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ORIGINAL ARTICLE

Analysis of daily habits and nutritional attitudes of taekwondo athletes during COVID-19 pandemic

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Abstract. *Study Objectives:* This study aimed to investigate whether the daily habits and nutritional attitudes of taekwondo athletes working in various regions of Turkey have changed during the COVID-19 pandemic. Upon approval of the ethics committee, it was attempted to reach the entire population of athletes who actively joined tournaments as national and amateur athletes. *Methods:* Prepared scale forms were opened to remote access via Google Forms and the research was announced through the agency of the federation. In the study conducted based on a voluntary basis, a 2-month time was given for filling out the scale form to collect data. At the end of the 2-month period, the research was completed with a total of 189 taekwondo athletes. Information Questionnaire identifying daily habits and socio-demographic characteristics of the participants during the pandemic, and Attitude Scale for Healthy Nutrition developed by Tekkursun Demir and Cicioglu (2019) were applied. As the data obtained were normally distributed, t test and variance analysis of parametric tests that are used for independent groups were employed. The significance level was taken as 0.05. *Results:* As a result; it was found that variables like gender, age, income level, father's education, years of engagement in sports, being a professional or amateur athlete caused significance difference in the attitude towards information; variables like being a national athlete, contracting COVID-19, appetite, age, education, mother's education, being a professional or amateur athlete, relatives contracting COVID-19, following news and social media caused significance difference in attitude towards positive nutritional habit; and variables like relatives contracting COVID-19, growing plants, hobby, age and mother's educational background caused significance difference in the attitude towards emotion for nutrition.

Key words: COVID-19, Pandemic, Taekwondo Athlete, Daily Habit, Nutritional Attitude

Introduction

Nutrition has played an important role in our lives at all times. The importance of gaining and paying attention to healthy eating habits is emphasized because of the vital role of nutrition (1). It is also reported that eating habits and lifestyle changes may threaten the health and that maintaining a healthy eating habit is very important especially for the immune system to resist certain diseases (2).

More than 48.450.000 people all over the world have contracted the Coronavirus pandemic (COVID-19) that threatens almost everyone today. It has caused a death toll above 1.220.000 and is defined as a global health crisis involving 190 countries (3). The world has been dismayed by the increasing number of deaths, the rapid spread of the outbreak, and people's state of being at risk which caused many adverse effects in terms of health services, economic recession, psychological problems, and many others in connection therewith (4).

It was finally declared a pandemic as a consequence of its extensive and rapid spread and loss of lives it caused. Declaring a pandemic resulted in measures taken by all states of the world including online school education and working from home, the shutdown of restaurants

and banning daily activities such as social meetings and doing sports and staying at home and social distancing (5). It was also reported that this kind of sudden lifestyle changes led to psychosocial stressors which have adverse effects on health including various emotional and mental symptoms like depression and anxiety (6). It was stated that it also deepened the feeling of loneliness and the decline in social interaction particularly due to compulsory isolation and social distancing (7). It was also argued that hoarding food on the first days of the outbreak, and persistent different posts and readers' followings on social media caused information pollution in minds and emotional changes (8).

Coronavirus disease which resulted in declaring a pandemic is among the diseases for which the immune system is reported to be important for both protection and treatment, as is the case for many other viruses like SARS-CoV-2 (9). It is a matter of common knowledge that physical and mental health needs to be well for strengthening the immune system (10, 11, 12) and that nutrition plays an important role in the well-being of physical and mental health that boosts immunity. Besides the effect of nutrition in strengthening the immune system, doing sports is an activity that both improves mental health and problem solving skills by allowing for the secretion of happy hormone (8). Sports do not only promote a positive effect. It is also considered important as it strengthens interpersonal relations and improves physical condition.

Social isolation, one of the measures taken against the COVID-19 global outbreak, has changed the lifestyles and habits of people to a considerable extent. One of the most important changes in this regard is distance learning and distance working. In fact, measures taken against the pandemic have led to an "online" daily life in many respects (8). The said measures allowed people in various occupational groups to carry on their jobs from distance and online while they caused individuals engaged in sports to maintain an inactive life upon shutdown of gymnasiums. In particular, the living habits of individuals who do sport as an occupation have necessarily changed. In the review of literature for studies on the subject, no studies were discovered which especially evaluated daily habits and healthy eating habits of athletes doing taekwondo, a combat sport, during the pandemic. Considering the knowledge from the literature regarding the fact that changing daily life and eating habits have been broken due to the pandemic (13, 14, 15) daily lives and eating habits of taekwondo athletes were wondered because it forms a basis for both overcoming the pandemic period healthily and the emotional state. In this context, it was aimed to analyze daily habits and healthy eating habits of athletes working in the branch of taekwondo which is among the combat sports.

Materials and Methods

Population and Sample

The study was planned following the principles of Helsinki and was approved by Kocaeli University Social Research Ethics Committee (2020/13). Upon approval of the ethics committee; it was attempted to reach the whole population of athletes who actively joined tournaments as national and amateur athletes. Prepared scale forms were opened to access via Google Forms for filling-out remotely and the research was announced through the agency of the federation. At the end of the 2-month period for filling-out scale forms to collect data, the research conducted voluntarily was completed with 189 taekwondo athletes in total. Participating athletes were applied socio-demographic information form and Attitude Scale for Healthy Nutrition developed by Tekkursun Demir and Cicioglu (2019).

Data Collection Tools

Socio-demographic form: A questionnaire comprising 26 questions aimed at identifying daily habits and socio-demographic characteristics during the pandemic was employed.

Attitude Scale for Healthy Nutrition: It is a 5-point Likert type scale consisting of 21 items developed by Tekkursun Demir and Cicioglu (2019). It has 4 subdimensions namely information on nutrition, emotion for nutrition, positive nutrition perception, and malnutrition perception (16). A score of 21 to be attained from the scale indicates a very low attitude for healthy nutrition while a score between 23-42 indicates low, 43-63 moderate, 64-84 high, and 85-110 ideally high

attitude for healthy nutrition, respectively. The reliability of sub-dimensions of the scale was found between 0.75-0.90. For this study, the reliability coefficient of the sub-dimensions of the scale was 0.79.

Statistical Analysis

As the data were normally distributed according to Kolmogorov-Smirnov test scores when analyzed with SPSS 25.0 program, for the independent groups; The independent Sample T-Test was used for comparing two groups, and One Way ANOVA test was used for comparing three or more groups. Tukey's test of advance level post-hoc analyses was used to determine the source of difference between the groups for which significant difference was found.

Results

Table 1 presents percentage distributions for the participating taekwondo athletes for variables like age, gender, educational background, income level, being a national athlete or not, the purpose of performing respective branch of sports, having relatives who have contracted COVID-19, person(s) lived together during COVID-19 and state of doing exercise during the pandemic.

Table 2 indicates a significant difference in the sub-dimension information on nutrition by gender while it was not found significant in the sub-dimensions of emotion for nutrition, positive nutritional habits, and malnutrition. As for being a national athlete, no significant difference was discovered in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition whereas significant difference was found

Table 1. Percentage distributions for taekwondo athletes by socio-demographic variables

Variables	n	%	Variables	n	%
Gender			**Person(s) lived together with during pandemic?**		
Female	123	65,1	Family	182	96,3
Male	66	34,9	Friend	1	0,5
			Alone	6	3,2
National athlete			**Any relatives having contracted COVID-19**		
Yes	56	29,6	Yes	138	73,0
No	133	70,4	No	51	27,0
Doing sport during the pandemic?			**Keeping pet**		
Yes	169	89,4	Yes	74	39,2
No	20	10,6	No	115	60,8
Age groups			**Family income?**		
Under 14 years	46	24,3	Below TRY 2500	24	12,7
15-20 Years	78	41,3	TRY 2501-3000	37	19,6
21-26 Years	30	15,9	TRY 3001-3500	14	7,4
Over 27	35	18,5	TRY 3501-4000	24	12,7
			Above TRY 4001	90	47,6
Educational background?			**Purpose of doing taekwondo**		
Primary school graduate	29	15,3	Professional	79	41,8
Secondary school graduate	45	23,8	Amateur but to be professional	82	43,4
High school graduate	39	20,6	Amateur, for recreational purposes	28	14,8
Bachelor's degree	67	35,4			
Postgraduate degree	9	4,8			

Table 2. T-Test Analyses for Nutrition Sub-dimensions by Socio-demographic Characteristics

Parameters (n=189)		No. (%)	Information on Nutrition X±SD	Emotion for Nutrition X±SD	Positive Nutritional Habit X±SD	Malnutrition X±SD
Gender	**Female**	123(65.1)	8,31±2.71	17.92±3.94	10.44±3,41	10.54±3.56
	Male	66(34.9)	7.15±2.36	18.04±4.05	9.68±3.68	9.93±3.54
	p		**0.032***	0.478	0.780	0.558
National Athlete	**Yes**	56(29.6)	7.28±2.33	17.94±4.46	9.44±2.65	9.85±3.40
	No	133(70.4)	8.17±2.73	17.97±3.76	10.48±3.79	10.53±3.61
	p		0.224	0.175	**0.006***	0.523
Having contracted COVID-19	**Yes**	17(9.0)	7.17±2.50	17.58±4.37	9.47±1.73	9.76±4.58
	No	172(91.0)	7.98±2.65	18.00±3.94	10.25±3.64	10.38±3.45
	p		0.902	0.596	**0.003***	0.070
Relatives having contracted COVID-19	**Yes**	138(73.0)	8.01±2.64	18.25±3.72	10.27±3.44	10.53±3.53
	No	51(27.0)	7.62±2.66	17.19±4.51	9.92±3.74	9.78±3.59
	p		0.364	**0.040***	0.730	0.631
Growing plants at home	**Yes**	134(70.9)	8.05±2.65	18.41±3.71	10.25±3.26	10.35±3.40
	No	55(29.1)	7.56±2.63	16.87±4.38	10.00±4.11	10.29±3.93
	p		0.442	**0.046***	0.131	0.073
Appetite during pandemic	**Yes**	77(40.7)	8.19±2.66	18.90±3.91	9.50±2.86	11.19±3.57
	No	112(59.3)	7.71±2.62	17.32±3.89	10.64±3.85	9.74±3.43
	p		0.507	0.544	**0.044***	0.803
Hobbies other than sports	**Yes**	157(83.1)	7.74±2.55	18.01±4.17	10.12±3.58	10.29±3.70
	No	32(16.9)	8.71±2.98	17.71±2.83	10.46±3.22	10.53±2.78
	p		0.310	**0.018***	0.195	0.058

*$p<0.05$

in the sub-dimension positive nutritional habit. For the state of having contracted COVID-19, no significant difference was shown in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition while significant difference was found in the sub-dimension positive nutritional habit. According to the state of relatives' contracting COVID-19, the table showed no significant difference in the sub-dimensions of information on nutrition, positive nutritional habit, and malnutrition while it indicated significant difference in the sub-dimension emotion for nutrition. As for the state of growing plants at home, no significant difference was observed in the sub-dimensions of information on nutrition, positive nutritional habit, and malnutrition while significant difference was found in the sub-dimension emotion for nutrition. For the appetite during the pandemic, no significant difference was shown in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition while significant difference was found in the sub-dimension positive nutritional habit. Regarding having a hobby other than sports, no significant difference was seen in the sub-dimensions of information on nutrition, positive nutritional habit, and malnutrition while significant difference was found in the sub-dimension emotion for nutrition.

Table 3 indicated a significant difference in the sub-dimensions of information on nutrition, emotion for nutrition, and positive nutritional habit with respect to age but no significant difference in the sub-dimension malnutrition. As for income level, significant difference was found in the sub-dimension information on nutrition while on the other hand no significant difference was discovered in the sub-dimensions of emotion for nutrition, positive nutritional habit, and malnutrition. For educational background, while no significant difference was found in the sub-dimensions

Table 3. Results of Analysis of Variance for Sub-dimensions of Nutrition Scale by Socio-demographic Characteristics

Parameters (n=189)		No. (%)	Information on Nutrition X±SD	Emotion for Nutrition X±SD	Positive Nutritional Habit X±SD	Malnutrition X±SD
Age	14 years and under[a]	46(24.3)	8.43±2.57	18.89±3.39	9.06±3.02	9.60±3.18
	15-20 years[b]	78(41.3)	8.43±2.43	18.25±3.66	10.37±3.49	10.73±3.32
	21-26 years[c]	30(15.9)	6.90±2.52	17.60±4.50	11.60±4.60	11.10±4.02
	27 years and over[d]	35(18.5)	6.91±2.86	17.96±4.49	10.00±2.67	9.74±3.55
	p Source of difference		**0.002*** a>d/b>c<d/ c<b/d<ad<b	**0.037*** a>d	**0.019*** a<c	0.115
Income level	TRY 2500 and below[a]	24(12.7)	9.25±3.09	17.50±4.11	11.04±3.62	10.29±3.32
	TRY 2501-3000[b]	37(19.6)	7.91±2.01	17.56±3.89	10.91±3.97	10.75±3.25
	TRY 3001-3500[c]	14(7.4)	8.92±2.70	18.21±1.84	9.78±2.57	9.50±2.76
	TRY 3501-4000[d]	24(12.7)	8.91±2.66	19.08±3.96	10.33±3.80	11.62±3.78
	TRY 4000 and above[e]	90(47.6)	7.12±2.49	17.92±4.21	9.66±3.31	9.95±3.74
	p Source of difference		**0.000**** a-e/d-e/e-a	0.619	0.269	0.243
Educational background	Primary school[a]	29(15.3)	7.82±2.57	18.65±3.18	8.6±2.42	8.89±2.84
	Secondary school[b]	45(23.8)	8.08±2.42	18.48±3.64	9.1±3.26	10.13±3.27
	High school[c]	39(20.6)	8.79±2.56	18.05±3.58	12.51±4.37	11.46±3.28
	University[d]	67(35.4)	7.44±2.75	17.46±4.55	10.29±2.89	10.52±3.99
	Higher Education[e]	9(4.8)	6.88±2.84	16.55±4.66	9.33±3.24	9.66±3.50
	p Source of difference		0.091	0.425	**0.000**** a<c/b<c b<d/d<c	**0.052*** a<c
Mother's educational background	Never went to school [a]	17(9.0)	9.00±3.75	15.41±4.15	11.70±4.17	9.35±2.93
	Primary school graduate[b]	56(29.6)	7.91±2.69	17.35±3.31	10.55±3.13	10.30±3.57
	Secondary school graduate[c]	36(19.0)	7.80±2.67	19.38±4.47	9.75±4.25	10.91±3.58
	High school graduate[d]	48(25.4)	7.95±2.31	18.12±3.55	10.58±3.26	10.93±3.30
	University graduate[e]	32(16.9)	7.37±2.26	18.56±4.30	8.59±2.78	9.34±4.00
	p Source of difference		0.374	**0.007*** a<d/a<c	**0.020*** a>e	0.190
Father's educational background	Never went to school [a]	5(26)	10.80±3.76	17.20±3.34	11.80±4.38	10.40±1.51
	Primary school graduate[b]	62(32.8)	7.29±2.59	17.74±3.83	10.41±3.83	10.20±3.62
	Secondary school graduate[c]	29(15.3)	8.48±2.57	17.65±4.46	11.41±3.82	11.44±3.53
	High school graduate[d]	55(29.1)	8.09±2.50	18.34±3.78	9.36±3.09	9.98±3.40
	University graduate[e]	38(20.1)	7.84±2.59	18.13±4.26	9.81±2.97	10.18±3.84
	p Source of difference		**0.025*** a>b	0.892	0.081	0.477

*p<0.05

of information on nutrition, emotion for nutrition, and malnutrition, significant difference was found in the sub-dimension positive nutritional habit. Regarding the mother's educational background, no significant difference was seen in the sub-dimensions of information on nutrition, and malnutrition whereas significant difference was found in the sub-dimensions of emotion for nutrition and positive nutritional habit. As for the father's educational background, significant difference was found in the sub-dimension information on nutrition while on the other hand no significant difference was discovered in the sub-dimensions of emotion for nutrition, positive nutritional habit, and malnutrition.

According to Table 4; as for the number of years engaged in sports, significant difference was discovered in the sub-dimension information on nutrition while no

Table 4. Results of Variance Analysis for Sub-dimensions of the Nutrition Scale by the State of Health and Doing Sports During the Pandemic

Parameters (n=189)		No. (%)	Information on Nutrition X±SD	Emotion for Nutrition X±SD	Positive Nutritional Habit X±SD	Malnutrition X±SD
Number of years engaged in doing sports	1 year and less [a]	21(11.1)	9.38±3.29	18.42±3.58	11.09±2.89	10.66±3.13
	1.5-5 years[b]	69(36.5)	8.43±2.54	18.28±3.51	9.98±3.56	10.37±3.34
	6-9 years[c]	37(19.6)	8.00±2.32	18.59±4.16	10.24±4.39	10.40±3.59
	10 years and over[d]	62(32.8)	6.77±2.29	17.08±4.37	10.04±3.09	10.12±3.95
	p Source of difference		**0.000**** a>e/b>e/a>b	0.191	0.635	0.938
Being a Professional or Amateur Athlete	Professional[a]	79(41.8)	7.05±2.22	18.56±4.31	9.39±2.86	10.12±3.70
	Amateur, to be prof.[b]	82(43.4)	8.58±2.70	17.80±3.56	10.71±4.10	10.53±3.42
	Amateur, for recreational purposes[c]	28(14.8)	8.35±2.95	16.75±3.89	10.82±3.00	10.32±3.61
	p Source of difference		**0.001*** b>a	0.101	**0.033*** b>a	0.767
How was the healing process of your relative who contracted COVID-19?	Not seriously affected and quickly recovered thanks to social isolation[a]	119(63.0)	8.00±2.76	18.37±3.79	10.41±3.66	10.71±3.69
	Treated at a hospital[b]	10(5.3)	7.70±2.59	18.60±3.80	11.60±3.27	10.20±3.76
	Hospitalized in intensive care unit[c]	1(0.5)	13.00±2.94	16.00±-	17.00±-	14.00±-
	Passed away[d]	12(6.3)	6.83±2.16	17.66±3.91	9.91±3.82	10.58±2.77
	p		0.205	0.274	**0.048***	0.145
How do you follow news about COVID-19?	Social media[a]	36(19.0)	7.73±2.84	17.47±3.49	11.72±3.96	10.52±3.20
	Television[b]	49(25.9)	7.95±2.80	17.53±4.59	9.95±3.39	10.18±3.59
	Official accounts[c]	75(39.7)	7.78±2.35	18.44±3.23	9.36±3.03	10.62±3.76
	I do not follow[d]	29(15.3)	8.24±2.93	18.10±5.03	10.75±3.78	9.58±3.42
	p Source of difference		0.883	0.525	**0.007*** a<c	0.579
Time of internet use	1 hour and less[a]	46(24.3)	7.63±2.69	17.17±3.92	9.23±2.89	9.41±3.58
	2-4 hours[b]	86(45.5)	7.94±2.74	18.18±3.88	9.86±3.00	10.26±3.38
	5 hours and over[c]	56(29.6)	8.12±2.47	18.32±4.14	11.51±4.30	11.26±3.62
	p		0.705	0.428	**0.003***	**0.036***

*p<0.05

significant difference was found in the sub-dimensions of motion for nutrition, positive nutritional habits, and malnutrition. In respect of being a professional or amateur athlete, while no significant difference was found in the sub-dimensions of emotion for nutrition and malnutrition, significant difference was found in the sub-dimensions of information on nutrition and positive nutritional habit. As for the state of recovery of the relative having contracted COVID-19, no significant difference was shown in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition while significant difference was found in the sub-dimension positive nutritional habit. Regarding the platforms used for the following news on COVID-19, no significant difference was found in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition while significant difference was found in the sub-dimension positive nutritional habit. As for the time spent using social media, no significant difference was observed in the sub-dimensions of information on nutrition and emotion for nutrition, and significant difference was found in the sub-dimensions of positive nutritional habit and malnutrition.

Discussion and Conclusion

This study aimed to investigate changing daily habits of taekwondo athletes whose opportunities for doing sports have been limited due to social isolation and restrictions during the pandemic and their healthy nutritional habits which are reported to have an important impact on health (17). To this end, scale forms were announced across Turkey via Google forms, and relevant data were collected.

In examining the Tables, no significant difference was found with respect to gender in the sub-dimensions of emotion for nutrition, positive nutritional perception, and malnutrition perception of the healthy nutrition scale. However, the females scored higher than males in the sub-dimension information on nutrition. The most important factor for the women's high score is supposed to be the fact that women, as a result of gender perception, may have more information about cooking and the nutrients they use for cooking. There are studies in the literature which found significant difference in the same sub-dimension for the gender variable (18) as well as others which did not identify significant difference (19). The studies reported that the reason for the high scores in favor of women in the sub-dimensions of the nutrition scale lies in the effect of gender-based impositions of the society which impose that women should be more fit. The significant difference was attributed to the fact that women paid more attention when consuming foods compared to men due to these impositions and tended to have more information about nutrients (20). These interpretations in the literature and the statements on the perception of the female body made via the media and by society; they are supposed to have caused women to have more information about nutrition compared to men.

Examining sub-dimensions of the nutrition scale based on the state of being a national athlete or not revealed significant difference in the sub-dimension positive nutrition in favor of non-national athletes. National athletes were found to have significantly lower positive nutrition scores compared to normal athletes. National athletes are known for caring nutrition, especially in branches for which weight matters, and this is also established by research (21, 22). According to the research findings that conflict with this literature information, national athletes who are working in a branch of weight category are not expected to get low positive nutrition scores. However, this has caused to think that the pandemic, concern, and emotional state brought about by the pandemic might have changed the attitude towards nutrition. Nonetheless, in order to come up with precise conclusions, it is considered pertinent to conduct studies that evaluate nutritional and emotional state during the pandemic. Considering the information in the literature about the presence of pressure for performance and weight category for some athletes (23) the fact that national athletes feel under pressure for weight category and performance and consistently have to eat healthily, and cancellation of tournaments due to the pandemic might have caused the athletes to tend towards more relaxed eating.

When looked at the sub-dimensions of the healthy nutrition scale with respect to the state of having contracted COVID-19 disease; no significant was found in the sub-dimensions of emotion for nutrition, information on nutrition, malnutrition. However, in

the sub-dimension positive nutrition, perceptions of positive nutrition of those who contracted COVID-19 were found to be significantly high. High positive nutrition scores of those contracting COVID-19 may be explained by the effect of statements made on the media and official health-related websites on the importance of nutrition and sleeping for protecting from the disease (24).

Furthermore, another justification for higher mean values for those who did not contract COVID-19 is supposed to be the statements reporting that healthy nutrition reduces the risk of contracting COVID-19 (25) and the fact that athletes tended to develop positive attitudes towards healthy nutrition after contracting and experiencing the disease. In addition, those with relatives who contracted COVID-19 are supposed to get significantly high scores in the sub-dimension emotion for nutrition as they closely witnessed the disease.

No significant difference was found in the sub-dimensions of information on nutrition, positive nutrition, and malnutrition in examining athletes' attitudes for healthy nutrition about the state of growing plants at home. However, significant difference was found in the sub-dimension of emotion for nutrition. The comparison was not possible as no such studies were discovered in the literature.

In reviewing the answers to the question of whether there was an increased appetite during the pandemic; no significant difference was found in the sub-dimensions of information on nutrition, emotion for nutrition, malnutrition. However, significant difference was discovered in the sub-dimension positive nutritional habit for those who reported no increased appetite but pointed out normal appetite. The reason for high scores of those who stated that they did not suffer increased appetite can be attributed to the fact that the information in the literature that it is not possible to protect oneself from COVID-19 due to weakening of immune system in case of under-nutrition (26) caused athletes to develop a positive attitude towards nutrition as a result of making this information known publicly.

When the attitude scale for healthy nutrition was looked into with regard to having a hobby other than sports, no significant difference was found in the sub-dimensions of information on nutrition, positive nutrition, and malnutrition. However, those having a hobby other than doing sports were found to get significantly high scores in the sub-dimension emotion for nutrition. A comparison could not be made because no studies were found in the literature which compared having a hobby and a healthy nutrition scale.

Examination of attitudes towards healthy nutrition based on age variable showed no significant difference in malnutrition sub-dimension. As the age was lowered the scores in the sub-dimensions of information on nutrition, emotion for nutrition increased while the scores in the sub-dimension positive nutritional habit increased as the age grew. These results indicated that youngsters of young age groups could not develop a positive attitude despite the high level of information on and awareness of nutrition. Literature review showed availability of studies which found significant difference in the sub-dimensions of emotion for nutrition and positive nutritional habit (19) and the sub-dimension information on nutrition (27). Both studies indicated increased scores in the sub-dimensions of the nutrition scale as the age grew. This is supposed to be resulting from the fact that individuals may develop positive attitudes for nutrition depending on the increased awareness of food as they get older (28).

When the data obtained from the attitude scale for healthy nutrition were examined based on income level; no significant difference was found in the sub-dimensions of emotion for nutrition, positive nutrition, and malnutrition. Nonetheless, it was discovered that the scores for the sub-dimension information on nutrition significantly increased as the income level decreased. A review of the literature revealed the existence of studies which found no significant difference in the same sub-dimension (19), while there were others which found significant difference on the contrary (27). The reason for attaining the highest scores in the group of lowest income level can be explained by positive information on nutrition brought along by being an athlete even if the purchasing power was low (29) and by the fact that a protective approach was adopted since treatment process would be costly in case of a low income level.

In examining taekwondo athletes' attitudes for healthy nutrition; it was observed that the highest scores in the sub-dimensions of positive nutritional

habit and malnutrition with respect to educational background were obtained by high school graduates. It is assumed that having a habit of consuming more fast food at the high school level increased malnutrition scores, on the other hand, doing sports and in particular, attaching importance to body perception in the adolescence period caused increased positive nutrition scores. A review of the literature revealed the existence of studies which found significant difference in the same sub-dimension (27) in contrary to some others which found no significant difference (18).

As for the mother's educational background; no significant difference was found in the sub-dimensions information on nutrition, and malnutrition. However, it was found that those whose mothers never went to school got significantly high scores for the emotion for nutrition while those having mothers who are secondary school graduates had significantly high scores in positive nutritional habit. regarding the father's educational background; while no significant difference was found in the sub-dimensions of emotion for nutrition, positive nutrition, and malnutrition, those whose fathers never went to school had significantly high scores in the sub-dimension of information on nutrition.

When examined with respect to the number of years engaged in sports; while no significant difference was found in the sub-dimensions of emotion for nutrition, positive nutrition, and malnutrition, the scores for the sub-dimension information on nutrition significantly increased as the number of years of doing sports decreased. It was noted that as the number of years engaged in sports increased, a significant decrease occurred in the sub-dimension information on nutrition. This finding is consistent with the results of the variable for which national athletes and amateur athletes were compared. Lower scores of national athletes for the attitude towards nutrition compared to those who are not national, and the fact that taekwondo is a branch of sports that is based on weight category (30), in terms of weight control, information about nutrition was more needed in the process of starting sports, the use of nutrients was seen as important (31), and that as the number of years in sports increased and once reached a national level athlete, people tend to behave more loosely.

In terms of the variable of being a professional or amateur athlete; no significant difference was found in the sub-dimensions of emotion for nutrition and malnutrition. On the other hand, the scores of professional athletes in the sub-dimensions of information on nutrition and positive nutritional habit were significantly low. This result supports the findings which concluded that the less the number of years in doing sports and the longer worked as an amateur athlete, the lower were the scores. It has also strengthened our interpretation that as professionalism and the number of years engaged in sports increases, the attitudes towards nutrition loosen.

When analyzed according to the variable where the recovery process of any relatives contracting COVID-19 is questioned; no significant difference was found in the sub-dimensions of information on nutrition, emotion for nutrition, and malnutrition. However, in the sub-dimension of positive nutritional habit, significantly high scores were noted for those having relative(s) who contracted COVID-19 and stayed in the intensive care unit. In particular, the fact that the highest mean values belonged to those whose relatives recovered after a period in the intensive care unit is supposed to be a result of the fact that individuals tended towards positive nutrition because of the increased fear of contracting COVID-19 (32).

In examining the answers to the question about how they kept abreast of the COVID-19; no significant difference was found with respect to the information on nutrition, emotion for nutrition, and malnutrition. However, the scores for positive nutrition perception of those who followed the developments via social media were found to be significantly higher. It was also considered that reading many different social media posts on COVID-19 during the pandemic as well as watching programs about the outbreak on the internet and television for hours affected emotion for nutrition and nutritional habits negatively (8). This is supposed to be resulting of people's increasing tendency towards the online environment (33).

As for the daily time allocated to internet use, while no significant difference was found in the sub-dimensions of information on nutrition, emotion for nutrition, it was noted that as more time was allocated to the use of the internet, the scores for positive nutrition

and malnutrition increased accordingly. The literature review confirmed the presence of studies which found significant difference in the same sub-dimensions (18). The fact that the group with the longest period allocated to the use of the internet is also the group with the highest mean values in both sub-dimensions can be explained by the increase in the time spent on the internet along with the emergence of the pandemic (34).

In conclusion, it was found that taekwondo athletes who were professional, national, and engaged in sports for relatively more years had looser attitudes towards nutrition. It was also found that the scores for nutrition increased as the level of education and income decreased.

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References

1. Whitney E, Rolfes SR. Understanding nutrition. Cengage Learning. Belmont, CA, West/Wadsworth 2018; p.3.
2. Di Renzo L, Gualtieri P, Pivari F, Soldati L, Attinà A, Cinelli G, Leggeri C, Caparello G, Barrea L, Scerbo F, Esposito E, De Lorenzo A. Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. Journal of translational medicine 2020; 18(1): 229. https://doi.org/10.1186/s12967-020-02399-5
3. Johns Hopkins Coronavirus Resource Center. Available online at: 2020; https://coronavirus.jhu.edu/map.html
4. Correia MI. Nutrition in times of COVID-19, how to trust the deluge of scientific information. Current opinion in clinical nutrition and metabolic care 2020; 23(4): 288–293. https://doi.org/10.1097/MCO.0000000000000666
5. Chee MJ, Koziel Ly NK, Anisman H, Matheson K. Piece of Cake: Coping with COVID-19. Nutrients 2020; 12(12): 3803.
6. Flanagan EW, Beyl RA, Fearnbach SN, Altazan AD, Martin CK, Redman LM. The impact of COVID-19 stay-at-home orders on health behaviors in adults. Obesity 2020; (Silver Spring) [CrossRef] doi:10.1002/oby.23066.
7. Holt-Lunstad J. The potential public health relevance of social isolation and loneliness: Prevalence, epidemiology, and risk factors. Public Policy & Aging Report 2017; 27(4), 127-130. doi:10.1093/ppar/prx030
8. Aşkın R, Bozkurt Y, Zeybek Z. COVID-19 Pandemic: Psychological Effects and Therapeutic Interventions. Istanbul Commercial University Journal 2020; COVID-19 Special Issue, 19(37), 304-318.
9. Zabetakis I, Lordan R, Norton C, Tsoupras A. COVID-19: the inflammation link and the role of nutrition in potential mitigation. Nutrients 2020; 12(5): 1466.
10. Baltaş A, Baltaş Z. Stress and coping styles. 24th Edition, Istanbul: Remzi Bookstore 2008.
11. Penedo FJ, Dahn JR. Exercise and well-being: a review of mental and physical health benefits associated with physical activity. Current Opinion in Psychiatry 2005; 18: 189–193.
12. Basso JC, Suzuki WA. The effects of acute exercise on mood, cognition, neurophysiology, and neurochemical pathways: A review. Brain Plasticity 2017; 2(2): 127-152. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5928534/
13. Almandoz JP, Xie L, Schellinger JN, Mathew MS, Gazda C, Ofori A, ... Messiah SE. Impact of COVID-19 Stay-at-Home Orders on Weight-Related Behaviors Among Patients with Obesity. Clinical Obesity 2020; 10(5): e12386.
14. Termorshuizen JD, Watson HJ, Thornton LM, Borg S, Flatt RE, MacDermod CM, ... Bulik CM. Early Impact of COVID-19 on Individuals with Eating Disorders: A survey of~ 1000 Individuals in the United States and the Netherlands. The International journal of eating disorders, 2020; 53(11), 1780–1790.
15. Panno A, Carbone GA, Massullo C, Farina B, Imperatori C. COVID-19 Related Distress Is Associated with Alcohol Problems, Social Media and Food Addiction Symptoms: Insights from the Italian Experience During the Lockdown. Frontiers in psychiatry 2020; 11: 1314. 577135.
16. Tekkurşun Demir G, Cicioğlu Hİ. Attitude Scale for Healthy Nutrition (ASHN): Validity and Reliability Study. Gaziantep University Journal Of Sports Sciences 2019; 4(2): 256-274.
17. Bozhüyük A, Özcan S, Kurdak H, Akpınar E, Saatçı E, Bozdemir N. Healthy Life Style and Family Medicine. Turkish Journal of Family Medicine and Primary Care (TJFMPC) 6(1): 13-21.
18. Özenoğlu A, Gün B, Karadeniz B, Koç F, Bilgin V, Bembeyaz Z, Saha BS. The Attitudes of Nutrition Literacy in Adults Towards Healthy Nutrition And Its Relation With Body Mass Index. Life Sciences 2021; 16(1): 1-18.
19. Ceylan V, Muştu Ç, Sarışık M. Healthy Nutritional Attitudes and Behaviors During COVID-19 Outbreak Lockdown. Journal of Tourism and Gastronomy Studies 2020; 8(4): 2491-2506.
20. Suiçmez M. Otherization of the Female Body in the Media: The Victoria's Secret Example. Middle Black Sea Journal of Communication Studies 2018; 3(2): 67-84.
21. Koç M, Examination on Nutritional Habits and Nutrition Supplements' Usage of Wrestlers Who Joined to National Team Camps. Unpublished Masters Thesis. Kahramanmaraş Sütçü İmam University, Institute Of Health Sciences. 2014.
22. Laviano A, Koverech A, Zanetti M. Nutrition support in the time of SARS-CoV-2 (COVID-19). Nutrition 2020; 74:1-2. https://doi.org/10.1016/j.nut.2020.110834.

23. Çetin E, Hacısoftaoğlu İ. Physical and Emotional Misuse in Sports: Example of Induvidual Sports. I. International Understanding Violence Congress. Book of papers. 2019; p. 96-101.
24. Calder PC. Nutrition, immunity and COVID-19. BMJ Nutr Prev Health. 2020; 20;3(1):74-92. doi: 10.1136/bmjnph-2020-000085. PMID: 33230497; PMCID: PMC7295866.
25. Aman F, Masood S. How Nutrition can help to fight against COVID-19 Pandemic. Pak J Med Sci 2020; 36(COVID19-S4): S121-S123. doi: 10.12669/pjms.36.COVID19-S4.2776. PMID: 32582329; PMCID: PMC7306972.
26. Thibault R, Coëffier M, Joly F, Bohé J, Schneider SM, Déchelotte P. How the COVID-19 epidemic is challenging our practice in clinical nutrition-feedback from the field. Eur J Clin Nutr 2020; 16:1–10. doi: 10.1038/s41430-020-00757-6. Epub ahead of print. PMID: 32939042; PMCID: PMC7492685.
27. Pak P & Arıca S. The attitude of women in reproductive age to healthy nutrition and factors affecting their behavior. 2020; Istanbul Prof. Dr. Cemil Taşcıoğlu City Hospital, Family Medicine Clinic, Unpublished Medical Specialty Thesis. Istanbul.
28. Onurlubaş E, Gürler AZ. Measurement of Consumers Knowledge Level on Food Safety: A Case Study in Tokat. Ministry of Food Agriculture and livestock Institute for Agricultural Economics and Policy Development. 2015.
29. Heaney S, O'Connor H, Michael S, Gifford J, Naughton G. Nutrition knowledge in athletes: a systematic review. International journal of sport nutrition and exercise metabolism 2011; 21(3): 248-261.
30. Çatıkkaş F. Rapid Weight Loss Attitudes of the Young Taekwondo Athletes. Celal Bayar Unive Journal of physical education and sports science 2016; 11(2), 125-130.
31. Samar E, Beyleroğlu M. The effect of goji berry consumption on weight loss in boxers. Progress in Nutrition 2020; 22(1): 103-110.
32. Knowles KA, Olatunji BO. Anxiety and safety behavior usage during the COVID-19 pandemic: The prospective role of contamination fear. J Anxiety Disord 2021; 77:102323. doi: 10.1016/j.janxdis.2020.102323. PMID: 33137593; PMCID: PMC7572316.
33. Durkee T, Kaess M, Carli V, Parzer P, Wasserman C, Floderus B, ... Wasserman D. Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. Addiction 2012; 107(12): 2210-2222.
34. Sun Y, Li Y, Bao Y, Meng S, Sun Y, Schumann G, ... Shi J. Brief report: increased addictive internet and substance use behavior during the COVID-19 pandemic in China. The American Journal on Addictions 2020; 29(4): 268-270.

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