

Examination of the Relationship Between Attitudes Towards Healthy Nutrition and Mental Toughness of Athletes in Different Branches

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Summary. *Study Objectives:* This study aimed to examine the relationship between attitudes towards healthy nutrition and mental toughness of athletes (aged \bar{X} = 17.77 \pm SD= 8.88, 122 females, 245 males, total of 367) in different branches. *Method:* An ethics committee approval was obtained for the research. Attitude scale for healthy nutrition, mental toughness scale, and personal information form were used to collect data. Confirmatory factor analysis (CFA) was administered for these scales. In addition to descriptive statistics, correlation and regression analyzes were performed under the relational model. *Result:* It was concluded that there was a positive relationship between knowledge on nutrition and positive nutrition with mental toughness. *Conclusion:* Athletes' knowledge on nutrition and their attitudes towards positive nutrition increase regarding their attitudes for healthy nutrition, their mental toughness will also increase.

Key words: Healthy nutrition, Mental toughness, Sports

Introduction

Nutrition, which is one of our basic needs to continue our life healthily, is of importance for providing an individual's physiological and psychological needs as well as the proper functioning of neurological traits. Nutrition refers to the intake of macro and micronutrients by organisms to allow the body to perform metabolic and physiological activities and then be absorbed by the body through the intestines as a result of many chemical processes and used for vital activities through circulation (1). Healthy nutrition is associated with adequate and balanced nutrition (2). For adequate and balanced nutrition, adequate energy and nutrients required for body growth, development, and regeneration should be received (3). A healthy lifestyle can be provided if adequate amounts of the right nutrients are received. On the other hand, malnutrition has become a public health issue and results

in obesity, diabetes, cardiovascular, and brain dysfunctions, which are increasingly observed (4).

Term of nutrition, which is of importance for athletes' performance, may increase awareness of healthy nutrition. If athletes have information on proper nutrition, they can better fulfill their physical, psychological, and performance development (5). Contrary to sedentary individuals, athletes need more calorie and protein intake to provide physiological and metabolic adaptations resulting from exercise. In a similar vein, utmost attention should be paid to taking vitamins and minerals, especially B vitamins, zinc, and chromium, to optimize carbohydrate metabolism, the ultimate factor for sports performance (6). It is essential to use mental functions, one of the important determinants of athletes' success, properly to provide success. Because providing the nutrients necessary for stimulation of the mind is of paramount importance to cope with issues faced during the performance and to develop various

strategies. In this respect, the term of mental toughness is argued to be significant.

Mental toughness has been comprehensively examined as a critical variable in applied sports psychology (7). However, it is one of the least understood terms in sports psychology (8). Clough et al. (9) urge that mentally tough people have high self-confidence and a firm belief in controlling their fates, and such individuals are not affected by competition and troubles relatively. In addition, Jones (10) reports that mental toughness represents an individual's ability to cope with the demands of education and competition, increased determination, focus, confidence, and maintaining control under pressure. In another study on Olympic and World Champions, Jones et al. (11) suggest mental toughness to be something consisting of attitude, mentality, training, competition, and post-competition. On the other hand, mental toughness has been categorized under "willpower," "control," "sociability," and "positivity" in a research carried out by Komatsu et al. (12) on Japanese athletes. Erdoğan (13) defines mental toughness as a cognitive skill allowing athletes to cope with the difficulties they face during the performance, to control their motivation, concentration, self-confidence, emotions, and thoughts, and to maintain them positively. Mental toughness, which refers to an internal focus and commitment required to overcome difficulties when facing them, is considered one of the most important psychological determinants of success in sports (14,15). It is also a fact that mentally tough athletes can maintain their performance levels (16).

More valid and reliable information may be obtained by both theoretical and applied research on mental toughness, which is one of the psychological skills that should be developed in athletes. The applied studies to be carried out by researchers in this field may contribute significantly to existing literature (17). In this regard, based on the literature, it was aimed to examine the relationship between attitudes towards healthy nutrition and the mental toughness of athletes in various branches. Research conclusions are considered to be a guide to sports dietitians, sports managers, trainers, and athletes, especially sports scientists.

Material and Methods

Research Model

This research was designed as a correlational survey model. Correlational survey models aim to determine the existence or degree of covariance between two or more variables (18).

Research Group

For this research, an ethics committee approval was obtained from the Institute of Science, Scientific Research and Publication Ethics Committee of Osmaniye Korkut Ata University with decision no. 2021/6/12. The population of the study consisted of active licensed athletes in the branches of athletics, badminton, basketball, boxing, cycling, fencing, football, wrestling, handball, hockey, karate, kick-boxing, rugby, judo, taekwondo, tennis, wheelchair basketball, volleyball, and swimming. The sample group included a total of 367 athletes, 122 females and 245 males, who voluntarily participated in the study.

Data Collection Tools

Attitude Scale For Healthy Nutrition is a 5 point Likert scale developed by Tekkurşun-Demir and Cicioğlu (19). The scale has 4 dimensions and 21 items, Knowledge About Nutrition (KAN), Emotion Towards Nutrition (ETN), Positive Nutrition (PN), and Malnutrition (M).

Mental Toughness Scale: It is a 5 point Likert scale developed by Madrigal et al, (2013) in order to determine the level of mental toughness in the sports environment. The scale consists of one dimension and 11 items. The scale was adapted by Erdoğan (13) into Turkish.

Results

Data Analysis

Confirmatory factor analysis (CFA) was administered for the scales utilized in the study. Firstly, data

were collected from 408 athletes. It was decided to exclude 41 questionnaires from the study by revising missing values and outliers. Thus, analyzes were carried out on the data collected from 367 athletes. In addition to descriptive statistics, Pearson correlation and multiple regression analysis methods were performed to test the relationships between the scales under the relational model.

Confirmatory Factor Analysis (CFA) for Data Collection Tools

Mental Toughness Scale. Fit criteria regarding the CFA of the mental toughness scale used in the research were examined and were reported as follows: CMIN/DF(x^2/df): 2.180, CFI: .971, GFI: .955, IFI: .972, AGFI: .926, TLI: .961, RMSEA: .057. In addition, Cronbach's Alfa (α) value of the scale was calculated to be .88.

Attitude Scale For Healthy Nutrition. Fit criteria regarding the CFA of the Attitude Scale For Healthy Nutrition used in the research were examined. It was decided to exclude the hypothesis numbered 10 from the data set as its factor load was not found within the proper value range 10 in the Emotion Towards Nutrition (EMN) dimension. The scale values were reported as follows: CMIN/DF(x^2/df): 2,035, CFI: .940, GFI: .921, IFI: .941, AGFI: .895, TLI: .928, RMSEA: .053. In addition, Cronbach's Alfa (α) values of the scale were found to be .89 for Knowledge About Nutrition (KAN), .77 for Emotion Towards Nutrition (EMN), .76 for Positive Nutrition (PN), and .76 for Malnutrition (M). Based on the confirmatory factor analysis, it can be argued that the goodness of fit values achieved for both scales used in the research were appropriate (20,21,22, 23).

As seen in Table 1, a total of 367 athletes participated, 122 females (33.2%) and 245 males (66.8%), participated in the study. 133 (36.3%) of these athletes were aged 10-13, 115 (31.3%) of them were in the age group of 14-17, 119 (32.4%) of them were aged 18 and above. Regarding sports time, there were 136 (37.1%) athletes in the 1-3 year group, 129 (35.1%) athletes in the 4-6 years group, and 102 (27.8%) athletes in the 7 and above year group. When considering branch distribution, number of

Table 1. Demographic characteristics of athletes

		N	%
Gender	Female	122	33.2
	Male	245	66.8
Age group	10-13	133	36.3
	14-17	115	31.3
	18 and above	119	32.4
Sports time	1-3 years	136	37.1
	4-6 years	129	35.1
	7 and above	102	27.8
Branches	Athletics	18	4.9
	Badminton	15	4.1
	Basketball	26	7.1
	Boxing	15	4.1
	Cycling	10	2.7
	Fencing	4	1.1
	Football	25	6.8
	Wrestling	43	11.7
	Handball	5	1.4
	Hockey	10	2.7
	Karate	36	9.8
	Kick Boxing	23	6.3
	Rugby	16	4.4
	Judo	19	5.2
	Taekwondo	32	8.7
Tennis	4	1.1	
Wheelchair Basketball	4	1.1	
Volleyball	14	3.8	
Swimming	48	13.1	
Total		367	100.0

athletes for each branch was as follows: 18 (4.9%) in athletics, 15 in badminton (4.1%), 26 in basketball (7.1%), 15 (4.1%) in boxing, 10 (2.7%) in cycling, 4 (1.1%) in fencing, 25 (6.8%) in football, 43 (11.7%) in wrestling, 5 (1.4%) in handball, 10(2.7%) in hockey, 36 (9.8%) in karate, 23 (6.3%) in kickboxing, 16 (4.4%) in rugby, 19 (5.2%) in judo, 32 (8.7%) in taekwondo athletes, 4 (1.1%) in tennis, 4 (1.1%) in wheelchair basketball, 14 (3.8%) in volleyball and 48 in swimming (13.1%).

Table 2. Correlation analysis results

N =367	\bar{X}	SD	1	2	3	4	5
1. Knowledge about nutrition	4.19	.702	-				
2. Emotion towards nutrition	287	.782	-.073	-			
3. Positive nutrition	3.98	.742	.533**	-.089	-		
4. Malnutrition	2.06	.813	-.167**	.372**	-.237**	-	
5. Mental toughness	4.23	.558	.377**	-.056	.383**	-.079	-

**p<0,01

With the correlation analysis between the four dimensions of the attitude scale for healthy nutrition and the dimension of mental toughness, the covariation direction and level of these variables were examined. As a result of the correlation analysis, the following results were found out: a significant, positive, and moderate relationship ($r = .533$; $p < .01$) between the knowledge about nutrition and the positive nutrition; a significant, negative, and poor relationship ($r = -.167$; $p < .01$) between the knowledge about nutrition and the malnutrition; a significant, positive and moderate relationship ($r = .377$; $p < .01$) between the knowledge about nutrition and the mental toughness; a significant, positive and moderate relationship ($r = .372$; $p < .01$) between the emotion towards nutrition and the malnutrition; a significant, negative and poor relationship ($r = -.237$; $p < .01$) between the positive nutrition and the malnutrition; a significant, positive and moderate relationship ($r = .383$; $p < .01$) between the positive nutrition and the mental toughness. A positive correlation may also be claimed among the knowledge about nutrition and the positive nutrition with the mental toughness.

Regression analysis is a statistical method utilized to model and examine the mathematical relationship between variables (24). In Table 3, you can see the multiple regression analysis administered among three sub-dimensions of the Attitude Scale For Healthy Nutrition, the independent variable, and the mental toughness, the dependent variable. The Durbin-Watson (D-W) values between 1.5 and 2.5 confirm that there is no multicollinearity problem between the variables. The multiple regression model established is statistically significant ($F_{(4-3362)} = 21.145$; $p < .001$). The R^2 value of the model was found to be .189, while its adjusted R^2 value was concluded to be .180. This result shows that the independent variable related to healthy nutrition explains 18% of the changes in the dependent variable of mental toughness in sports. R^2 is installed with a systematic error statistics is the systematic error level, for the number of constant independent variables, the value of R^2 decreases as it rises and/or as the sample size increases. If the "adjusted R^2 " is calculated taking into account the sample size is negative if the sample size remains below a certain value, it receives negative values (25). When examining the power of

Table 3. Multiple linear regression analysis

Model	B	Std. Error	Beta (β)	t	p	VIF
(Constant)	2.663	.220		12.100	.000	
Knowledge about nutrition	.193	.045	.242	4.328	.000	1.400
Emotion towards nutrition	-.020	.036	-.028	-.554	.580	1.161
Positive nutrition	.195	.043	.259	4.557	.000	1.442
Malnutrition	.023	.036	.033	.636	.525	1.223
R=,435	$R^2 = .189$	Adj. $R^2 = .180$				
$F_{(4-3362)} = 21.145$	$p = .000$	D-W = 2.26				

Dependent Variable: Mental Toughness (MT)

the independent variables in this relationship to affect the dependent variable based on beta indicators, a significant impact was found out between the knowledge about nutrition ($\beta = .242$; $p < .01$), a sub-dimension of the attitude scale for healthy nutrition, and positive nutrition ($\beta = .259$; $p < .01$). It was also concluded that the knowledge about nutrition and positive nutrition had a significantly positive contribution to explaining the effect of a healthy nutrition attitude on mental toughness in sports. In addition, it can be argued that a unit increase in knowledge about nutrition increases mental toughness in sports by .242, and a unit increase in positive nutrition increases mental toughness in sports by .259.

Discussion

This study has been carried out to determine the relationship between the attitudes of athletes in various branches towards healthy nutrition and their mental toughness. In this section, it was aimed to discuss the nature of the relationship between the attitudes of athletes towards healthy nutrition and their mental toughness levels, and what an effect their attitudes towards nutrition have on mental toughness.

As a result of the correlation analysis administered to specify the relationship between the attitude towards healthy nutrition and mental toughness, the following relationships have been found out: a positive relationship between knowledge about nutrition and positive nutrition, a negative relationship between knowledge about nutrition and malnutrition, a positive relationship between knowledge about nutrition and mental toughness, a positive relationship between emotion towards nutrition and malnutrition, a negative relationship between positive nutrition and malnutrition, a positive relationship between positive nutrition and mental toughness (Table 2). Based on this result, it may be suggested that as the knowledge about nutrition increases, positive nutrition, and mental toughness increase. On the other hand, the more knowledge about nutrition, the less malnutrition. Therefore, it can be argued that knowledge about nutrition results in awareness for positive nutrition. In this respect, the knowledge we have about nutrition may become an

important step in acquiring positive nutrition habits. Similar to this conclusion, it has been reported that as the attitude scores of the individuals, who go to gyms, towards healthy nutrition increase, their social appearance anxiety levels decrease (26). Moreover, it has been specified that as the level of nutrition knowledge increases, students' psychological nutrition behavior scores decrease, and their tendency to be physically active increases (27).

Based on the correlational analysis, it can also be argued that the more knowledge about nutrition, the higher mental toughness (Table 2). The brain is in great demand of energy and nutrients to function well. Thus, if the right nutrients are received in an adequate amount, mental toughness can be provided because these nutrients play a critical role in providing the energy required for the maintenance of life-supporting functions such as the heart, brain, organs, and breathing (28). In addition to the intake of protein, vitamins, and iron necessary for healthy brain development, not consuming processed food is also important to increase our mental toughness. A study in the literature reports that lack of nutritional awareness may cause obsessive symptoms and orthorexia nervosa (29). It has been also urged that dancers with anorexia nervosa have lower nutritional knowledge (30).

The correlation analysis also suggests that as malnutrition increases, the emotion towards nutrition also increases, the higher positive nutrition, the less malnutrition, and as positive nutrition increases, mental toughness increases (Table 2). When examining the reasons for these, individuals with bad nutrition habits may need more nutrition as a result of the harmful foods they receive. To this end, any food received out of body need may increase nutrition emotion as they may not fulfill nutrition need of the body. When examining similar studies, Zeybek and Aydın (31) report malnutrition habits among the causes of obesity. Malnutrition has also been concluded to result in social body anxiety (32). Regarding the fact that the higher positive nutrition, the higher mental toughness, and the less malnutrition, it may be suggested that positive nutrition reduces malnutrition, and mental toughness will increase by providing the nutrients necessary for the mind with the effect of positive nutrition. In a similar vein, Liu et al., (33) conclude that

improved nutrition has a healing effect on the mental health of rural students.

As a result of the regression analysis performed to specify how attitudes towards nutrition affect mental toughness, it has been concluded that the knowledge about nutrition and attitudes towards positive nutrition significantly predicted mental toughness regarding the attitudes of athletes towards healthy nutrition (Table 3). In this respect, it can be suggested that as the knowledge about nutrition and attitudes towards positive nutrition increase, mental toughness will also increase. The human brain consists of hundreds of billions of nerves and as many helper cells. Learning and other mental activities take place as a result of the interaction of these cells with the stimulus transmitters generated in the brain. Not only the formation and functioning of cells but also the generation of stimulus transmitters can be provided by enabling the brain to have regular, required amount and quality of energy source, protein, vitamins, and minerals (34). Accordingly, if these resources are less or more than the necessary amount, this may affect mental activities. In this regard, it may be argued that the knowledge about nutrition and the attitudes towards positive nutrition may affect mental toughness. No finding has been identified in the literature on the impact of attitudes towards healthy nutrition on mental toughness. When examining similar studies, Aktan and Önder (35) suggest that children with proper nutrition in early childhood may have an increase in their psychological toughness levels. In addition, Shaw (36) urges that a nutritious diet will increase the mental toughness processes of chess players by creating natural differences in factors such as glycogen, storage, and metabolism.

Considering the results of this study, healthy nutrition has been found to have a positive effect on mental toughness. It has been proven by the research conclusions in the literature that healthy mental toughness has significant effects on various skills of athletes. In this respect, in a study on competitive tennis players, mental toughness and flexibility have been found to have a positive relationship (37). Similar findings have also been achieved in another study examining the mediation role of mental toughness in sports under terms of emotional intelligence, motivation, and self-efficacy (38). In another investigation on the relationship between mental toughness and mental skills in Taekwondo

athletes, mental toughness has been found to have positive effects on mental skills (39). Triathlon athletes have been determined to take more careful decisions as their mental toughness increases (40). In another research on martial arts athletes, a positive and significant relationship has been concluded among mental toughness with self-talk, relaxation, goal setting, and emotional control (41). It has been also found that high mental toughness levels have a significant effect on reducing stress, anxiety, and depression so that athletes can perform better (42). When considering the results of this study, we suggest that healthy nutrition affects mental toughness, thus healthy nutrition may also have an effect on other mental factors. These results may also be of importance in contributing to the literature.

Conclusion

To conclude, it may be reported that there is a positive significant relationship between the athletes' knowledge about nutrition and their positive nutrition with their mental toughness. It can also be suggested that as athletes' knowledge about nutrition and their attitudes towards positive nutrition increase, their mental toughness will also increase. Healthy nutrition may also refer to a healthy and strong mind. For further studies, it is suggested to examine the attitudes towards healthy nutrition and mental toughness of individuals who do and do not do sports.

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