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THE EFFECT OF KARATE PRACTICE ON STRESS AND SELF-CONFIDENCE LEVELS: AN EMPIRICAL PRACTICE AMONG SEDENTARY TEENAGERS

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ABSTRACT

The current study aims to investigate the effects of an 8-week karate practice on stress and self-confidence levels among sedentary teenagers. In this regard, the research was conducted with a pretest-posttest control group design. The 95% confidence interval is determined with a 5% margin of error. We used the simple random sampling method and included a total of 124 people in two groups: the experimental group n=62 (Mage=16.11±0.81) and the control group n=62 (Mage=15.32±0.82). We collected participant data using the Stress Level Scale II and the Self-Confidence Scale. Descriptive statistics were applied to the data. Sample Paired t-test and Independent Sample t-test were used for data analysis. A statistically significant difference was determined between the stress and self-confidence levels of the sedentary youth in karate training in the experimental group and the first-posttest mean scores. In the control group, there was no significant difference between the mean scores of the first-test-posttest. In the literature, some studies have been found separately on the effects of martial arts on stress and self-confidence levels. However, studies that analyzed two variables at the same time were very limited. In this respect, it is thought that the present study will contribute to the literature. We used the paired samples t-test to analyze the data. We observed that regular karate practice for eight weeks reduced high levels of stress to moderate levels and increased moderate levels of self-confidence to high levels among the sample. We found that the karate practice had similar effects among both sexes. We recommend directing young people to karate as a successful method to cope with stress and increase self-confidence. The current study was on sedentary youth. However, it can be applied to professional karate athletes to shed light on future studies. Karate practice interventions can be practiced among high school students aged 14-17 years as a universal program.

Keywords: Karate Practice, Teenager, Stress, Self-Confidence.

INTRODUCTION

The term of martial arts is often used to describe most types of martial arts that originated in Eastern cultures. The 20th century saw a significant rise in participation in martial arts (Moore, Woodcock & Dudley, 2018). Historically, martial arts have been used for self-defense, but now, they are often preferred for self-development (Bu, Haijun, Yong, Chaohui, Xiaoyuan & Singh, 2010). Today, martial arts are practiced for several reasons like fitness, sports, self-defense, developing martial skills, self-improvement (meditation), mental discipline, character development, and self-confidence, as well as complementary or alternative therapy for some medical conditions (Sharpe, Blanck, Williams, Ainsworth & Conway, 2007). Martial arts are popular among adolescents (Vertonghen & Theeboom 2010). This popularity has also made significant contributions to the interest in martial arts research (Vertonghen et al., 2014). Numerous research on young people after the mid-90s have shown that martial arts practices have positive effects on psychosocial characteristics like physical characteristics, personality profiles, and overall well-being among adolescents (Yılmaz, Bektas, & Beyazoglu, 2013; Vertonghen & Theeboom 2010; Tadesse, 2017; Ersan, Beyazoğlu & Uysal, 2019).). One meta-analysis reported that martial arts practices had a positive effect on mental health outcomes (Moore, Woodcock & Dudley, 2018). Derived from a martial art originating from Okinawa, Japan and meaning “empty hand,” Karate was first included in the 2020 Olympic Games in Tokyo, which has since made Karate even more attractive (wkf, 2022). Karate practices consist of Kihon, Kata, and Kumite. Kihon involves basic techniques, while Kata and Kumite are two types of competition. Kata best symbolizes the original tradition and principles of Karate, with over 20 offensive and defensive techniques based on personal experience (Greco, 2020). Karate emphasizes the philosophy and tradition of respect, meditation, self-control, and non-aggression (Tadesse, 2017). In modern life, Karate has also become a type of recreational sports, practiced for personal, physical, and mental health (Chang, Yeh, Pai & Huang, 2018). Like any other physical activity, Karate can be practiced as a leisure activity, acting as a buffer against stress, maintaining physical and mental health, and helping people recover from stress (Kim, Heo, Dvorak & Han, 2018; Yeh, Chang, Lai, 2017). Psychosocial interventions involving Karate can improve resilience and self-efficacy among teenagers, reducing the probability that they engage in aggressive behaviors or get bullied (Greco, Cataldi & Fischetti, 2019a; Greco, Fischetti, Cataldi & Latino, 2019b). Relevant research has investigated the correlations between emotional states like anxiety, stress, and self-confidence and performance and sports success among martial arts athletes, while Karate research has mostly focused on improving the competitive abilities of Karate athletes (Tadesse, 2017). However, some researchers have presented evidence for negative effects regarding participation in martial arts among adolescents. For example, a Norwegian study highlighted that participating in weightlifting, wrestling, and eastern martial arts (Karate, Judo, and Taekwondo) led to higher antisocial behaviors among teenagers (Endresen & Olweus, 2005). This indicates some uncertainties about the psychosocial consequences of practicing martial arts among young people. Besides, most research has focused on the performance of martial arts or Karate athletes, with a cross-sectional design, small sample size, and not considering the differences between the sexes (Bu et al., 2010). Compared to these limitations, the present study has an experimental, longitudinal, control group design with a sufficient sample size, considering the differences between the sexes; therefore, this study gains some importance in the literature. From this point of view, it is

thought that a high-confidence karate athlete will contribute positively to her success. Here, we evaluated whether dynamic Karate practice, as a martial arts-based psychosocial and recreational approach, is an appropriate method of exercise to reduce stress and improve self-confidence among young participants, while investigating and comparing acute changes in stress and self-confidence levels among beginner Karate athletes. Below are the research hypotheses.

H1: Karate practice has a significant effect on the stress levels of sedentary teenagers

H2: Karate practice has a significant effect on the self-confidence levels of sedentary teenagers.

METHOD

This study was performed with the pretest-posttest randomized experimental design. The procedures were selecting participants, the karate practice, and pretest-posttest analyses

Research Pattern

The research was conducted with a pretest-posttest control group design. Since the study is an experimental research, it was decided to use this design.

Participant

For sampling, we selected two state high schools and obtained written permission from the Directorate of National Education in a western city in Turkey. We conducted interviews with the physical education teachers and the administrators of these schools for participation in the research. Both schools showed interest and were included in the study. We verbally invited all the students in the 9th, 10th, 11th, and 12th grade (sample-target age range: 14-17 years) at these schools to participate in the study. The students who wanted to participate were given informed parental consent forms and asked to complete the parental approval procedures. We obtained data from 126 students who responded to our invitation and had parental consent. The students who met the inclusion criteria were matched according to their sex and randomly divided into two groups via a computer software: 66 in the control group and 68 in the experimental group. The researchers were blinded to the randomized grouping process. 4 students from the control group and 6 from the experimental group left the study, so we evaluated the data of 62 individuals from the control group (female=40 and male=22) and 62 from the experimental group (female=40 and male=22). The inclusion criteria for both groups were: being aged 14-17 years, not having any physical, physiological, or psychological health problem that prevents doing sports, and not participating in regular exercises other than the physical education courses at school. Also, we requested a health report from the students in the experimental group, stating that there was no harm in them participating in Karate practices. Prior to the practice, we gave detailed information about the training program to the experimental group and assured them that the records would be used for scientific purposes only. The students in the experimental group participated in Karate practices for 75 minutes a day, 3 days a week for 8 weeks. The volunteers in the control group did not participate in any Karate practice and continued their daily routine. None of the participants received nutritional intervention.

Data Collection Tools

The data of the volunteers in the control and experimental groups were collected online using Google forms, with pretest and posttest measurement. The pretest was applied to all participants on the day before starting Karate practice and the posttest the day after 8 weeks of Karate practice. The data of the control group was collected by the researchers under the supervision of the physical education teacher at the school. The data of the experimental group was collected by the researchers under the supervision of the Karate trainer. The online form included 63 questions in total, 5 for demographic information like age, sex, body weight, and height, 25 for the Stress Level Scale II, and 33 for the Self-Confidence Scale. The responses were anonymous. Body mass index was calculated based on the following formula: BMI = Weight (kg) / Height (m2). Stress Level Scale I-II: To measure stress, we used the Stress Level Scale I-II developed by Leighton (1989). The Stress Level Scale I-II was adapted into Turkish by Baltaş & Baltaş (1999). Here, we used the second part of the scale. It is a 3-point Likert-type scale that consists of 25 items, with responses ranging from often (3) to never (1). A total score of 27-29 indicates a normal stress level, 30-35 indicates a borderline high stress level, and 36 and above indicates a high stress level. The internal consistency reliability value of the stress level scale was determined as α=,84. Thus, the scale was considered highly reliable. Self-Confidence Scale: For self-confidence, we used the Self-Confidence Scale developed by Akın (2007). It is a 5-point Likert-type scale that consists of 33 items, with responses ranging from never (1) to always (5). The total score from the scale is divided by the number of items to reach a conclusion regarding the self-confidence level (33). Accordingly, 2.5 points represents low self-confidence, 2.5-3.5 moderate self-confidence, and 3.5 and above high self-confidence. The internal consistency reliability value of the self-confidence scale was determined as α=,90. Thus, the scale was considered highly reliable.

Statistical Analysis

All data analyses were performed using the SPSS 24.0 (Statistical Package for the Social Sciences) package software. The normality of the data was tested with the Kolmogorov-Smirnov test and the homogeneity of variance was checked with Levene's test. The mean differences between stress and self-confidence levels by sexes was analyzed with the independent samples t-test. The pretest and posttest scores were compared between the groups with the paired samples t-test. For all analyses, the level of statistical significance was taken as 95% confidence level ($p<.05$).

Karate Training Program

The training was given by a 2nd dan black belt Karate trainer with at least 5 years of experience. The students in the experimental group received Karate training for 75 minutes, 3 days a week on non-consecutive days for 8 weeks. The daily Karate training program consisted of three stages:

1) Warm-up: The warm-up took 15 minutes, including basic exercises like running, jumping rope, vertical jumps, push-ups, and sit-ups.

2) Karate technique practice: Shotokan Karate (Karate-Do) practice was carried out for 45 minutes. Karate-Do is a training program that includes Kihon, Kata, and Kumite. Kihon involves making certain moves with the legs, the arms, or both. Kata is the execution of a variety of tactical combat exercises. Kumite involves training with a partner (Jansen et al., 2017; Moore et al., 2018). Participants learn offensive and defensive techniques with their partners. Collaborative learning was emphasized to ensure both partners effectively benefited from the training. The participants performed the leg and arm moves in coordination with their partners. For Kata, the participants practiced the "Heian Shodan" technique. Getting tired excessively was not allowed during the training. The trainer also highlighted that aggressive physical contact was not a part of the intervention program.

3) Cooldown: The cooldown involved 15-minute stretching.

FINDINGS

Table 1. Descriptive Statistics of the Sample.

Variables	Experimental Group (N=62)		Control Group (N=62)	
	M	SD	M	SD
Age	16,11	0,81	15,32	0,86
Length (cm)	1,60	9,66	1,61	9,77
Weight (kg)	53,34	12,70	54,46	14,46
BMI (kg/m^2)	20,63	3,49	20,69	3,76

BMI= Body Mass Indeks

As seen in Table 1, there were 62 karate practitioners in the experimental group (Mage=16.11±0.81) and 62 volunteers in the control group (Mage=15.32±0.86).

Table 2. Descriptive Statistics Regarding Sex

Work Groups	Groups	f	%
Experimental Group	Male	22	35,5
	Female	40	64,5
Control Group	Male	22	35,5
	Female	40	64,5

According to Table 2, 35.5% of the participants in the experimental and control groups were male and 64.5% were female

Table 3. Normality Analysis for the Sample

		Kolmogorov-Smirnova		
Scales	Tests	Statistic	Df	p
Stress Level	Pre-test	,086	124	,072
Self Confidence Level	Post-test	,077	124	,069

As seen in Table 3, the data was normally distributed (p>0.05). Accordingly, we decided to perform the paired samples t-test, a parametric analysis.

Table 4. Comparison of the Mean Stress and Self-Confidence Levels between Experimental and Control Groups

							Levene Test				
Scales	**Groups**	**Tests**	**Gender**	**n**	$\bar{x}$	**sd**	**F**	***P***	**t**	**df**	***p***
Stress Level	Experimental Group	Pre-test	Male	22	30,81	5,46	,245	,623	-,777	60	,440
			Female	40	31,97	5,68					
		Post-test	Male	22	26,86	4,55	,303	,584	-,215	60	,831
			Female	40	27,12	4,60					
	Control Group	Pre-test	Male	22	26,54	5,68	,141	,709	-,468	60	,642
			Female	40	27,25	5,66					
		Post-test	Male	22	49,77	2,24	,958	,332	1,196	60	,236
			Female	40	48,90	2,98					
Self Confidence Level	Experimental Group	Pre-test	Male	22	143,00	17,07	,543	,464	2,988	60	**,004***
			Female	40	130,47	15,05					
		Post-test	Male	22	130,86	17,74	1,104	,298	,586	60	,560
			Female	40	128,50	13,61					
	Control Group	Pre-test	Male	22	129,13	17,79	,239	,626	,515	60	,609
			Female	40	127,00	14,33					
		Post-test	Male	22	114,86	29,94	,585	,447	,840	60	,404
			Female	40	109,02	23,94					

As seen in Table 4, we found no statistically significant difference between the experimental and control groups in terms of the mean pretest-posttest scores for stress levels according to sex (p>0.05). Although, there was a statistically significant difference between the groups in terms of the mean pretest scores for self-confidence levels according to sex (t(60)=2.988; p=0.004; p<0.05). Accordingly, males had higher self-confidence levels ($\bar{x}$=143.00) compared to females ($\bar{x}$=130.47). However, there was no statistically significant difference between the groups in terms of the mean posttest scores for self-confidence levels according to sex (p>0.05).

Table 5. Comparison of the Mean Stress and Self-Confidence Levels Between Experimental and Control Groups

Scales	**Groups**	**Tests**	**n**	$\bar{x}$	**sd**	**t**	**df**	**p**
Stress Level	Experimental Group	Pre-test	62	31,45	5,25	8,361	61	**0,000****
		Post-test	62	27,03	4,55			
	Control Group	Pre-test	62	31,08	5,12	2,125		0,066
		Post-test	62	30,58	4,44			
Self Confidence Level	Experimental Group	Pre-test	62	111,33	15,78	4,776		**0,000****
		Post-test	62	134,91	15,10			
	Control Group	Pre-test	62	112,09	15,54	1,871		0,061
		Post-test	62	127,75	26,13			

As seen in Table 3, we observed a statistically significant difference between the pretest and posttest stress scores of the experimental group ($t_{(61)}$=18.361; p<0.01;p=0.000). Accordingly, after the Karate practice was completed, the high stress levels among the experimental group ($\bar{x}$=31.45) decreased significantly ($\bar{x}$=27.03). However, there was no statistically significant difference between the pretest and posttest stress scores of the control group (p=0.066; p>0.05). We found a statistically significant difference between the pretest and posttest self-confidence scores of the experimental group ($t_{(61)}$=4.776; p<0.01; p=0.000). Accordingly, after the Karate practice was completed, the moderate self-confidence levels among the experimental group ($\bar{x}$=111.33) increased significantly ($\bar{x}$=134.91). Still, there was no statistically significant difference between the pretest and posttest self-confidence scores of the control group (p=0.061; p>0.05).

CONCLUSION and DISCUSSION

In the present study, we investigated the effect of an 8-week Karate practice on stress and self-confidence levels among volunteers in an experimental group. Numerous studies have shown that participating in Karate practices can provide physical, mental, and spiritual benefits, as well as protect overall health (Tadesse, 2016; Petrovic, 2017). Considering our findings, the stress levels of the experimental group decreased from very high ($\bar{x}$=49.20) to the lower limit of moderate ($\bar{x}$=31,56). Although, we observed no statistically significant difference between the pretest and posttest stress scores of the control group (Table 3). Naves-Bittencourt et al. (2015) concluded that martial arts sports had a reducing effect on the stress levels of athletes, similar to our findings. Fernández et al. (2022). In the study conducted by Karate, it was seen that the anxiety levels and stress levels of karate athletes decreased. Jamurtas et al. (2003) demonstrated that regular Taekwondo practice significantly decreased stress levels among athletes. Bae and Roh (2021) found that an 8-week Taekwondo practice had a positive effect on the stress levels experienced by athletes. In parallel with our findings, Sandlund & Norlander (2000) observed a significant decrease in stress levels among athletes after performing Tai Chi exercises. In the current study, we found a significant increase in self-confidence levels among the volunteers in the experimental group after completing an 8-week Karate practice. Again, consistent with our research, Kim and Cruz (2021) reported that athletes who regularly performed martial arts training experienced a positive effect on their self-confidence levels. In another experimental research, Hussen (2010) detected a significant increase in self-confidence levels among athletes who regularly participated in Karate practices. Fachrezzy et al. (2021) showed that teakwondo kick training significantly increased the self-confidence levels of athletes. Björkqvist and Varhama (2001) compared different types of martial arts as a function of the level of experience. They investigated attitudes of aggression among male and female practitioners of different types of non-contact martial arts (Karateka versus wrestlers and boxers) and controls who did not perform any sports. The authors showed that martial arts practices had positive effects on males but negative effects on females compared to the control group. In the present study, we found no difference in self-confidence or stress levels between male and female practitioners after the 8-week recreational Karate practice. This indicates that Karate practices have positively similar effects on males and females, unlike the findings reported by Björkqvist and Varhama (2001).

Here, we investigated the acute effects of regular Karate practice on stress and self-confidence levels among sedentary teenagers and our findings indicate that Karate practices significantly reduce stress levels and increase self-confidence levels in adolescents. We recommend directing young people to recreational Karate sports as an efficient method to cope with stress and increase self-confidence. However, our sample was limited to the age range of 14-17 years, so younger and older age groups should be investigated separately. Besides, we believe that the specific effect of Karate needs to be proved by comparative validation with other types of martial arts. Further research should investigate the effects of such intervention programs on different samples like people with disabilities. Karate practice interventions can be applied to high school students aged 14-17 as a universal program.

RECOMMENDATIONS

In our research, we measured the stress and self-confidence levels of karate athletes by spreading them over the 8-week training period, but in future studies, the stress and anxiety levels of karate athletes before and after the competition can be investigated.

ETHICAL TEXT

Ethical approval was obtained for this study from the ethics committee of Uşak University Faculty of Medicine with the date of 15.06.2022 and the decision number 113-113-10.

Author(s) Contribution Rate: In this study, the contribution of the first author to the study was determined as 60%, the contribution of the second author to the study was determined as 40%.

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