

ORIGINAL RESEARCH

The relationship between attitudes towards healthy nutrition and awareness levels of exercise addiction in male taekwondo athletes

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Abstract

Exercise has a vital role in the physical, mental, emotional and social health of individuals. However, excessive and uncontrolled exercise may have negative consequences instead of the expected benefits such as exercise addiction. Studies on exercise addiction in athletes are thus crucial. In this regard, the present study was aimed to examine the relationship between male taekwondo athletes' attitudes towards healthy nutrition and their awareness levels of exercise addiction. Data for the study were collected in 2024 from 282 Turkish taekwondo athletes selected through convenience sampling. The average sports experience of study participants was 9.3 ± 5.7 years. The questionnaire for data collection had three parts: the personal information form, the Attitude Scale for Healthy Nutrition Awareness, and the Exercise Addiction Scale. A Pearson correlation coefficient was calculated to analyze the relationships between variables wherein the data showed normal distribution. A simple regression analysis was performed to examine the effects. An independent *t*-test was conducted to explore differences between the national and non-national athletes. Results demonstrated that the national athletes had higher exercise addiction scores. The study found significant and positive relationship between male taekwondo athletes' attitudes towards healthy nutrition and their awareness levels of exercise addiction ($p < 0.05$). The attitudes towards healthy nutrition significantly predicted exercise addiction awareness ($p < 0.05$; $r = 0.186$). The increase in positive attitudes towards healthy nutrition may bring greater awareness of exercise addiction. Efforts should be made to improve athletes' attitudes towards nutrition for preventing exercise addiction as a negative outcome. Further studies are recommended to enhance athletes' knowledge and attitude towards nutrition.

Keywords

Athlete; Healthy lifestyle; Prevention of addiction

1. Introduction

Studies have demonstrated the positive impact of regular exercise on individuals [1, 2]. These benefits in adults include reduced all-cause mortality, enhanced cognitive function, and improved mental health [3, 4]. Regular physical activity is linked to positive mental health such as decreased depression and anxiety, improved mood, emotional well-being, and greater stress resilience [5, 6]. It is also beneficial for physical and social well-being. However, intense, excessive and uncontrolled exercise can bring in negative outcomes including exercise addiction (EA) [7–9]. EA diminishes life quality by negatively impacting the social relationships and impairing the impulse control [10, 11]. These factors highlight the importance of EA awareness as a key concept for maintaining healthy life.

Taekwondo athletes being the focus of this study can adjust training programs and their frequency according to own

preferences unlike the team athletes. This flexibility may increase the risk of overtraining and can thus heighten the EA likelihood. EA can have detrimental effects including physical injuries, mental health issues like anxiety and depression, and disruptions in daily functioning and personal relationships [12]. EA is characterized by excessive training, inability to regulate exercise habits, and harmful consequences that can be physical, psychological, social or their combinations [13]. EA is linked with the inability to stop exercising or experience emotional distress when unable to exercise [14]. It is a pathological behavioral pattern where individuals are overly focused on exercise, lose control, act compulsively, and experience negative impact on health, social life, and professional responsibilities [15]. Recognizing the connection between EA and other lifestyle factors is essential as they collectively shape up the overall well-being of an individual [16].

Factors such as dietary behaviors, physical activity, and

weight control should also be considered in addition to EA for the healthy lifestyle. Healthy diet is crucial as it protects against malnutrition-related health problems and non-communicable diseases like diabetes, stroke and cardiovascular diseases [1]. The EA and eating disorders (EDs) relationship is well-documented in literature. EA may be a part of broader spectrum of disordered eating behaviors with EA symptoms overlapping with those of EDs. Compensatory behaviors to maintain thinness in EDs individuals can evolve into EA [7]. Athletes are at higher risk of developing EDs [17, 18]. They may engage in unhealthy weight-control such as skipping meals, restrictive eating, excessive exercising, dehydration techniques, vomiting, and using diuretics, laxatives, or diet medications [19]. Such behaviors are prevalent in weight-class athletes like those in taekwondo. Studies have shown high EA prevalence in suspected or diagnosed EDs individuals [20, 21]. Suspected EDs individuals are 3.5 times more prone to develop EA compared to without EDs [22]. Athletes with EA can thus benefit from treatments used for EDs [23]. However, the current literature in this regard is limited, especially concerning taekwondo athletes which necessitates further studies.

This study is designed based on the hypothesis that “there is a linear relationship between attitudes toward healthy nutrition and exercise addiction in male taekwondo athletes”. The study explores whether being a national athlete affects attitude toward healthy nutrition and EA awareness, as the athletic experience may influence these characteristics. Hypothesis of this study is based on the findings from previous research that reveals linear relationship between athletes’ nutritional habits and EA [7, 17–22]. Results provide insight into the relationship of EA with EDs in taekwondo athletes to give evidence about the interventions for improving EA awareness in this group.

2. Materials and methods

2.1 Study design and participants

This was a cross-sectional and descriptive study using correlational survey model within the framework of survey methodology. The correlational survey model determined relationships between two or more variables and provided insights into their potential cause-and-effect [24]. Study was limited to the considered characteristics and responses were obtained from the male taekwondo athletes. Data collection tools were administered online after the approval from ethics committee. Research was conducted by following the principles of Declaration of Helsinki. Participation was voluntary and the participants were informed of their rights prior to the study. A total of 301 athletes responded to the survey, however 19 were excluded due to incomplete responses making 282 valid responses in the final analysis. The data were collected in 2024 via convenience sampling. The average athletic experience of 282 Turkish taekwondo athletes was 9.3 ± 5.7 years. The study group had 5.83% margin of error. Eligibility criteria for participation included minimum three years of taekwondo experience and age below 35 years. The demographic characteristics of participants in the study group are given in Table 1.

2.2 Data collection tools

The data collection tool prepared by researchers in accordance with the purpose of study had three parts. The first section included demographic information, the second had Attitude Scale on Healthy Eating developed by Demir and Cicioglu [25], and the third had Awareness Scale on Exercise Addiction by Demir and Cicioglu [26].

2.2.1 Attitude scale for healthy nutrition (ASHN)

ASHN developed by Demir and Cicioglu [25] had 21 questions with 4 sub-dimensions: Emotion for Nutrition (EN), Information on Nutrition (IN), Positive Nutrition (PN), and Malnutrition (PM). The scale evaluation was of 5-point Likert type. Participants’ ≤ 21 points meant very low attitude towards healthy nutrition, 23–42 low, 43–63 medium, 64–84 high, and ≥ 85 –105 very high. The Cronbach Alpha coefficients calculated for the responses from relevant scale within the study scope were between 0.66 and 0.86.

2.2.2 Awareness for exercise addiction scale (AFEAS)

AFEAS developed by Demir and Cicioglu [26] had 15 questions with 3 sub-dimensions: Awareness of the Effect on Emotions (AEE), Awareness of the Effect on Socialization (AES), and General Awareness (GA). The scale evaluation was of 5-point Likert type. The Cronbach Alpha coefficients calculated for the responses from relevant scale within the study scope were between 0.77 and 0.83.

2.3 Data analysis

It was determined that the internal consistency of responses obtained within study scope was sufficient. The normality of data used in the analyses was evaluated based on kurtosis and skewness coefficients. The determined values were between +2 and -2 and accepted as the criterion values by George and Mallery [27]. The data were deemed suitable for normal distribution (Table 2). The correlation and simple regression analyses were accordingly applied. The normality of data and residuals were reviewed according to the assumptions required for regression analysis. The possibility of linear relationship between the variables was examined. The covariance of variables was also assessed. The residuals were independent of each other. It was confirmed that all the assumptions required for analyses were met. Data were analyzed by the IBM SPSS Statistics for Windows (version 27.0, Armonk, NY, USA: IBM Corp) package program with $p < 0.05$ considered significant for all the analyses.

3. Results

Table 2 shows the descriptive statistics of participants’ responses. It is seen that the participants have high attitudes towards healthy nutrition and moderate exercise addiction awareness levels.

Table 3 shows the correlation analysis for determining relationship between participants’ attitudes towards healthy nutrition and exercise addiction awareness levels. There is a low

TABLE 1. Demographic information of the participants.

Variables	Frequency	%
Age (years)		
18–20	88	31.2
21–23	46	16.3
24–26	52	18.4
27–29	28	9.9
30+	68	24.1
A National Athlete		
Yes	91	32.3
No	191	67.7
Weekly Exercising Frequency		
1–2 days	95	33.7
3–4 days	94	33.3
5–6 days	63	22.3
Everyday	30	10.6
Medals in International Tournaments		
Yes	77	27.3
No	205	72.7
Total	282	100.0

Table examination shows that 32.3% (91) of 282 athletes are the national athletes, and 27.3% (77) athletes have won the medals in international tournaments.

TABLE 2. Descriptive statistics of the data.

Variables	Mean	Standard Deviation	Skewness	Kurtosis
Information on Nutrition	19.98	3.08	−0.169	0.062
Emotion for Nutrition	17.98	3.93	−0.171	−0.166
Positive Nutrition	18.22	3.58	−0.147	−0.149
Malnutrition	12.43	3.90	0.259	0.081
Attitude towards Healthy Nutrition	68.62	6.72	0.220	0.145
Awareness of the Effect on Emotions	26.41	3.93	−0.178	0.275
Awareness of the Effect on Socialization	11.43	3.26	0.258	−0.020
General Awareness	9.25	3.46	0.222	−0.633
Awareness of Exercise Addiction	47.10	6.72	0.278	0.297

TABLE 3. Results of correlation analysis for determining the relationship between attitudes towards healthy nutrition and exercise addiction awareness levels.

Attitudes towards Healthy Nutrition	Awareness of Exercise Addiction
<i>r</i>	0.186
<i>p</i>	0.002

but significant positive relationship between attitude towards healthy nutrition and exercise addiction awareness ($r = 0.186$).

Table 4 shows the regression analysis results to determine the effect of participants' attitudes towards healthy nutrition on exercise addiction awareness levels. The attitude towards healthy nutrition predicts exercise addiction awareness level ($p = 0.002$) and explains ~4% variance ($R = 0.186$; $R^2 = 0.035$). The standardized regression coefficient is $\beta = 0.186$ (95% Confidence Interval (CI), 0.070–0.301). It can be said based on these findings that attitude towards healthy nutrition is determinant of exercise addiction awareness level. Exercise addiction awareness level increases with the increase in attitude towards healthy nutrition.

Table 5 shows the comparative analysis results of being a national athlete. Descriptive statistics on the participants' responses are given. It is seen that the national athletes have higher exercise addiction awareness level scores compared to non-national athletes.

4. Discussion

This study is aimed to explore the relationship between male taekwondo athletes' attitudes toward healthy eating and their EA awareness. Previous literature suggests that EA may be linked to EDs [24]. The present research shows significant positive correlation between athletes' attitudes toward healthy eating and their EA awareness (Table 3). Furthermore, the attitudes toward healthy eating significantly predict EA awareness (Table 4). The attitudes toward healthy eating can thus be considered a determinant of EA awareness. It can be further suggested that male taekwondo athletes' attitudes toward healthy nutrition may enhance their EA awareness given that the sports performance is influenced by both mental [28, 29] and physical [30, 31] factors.

The literature highlights high prevalence of disordered eating behaviors among elite athletes [32]. The individuals having regular exercise possess lower nutritional knowledge compared to the non-exercisers [33]. EDs are predominantly

observed in female athletes [34, 35] as the males experience less social appearance anxiety and aesthetic pressures. Women report higher aesthetic concerns and their biological structure may periodically influence dietary behaviors. They are also considered part of the female athlete triad as these conditions are at concerning rates in female athletes [36].

EA is prevalent among individuals engaged in regular physical activity [20]. The risk of developing EA increases with frequent exercise [37–39]. A recent review has identified that endurance athletes (14.2%), ball game players (10.4%), gym-goers (8.2%), and strength athletes (6.4%) are at higher risk of EA as compared to ~3.0% in other sports [40]. Higher rates are observed in elite ultramarathon runners (17%) [41] and Australian elite athletes (34.8%) [39]. Szabo [41] has found comparable rates in ultramarathon runners which are aligned with the findings from Italian team-sport athletes with 18.3% of 262 athletes identified at EA risk [42]. This risk is also prevalent in combat sports like kickboxing, taekwondo and muay thai [43]. EA is more common in male athletes [3, 25, 44–47]. The individual athletes are more susceptible than team athletes [48]. The tendency towards EA increases with age [49]. The athletes' competitive focus on performance enhancement may increase exercise frequency considering the relationship between regular exercise and EA. The desire of endorphin and dopamine release associated with exercise can further contribute to EA development.

The limited existing literature supports relationship between attitudes toward healthy nutrition and EA awareness levels. Guler *et al.* [50] have found positive correlation between these factors. Hauck *et al.* [51] have emphasized that athletes with EDs or food addiction are more prone to EA, particularly when exercise is done as compensation. The findings of this study align with literature where the relatively low correlation coefficients may reflect the specific characteristics of research sample, however further validation in future studies is imperative. Furthermore, forthcoming studies should explore how personality traits such as perfectionism and psychological

TABLE 4. Regression analysis results in determining the effect of attitude towards healthy nutrition on exercise addiction awareness levels.

Model	B	Std. Error	Beta	<i>t</i>	<i>R</i>	<i>R</i> ²	Adj. <i>R</i> ²	<i>F</i>	<i>p</i>	Durbin Watson
Constant	34.349	4.045	0.186	8.491	0.186	0.035	0.031	10.035	0.002	1.392
ATHN	0.186	0.059		3.168						

B: Unstandardized Coefficient; Std. Error: Standard Error; Adj.: Adjusted.

TABLE 5. Comparison of healthy nutrition and exercise addiction awareness levels for being a national athlete.

Variables	National Athlete	<i>n</i>	Mean	<i>sd</i>	<i>t</i>	<i>p</i>
Attitude towards Healthy Nutrition	Yes	91	69.27	6.38	1.14	0.253
	No	191	68.31	6.88		
Awareness for Exercise Addiction	Yes	91	49.53	6.79	4.23	0.001
	No	191	45.94	6.38		

n: Participants; sd: Standard Deviation.

factors like insecure attachment may influence EDs and EA [52]. Studies should also explore other factors influencing EA awareness and attitudes towards healthy nutrition to provide further insights into this complex issue.

Athletes must prioritize healthy balance of nutrition, exercise and rest to promote sustainable high performance. A positive attitude towards healthy nutrition is associated with greater EA awareness. Athletes should thus receive guidance from coaches and dietitians to maintain this balance. Even dietitians may face pressure to conform to physical ideals for potentially leading to EDs and EA which further complicate the issue.

It is thus essential to educate athletes, their families, and coaches to prevent the negative impact of increased athletic success regarding attitudes toward healthy nutrition and EA. It is imperative to integrate nutritional education into athlete development programs as preventative measure. The psychological support focusing on emotional awareness, stress management, and EA risks should be prioritized. The tailored interventions may be beneficial as the national athletes demonstrate higher EA awareness. Coaches should monitor the training intensity to prevent overtraining and ensure adequate rest.

Finally, integrating the regular nutrition monitoring into training assessments would keep athletes on track regarding their dietary goals, foster balanced and health-conscious approach to training, and reduce the EA risk.

This study has certain limitations despite the above-stated practical recommendations. First, it focuses solely on taekwondo athletes which limits the generalizability of findings to other sports disciplines. Results may not be applicable to broader athletic population without the inclusion of athletes from various sports. Moreover, the usage of self-report methods may have introduced bias as the participants can overestimate or underreport their behaviors due to social desires. The cross-sectional design also limits causal inferences between healthy nutrition attitudes and EA awareness levels. Longitudinal studies would provide clearer understanding of such relationships. Furthermore, the accuracy of findings may be affected by the validity and reliability of scales used to measure EA awareness as the complex psychological constructs require precise measurement tools. The differences in EA awareness levels between national and non-national athletes are observed, however the underlying reasons are not explored in depth. Lastly, the study is exclusively conducted on Turkish athletes which limits the generalizability of findings to athletes from diverse cultural or regional backgrounds. These limitations must be considered in results' interpretation and planning future studies.

5. Conclusions

This study has found significant, however moderate positive relationship between taekwondo athletes' attitudes toward healthy nutrition and their awareness of exercise addiction. Healthy eating attitudes are identified as the predictor of EA awareness which suggests that the athletes with stronger focus on nutrition may also be more aware of the risks associated with excessive exercise. The national-level athletes possess

higher levels of EA awareness compared to non-national athletes. This highlights the impact of elite-level training environments on such awareness.

This study contributes to literature by emphasizing the importance of fostering healthy eating habits and incorporating nutritional education into athletic training programs for promoting physical and mental well-being.

AVAILABILITY OF DATA AND MATERIALS

Due to the limitations specified in the ethics committee approval, the data collected for this research cannot be shared with third parties.

AUTHOR CONTRIBUTIONS

ET and HG—designed the research study. ET, HG and ABY—performed the research. HG and ABY—analyzed the data. ET, HG, ABY, GC, IY, AB and NEE—wrote the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research was conducted with the permission of Aydin Adnan Menderes University Rectorate Social and Human Sciences Research Ethics Committee dated 29 April 2024 and numbered 13/10. Participants were assured that they could withdraw from the study at any stage, and they voluntarily agreed to participate.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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