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EFFECTIVENESS OF PRACTICE IN MIND PROGRAM ON STANDING SHOT AND JUMP SHOT PERFORMANCE IN ELITE NETBALL PLAYERS

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Abstract

Practice in Mind (PIM) training help to resolve physical and psychological problem in sport skills performance. Therefore, the present study was done to investigate the effectiveness of PIM training on netball standing shot and jump shot performances. Twenty state level netball shooters with 3 to 5 years playing experiences participated in this experimental study. Participants were randomly assigned into PIM training group and control group with 10 participants for each group. Both groups completed 18 training sessions in 3 times a week for 6 weeks intervention program. Pre, post, and retention test were conducted prior to the 10 standing and jump shooting task. The results revealed that there was significant different of PIM training group versus control group for both standing shot ($p < .05$) and jump shot ($p<.05$) after 6 weeks. However, no significant different was observed after retention (week 12) for both groups. Based on the finding, it is suggested this present study will be beneficial to the athletes in terms of educating them about the importance of systematic imagery training to increase shooting performance in netball and for further improvement on their shooting techniques. Future studies are warranted to explore potential benefits of PIM training by focusing on a larger exposure and other netball specific motor-abilities.

Keywords: *PIM training program, imagery practice, physical practice, netball shooting*

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INTRODUCTION

A successful performance in sports depends on the collaboration of several factors such as physical, tactical, technical, and psychological (Grobbelaar, & Eloff, 2011). When athletes achieve highest level of performance, his or her level of competition, physical and tactical skills seem equivalent with each other but it might be differed for their psychological skill which it may affected the performance of competitions and games' patterns (Dosil, Cremades, & Rivera, 2014). According to Xiong (2012) has stated that the role of psychological factor has become more prominent in determining the result of a game. In certain situations, some athletes are unable to cope with the performance pressure, hence, are less confident to perform the skills at their best in certain conditions. Nevertheless, in the current situation, some coaches have failed to incorporate mental skills or mental preparation training in the daily training schedule for their athletes (Kumari, & Kumar, 2016). Lack of knowledge about sports psychology, misunderstanding about mental skills, lack of time to monitor, and the habit of personal guidance could be some of the reasons why coaches could not properly incorporate mental skills training for their athletes.

Coaches should know that the different mental skill programs may depict different outcomes in achieving success performance across various sports. Hence, it is important for coaches to identify the specific mental skill program that should be carried out for a specific sport and skill (Mousavi, & Meshkini, 2011). Mental skill is one of the crucial ingredients for successful performances' enhancement. Mental skill is an important element in the preparation and implementation of traditional cognitive behavioral technique that aims to help participants in the development of sport mental skills to achieve outstanding performance of well-being (Mousavi, & Meshkini, 2011). There are various ways or different strategies to conduct the mental skill training to overcome the psychological conflict within athletes. Previous researchers mentioned that among other performance strategies, imagery is one of the most widely used techniques in mental skill training (Mellalieu, & Shearer, 2011; Mazlan, 2014; Mazlan, 2015). Certainly, imagery is the most relevant method that has been used for several purposes in sports to enhance skills, improve skills acquisition, and increase the athletes' level of confidence (Munroe-Chandler, Hall, & Fishburne, 2005; Asmidar, 2016; Fared, Mazlan, & Afizan, 2016).

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There are several skills that have been developed to perform shooting in the game of netball. It was developed to produce different shots or skills in different circumstances. A successful shooter should work towards mastery of these techniques to ensure that she is comfortable and able to adapt to all types of defenses in all game situations. These techniques include the high-release standard shot, stepping back, stepping to the side, stepping in, the jump shot, the running shot, and the fake shot (Woodlands, 2006). Standard or standing shot is usually used by shooters in the game. To perform standing shot, the shooter should be seeing the post first after receiving the ball. Then, the legs should be open with shoulder-width apart, with toes, hips and shoulders level and parallel to the vertical position. When on balance and the ball is brought above her head, the knees are bent and finally the ball is released into the net. Although the standard shot should be used wherever practicable, sometimes different situations call for a variation in techniques to maximize chances of success (Woodlands, 2006).

Jump shot is another variation of standing shot in netball and provides advantages to the shooter who tries to score goals to counteract the action of tall defender, action of long distance or has an overbalanced baseline (Woodlands, 2006). More recent heightened competition has naturally led towards intense speculation on utilizing a jump shot technique, modified from the technique employed in basketball. In addition, jump shot can increase the height at which the ball is released (i.e., the release point) (Struzik, Pietraszewski, & Zawadzki, 2014). The technique for jump shots is the same as the standing shot technique, but the shooter jumps slightly at the release level to provide additional momentum to overcome the extra distance the ball needs to travel. More flexion in the knee is also advantageous which is to ensure that the vertical alignment is maintained (Henderson, Hume, & Bradshaw, 2006). Fowler (2010) argued that a systematic imagery training or strategies should be provided to enhance shooting performance which indirectly helps to boost the motivation among the netball shooters. This is because the use of imagery has been established to enhance cognitive and motivation, maintain their self-confidence, improve the skill, and using it to stay relaxed and be focused in the competition (Cumming, & Hall, 2002; Woodlands, 2006; Fowler, 2010).

Past studies conducted by Mazlan (2014; 2015; 2016) found that systematic imagery training known as Practice In Mind (PIM) improved golf performances especially in golf putting, self-efficacy, and moods of golfers. PIM training program is a six weeks imagery –

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physical training program which consists of sevens PETTLEP components (i.e. Physical, Environment, Timing, Task, Learning, Emotion, Perspective). The components were derived from functional similarity between imagery and physical performance of a motor task (Holmes, & Collins, 2007). The Physical (P) relates to individual's physical nature of imagery reflected during the actual performance. For instance, they should be imaging the real performance of the skill (e.g., performing a netball shooting and wearing game attire). Environment (E) refers to the inclusion of stimulus materials that help mimic motor performance (e.g., performing the netball shooting skill at a netball court to develop feeling that is close to the real situation). Task (T) is described as the imaged task that should be similar to when performing the task in real life in terms of thoughts, feelings, and actions in making a shot. Timing (T) refers to the action according to the actual performance duration. Learning (L) refers to the imagery for the purpose of becoming familiar with new skills, and for the correction of some technical aspects. Emotion (E) relates to the athlete's emotions and arousal when performing the task. Lastly, Perspective (P) which is described as the use of an internal imagery perspective, while indicating the importance of an external perspective as it relates to the characteristics of the motor skill being performed.

The imagery content in PIM training also integrated the facilitative imagery direction and stimulus – response propositions other than motivation, visual and kinesthetic directions. Previous study found that PIM training also benefits team sport especially in netball shooting perfomance (Asmidar, 2016). However, there is limitation finding of mental training on netball shooting skill especially in standing and jump shot techniques. Thus, there is a need to investigate the effects of PIM training particularly on netball game to increase shooting skills performance.

METHOD

Twenty state level netball shooters with 3 to 5 years playing experiences participated in this experimental study. Participants were randomly assigned into 2 different groups by using fishbowl technique: (i) PIM training group (combined imagery – skill practice) and (ii) control group (only skill practice) with 10 participants for each group. Both groups completed 18

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training sessions in 3 times a week for 6 weeks intervention program. Participants in PIM training group performed 10 imagery practices together with 10 skill practices for standing shot followed by practicing jump shot. The control group only performed 10 skill practices. Pre, post, and retention test were conducted prior to the 10 standing and jump shooting task 3.2 meters' distance from goalpost.

Instrument

Movement Imagery Questionnaire-Revised (MIQ-R)

Movement Imagery Questionnaire-Revised (MIQ-R) adopted from Hall and Martin (1997) was used as screening imagery ability and were required to obtain MIQ-R scores of at least 16 before they begin with the imagery intervention. The questionnaire was used to assess individual differences in both kinesthetic and visual imagery ability before engaging with the imagery intervention program. The MIQ-R is an eight-item questionnaire asking participants to first physically perform, and then visually or kinaesthetically imagine four simple movements such as "Raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet". Following imagery performance, participants rated their ability to visually or kinaesthetically imagine the movement on a 7-point Likert scale ranging from 1 (very hard to see/feel) to 7 (very easy to see/feel). The items were then averaged to form visual and kinaesthetic subscales.

Shooting Task Performance and Points Scoring

The participants performed two shooting tasks performance. Firstly, the participants completed 10 imagery practices and continued with 10 skill practices on the actual netball court for standing shot performance. Secondly, after taking a break of about 5 minutes the participants continued the task by completing 10 imagery practices and accomplished 10 skill practices for jump shot performance. Each attempt of all the shooting task performance (i.e., standing shot and jump shot) practice recorded using the following scoring system (Complete miss = 0 points, Hitting the ring and not going through the net =1 point, Hitting the ring and going through the net = 2 points, and Clean net = 3 points). The reliability of this scoring system was reported by Pates, Fryer, and Maynard (2003) with a Cronbach alpha coefficient for the scale was 1.0.

Procedures

All participants had obtained MIQ-R scores of 16 and above in imagery ability screening besides meeting the following criteria; (a) has experienced as shooters position and represent state more than two years (b) not involved in any form of imagery training, and (c) not involved in any tournaments during the intervention program. Then, the participants were randomly assigned into two different groups: (i) PIM training group (combined imagery – skill practice) and (ii) control group (only skill practice) with 10 participants in each group. Before the intervention program, all participants were asked to complete a pre-test. However, before proceeding to the test, a 5 min active warm-up was performed mimicking the specific test's movements (Ayed, Latiri, dore, & Tabka, 2011). The participants were required to perform a warm-up consisting of 10 repetition of squats and five netball shots practices (Wakefield, & Smith, 2009).

After performing 5 minutes of active warm-up, all participants in the PIM training group and control group performed the first sequence consisting of 10 times netball standing shooting. This test was conducted on the actual netball court and well monitored by the researcher, coaches, and instructors. Every point of the 10 attempts were added together to form a test score performance, with a maximum score of 30. After completing the standing shot, the participants were asked to take a short rest before continuing with the next task. Rest interval between the sequences was 5 minutes which enables the participants to recover after performing the standing shot test before proceeding to performing another test which is the jump shot test. Bioshop (2003) argued that 5 minutes' recovery period is sufficient to result in an elevated base-line VO2 immediately prior to the intermediate performance task.

Following the pre-test, the intervention program was introduced to the participants. During intervention, all participants were instructed to complete the training three times per week within the 6-weeks intervention program. The imagery script for netball standing shooting was given to the participants in the PIM training group. After that, the participants read and recorded the imagery script using audio tools. Next, the participants listened to the imagery script using an earphone and mentally practiced 10 successful netball standing shooting based on the script. The participants were instructed to perform the imagery in a

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standing position 10 meter from the actual netball court by holding the ball and facing the netball court. This is to apply distance to practice imagery in the actual court before performing in the real competition (Mazlan, 2014, 2015, 2016).

Continuously, after completing the imagery training, the participants went to the actual netball court and completed 10 skill practices for standing shot technique. After resting about 5 minutes, the same procedures were conducted to the participants for netball jump shooting techniques. The imagery script for netball jump shooting was given to the participants and recorded using audio tools named Philip VTR5000 Digital Voice Recorder. After that, the participants used this audio during imagery practice particularly for the PIM training group because it is applicable and practical to be brought during the imagery practices (Holmes & Collins, 2001; Mazlan, 2015, 2016; Mazlan, 2014; Mohd Fared et al., 2016). Meanwhile, the control group were instructed to perform 10 physical practices of netball standing shot and jump shot at a 3.2 distance from the goalpost in the actual netball court. After completing 18 intervention sessions, the post-test was conducted on the PIM training group and control group. During the post-test, all the participants performed a shooting test involving 10 times of standing shot and 10 times of jump shot from 3.2 m distance. During the retention period, the researcher only asked the shooters to continue using the PIM training program during the 6 weeks period from post-test to retention-test, so during this period, the choice of using the training method depended much more on the shooters themselves (Krasnow, Chatfield, Barr, Jensen, & Dufek, 1997). The 6 weeks follow up was conducted because it is aimed to see the process of transferring learning from the training and to evaluate the long-term effect of imagery training among the participants.

RESULTS

A mixed between-within subjects' ANOVA was conducted to investigate the effect of two different interventions (PIM training program group and control group) on participant's scores on standing and jumping shooting, across three time periods (Pre-Test, Post-Test, Retention-Test).

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Table 1. The Effect of PIM Training Program on Standing Shot

Effect	Wilks' Lambda	F	Sig.	Partial Eta Squared
time	.34	16.40	.001	.67
time * group	.22	31.00	.001	.79

Table 1 showed that there was a significant interaction between group of intervention and time, Wilks' Lambda = 22, F (2, 17) = 31.00, p = .001, partial eta squared = .79. There was substantial main effect for time was obtained Wilks' Lamda = .34, F (2, 17) = 16.40, p <.001, partial eta squared = .67, with PIM and control group improved in standing shot performance from pre-test to post-test. The main effect comparing the two types of intervention (PIM training group vs. control group) was significant, F (1, 18) = 61.22, *p* = .001, partial eta squared = .77, suggesting that there was a difference in effectiveness of PIM training program on standing shot compared to the control group.

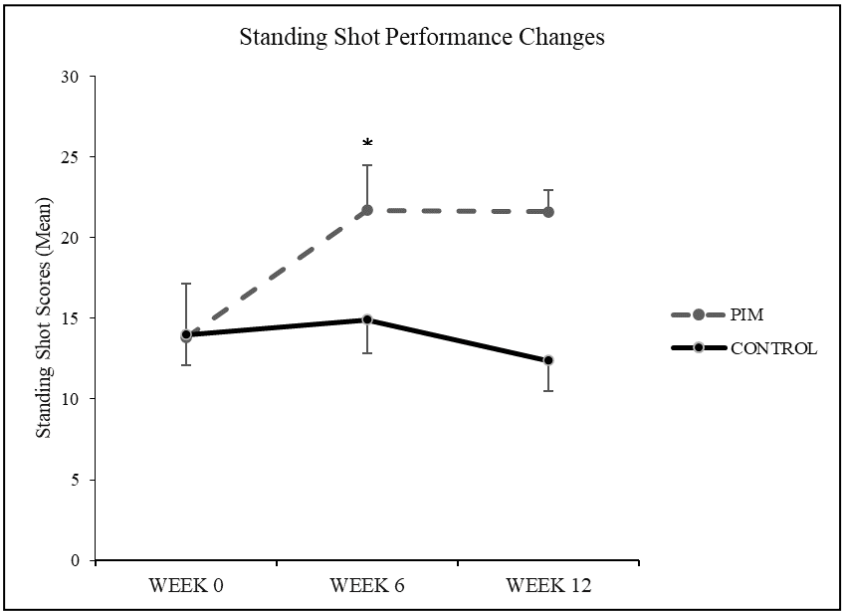

Figure 1: Standing Shot Performance Changes

The graph in figure 1 shows the average the PIM training group and the control group scores each time for standing shot. The graph clearly shows the PIM training group scores increase and it shows a significant improvement during post-test. Otherwise, control group scores were very similar during pre-test. PIM training group seem to show scores more highly than control group in post-test. Lastly, both groups showed a reduction during retention-test.

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Table 2. The Effect of PIM Training Program on Jump Shot

Effect	Wilks' Lambda	F	Sig.	Partial Eta Squared
time	.25	25.43	. 001	.75
time * group	.50	8.71	.002	.51

Table 2 showed that there was a significant interaction between group of intervention and time, Wilks' Lambda = .50, F (2, 17) = 8.71, p= .002, partial eta squared = .51. There was substantial main effect for time was obtained Wilks' Lamda = .25, F (2, 17) = 25.43, p < .001, partial eta squared = .75 with PIM and control group improved in jump shot performance from pre-test to post-test. The main effect comparing the two types of intervention (PIM group vs. control group) was significant, F (1, 18) = 30.17, *p* = .001, partial eta squared = .63, suggesting that there was a difference in effectiveness of PIM training program on jump shot compared to the control group.

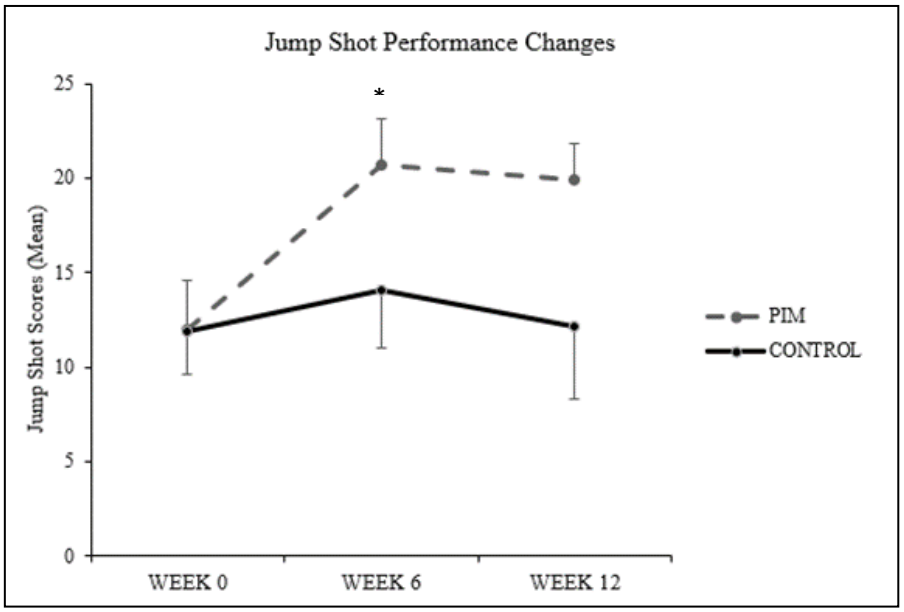

Figure 2. Jump Shot Performance Changes

The graph in figure 2 shows the average the PIM training group and the control group scores each time for jump shot. The graph clearly shows that the PIM training group scores increase and it shows significant improvement during post-test. Otherwise, control group scores were very similar during pre-test. PIM training group seem to show scores more

exceedingly than control group in post-test. Lastly, both groups showed a reduction during retention-test.

DISCUSSIONS

The finding of the current study strongly supports the effectiveness of imagery training on standing shot. The result showed that there was a significant difference between the PIM training group (skill combined with imagery practice) and control group (skill practice only). Besides, the current results reported a superior improvement in standing shot scores across the three time periods with the PIM group showing an increase from pre-test to post-test, higher than the control group. However, the PIM training group showed that the retention scores were notably higher than pre-test scores. This result showed that the PIM training program should be completely monitored by the coaches or sport psychologist during the mental training same as physical, technical, and tactical training.

The finding of the current study also supports the effectiveness of imagery training on jump shot. The results presented a significant difference between the PIM training group (skill combined with imagery practice) and control group (skill practice only). Besides, the current results also reported an improvement in jump shot scores across the three time periods with the PIM group showing an improvement from pre-test to post-test, higher than the control group. Additionally, the PIM training group showed that the retention scores were notably higher than pre-test scores for jump shot. The results showed that the mental training like PIM training program should be scheduled and continuously practices among the athletes to produce optimum performance.

This is surprising as based on previous research the imagery technique only has impact on single player sports, compared to team sports such as netball (Fowler, 2010). However, an unforeseen finding found that systematic imagery training such as the PIM training program can produce superior improvement for netball shooting performance particularly standing shot and jump shot skills after completing the 6 weeks training. The results obtained from Fowler (2010) said that imagery intervention may not be effective for those who have never been

involved in imagery training before because they do not have imagery abilities. However, the present finding proved that imagery abilities can be developed even though the participants have not gone through the imagery training before participating in the intervention. Consequently, the results showed that the participants received the comprehensive elements in PIM training to execute their skill to enhance their shooting accuracy.

In the present study, the results indicated that the PIM training group improved in netball standing shot and jump shot performances compared to the control group (physical practices only) which may be influenced by the presence of PETTLEP imagery elements during the intervention. Similar findings highlighted by Wakefield and Smith (2009) which demonstrated that imagery training consisting of PETTLEP elements can improve netball shooting accuracy. Mazlan (2014) also shed light on the effectiveness of the PETTLEP to enhance golf putting skill performance. It is believed that the presence of functional equivalence; PETTLEP can help participants perform the task (i.e., standing shot and jump shot) in real life in by incorporating the elements of thoughts, feeling, and actions to deal with emotions when the athletes wear the actual game attire as it boosts the desire to perform well. Additionally, similar environment during the practice and the actual netball court also plays a vital role in enhancing shooting accuracy. Thus, the participants could perform relevant postural adjustments prior to imaging the shots and receive functionally equivalent and kinesthetic sensations.

The learning component really helps the participants perform the complex techniques such as jump shot. Jump shot technique is a complex skill that brings a high degree of difficulty, and requires a very good dynamic balance, as the shot is taken from the airbase. Henderson, Hume, and Bradshaw (2006) suggested that the right training and well-planned strategy must be carried out as the application of jump shot as it gives the advantages in terms of showing a greater release height and contributes to more successful shooting. The results of the current finding found that PIM training program can produce high impact to this jump shot technique by showing improvement in shooting performance. This supports the finding by Rattanakoses, Geok, Chong, and Sofian (2012) which mentioned that imagery training is an effective mental skill for enhancing skill acquisition of complex skill. As said by Morris, Spittle, and Watt (2005) the effectiveness of imagery training is due to the athlete's ability to use imagery

effectively with a concentration on the information that was given through the senses. This is also consistent with the finding of Afrouzeh, Sohrabi, Torbati, Gorgin, and Mallett (2013) who reported that the PETTLEP model produces great effect to improve learning and performance of difficult skills in volleyball. In the present study, the results show an encouraging achievement from the pre-test to post-test after six weeks of intervention. This may be due to the ability of the participants in controlling the imaging process and focusing more on proper techniques and making skills to become more familiar that bring participants closer to success.

The present finding strongly suggests that by combining physical practice and imagery training in PIM training program, it brings about impact to the shooting performance for the athletes. This is consistent with the findings of Rattanakoses, Geok, Chong, and Sofian (2012) reported that the physical skill of cyclists increased and improved after completing the physical training program with a combination of visual imagery. Specifically, several previous studies showed that the combination of physical practices and PETTLEP imagery model produced positive influence on sports skill performances compared to the group which did not receive this kind of combination (Smith, Wright, & Cantwell, 2008; Mazlan, 2014). According to Lang (1979) by combining imagery practices with the actual movement, the skill learning process can be improved, and the transfer of learning can be sped up to the optimum level. Conversely, numerous studies also reported that physical practices alone without imagery intervention was not found to be significantly efficient to enhance motor skill performance (Afrouzeh, Sohrabi, Torbati, Gorgin, & Mallett, 2013; Mazlan, 2014).

The present study showed that 10 minutes for 10 times of imagery practices and the number of imagery and physical practice sessions (10 imagery x 18 sessions) or three times a week in the six-weeks program are enough to justify the effect of the PIM training program and whether it helps to improve the netball shooting performance. This is supported by Morris, Spittle, and Watt (2005) who mentioned that individuals in groups that were instructed to use imagery practice for either 1 or 3 minutes per task improved in their shooting performance compared to those who practiced for 5 or 7 min without imagery practices. This finding is also supported by Fared, Mazlan, and Afizan (2016) who reported that practicing physical-imagery training to athletes about not more than 2 minutes in total sessions of about 30 minutes, give favorable result to the place-kick performance among rugby players. According to Asmidar

(2016) showed that 10 times imagery practices combined with 10 times physical practices were applicable to enhance netball shooting performance. Based on the idea of this study, it can be concluded that the period for mental training must not too long nor too fast to avoid the participants from losing focus on the given task.

The results of this study strongly supported that audio imagery used was one of the effective tools to aid in imagery practice as it provides a similar perspective as script reading. The results also supported the effectiveness of incorporating audio modality to practice imagery to obtain similar perspective (internal perspective) compared to the written scripts (Smith, wright, & Cantwell, 2008). In addition, this finding was in line with previous research suggesting that auditory imagery may be an effective tool for improving sport performance (Mazlan, 2104; Fared, Mazlan, & Afizan, 2016). By using audio modality when practicing individual imagery script makes imagery processing easier and gives more impact on the participants to improve the performance.

CONCLUSIONS

In conclusion, the effectiveness of this training has clearly explained that netball shooting performance improved when the scores was increased across pre- and post-assessments for standing shot and jump shot. The studies also showed that the PIM training program was effective towards the experienced players. The results also support the idea of using functional equivalence enhancing methods to produce the most effective imagery intervention, with many practical implications for sport psychology consultants and practitioners. The present study provided clear evidence that the PIM training is an effective program to improve netball shooting performance. Future study be conducted in the presence of high skilled defender to give pressure like in a real game.

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