

## An 18-month Follow-up of Anger in Female Karate Athletes

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**Objective:** The aim of this study was to evaluate changes of anger scores in female karate athletes during 18 months, and to compare anger scores in adolescents who continue or stop training karate.

**Method:** The sample consisted of 18 female elite karate athletes, practicing modern style of karate. To measure anger and its subscales, participants were asked to complete "Adolescent Anger Rating Scale" (AARS) questionnaire in both stages of the study. Athletes were divided in to two groups of "stayer" (n=12) and "quitter" (n=6) if they continued practicing karate or stopped it, respectively. In order to study the changes of anger score with time, paired T test was used.

**Results:** In analysis of changes in anger scores with time, there was a statistically significant increase in instrumental anger (p=0.001) and non-significant increase in other anger scores among 14-year-old girls who continued practicing karate.

**Conclusion :** Increased instrumental anger in female karate athletes could be due to the impact of participation in a combative sport. However, the results should be interpreted cautiously due to limitations of the study.

**Key words:** Adolescent; anger; female; karate

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There is growing evidence about the interrelationship between martial arts training and aggressiveness, though the findings are not consistent with each other. The inconsistency is in part due to cross-sectional design of studies and presence of lots of psychological and environmental factors which are difficult to be controlled in such studies. Anger was defined by Spielberger as "an emotional state that consists of feelings that vary in intensity from mild irritation or annoyance to fury and rage" (1). According to frustration-aggression hypothesis of Berkowitz, any negative affect including anger or fear can lead to frustration, which eventually may be expressed as aggression or avoidance behaviors respectively (2).

Provocation was reported as the best predicting factor for aggression, followed by anger rumination, gender and type of sport (3). Anger which arises from frustration or provocation can eventually be expressed as aggression. Hostile or reactive aggression is a more prevalent consequence of anger compared with instrumental aggression which does not require anger to be expressed (3-4).

We previously examined whether there was any relationship between the sports training and the adolescents' anger. The results showed that the anger rate was not different between judoka and non-athletes in girls, meanwhile both of these groups scored higher in total anger than karateka and

swimmers (5). However, the results implied a beneficial effect of karate on male athletes' anger, except for judo training (6).

Therefore, a longitudinal study was designed to follow changes in anger scores of female karate athletes after 18 months. Based on the findings of previous studies (7-9), it was hypothesized that anger rate would not change significantly after this period of time. It was also aimed to follow up adolescents who dropped out to investigate if there is any difference in anger scores between athletes who continue and quit exercising karate.

### Material and Methods

#### Participants

A total of 20 female elite karate athletes were recruited from two major karate clubs in Tehran. Adolescents took part in three or four training sessions each week, depending on the league calendar. Each session lasted 90 to 120 minutes, including warm-up, technical instructions, kumite (i.e. combat work outs), and cool-down. The method of training karate in this study can be classified as modern (10). There was more emphasis on combat (kumite) and winning a match; however, participants were taught to respect the sensei (i.e. karate instructor) and senior karateka as a rule. The training sessions were scheduled and practiced in the same manner (in evenings) for participants of both clubs. In the first stage, after being introduced to the

study outlines, participants completed the questionnaire. Karateka completed the questionnaires before the start of their training session.

To follow up the athletes, all participants were given a unique code in the first stage which was repeated in the second stage. Informed consent was obtained from the adolescents and their caregivers. This study was approved by the Research Ethics Committee of Tehran University of Medical Sciences.

More than one year of practice is necessary to assess meaningful changes, the athletes were followed for 18 months (11). In the second stage, participants were asked to complete the questionnaire and data sheet including demographic data, practice status changes in previous 18 months, and the reasons for quitting karate if it was the case. At the end of this stage, 18 adolescents completed the study. Two participants were no longer available for assessment.

*Measures*

The “Adolescent Anger Rating Scale” (AARS) questionnaire, designed by DM Burney, was applied in both stages of the study. The validity and reliability of the AARS tool has been reported as satisfactory by Burney and Kromrey (12-13). The AARS is a 41-item, 4-point Likert-type scale which measures adolescents’ total, and its subscales include reactive anger, instrumental anger and anger control. Participants were asked to answer the items ranging from “hardly ever” to “very often”. Reactive anger is an immediate angry response to a perceived negative, threatening, or fear-provoking event. Instrumental anger is defined as a negative emotion that triggers a delayed response resulting in a desired and planned goal of revenge and/or retaliation. Reactive anger score ranges from 8 to 32 and instrumental anger score range is 20 to 80. Higher scores of reactive or instrumental anger show greater reactive or instrumental anger. Anger control is a method used to respond to reactive and/or instrumental stimulations. Anger control score ranges

from 13 to 52 and higher scores show better anger control (12).

*Analysis*

The participants were divided in to two groups of “stayer” (n=12) and “quitter” (n=6). “Stayers” were athletes who have practiced karate throughout the previous 18 months for three or more days a week. “Quitters” were adolescents who stopped exercising karate for at least 6 months and were not willing to start again. The “quitter” group was questioned about the reason of quitting karate. There were four choices: parental prohibition i.e., “My parents don’t allow me to take karate classes anymore.” personal motivation, i.e., “I am not interested in karate anymore.” injury, i.e., “I was injured during training or competition”; and for other details, the adolescents were allowed to write their own reasons.

In order to compare anger scores of “stayer” and “quitter” groups at the start or end of the study, independent t-test was used, and paired t- test was used to study the changes of anger score with time. SPSS software (version 13) was used for data analysis; and p values of less than 0.05 were considered statistically significant.

**Result**

The mean age of adolescents was 14.6 (SD=2.2) at the beginning of the study. Furthermore, we divided the adolescents into two groups of “stayers” and “quitters”. In comparison of stayers and quitters’ age, which were 14.1 (SD=2.2) and 15.8 (SD=1.7) respectively, the difference was not significant (p=0.11). As shown in table 1, no significant differences were observed between the two groups of stayers and quitters in anger scores (total anger, reactive anger, instrumental anger and anger control) neither at the beginning nor at the end of the study.

**Table 1: Comparison of anger scores in “stayer” and “quitter” groups at the beginning (stage 1) and after 18 months (stage 2)**

	Stage 1				Stage 2			
	Stayer	Quitter	t	P value	Stayer	Quitter	t	P value
Reactive anger	48.33 (8.06)	44.3 (7.0)	1.025	0.320	49.67 (5.53)	53.00 (9.96)	-0.92	0.396
Instrumental anger	47.92 (4.12)	49.6 (13.05)	-0.43	0.670	55.17 (4.91)	54.83 (3.19)	0.15	0.883
Anger control	52.00 (7.16)	50.00 (8.20)	0.53	0.601	52.08 (6.53)	52.50 (6.25)	-0.12	0.899
Total anger	48.58 (6.93)	48.00 (4.64)	0.13	0.893	51.33 (5.05)	52.00 (5.40)	-0.25	0.800

P value and t value stands for independent t-test analysis between stayers and quitters in each stage. mean (standard deviation)

**Table 2: Changes of anger scores in 18 months**

	Stayer				Quitter				Total			
	t	P value	95% confidence interval		t	P value	95% confidence interval		t	P value	95% confidence interval	
			lower	upper			lower	upper			lower	upper
Reactive anger	-0.464	0.652	-7.65	4.99	0.146	0.146	-21.63	4.30	-1.454	0.164	-9.26	1.71
Instrumental anger	-4.699	0.001	-10.65	-3.85	-1.080	0.330	17.47	7.13	-3.593	0.002	-10.40	-2.71
Anger control	-0.035	0.973	-5.39	5.23	-0.677	0.529	-12.00	7.00	-0.449	0.659	-5.07	3.29
Total anger	-0.947	0.364	-9.14	3.64	-0.862	0.428	-15.93	7.93	-1.319	0.205	-8.23	1.90

p value and t value stands for paired t-test analysis.

However, in examining longitudinal changes in anger scores, paired t-test analysis showed a significant increase in instrumental anger after 18 months. Further analysis in each group revealed that instrumental anger significantly increased in stayers, but not in quitters as it is shown in Table 2.

Furthermore, when quitters were asked about the reason of quitting karate, 5 of 6 (~ 83%) indicated the personal motivation, though one participant did not state any reason.

## Discussion

Previous studies have shown that girls are generally less aggressive than boys, although there are some reports of no sex difference in anger (14-15). It was reported that 14-year-old girls used aggression as a problem-solving strategy more than 17-year-old girls. In other words, in late adolescence (17 years of age) aggression decreases to the lowest level, which seems to be different from behavioral maturation in boys (15-16). Overall, it seems necessary to investigate how martial arts influence girls' performance instead of generalizing the anger and aggressiveness findings in boys to their female counterparts (17). Therefore, the main purpose of this study was to observe the changes in anger scores of a group of female elite karate athletes.

Investigating karate, wrestling and boxing, Bjorkqvist and Varhama reported positive effects of karate training on males and negative effects on females in violent conflict resolution compared with other groups (18). Wargo examined personality characteristics of martial athletes, and found two main differences among expert and novice female players and novice and expert male players. Expert female karateka received significantly higher scores on paranoia and anger, as well as lower measures in social discomfort (19). Accordingly, our results revealed a statistically significant increase in instrumental anger and non-significant increase in other anger scores among 14-year-old girls across a period of 18 months. A possible explanation may be that participation in martial arts training and competition sessions can suppress or reverse the developmental decrease of anger and aggressiveness in girls.

Another possible explanation for observed increase of anger scores is the style of training. Karate could be practiced in a traditional or modern style; each of which may have a distinct influence on adolescents' aggressiveness and anger. Those athletes who attended a modern program with more emphasis on combat and goal orientation as the athletes in the present study, showed higher aggressiveness score, which was assumed to be the result of the training style (10).

Although previous studies showed that Judo and Karate training decreases aggressiveness, our results in accordance with Reynes & Lorant study, did not support these early findings. Authors also proposed a

correlation between kata, meditation and self-control (9). According to a review by Vertonghen and Theeboom, there is an inconsistency in the findings of studies after mid 90s compared with earlier studies that reported positive impact of martial arts training on personality traits. This discrepancy may be due to increase in popularity of modern style of martial arts (20). Another potential source of difference, which was reported by Maxwell and colleagues, is culture. They addressed the differences in anger and aggressiveness between British and Hong Kong Chinese athletes, and reported lower aggressive responses or more frequent disapproval of aggressive behaviors in eastern male athletes, although the difference was not observed in anger (21-22). Consequently, the differences between our data and results from East Asian athletes could be explained in a sociocultural context.

## Limitation

The study findings should be interpreted with caution due to small sample size and lack of a control group. The other limitation is the application of only one measure for presenting anger. Although examining other psychosocial factors underlying anger in athletes is beyond the scope of the current study, further investigation on possible associated factors will be warranted. Despite the limitations, there seems to be some strong points in the study. To our knowledge, this is the first longitudinal study investigating anger in female karate athletes. Moreover, we followed quitters and stayers in parallel to ensure a real comparison.

## Conclusion

Although a developmental decrease was presumed, young girls training karate showed a small increase in anger scores. Increased instrumental anger in female karate athletes could be due to the impact of participation in a combative sport. However, the results should be interpreted cautiously due to limitations of the study.

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