Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 44 No. 3 (2023)

Effects of Taekwondo Training Program on Executive Function Among School Female Adolescents of Bahrain

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Abstract

The purpose of the study is to identify effect of taekwondo training program on executive functions among school going female adolescents of Bahrain. This study was conducted on a sample of eighty (N=80) female adolescents, which includes experimental group (n = 40) and control group (n = 40) age of in between 12-16 years from the Indian School of Bahrain was selected as subjects. The data was collected by using an executive skills questionnaire 'self-made questionnaire on Executive Function skill 'for adolescents of Bahrain (2023) which include the 36 items. Paired sample t-test was applied to assess the differences between experimental group and control group school going female adolescents of Bahrain. For testing the hypotheses, the level of significance was set at 0.05. The result revealed that there is a significant difference in executive function between the experimental group and control group after 6 weeks of taekwondo training program on executive functions among school going female adolescents of Bahrain. It is recommended that a similar study may be repeated on large sample to make the study more valid and authentic.

Keywords: Executive Function Skills, Female, Taekwondo, Well-being

Introduction

Taekwondo, a Korean origin self-defense basically focused on kicks. it absolutely was developed by Korean martial artists during 1940s and 1950s.It was advanced as a mix of Okinawan karate, Chinese martial arts, and the indigenous tradition of Takedown and Gwonbeop. The two main international organizational bodies for taekwondo today are- International Tae Kwon-Do Federation (ITF) founded by General Choi Hong Hi in 1966, and World Tae Kwon Do Federation (WTF), founded in 1973 by the KTA Kang, (Myung,et.al. 1999). This self-defense was categorized by its emphasis on head-height kicks, fast kicking techniques,

jumping & spinning-kicks. Additional points for strikes that incorporate jumping and spinning kicks in sparring competitions are awarded. Stances that are narrower and hence less stable than the broader to facilitate fast turning kicks has been adopted in Tae kwon do whereas stances which are wide is being utilized by martial arts like karate.

Executive function may be a set of mental skills which includes flexible thinking, remembering, and self-control. Each day a person uses these skills to find out, work and manage a standard of living. It helps a personal to manage schedules, to figure out things in a proper arranged way to achieve their goal on time. The management skill under EF skills helps an individual to prioritize and organize its work. It helps a person to manage schedules, to work out things with a correct plan to achieve their goal on time. The management skill under EF skills helps a person to prioritize and organize their work. Adolescence can be a phase of life considered by massive hormonal and physical deviations (Coleman & Hendry, 1990; Feldman & Elliott, 1990) (Blakemore & Choudhury, 2006). This development from childhood to adulthood includes changes in identity, self-consciousness, and cognitive flexibility (Rutter & Rutter, 1993). Youths are ready to think in a more strategic manner because their capacity to hold things in mind is more multidimensional. Executive functioning' refers to higher-order cognitive processes such as response initiation and selection, planning and strategy formation, cognitive flexibility, and inhibition of a prepotent response (Shallice and Burgess, 1991). These processes are typically affected following alterations in prefrontal cortex functioning arising through acquired abnormalities such as tumors, infections and brain injury (Stuss and Benson, 1983; Tucha et al., 2000). However, impairments in executive functioning are also exhibited in neurodevelopmental disorders that are associated with frontostriatal dysfunction, including attention deficit hyperactivity disorder (Bradshaw and Sheppard, 2000; Heilman et al., 1991) and autism spectrum disorders (Kemper and Bauman, 1998; McAlonan et al., 2005)

Executive function is a construct pertaining astronomically to a set of inter-related advanced- order cognitive capacities involved in tone nonsupervisory functions that organize, direct, and manage cognitive conditioning, emotional responses, and overt actions (Barkley, 2011; Gioia, Isquith, & Guy, 2001 Stuss & Alexander, 2000; Stuss & Benson, 1984). The specific processes contained under the rubric of administrative function remain, still, an active area of scientific inquiry (Jurado & Rosselli, 2007; Stuss & Benson, 1984; Tranel, Anderson, & Benton, 1994). Processes generally regarded as administrative functions include the capability to initiate actions; inhibit prepotent responses or contending conduct; retain and manipulate information " online "(i.e., working memory); elect applicable task pretensions; plan and organize studies and actions; suppose flexibly in order to break problems or, more generally, to acclimatize to changes in one's terrain; regulate feelings; and cover and estimate one's studies, feelings, and actions. Administrative functions, assessed via performance- grounded and questionnaire measures, have been reported to be also cited with multiple aspects of performing in everyday life in non-clinical and clinical populations similar as academic achievement (Weber, Gerber, Turcios, Wagner, & Forbes, 2006), social functioning(Dawson, Shear, & Strakowski, 2012), and behavioral pro balms(Baird, Silver, & Veague, 2010; Giancola, Godlaski, & Roth, 2012).

Objectives of the Study

The objectives of the study to examine the effect of taekwondo training program on executive functions among school going adolescents of Bahrain.

Hypothesis

From the personal experience, Expert's opinion, public view and after review of the literature,
H_1 - There is significant effect of taekwondo training program on executive function of school going female adolescents of Bahrain.

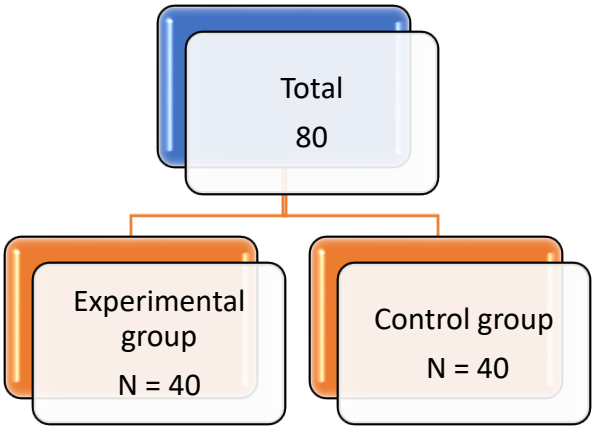
RESEARCH METHODOLOGY

Research Design

To fully fulfill the purpose of the study, a pre-test and post-test randomized group design from an experimental design has been used in the proposed study. A total of 80 females from the Indian School of Bahrain will be selected as subjects and further grouped into two groups. Experimental group (n = 40) and control group (n = 40). A pretest has been conducted, and the experimental group has undergone their respective training program for 3 days a week for 6 weeks. The skill-based Taekwondo training program has conducted for 1 hour each day and composed of Taekwondo kicks on a kicking pad, steps, and blocking. The treatment group has gone through a taekwondo training program for six weeks, whereas control group was not trained. Training has been provided by qualified individuals, particularly a black belt 3rd Dan Taekwondo player and a World Taekwondo Certified Level-2 Coach.

Method

Sampling Design



Sources of Data

The data pertaining to this study was collected from female adolescents at The Indian School of Bahrain, students of the Kingdom of Bahrain.

Selection of the Subject

The present study was conducted on 80 females (between the ages of 12 and 16 years was chosen as subjects for this study.

Sampling procedure

For appropriate representation of the population, purposive random sampling technique was used, the research was of a purely qualitative nature.

TOOLS

To collect data following tools were used in this study:
'self-made questionnaire on Executive Function skill 'for adolescents of Bahrain (2023)
For evaluating the executive functions skill level of the topics, an executive skills questionnaire

The questionnaire was on Executive Function skill ’for adolescents of Bahrain (2023). It is a seven point Likert scale ranging from 1-7 (where, (Strongly Disagree-1, Disagree-2, Tend to Disagree -3, Neutral-4, Tend to agree-5, Agree-6 and Strongly Agree-7). It includes 36 items that asked the respondents how often they experience feelings that relate to Executive Function skill. These items are related to the twelve (12) dimensions of Executive Function i.e., Response inhibition=3, Working Memory=3, Emotional Control=3, Task Initiation=3, Sustain Attention=3, Planning /Prioritizing=3, Organization=3, Time Management=3, Flexibility=3, Metacognition=3, Goal Directive Persistence=3, Stress Tolerance=3. “Executive Function skill for adolescents” is a style intervention supporting a student’s specific profile of stronger and weaker skills.

Procedure

The questionnaires administrated the short 36 items that asked the respondents how often they experience feelings that relate to Executive Function skill. Manual scoring is done conveniently, from adolescents at The Indian School of Bahrain, students of the Kingdom of Bahrain. Hence no scoring key is provided. The scores below are the average score for each competency area and can range from 1 to 7. The higher the score, the stronger your skills in that area. A score of 3 or lower means that you have rated the items on this scale as "Strongly Disagree," " Disagree," and " Tend to Disagree," so any competency area with a score of 3 or less may be problematic for you. The sum of the scores was the occupational Executive Function skill Score.

Data Analysis

Mean, S.D., and paired t-test was computed by using Statistical Package for the Social Science (SPSS) to examine significant discrepancy between two experimental groups on parameter of “Executive Function skill for adolescents” (2023) considered for the study.

TRAINING PROGRAM

Training Intervention (Taekwondo Training) Method

A 12-week skill-based taekwondo training protocol was conducted three days per week with ratings of perceived exertion (RPE) of 3–10 per training session, each of which lasted 60 minutes and was composed of 5 minutes of warm-up, 10 minutes of basic physical fitness training, 35 minutes of the taekwondo skills, and 10 minutes of cool-down exercises which involved stretching. The basic physical fitness training, which includes shuttle runs, jumping jacks, etc. While the taekwondo skill training involves 10 minutes of basic movements, comprising 6 basic movements and a trunk punch in the riding stance, 10 minutes of Poomsae based on Taegeuk chapters 1–2, and 15 minutes of kicking techniques comprising basic Taekwondo kicks, steps, and self-sparring.

RESULTS AND DISCUSSION

This chapter includes two different sections, the first section interprets the results of the study, and the second section includes discussion of the results. The results sections of this study comprise viz., Pre, and post-test mean, Analysis of Covariance, Hypotheses testing, t-test comparisons and adjusted mean values. The discussion of the results is explained in the later section of this chapter.

Result and Interpretation pertaining to Executive Function

Table -1 Mean and Standard Deviation Measuring Executive Function Among Experimental Groups and Control Groups During Pre and Post-Testing.

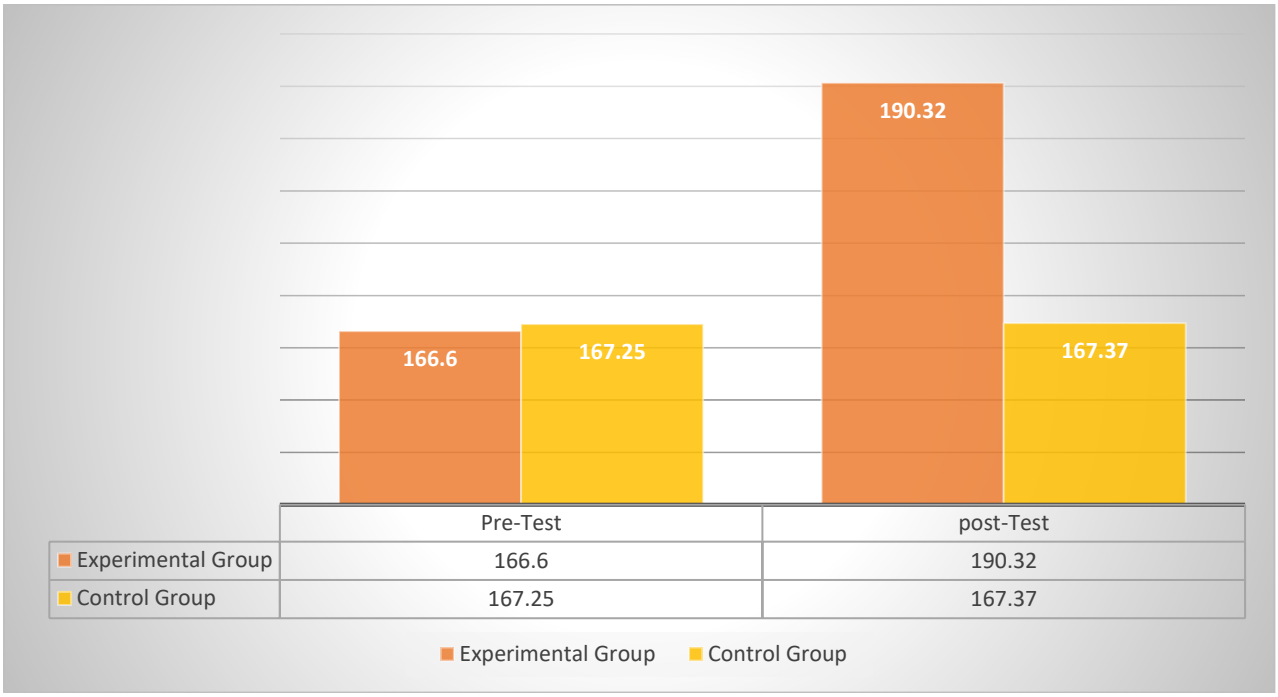
Measure: Executive Function					
Treatment Groups	**N**	**Pre-Test Mean**	**SD**	**Post-Test Mean**	**SD**
Experimental	40	166.6	25.77	190.32	30.49
Control	40	167.25	35.90	167.37	36.02

Table -1 represents the values of mean and standard deviation based on Pre and Post-test conducted among Experimental group and Control Group to measure the effect of taekwondo training program on executive functions among school going female adolescents of Bahrain.
The values pertaining to observed Mean and SD are as below:

Pre-test Mean: Experimental group -166.6, Control Group-167.25. **Pre-test SD**: Experimental group -25.77, Control Group-35.91. **Post-test Mean**: Experimental group -190.32 Control Group-167. 37.**Post-test SD**: Experimental group -30.49, Control Group-36.02

Table -1

Graphical Presentation of Executive Function Mean of Experimental Groups and Control Groups During Pre and Post-Testing.



To determine the significant difference if any in executive function skills of experimental group and control group independent t-test was used in pre-test and post- test and have shown in the table below-

Table -2

Analysis of Mean, SD and t- test Showing the Difference in Executive Function of Experimental and Control Group Among School Going Female Adolescents of Bahrain

Time of assessment	Groups	N	Mean	Standard Deviation	Standard Error	t-ratio	p-value
Pre -test (Before the training)	Experimental group	40	166.6	25.77	6.98841	.093	.926
	Control group	40	167.25	35.90			
Post-test (6 weeks of training)	Experimental group	40	190.32	30.49	7.463	3.075	.003**
	Control group	40	167.37	36.02			

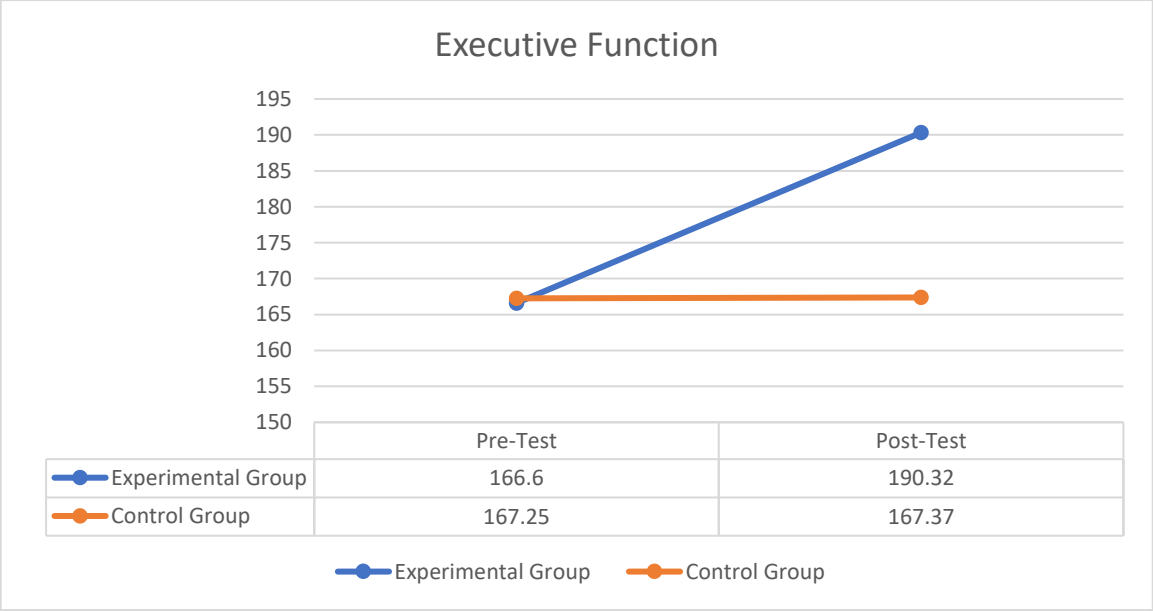
*** at 0.05 and ** at 0.01; DF=78, z-table = 1.66 at 0.05**

Table 4.1.14 Presents t-value for comparing the adjusted means on Executive Function in experimental group and control group during pre, mid and post testing. On the **pre-test** it was found that the calculated t-value is .093 (<1.66 at 0.05) and the p-value is .926 (>.05) which are not statically significant at 0.05 level of significance. It revealed that there is no significant difference in executive function between the experimental group and control group during the pre-test. On **post- test** it was found that the calculated t-value is 3.075 (>1.66 at 0.05) and the p-value is .003 (<.05) which are statically significant at 0.05 level of significance. It revealed that there is a significant difference in executive function between the experimental group and control group after 6 weeks of taekwondo training program.

Therefore, the research hypothesis "There is significant effect of taekwondo training program on executive function of school going female adolescents of Bahrain," accepted.

Table -2

Graphical Presentation on Analysis Mean, SD and t- test Showing the Difference in Executive Function of Experimental Group and Control Group among School Going Female Adolescents of Bahrain



Discussion of the Results

Discussion Pertaining to The Impact of Taekwondo Training Program in Executive Function of Experimental and Control Group Among School Going Female Adolescents of Bahrain –

As presented in table 2 demonstrate significant difference among experimental group and control group at the post-test stage of after 6 weeks of taekwondo training program it was found that on post test the t-value is 3.075 (>1.66 at 0.05) and the p-value is .003 (<.05) which are statically significant at 0.05 level of significance. It revealed that there is a significant difference in executive function between the experimental group and control group after 6 weeks of taekwondo training program. Therefore, based on these findings the taekwondo training program was considered as the most effective treatment program on goal directive persistence skill of school going adolescents of Bahrain. There are several previous studies exploring the effects of physical training (Chromiak et al., 2004) showed that the relative anaerobic power of physically active grown-ups increases significantly following 10 weeks of periodized strength training program conforming of 4 days of training a week. (Fong et.al., 2012) who studied and stated that taekwondo interpreters and those in other analogous combat sports turn to have superior sensitive information processing capability than the nonpractitioners performing in better and more accurate use of postural strategies. (Fong & Ng,2011) evaluate that taekwondo training can be related to reducing fat and improvements in flexibility and reaction time. This finding is in line with previous studies. Taekwondo training is systematic, long-term, and progressive (Pieter & Heijmans, 2003), and generally involves the basic skills, forms, sparring and breaking techniques. On other hand after taekwondo training, it improves a faster reaction time in mentally retarded youths (Song &An, 2004). (Toplak et al. 2012) counseled that executive function's performance in cognitive skills performance is best situations while executive function ratings measure fulfillment with long-time period of training in each day conditions. Some research concerning the impact of different training programs than cardio ones on cognitive performance (Böckelmann, et al.2016). Although systematic studies into intellectual fitness blessings have persisted due to the fact (Morgan, 1969). (Brawley & Rodgers, 1993) had found that regular and relatively strenuous exercise improves physical health. There are several previous studies shows three months of daily taekwondo training can improve sensory organization and standing balance for children with developmental coordination disorder (Fong et al. 2012). Sports training is mostly a feasible and exciting manner of enhancing the stability of kids with developmental coordination disorder (Hung and Pang, 2010, Mercer et al., 1997). Similarly, it could be concluded from this study that intervention development is needed focused on developing strategies to improve real world aspects of Executive Function. Therefore, results of the study contribute to the literature by improvising the treatment program in Executive Function.

Conclusions

The present study provides evidence that ratings of EF significantly contribute to the cognitive functioning of adolescents. As is shown in Table 2 after 6 weeks of the taekwondo training program on (post- test) it was found that the calculated t-value is 3.075 (>1.66 at 0.05) and the p-value is .003 (<.05) which are statically significant at 0.05 level of significance. Our study shows that there is significant differences between experimental group and control group on executive function. Therefore, it was considered as taekwondo training program the most effective treatment program on executive function of school going female adolescents of Bahrain. Similarly, it could be concluded from this study that intervention development is needed focused on developing strategies to improve real world aspects of Executive Function.

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