis of findings was grouped into: (1) Game Variations and Characteristics: Studies identified various games such as Gobak Sodor, Bentengan, Egrang, Terompah Panjang, Lari Balok, Patok Lele, and other regional games, each of which contains the values of cooperation, strategy, dexterity, endurance, and honesty. (2) Impact on Learning Outcomes: Many studies reported positive impacts, including increased: student motivation and engagement (enjoyment), gross and fine motor skills, physical fitness (especially components of agility, balance, coordination), social skills (cooperation, communication, leadership), and internalization of character values such as sportsmanship, honesty, discipline, and respect for culture. (3) Implementation Models and Strategies: Various approaches were found, such as modifying rules/equipment to suit age and facilities, integration in warm-up/core/cool-down, project-based learning (documenting games), and thematic-integrated approaches. (4) Challenges and Obstacles: Some of the main obstacles include limited time due to a busy curriculum, and the perception of some students/parents that traditional games are out of date compared to modern sports.

IV. CONCLUSIONS

Traditional sports games based on local wisdom are a highly effective and holistic source of physical education (PJOK) learning, capable of bridging the goals of physical, social-emotional, and cognitive-socio-cultural education.

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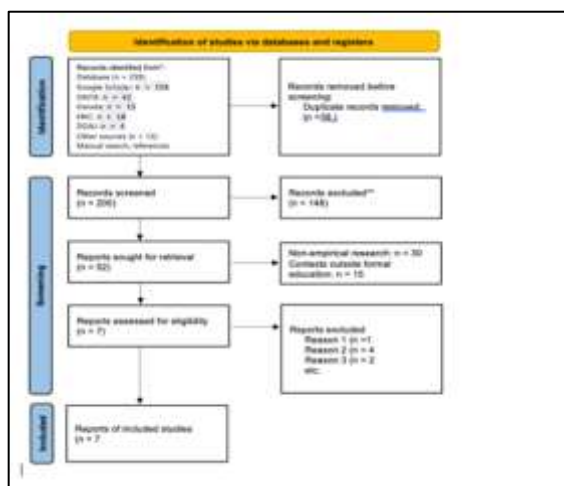


Fig. 1 Prisma Flow

Malaysia, 10 February 2026

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Physical Fitness of Adolescent Students Through General Gymnastics (Rhythmic Gymnastics, Physical Fitness Gymnastics and Aerobic Gymnastics) – A Systematic Literature Review

Mohammad Taufik^{1*}, Ervan Kastrena¹, & Muhamad Syamsul Taufik¹

¹Suryakancana University, Cianjur, Indonesia

*Corresponding Author: taufikmohammad92@gmail.com

Keywords: Physical Fitness, Gymnastics, Rhythm, Aerobics, Adolescent Students

I. INTRODUCTION

This review article aims to determine the implementation of general gymnastics, namely rhythmic gymnastics, physical fitness gymnastics and aerobic gymnastics in improving the physical fitness of adolescent students. This study is expected to contribute to physical education teachers, coaches, and sports practitioners in implementing a general gymnastics model that is effective, interesting, and appropriate to the characteristics of adolescent students.

II. METHODS

This journal uses the PICO method as a guideline for article screening. PICO (*Population, Intervention, Comparison, and Outcome*) were used in this article to ensure the search met its objectives. The PICO method is one method to facilitate journal reference searches.

III. RESULTS AND DISCUSSION

After conducting an in-depth analysis of all selected articles, the authors identified nine articles that met all eligibility criteria to serve as the primary data source for this study. Of these, six articles were related to Physical Fitness Gymnastics, two articles were about rhythmic gymnastics, and one article was about aerobic gymnastics. To provide a clearer picture of the literature screening process, the figure below shows a detailed flowchart of the article selection process.

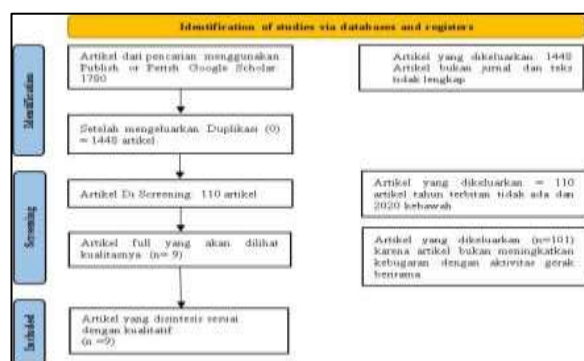


Fig. 1 Prism Flow Diagram

The results of the review of each article are presented in detail in Table 1 below which displays a summary of the research findings and its relevance to the relationship between general gymnastics such as rhythmic gymnastics, physical fitness gymnastics and aerobic gymnastics with the physical fitness of adolescent students.

TABLE I
GENERAL EXERCISE IMPROVES PHYSICAL FITNESS TEENAGE STUDENTS

1	The Effect of Rhythmic Activity Learning on Physical Fitness Levels Tulda Fata, Erawan, Jassi, So Gudi Handayani	Experimental research	Based on the results of the data analysis, it shows that: There is an influence of rhythmic activity learning on students' physical fitness levels Fading 15th Junior High School
2	The Influence of Physical Fitness Exercises (SKJ) on Students' Levels Physical Fitness in Grade VIII Students of Al-Busrah Cika Rakyat Middle School Della Adia Kusuma Wardana, Muhammad Syahid	Experimental approach	The results show that there is: A significant increase in students' physical fitness levels with an average posttest score of 11.36 and a posttest score of 13.16. This activity proves that Student SKJ has a positive effect on improving the physical fitness of students at Al-Busrah Cika Rakyat Middle School
3	The Effectiveness of Aerobic Exercise in Improving Physical Fitness of Adolescents in Makassar City Retro Fathana Harrita, Poppy Simo Arianda, Rizki Rahmi	Quantitative approach and experimental design	The results of the data analysis showed a significant increase in the physical fitness of adolescents after participating in aerobic exercise, with an average increase of 13% in the physical fitness scores of participants. The paired sample t-test statistical test produced a p-value < 0.05, which indicates that the changes that occurred were not coincidental and can be considered as an effect of aerobic exercise. This study concluded that aerobic exercise has been proven effective in improving the physical fitness of adolescents in Makassar City.

IV. CONCLUSION

Based on the author's analysis of research articles, it is concluded that several types of rhythmic movement activities or general gymnastics such as rhythmic gymnastics, physical fitness gymnastics (SKJ) and aerobic gymnastics can significantly improve the physical fitness of adolescent students.

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Police on The Integration of Mental Health: Goal Setting and Anxiety Levels of Wrestling Athletes in Achieving Performance – A Systematic Literature Review

Muhammad Arifin^{1*}, Adi Rahadian¹, & Eneng Fitri Amalia¹

¹Suryakancana University, Cianjur, Indonesia

*Corresponding Author: kakangarifin111@gmail.com

Keywords: Anxiety Level, Goal Setting, Mental Health, Performance, Wrestling Athletes

I. INTRODUCTION

The priority of the athlete's mental toughness underlies the foundation of self to be able to give the best performance. A strong body and a knight's soul convey a symbol of humility and toughness of athletes. However, mental health plays an important role in sports, based on the relevance of data showing high levels of mental disorders among athletes [1]. Based on the facts on the ground, the condition of wrestling athletes who experience mental health disorders begins with various factors and risks that occur, both during the training process, matches, and post-match, such as collisions that result in sports injuries [2], overtraining syndrome [3], or achievement crisis [4].

In fact, athletes may be at higher risk and often face unique stressors, which can make them vulnerable to mental health issues. Furthermore, the main issues reported by athletes include feelings of burnout, depression, and anxiety. The relentless pursuit of perfection can negatively impact their well-being. Athletes often face challenges balancing personal responsibilities with fulfilling their sporting commitments and goals. For example, athletes consistently ensure their academic and athletic achievements.

On the other hand, the main factors that determine athlete achievement are physical and psychological. Two psychological variables that influence athlete achievement are goal setting and anxiety levels [5]. A number of studies have also proven that goal setting and the level of anxiety experienced by athletes at a young age have a significant impact on the decline in athlete performance [6]. Thus, it is important for coaches, sports psychologists, medical staff, and athletes to be aware of clinical and subclinical mental health changes. This is useful as a database in providing evidence-based treatment, providing counselors and mentoring programs, and also providing mental health referrals for athletes for their developmental changes [7].

In its development, psychology institutions began to orient themselves towards professional expertise competency zones. This was done in order to effectively support the mental health of athletes from various perspectives, including clinical psychologists, sports psychologists, sports psychiatrists, and sports scientists [8]. Since it is

undeniable that the match situation provides a stressful intervention for athletes, this seeks to help treat their mental health. In other words, what is known about mental health sparks a dialogue between experts and specialists to contribute to research and services that support the improvement of athletes' mental health.

A clinical perspective on mental health and athletic performance can explore mental health in relation to the athlete's entire career, identity, and culture [9]. It then discusses interventions related to mental health and goal setting for achievement, as well as the interconnectedness of physical and mental health. The physical challenges athletes face in sport, including intense training and sports injuries, can result in psychological consequences, including cognitive, emotional, and behavioral symptoms. In addition, psychological challenges can lead to relationship problems, traumatic stress, anxiety, depression, aggression, and nutritional disorders, which can lead to serious physical-psychological consequences [10].

Furthermore, the impact of physical injuries and psychological stress can also affect an athlete's performance and hinder training processes, career transitions, interpersonal functioning, and physical rehabilitation, unless addressed appropriately and periodically. On the other hand, the mental health of athletes is a condition of performance or mental function that is successful [9] in producing productive activities. But it is also a state of maintaining harmonious, satisfying relationships with others to adapt to changes in overcoming difficulties.

Historically, the term "mental health" has been used dichotomously as a way to distinguish between optimal and suboptimal personal functioning [11]. Based on the classical medical model, those using the term would assume that an athlete either does or does not have a disease or impairment condition [12]. Physical injury conditions and psychological stress [13] can also affect athletic performance and hinder training, career transition, interpersonal functioning, and physical rehabilitation, unless appropriately addressed. The peak situation of the risk of mental disorders in athletes that result in athletes not achieving is due to poor performance and efforts to avoid tasks. Thus, athletes show various negative

behaviors that have an impact on their mental health and disrupt their performance.

Goal setting is a self-regulation tool that plays an important role in sports performance, influencing the emotional state and anxiety levels of athletes [14]. Furthermore, within the framework of the development of an integrative model of athletic performance (IMAP) that focuses primarily on three interactive phases, athletes can achieve and maintain optimal performance conditions. The pre-performance phase involves internal and external demands and processes that drive competitive behavioral readiness. Naturally, the dispositional behavior of athletes is still found in various cases of sports matches. Starting from the scheme that regulates athlete performance to interpret and respond to external demands from environmental adaptation. Furthermore, in the performance phase, it is oriented towards the interaction of cognitive, affective, physiological, and behavioral processes to produce optimal performance. For example, athletes with low frustration tolerance schemes usually cannot or will not exercise sufficient self-control and frustration tolerance to achieve personal or team goals in achieving their achievements. Given that these athletes in certain situations and conditions will have difficulty regulating their emotions in certain situations and conditions, especially during competition. Meanwhile, in the post-performance phase, with its priority scale, is the response to external consequences and internal processes related to athlete performance. Next, during the post-performance phase, there are 3 athlete paths: starting from (a) being continuously involved, (b) re-involved after a short dysfunctional period, and (c) disengaging from the series of activities [15].

In the sport of wrestling, psychological interventions focused on goal setting have been shown to reduce pre-competition anxiety levels and improve athlete performance [16]. Approach through mental imagery and cognitive restructuring [17] is effective in managing athlete anxiety. Thus, the review of novelty in this study prioritizes the study on mental health: goal setting and anxiety levels of wrestling athletes, ranging from excessive training programs, fear of sports injuries, and athlete stress levels, both during the training process and preparation for the competition and its main competition

II. METHODS

This investigation employs a quantitative descriptive methodology [18] with the objective of assessing the degree of mental and emotional health maturity among wrestling athletes in Cianjur, concentrating on the examination of goal attainment and levels of anxiety. Quantitative data is acquired when the variable of interest is evaluated along a continuum that signifies the extent to which the

variable is manifested. Consequently, quantitative data is presented in the form of numerical scores

A. Participants

The subjects involved in this study comprised wrestling athletes participating in the Pelatda program for PORPROV 2026. Employing a purposive sampling methodology, the selection criteria and population were established in accordance with the research parameters and requirements (Creswell & Creswell, 2018), including a cohort of 12 wrestling athletes aged between 17-21 years, all of whom were students who had been engaged in the Regional Training Center (PELATDA) program for a duration of approximately three years. This cohort adhered to a prioritized training regimen of 3 to 5 sessions per week and demonstrated active involvement in local, regional, and national competitions across both the freestyle and Greco-Roman categories.

B. Research Design

The research design pertains to the comprehensive methodology that is selected to systematically and logically amalgamate the various elements of the investigation, consequently ensuring that the research problem is effectively addressed; it serves as the foundational framework for the collection, evaluation, and interpretation of data. In instances where the study's design is intricate or the stimuli necessitate elaborate descriptions, it may be prudent to incorporate supplementary subsections with subheadings to segment the subsections, thereby facilitating readers in locating specific information.

C. Instruments

The construction of scales is an instrument developed in this research, which is expected to function as diagnostic feedback so that even though it has a broad scope, the instrument must still contain specific items to be able to measure the symptoms and disorders experienced by athletes during competition in a reliable and valid. Meanwhile, this study also uses the SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goal-setting orientation of wrestling athletes to differentiate the results between ego-goal orientation and task-goal orientation [19]. This integration is to understand the emotional regulation strategies of athletes in relation to pre-competition anxiety levels. Furthermore, to determine the competitive anxiety scale (CSAI-2), namely by assessing the level of anxiety among wrestling athletes during the pre-competition period by measuring situational, personal, and competitive anxiety, assisted by the application of data processing programs [20].

D. Procedures

Assessing the correlation between anxiety levels and the quality of goal setting concurrently to determine potential statistical associations. An investigation involving athletes who engaged in goal-setting practices (for instance, establishing specific temporal objectives for each lap) prior to a competitive event, followed by an evaluation of their levels of competitive anxiety. The findings may suggest that effective goal-setting strategies (such as the implementation of the SMART framework) have the potential to mitigate anxiety in the context of competitive pressures.

This information is likely to merge the actual data collection techniques with the instruments because it is hard to say what the participants were doing without indicating what they were doing it with. There are some fairly standard elements in the procedure. They include (a) variables that are manipulated and measured, including independent and dependent variables, (b) any conditions or groups that you intend to compare; (c) how participants are assigned to, or placed in, groups; (d) the role of the researcher in the session; (e) the directions that participants received; and (f) the activities in which the participants engaged.

Finally, include a statement that the procedure for which participants provided informed consent. When you write your procedure section, you can determine whether to include how you obtained informed consent. Strictly speaking, it is not part of the data collection process, so you can logically argue that it does not belong in this subsection.

E. Data Collection and Measurement

Data were collected using a mental health scale with a goal-setting instrument (SMART) and a validated mental anxiety level (CSAI-2). Both instruments are presented in the form of a standard questionnaire that shows good internal consistency with a Cronbach alpha coefficient of 0.825. The questionnaire contains 23 statements that are rated 1-5 based on a Likert scale. Furthermore, this questionnaire has been tested for feasibility and has a validity level of 0.810 with a significance level of 0.05, while its reliability is 0.875 with a very highcoefficient interval. Participants completed the questionnaire by understanding the statement items to ensure consistency of answers and ensure that there was no intervention from external parties. Then, the athletes reported the results of the questionnaire for research purposes. Furthermore, the commodities were analyzed and translated to provide further clarity of information related to the objectives of the study.

F. Data Analysis

The collected data were then analyzed using IBM SPSS Statistics software version 30, with a focus on descriptive statistical analysis. Descriptive statistical

analysis attempts to trace the characteristics of the sample by presenting various detailed value tracing results on goal setting and athlete anxiety levels, ranging from minimum, maximum, median, average, standard deviation, and total scores of each variable. The categories are divided into low, medium, and high. Thus, the assessment aspects in this instrument for goal setting are: 1) goal focus, 2) measurable progress, 3) goal achievement, 4) goal relevance, and 5) goal deadline. While for competitive anxiety: 1) motor, 2) affective, 3) somatic, and 4) cognitive.

III.RESULT AND DISCUSSION

In the world of sports, goal setting can be an effective tool for reducing anxiety. By setting clear and measurable goals, athletes can feel more in control of their emotional state, manage their self-control, and have a positive focus. However, it is also important to ensure that the goals set are realistic and achievable, and that they are time-bound to ensure that they are achieved.

On the other hand, athletes and coaches see the mental health perspective, especially performance anxiety, as one of the most important factors that may affect the results of sports competitions. This emotion is of great interest because even today, it continues to cause many symptoms with its condition. Positive emotions are generally considered to be very helpful for athletic performance. Some athletes view anxiety as a negative emotional phenomenon that hinders performance. Anxious athletes are emotionally disturbed and unstable. In addition, anxiety is caused by competition and the state of anxiety it causes. Thus, from the results of the investigation in this study, we can better understand the relationship between the two variables.

This study produced consistent results between the framework of goal setting and the level of anxiety of wrestling athletes in achieving their goals. Furthermore, the results obtained regarding the integration of both goal setting constructs and the level of anxiety of wrestling athletes (Table 1) showed that goal setting provided a sense of emotional control: specificity of goal focus ($r = 0.93$; $p = 0.05$), measurable progress ($r = 0.87$; $p = 0.05$), achievement of goals ($r = 0.91$; $p = 0.05$), relevance of goals ($r = 0.85$; $p = 0.05$), deadline for goals ($r = 0.83$; $p = 0.05$). This means that the value of wrestling athlete performance based on the statistical results of goal setting is categorized as high quality.

TABLE I
MENTAL HEALTH FROM A GOAL SETTING PERSPECTIVE

Variable	Study Group N=12	p (level of significance)	SMART				
			Specific	Measurable	Achievable	Relevant	Time-bound
Goal Setting	0.57	0.05	0.93	0.87	0.91	0.85	0.83

Meanwhile, for competitive anxiety levels of wrestling athletes (Table 2) shows the results of the motoric dimensions ($r = 0.43$; $p = 0.05$), affective ($r = 0.52$; $p = 0.05$), somatic ($r = 0.41$; $p = 0.05$), and cognitive ($r = 0.55$; $p = 0.05$). In other words, the performance value of wrestling athletes based on the results of statistical analysis obtained a low anxiety level (meaning there is no excessive worry, fear, or tension). Thus, the goal setting intervention provides a significant manifestation of the anxiety level of wrestling athletes.

TABLE II
MENTAL HEALTH FROM AN ANXIETY LEVEL PERSPECTIVE

Variable	Study Group N=12	p (level of significance)	CSAI-2			
			Motoric	Affective	Somatic	Cognitive
Anxiety Level	0.57	0.05	0.43	0.52	0.41	0.55

If explored further, the results of various athlete conditions, ranging from goal setting regulations, recovery processes, and mental health literacy, are also the main psychological factors that are oriented towards cognitive and emotional adaptation, so that they affect sports performance in achieving their goals. In addition, these results can also be useful for sports psychologists, coaches, athletes, and other sports professionals to help build and maintain a positive cultural training ecosystem that supports athlete success. Another interpretation of the results of this study also reveals a general picture of the mental health conditions of wrestling athletes from the perspective of goal setting and anxiety level (Figure 1).

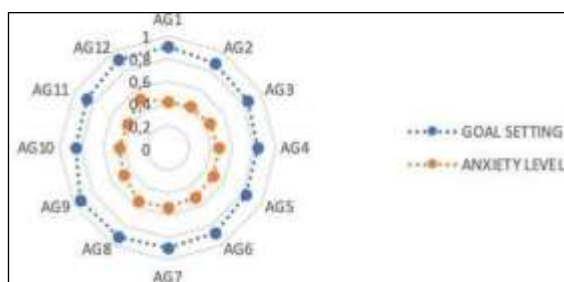


Fig. 1 Overview of mental health conditions of wrestling athletes

The findings from the study indicated that the general mental health of the 12 wrestling athletes was rated highly in terms of goal setting. In contrast, anxiety levels were assessed as low, suggesting the athletes felt calm, alert, and in command of themselves. As a result, these athletes demonstrated robust mental toughness and a strong mindset. Considering the significant challenges faced by athletes in competitive sports, there has been a marked improvement in the mental wellbeing of these individuals. This research highlighted how goal-setting strategies and anxiety levels influence

athletes' performance. Therefore, serious mental health challenges reduce the chances of experiencing more severe psychological issues. Additionally, athletes need to participate in a sports psychology support program; by employing effective goal-setting strategies, elite athletes can turn anxiety into motivation to optimize their performance.

There seems to be a need for the development of a tailored psychiatric intervention model for elite wrestling athletes dealing with serious psychological issues and disorders. This model would adopt an early intervention approach, promoting prompt identification and swift access to high-quality, evidence-informed treatments. It could involve launching a mental health screening initiative for athletes alongside physical health assessments, as well as spreading mental health awareness support to vital groups such as partners, friends, family members, coaches, and administrative personnel. Achieving this necessitates a cooperative effort among sports medicine professionals, psychiatrists, psychologists, and other mental health practitioners, tackling obstacles to treatment and stigma faced by elite athletes while balancing the need for treatment with their commitment to ongoing performance in their sports careers.

Technology for support presents a distinct chance for this advancement, especially considering that the upcoming generation of elite athletes will be digital natives, proficient in utilizing online or computer-based interventions. In conclusion, due to the limited number of high-quality studies available thus far, we urge sports organizations to think about publicly sharing any research on elite athlete mental health (in line with ethical guidelines) that is currently underway. Such initiatives will help the field grow and evolve.

The purpose of systematic analysis is to compile research on variables and pinpoint ongoing knowledge. However, thus far, there has not been a focused examination of mental health issues and psychological well-being in elite wrestling competitors. This study aims to integrate the increasing body of evidence regarding the prevalence and characteristics of mental health disorders (including goal setting and anxiety) and psychological well-being in elite wrestling athletes. The goal is to uncover any unique aspects that should be prioritized for future inquiry and to guide strategies or frameworks that enhance the detection and management of mental health issues in elite wrestlers.

Moreover, elite wrestling competitors face numerous distinctive stressors that may heighten their susceptibility to mental health disorders. Significant factors include the psychological effects of injuries, overtraining, anxiety, fatigue, and the continuous competitive pressure to succeed. To ensure that the evaluation and management of elite

athletes' mental health are on par with their physical needs, additional high-quality epidemiological and intervention studies are essential. Ideally, when feasible and suitable, the outcomes of these studies should be communicated beyond wrestling organizations or related fields.

From a mental health perspective, the findings of this study are that goal setting and anxiety levels play an important role in determining the performance of wrestling athletes [21]. Effective, process-oriented goal setting serves as a motivational and focus-enhancing tool, but if not managed properly (unrealistic, only results-oriented), it can become a major source of inhibiting anxiety that damages performance [22]. While optimal levels of anxiety can serve as a motivator, excessive anxiety ultimately presents significant barriers to both physical and mental disorders.

The key to sustainable athlete performance improvement lies in goal setting and intelligently prioritizing the process for self-development [23]. Furthermore, proactive management of anxiety using various training techniques is essential for mental health [24]. This support for mental well-being should be treated with equal importance to physical training, technique, and strategy. Adopting a holistic and systematic approach that considers these psychological elements enables wrestling athletes not only to achieve peak performance but also to sustain long-term mental health throughout their careers.

This review also examined the specific stress management needs of athletes, emphasizing goal setting and performance-related anxiety. Enhanced goal-setting and stress management capabilities can be developed by coaches who promote a nurturing coaching environment, encouraging athletes to view performance-related anxiety as beneficial and to formulate strategic approaches. Additionally, coaches play a pivotal role in fostering an organizational climate that affects athletes' stress levels. Given the positive correlation between coaching and a mastery climate versus a performance climate, future research on mental health interventions should incorporate the involvement and backing of primary coaches.

IV. CONCLUSION

The conclusion of this study is that mental health plays a crucial role in improving the performance of wrestling athletes. Effective goal setting can strengthen focus and motivation, while anxiety management helps maintain calm and alertness in the match. Strategic integration of both in the training program can be the key to the success of athlete performance holistically and systematically. Furthermore, it is very necessary to have professional mental health experts who can provide clinical psychology services to wrestling athletes. So that their role can help diagnose and treat various

psychological problems, as well as provide appropriate interventions such as counseling and psychotherapy for athletes. In addition, this study also ensures that recovery is an intra and interindividual process that also depends on psychological, physiological, and social factors in wrestling athletes, which is to present feelings of joy, happiness, and well-being in achieving their goals.

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A Systematic Review of The Relationship Between Socio-Emotional Competence, Physical Activity, and Healthy Lifestyle on Physical Fitness

Muhammad Azis Munazat Maulana Sopian^{1*}, Adi Rahadian¹, & Taupik Rochman¹

¹Universitas of Suryakancana, Cianjur, Indonesia

*Corresponding Author: azismaulana838@gmail.com

Keywords: Socio-Emotional Competence, Physical Activity, Healthy Lifestyle, Physical Fitness

I. INTRODUCTION

Article aims to examine and develop The Relationship Between Social-Emotional Competence, Physical Activity, and Healthy Lifestyles and Physical Fitness Levels through an analysis of recent research findings (2020–2025). This study is expected to contribute to physical education teachers, coaches, and sports practitioners in implementing effective, and It is hoped that it will provide new insights regarding the importance of strengthening the social-emotional aspects as a foundation in building an active and fit lifestyle.

II. METHOD

This journal uses the PICO (Population, Intervention, Comparison, and Outcome) method as a guideline for article screening. The PICO approach helps researchers develop a systematic search strategy that aligns with the study's focus. According to past study by Khaulla Miandi & Peristiowati (2022), this method is effective in selecting literature because it can clarify the relationship between the study population, the intervention, the comparison, and the expected outcomes.

III. RESULTS AND DISCUSSION

After conducting an in-depth analysis of all selected articles, the author successfully identified 4 articles that met all eligibility criteria to serve as the primary data source for this study. Of these articles, Of these articles, 2 discuss social emotional competence, 1 discusses The Relationship between Physical Activity and Physical Fitness, and 1 discusses healthy lifestyles. To provide a clearer picture of the literature screening stages, the figure below shows a detailed flow of the article selection process.

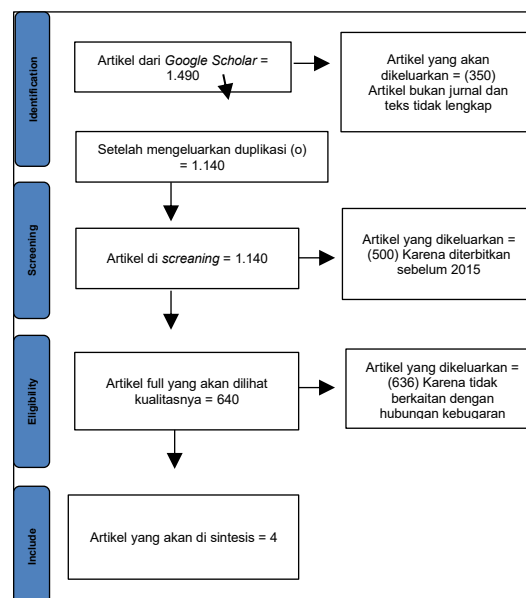


Fig. 1 Prism Flow Diagram

The results of the review of each article are presented in detail in Table 1 below, which displays a summary of the research findings and their relevance.

TABLE I
OUTCOME OF THE RELATIONSHIP BETWEEN SOCIAL-EMOTIONAL COMPETENCE, PHYSICAL ACTIVITY, AND HEALTHY LIFESTYLE AND PHYSICAL FITNESS LEVELS

No	Author Name & Year	Method	Results
1	Azizah Fitri Rahmawati (2024)	descriptive	The results of the data analysis indicate the development of social-emotional competencies in PJBL learning. This study was limited by the small sample size; it is hoped that further research can use larger samples and add interview instruments.
2	Faishol Zulfa Alghozi (2021)	(Correlational)	it can be concluded that there is a positive relationship between physical activity and physical fitness. The better the physical activity, the better the physical fitness.
3	Adjitama Yoga Wiguna (2021)	descriptive	It can be concluded that there is a positive relationship between physical activity and physical fitness. The better the physical activity, the better the physical fitness

IV. CONCLUSION

After analyzing several selected research articles, it can be concluded that there is a relationship between social emotional competence, physical activity, healthy lifestyle patterns and physical fitness.

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Cianjur for their guidance, input, and encouragement throughout the research and writing process.

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A Systematic Literature Review Techniques of Sila Sepak Takraw in The Sepak Takraw

Yuki Pahlevi^{1*}, Ervan Kastresna¹, & Muhamad Syamsul Taufik^{1*}

¹Suryakancana University, Cianjur, Indonesia

*Corresponding Author: yukifahlevi@gmail.com

Keywords: Technique, Sepak Sila, Sepak Takraw

I. INTRODUCTION

Article aims to examine and develop a training approach for sepak takraw techniques through an analysis of recent research findings (2020–2025). This study is expected to contribute to physical education teachers, coaches, and sports practitioners in implementing effective, engaging training models that are tailored to the characteristics of students at both elementary and secondary school levels.

II. METHODS

During the data collection process, the authors searched for various national articles using Google Scholar and the Publish or Perish tool. The search focused on publications published between 2020 and 2025, with the aim of obtaining relevant and up-to-date sources. To maintain the accuracy of the search for the research topic, the authors applied the PICO (Population, Intervention, Comparison, and Outcome) method as a guideline for article screening.

TABLE I
PICO METHOD

PICO	Information
P (Problem/Population)	The low ability of students to perform sepak takraw techniques consistently and accurately in sepak takraw games.
I (Intervention)	Efforts to implement various training methods for developing sepak takraw techniques in the Sepak Takraw sport.
C (Comparison)	Efforts to implement the effectiveness between conventional technical training methods and motor learning and game-based training models to improve soccer skills.
O (Outcome)	Application of the Sepak Sila Technique in Sepak Takraw

III. RESULTS AND DISCUSSION

The authors successfully identified approximately 1,000 articles through Google Scholar search results using the Publish or Perish application. In the final selection stage, the authors identified 3 articles that fully met all established inclusion and exclusion criteria. These articles were deemed most relevant to serve as data sources in this systematic review. To provide a clearer picture of the literature screening stages, the figure below shows a detailed flow of the article selection process.

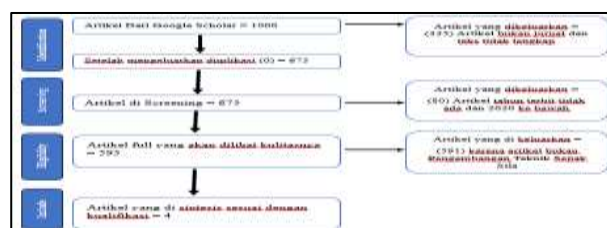


Fig. 1 Prism Flow Diagram

After conducting an in-depth analysis of all selected articles, the author successfully identified 4 articles that met all eligibility criteria to serve as the primary data source for this study. Of these articles, three discussed the development of sepak takraw techniques in sepak takraw, while one specifically focused on teaching sepak takraw techniques to young athletes.

TABLE II
OUTCOME OF DEVELOPING SEPAK SILENCE TECHNIQUES IN SEPAK TAKRAW

No	Author Name and Year	Method	Results
1	(Abdillah, 2023)	(Research and Development)	Based on the results of research and discussion, the sepak takraw training model in sepak takraw games which includes 6 forms of training is very suitable for use in sepak takraw training.
2	(Nur Kholis, Harwanto, Abd Cholid, 2025)	(Research and Development)	The development of variations of sepak takraw exercises was declared valid and suitable that in the long term it can have an impact on national sepak takraw achievements.
3	(Robertus Teja Sue, Yanuarius Ricardus Natal, Ferdinandus Samri, 2021)	PJKR-Exercise (Research and Development)	Based on the development steps that have been carried out from the initial stage to the final stage of the research, the final conclusion of this research is to produce a development product in the form of a PJKR-

IV. CONCLUSIONS

Based on the analysis of several research articles, it can be concluded that various training methods such as movement variation training, kicking pads, hula hoops, and balloon training have been proven effective in improving sepak takraw technique skills in young students and athletes in sepak takraw.

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