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Original Article

Effects of regular Taekwondo exercise on mood changes in children from multicultural families in South Korea: a pilot study

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Abstract. [Purpose] The purpose of this study was to investigate the effects of regular Taekwondo training on mood state in children from multicultural families. [Subjects and Methods] Twenty-four children participated in the study. Eight children from non-multicultural families were assigned to the non-multicultural family children group. The remaining 16 children from multicultural families were randomly assigned to the multicultural family children (control, n=8) or multicultural family children trained in Taekwondo (Taekwondo training, n=8) group. Mood state was measured using the Profile of Mood States (Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment). [Results] Vigor-Activity scores increased significantly, whereas Tension-Anxiety and Anger-Hostility scores decreased significantly after intervention when compared with the pre-intervention scores in the multicultural family children trained in Taekwondo group. [Conclusion] It is suggested that regular Taekwondo training may be effective in improving the mood states of children from multicultural families living in Korea.

Key words: Taekwondo, Mood state, Multicultural family

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INTRODUCTION

Since the mid-1990s, a large number of women from developing countries have been immigrating to South Korea through international marriages. As a result, the number of children born to multicultural families is burgeoning[1, 2)]. As of 2011, the number of children from multicultural families had reached 155,000, which accounts for approximately 11.9% of the entire foreign population of Korea. This is a substantial increase from 2006, in which the number of children from multicultural families was 25,000[2)]. However, it has been reported that children from multicultural families may be faced with serious difficulties in acculturation because of differences in their cultural and historical background, language, culture, and education methods, low socioeconomic status, and communication problems[2)]. Such difficulties with acculturation may pose a significant threat to mental health. In fact, Kim et al. reported that the degree of acculturation may be intimately associated with mental health disorders, such as depression and anxiety, and with behavioral problems, such as delinquency, in immigrant children and adolescents[3)]. Furthermore, Moon and An suggested that children from multicultural families in Korea show relatively higher levels of hostility, fear, anxiety, and anger than do children from non-multicultural families (i.e., those with Korean parents)[4)].

Taekwondo (TKD) is a Korean traditional martial art that is highly popular worldwide, with more than 70 million practitioner from more than 200 countries[5)]. Regular TKD training has been reported to have various benefits to children's growth.

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More specifically, Lee and Kim reported that TKD training is effective in improving children's physical fitness and promoting physical growth and development[5], whereas Lakes et al. suggested that TKD training could be effective in improving not only physical fitness, but also cognitive function in children[6].

Despite TKD being a behavioral philosophy that emphasizes self-control, respect, integrity, and perseverance[6], studies investigating the effects of TKD training on mental health are rare. Thus, this study aimed to examine the effects of regular TKD training on changes in mood state in children from multicultural families.

SUBJECTS AND METHODS

Twenty-four fifth and sixth graders (elementary school) were enrolled in the study. Eight of the subjects, for whom both parents were Korean, were assigned to the non-multicultural family children (NMC) group (6 boys, 2 girls; mean age: 11.8 ± 0.5 years; mean height: 149.3 ± 7.6 cm; mean weight: 46.0 ± 6.2 kg; mean BMI: 20.6 ± 2.0 kg/m^2). The remaining 16 subjects were born to a Korean father and a Chinese or Vietnamese mother. Eight of these subjects were randomly assigned to the multicultural family children (MC) group (6 boys, 2 girls; mean age: 11.6 ± 0.5 years; mean height: 149.4 ± 7.3 cm; mean weight: 47.2 ± 8.9 kg; mean BMI: 21.0 ± 3.1 kg/m^2) and did not receive any form of intervention. The remaining eight subjects were assigned to the multicultural family children trained in TKD (MCT) group (6 boys, 2 girls; mean age: 11.6 ± 0.5 years; mean height: 150.3 ± 5.7 cm; mean weight: 45.3 ± 9.3 kg; mean BMI: 21.1 ± 3.6 kg/m^2) and participated in a 16-week TKD training program. The institutional ethics review board of the Dong-A University approved the study protocol. All subjects and their parents were informed of the study procedure and possible risks involved, and both the parents and the subjects provided written informed consent.

The 16-week TKD training protocol was conducted once per week with an HRmax of 50–80% for each training session. Each training session lasted 60 min and included 10 min of basic physical fitness training, 40 min of the main exercise (basic TKD movements, Poomsae, kicks, and Taekwon gymnastics), and 5 min each of warm-up and cool-down exercises (stretching).

Changes in mood were assessed using the Korean version of the Profile of Mood States (POMS), which has established reliability and validity[7] and has been adapted from the original version developed by McNair et al[8]. This questionnaire consists of six sub-domains: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment.

Statistical analyses were performed using SPSS version 24.0 for Windows (SPSS Inc., Chicago, IL, USA). Data are presented as mean ± standard deviation (SD) unless otherwise stated. For identifying differences in normally distributed results, two-way repeated analysis of variance (ANOVA) was employed. When significant group by time interactions occurred, simple main effects were assessed using one-way ANOVA and paired t-tests. The level of significance was set at a value of 0.05.

RESULTS

The POMS scores for the three groups before and after intervention are shown in Table 1. Vigor-Activity scores increased significantly, while Tension-Anxiety and Anger-Hostility scores decreased significantly after intervention when compared with the pre-intervention scores for the MCT group ($p<0.05$). In contrast, Depression-Dejection, Fatigue-Inertia, and Confusion-Bewilderment scores were not significantly different among groups or time points ($p>0.05$).

Table 1. Changes in POMS scores before and after intervention

Variables	NMC group (n=8)		MC group (n=8)		MCT group (n=8)	
	Before	After	Before	After	Before	After
Tension-Anxiety (scores)	1.6 ± 0.5	1.7 ± 0.6	2.1 ± 0.6	2.1 ± 0.8	2.0 ± 0.5	1.5 ± 0.6*
Depression-Dejection (scores)	2.3 ± 0.7	2.2 ± 0.7	2.1 ± 0.7	2.1 ± 0.7	2.3 ± 0.8	2.0 ± 0.8
Anger-Hostility (scores)	1.4 ± 0.3	1.3 ± 0.3	1.8 ± 0.6	1.8 ± 0.6	1.9 ± 0.4	1.4 ± 0.4*
Vigor-Activity (scores)	1.6 ± 0.6	1.7 ± 0.7	1.6 ± 0.8	1.8 ± 0.6	1.6 ± 0.6	2.3 ± 0.4*
Fatigue-Inertia (scores)	1.6 ± 0.7	1.6 ± 0.5	1.6 ± 0.5	1.6 ± 0.6	1.6 ± 0.6	1.3 ± 0.4
Confusion-Bewilderment (scores)	1.9 ± 0.5	1.9 ± 0.4	1.8 ± 0.6	1.9 ± 0.6	1.9 ± 0.5	1.9 ± 0.6

Data are presented as mean ± SD. NMC: non-multicultural family children; MC: multicultural family children; MCT: multicultural family children trained in Taekwondo. *$p<0.05$ vs. Before.

DISCUSSION

The number of people practicing martial arts, including TKD, reportedly increases by more than 20% every year. TKD is particularly a popular sport among children, and more than 300,000 children apply for a TKD belt test each year[5, 9]. Previous studies have suggested that regular TKD training may be effective in improving aerobic capacity, flexibility, and body composition[10]. It may also have diverse benefits for children, including physiological benefits, such as improving physical fitness and promoting physical growth and development, as well as cognitive and academic benefits[6]. This study conducted a Profile of Mood States (POMS), which comprises domains on Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment, to verify the effects of regular TKD training on the mood states of children from multicultural families. The results showed that there were no significant differences between children from Korean parents and children from multicultural families in any of the six subscales of the POMS. However, the Vigor-Activity score significantly increased while the Tension-Anxiety and Anger-Hostility scores significantly decreased in children from multicultural families who participated in the 16-week TKD training program. These results suggest that TKD training may effectively improve the mood state of children from multicultural families and that TKD training may have benefits to mental health similar to that of traditional aerobic exercise training. Regular exercise is effective in maintaining and improving mental health by reducing distress and negative effects while promoting positive benefits for cognitive, emotional, and motor domains[11, 12], and several studies have used the POMS to confirm that aerobic exercise results in positive changes to mood state[13, 14]. More specifically, Brown et al. reported that a 9-week aerobic exercise program resulted in a significant increase in the Vigor-Activity score[13], whereas Sakuragi and Sugiyama reported that a 4-week walking exercise program led to a significant reduction in the Tension-Anxiety and Anger-Hostility scores[14]. In particular, TKD training during childhood has been reported to promote emotional and social development, mitigate anxiety, improve independence and leadership, and effectively control aggression[15, 16], all of which support the findings of our study. Additionally, TKD exercise was effective for improving Vigor, Anxiety, Depression, Anger, Fatigue, and Confusion among POMS sub-variables[17]. As TKD training helps children improve mental health as well as self-accomplishment and fulfillment while acquiring various techniques, TKD during childhood has been reported to promote stable and positive emotional development[18]. In the present study, we also consider that TKD-induced positive emotions elicited changes of mood states, albeit in a limited manner.

In conclusion, regular TKD training may be effective in improving the mood states of children from multicultural families living in Korea. One shortcoming of this study was the small sample size. Future studies should incorporate other exercise programs into the study design to verify the sole effects of TKD training.

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Conflict of interest

None.

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