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

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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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