



Research report

Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine (Ankara, Turkey)

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Abstract

This study has been carried out to “identify highly sensitive behavior on healthy nutrition (orthorexia nervosa—ON)” in residence medical doctors (MD) in the Faculty of Medicine. Diagnoses of ON was based on the presence of a disorder with obsessive–compulsive personality. The study is a cross-sectional research, which reached out to the entire 318 MD. The ORTO-15 test was used to propose a diagnostic proceeding and to try verify the prevalence of ON. Those subjects who were classified below 40 from the ORTO-15 test are accepted to have ON.

Chi-square test, ANOVA (univariate) analysis and logistic regression were used for analyses of the data. Mean score of the participants from the ORTO-15 test is 39.8 ± 0.22 , and there is no statistical difference between women and men. A total of 45.5% of the residence MD involved in the research scored below 40 in the ORTO-15 test. Those who do their food shopping themselves, skip a meal with a salad/fruit, care about the quality of the things they eat, think that eating outside is healthy, look at the content of what they eat and the content of food is important in selection of a product score lower in their average marks in ORTO-15 and the difference among the groups is statistically significant. Food selection of 20.1% of the male participants and 38.9% of the female participants among the residence MD is influenced by the programs on nutrition/health in mass-media. The difference between the groups is statistically significant ($p < 0.05$). Female medical doctors are more careful than men of their physical appearance and weight control and consume less caloric food, which is statistically significant. Since those who exhibit “healthy fanatic” eating habits may have a risk of ON in the future, it would be useful to conduct studies that identify the prevalence of ON in the public.

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Introduction

Human beings need nourishment in order to grow, preserve their health and sustain their lives. We must consume sufficient amounts of all nutrient elements and types depending on our individual needs as determined by age, gender and the physiological condition of our bodies. If we do not consume an adequate and sufficiently well-balanced amount of all essential nutrients, we may come face-to-face with several different health problems.

In our day, healthy nutrition is one of the most important concepts emphasized when considering issues related to health improvement. In recent years, the number of individuals in the public that exhibit different forms of “highly sensitive eating behavior disorders”, or “orthorexia nervosa” is increasing. These people categorize foods according to whether they are healthy or not and display obsessive concern and excessively sensitive behavior about the consumption of healthy food. Recently, science communities, literature, expert in the field of nutrition and the mass-media have started to use a new concept called “*orthorexia nervosa*”. “Orthorexia” term is produced from “*orthos*” which means “accurate, right, correct, valid” in Latin and “*orexis*” meanings hunger. This term is used for “obsession of healthy and proper nutrition” (Bratman, 1997; Evilly, 2001).

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It has been argued that under the considerable influence of commercial food advertisements in our media today, society has produced “orthorexic” individuals with dissonant character traits who select their food intake based solely on whether or not they are considered to be properly wholesome foodstuffs. This obsessive state leads individuals to follow strict diets or to leave major food components out of their diets and therefore have insufficient and unbalanced staple diets. This behavior consequently gives rise to a shortage of essential nutrients, the modification of social and personal relationships and change in the individual’s general psycho-physical condition. A number of orthorexic individuals would rather starve than consume any foodstuff, which they deem to be impure or unnatural. This obsession about foods suffered by people who are orthorexic, in time, leads them to social isolation (Bratman, 1997). These people avoid consumption of specific foods or all of a specific group of foods since they consider them to be harmful for their health. The quality of the foods they consume is more important than personal values, interpersonal relations, career plans and social relationships (ANRED, 2006).

Unlike other eating disorders such as “*anorexia nervosa*” and “*bulimia nervosa*”, which are obsessions about the quantity of food intake, “*orthorexia nervosa*” stems from an obsession about quality of food intake (Bratman, 1997; Sinton, 2003).

“*Orthorexia nervosa*” has not been defined as a disease as of yet. However, the relationship between changes in the eating behaviors in *orthorexia nervosa* and obsessive-compulsive disorders is presently being studied (ANRED, 2006; Catalina et al., 2005; Donini, Marsili, Gaziani, Imbriale, & Cannella, 2004; Mathieu, 2005).

Since particularity about healthy nutrition is general considered as positive behavior by the general public, the prevalence of *orthorexia* is assumed to be low (Sinton, 2003). People who exhibit highly sensitive behavior about their consumption of healthy nutrition carry the risk of developing *orthorexia nervosa* in the future. Therefore, this study has been conducted both in order to identify the prevalence of *orthorexia nervosa* or highly sensitive attitudes in the eating behavior of the resident doctors working in the Faculty of Medicine of a university in Ankara, and to examine the effect of certain factors on eating habits.

Methods

The study was conducted in November–December 2005 in a Faculty of Medicine in Ankara. The research is cross-sectional and includes all of the 318 resident medical doctors of the Faculty of Medicine. A list of all the doctors at the hospital was obtained from the administrative department and all the doctors were visited more than once in their departments in order to achieve 100% inclusiveness. A questionnaire was designed to identify the socio-demographic properties of the medical doctors,

their daily nutritional intake, their physical activities, their criteria for selection of foodstuffs and how this food choice affects their life styles in order to determine the prevalence of highly sensitive behavior related to health and proper nutrition. The purpose of the study was explained to each of the subjects and their consent was obtained verbally before the questionnaire was filled out by each doctor while under supervision. The questionnaire consists of a total of 39 questions of which the first nine are related to the subjects’ demographic characteristics. The next 15 questions were designed to assess their nutritional habits and eating behavior, their self-perceptions of their bodies and the extent and forms of physical activity they undertake. The last 15 questions in the questionnaire were devised in order to determine the prevalence of highly sensitive behavior related to health and proper nutrition by directly translating the ORTO-15 test developed by Donini, Marsili, Gaziani, Imbriale, and Cannella (2005) and applied in Italy. Some of the questions in this test were taken from the original 10-question test developed by Bratman for American society (Bratman, 2006). The ORTO-15 test questions were designed within the framework of a four-step likert scale assessment. The results showing the existence of *orthorexia nervosa* are given 1 point on the scale and results showing normal eating sensitivity are given 4 points. In the ORTO-15 test, scoring for answers that show *orthorexia nervosa* is 1 point on the scale, while this is 4 points on the scale for those that have normal eating habits. While those subjects that score below 40 in the ORTO-15 test are defined as *orthorexic* (having highly sensitive behavior), eating behavior reaches more normal standards as the score increases (Donini et al., 2005).

The original ORTO-15 test questions were obtained from Donini in Italy via e-mail and the questions were first translated from both Italian and English into Turkish. These questions were subsequently translated from the Turkish back into English and at the final stage, the test questions were translated back into Turkish for accuracy check purposes. At both phases of this translation process, the original questions that had been translated from Italian and English into Turkish were answered under supervision by the same 15 subjects and their comprehensibility was checked before the final questionnaire was produced.

The pilot application of this survey was applied to a selected group of 15 medical doctors that work in another Faculty of Medicine in Ankara. In this way, any possible contamination of the study was prevented. It was then applied to medical doctors of the university hospital, which is the focus of this study.

In fact, the desire to consume healthy foods is not a disease in itself, and it is only defined as *orthorexia nervosa* when it causes a person to give up his or her normal lifestyle (Donini et al., 2004). As the present study only tests the intensity of the subjects’ desire to consume healthy foods, it was decided to use the term “highly sensitive

attitudes in the eating behavior” instead of orthorexia nervosa throughout this research.

The dependent variable in this study is the frequency of orthorexia nervosa and the independent variables are: gender, age, body mass index (BMI), marital status, the departments they work in and the length of time they have been working there, their residential location, the co-habitants of the subjects, the person(s) in the household that does the shopping, their criteria for selection of foodstuffs to be consumed, the location where they consume each meal, their interest in their weight control, whether or not they consume low calorie foods and vitamin and/or mineral food supplements and whether they take regular physical exercise.

The subjects' dates of birth were filled in on the questionnaire and their exact ages were calculated on the computer. Thus, the age distribution was determined to be within the normal distribution range, and the ages were then categorized into bands consisting of five consecutive ages.

The measurements of each subject's height and weight were recorded according to their own written statements, and their body mass indexes were calculated accordingly, using the classifications of the World Health Organization (WHO, 2006). According to this classification, those people with a BMI of <18.5 are classified as underweight, those with 18.5–24.99 are classified as being of normal weight, those with 25.0–29.99 are classified as overweight, those with ≥ 30 are classified as obese. Subsequently, in this analysis, the BMI value 18.5–24.99 is considered to be of normal weight, and the other group includes the underweight, overweight and obese categories.

Chi-square analysis was applied to the data obtained from the research, and the ANOVA (univariate) analysis was employed to examine the effect of each variable on the ORTO-15 score. When the ORTO-15 score was evaluated as the dependent variable, the effects of independent variables (gender, age, BMI, whether or not they shop for themselves, control their weight and look at the contents of the food product, the effect of contents in food selection and whether or not they spend time in stores/counters selling natural food products) on the ORTO-15 score were examined via logistic regression. The statistical section point was taken as 0.05.

The independent variables for the reference category were taken to be: those people who were male, between the ages of 20–24, had a BMI of 18.5–24.99, did not insist on shopping for food themselves, did not control their weight, did not look at the contents of the products and stated that the contents of the products did not effect their selection, and while shopping, did not spend more than 30 min in stores or departments selling natural food products. A logistic model was devised according to this reference category where those who scored less than 40 points on the ORTO-15 test were ascribed as “1” and those who scored more than 40 points on the test were ascribed as “0”. According to this logistic regression analysis and given

Table 1
Characteristics of the medical doctors (Ankara, 2005)

Characteristics	No.	%
Sex		
Men	169	53.1
Women	149	46.9
Age		
20–24	38	11.9
25–29	226	71.1
30–35	48	15.1
>35	6	1.9
Marital status		
Married	95	29.9
Single	223	70.1
With child/children		
Yes	30	9.4
No	288	90.6
Department		
Internal	195	61.3
Surgery	90	28.3
Basic sciences	33	10.4
BMI (body mass index)		
<18.5	15	4.7
18.5–24.99	209	65.7
25–30	82	25.8
>30	12	3.8
Total	318	100.0

reference categories, the scores on the ORTO-15 of the groups were analyzed to see if they were at risk of having orthorexia nervosa and their odds ratio values and the confidence interval was calculated. Confidence intervals that do not include the value “1” are disregarded as having no statistical value. According to the given reference categories, only confidence intervals with values that include the value “1” are deemed to be significant.

Results

53.1% of the residence medical doctors working in the university hospital are males and 70.1% are single. The average age is 27.2 ± 2.9 years. 61.3% of the research group works in internal medical science. When the BMI values are evaluated, 65.7% of the group is “normal” in body weight (Table 1). 79.2% of the resident medical doctors do their food shopping themselves. 33.7% of them state that they attach importance to health while buying food and only 15.7% stated that they check the expiry date of food products. 26.7% of the doctors do not have breakfast. 20.1% of male doctors and 38.9% of the female doctors stated that health programs affect their food selection. The difference between the groups is regarded to be statistically significant ($\chi^2 = 13.6$, $p < 0.05$).

33.3% of the resident medical doctors, 51.1% of the females and 28.9% of the males eat salad and/or fruit instead of a hot meal at lunch or dinner. It was seen that

Table 2
Distribution of ORTO-15 score in medical doctors according to some properties and eating habits (Ankara, 2005)

Characteristics	<i>n</i>	Minimum–maximum	OR ± SH	<i>t</i> / <i>F</i>	<i>p</i>
Sex					
Men	169	28–47	40.2 ± 0.31	2.7*	0.09
Women	149	26–48	39.8 ± 0.22		
Food shopping					
Done by themselves	252	26–48	39.6 ± 0.26	4.1*	0.04
Done by others	66	34–47	40.7 ± 0.42		
BMI					
< 18.5	15	32–44	38.9 ± 0.96	0.3**	0.80
18.5–24.99	209	26–48	39.8 ± 0.27		
25–30	82	28–47	39.9 ± 0.46		
> 30	12	34–47	40.3 ± 1.20		
Weight control					
Those who do	63	33–47	39.7 ± 0.46	3.3**	0.03
Those who currently do	87	26–48	39.0 ± 0.45		
Those who do not do	168	29–47	40.3 ± 0.31		
Substitution of meals with salad/fruit					
Yes	125	26–47	39.2–0.35	5.1*	0.02
No	193	29–48	40.2–0.28		
Eating out is					
Healthy	228	26–47	39.1 ± 0.25	41.4*	0.00
Unhealthy	83	32–48	42.1 ± 0.37		
Caring about the food quality					
Important	257	26–48	39.5 ± 0.24	9.2*	0.00
Not important	61	28–47	41.0 ± 0.54		
Looking at the content's of the product					
Yes	203	28–47	38.9 ± 0.27	28.2*	0.00
No	115	26–48	41.3 ± 0.35		
Effect of contents in food selection					
Yes	221	26–47	39.0 ± 0.26	36.4*	0.00
No	97	30–48	41.8 ± 0.37		
Spending time in stores/departments selling natural food products					
≥ 30 min	18	30–46	37.6 ± 1.09	10.8**	0.00
< 30 min	153	26–48	39.1 ± 0.31		
I do not spend time	147	29–47	40.9 ± 0.32		
Total	318	26–48	39.8 ± 0.22		

t*, *F*.

female doctors tend to substitute a meal with a salad or fruit more than males do and this difference is regarded to be statistically significant ($\chi^2 = 16.08$, $p = 0.00$).

Among the resident medical doctors, there is a significant statistical difference between the sexes as to weight control and consumption of low calorie foods, and this difference comes from female medical doctors ($p < 0.05$). No statistically significant relationship was found between sex, weight control and vitamin mineral support.

The average score of the research group on the ORTO-15 test is 39.8 ± 0.22 , being 39.4 ± 0.31 in women and 40.2 ± 0.31 in men. There is no difference between the ORTO-15 score of female and male medical doctors involved in the research group ($F = 2.78$, $p = 0.09$).

45.5% of the research group scored below 40 in ORTO-15 test and these people have orthorexia or “highly sensitive behavior” about eating habits according to ORTO-15 test (Table 2).

It has been seen that medical doctors that care about the nutritional quality while buying foods score low in ORTO-15 which means they have highly sensitive behavior about healthy nutrition. The average score on the ORTO-15 is lower in those who do their shopping themselves, substitute lunch or dinner with salad/fruit, care about the nutritional quality of the foods they eat, say that eating out is healthy, look at the contents of the food purchased, say that contents is important in product selection; and difference between the groups in healthy nutrition is statistically significant ($p < 0.05$).

Table 3
Effect of some properties and eating habits of medical doctors on ORTO-15 score (Ankara, 2005)

Variable	OR	CI 95%
Sex		
Men	1	
Women	0.86	0.49–1.49
Age		
20–24	1	
25–29	0.58	0.09–3.05
30–34	0.62	0.11–3.45
≥35	1.16	0.19–6.87
BMI		
Normal weight	1	
Underweight/overweight/obese	0.78	0.43–1.41
Food shopping		
Done by themselves	0.64	0.35–1.17
Done by others	1	
Weight control		
Yes	0.53	0.32–0.89
No	1	
Looking at contents of the product		
Yes	0.88	0.41–1.92
No	1	
Effect of contents in food selection		
Yes	0.41	0.18–0.92
No	1	
Spending time in stores/departments selling natural food products		
Yes	2.09	1.26–3.47
No	1	

There is a relationship between attention to weight control and “orthorexia nervosa—highly sensitive behavior” and this relation is due to the difference between those that are currently controlling their weight and those that are not ($F = 3.3$, $p = 0.03$). When the variable of spending time in stores or departments that sell natural product in the markets is examined, there is a difference between those who do not spend time in these sections and the other two groups ($F = 10.8$, $p = 0.00$). As the BMI increases, the ORTO-15 score increases and risk of orthorexia nervosa decreases. However, the difference between the groups is not statistically significant ($F = 0.3$, $p = 0.80$) (Table 2).

The OR (CI 95%) values found in the logistic regression analysis were the variables of sex, age, BMI, doing food shopping themselves, controlling their weight, caring about product contents, being affected by the product contents, spending time in stores or departments selling natural products and these were included in the model as seen in Table 3. Among the variables included in the model, the ORTO-15 score is higher in those who are controlling their weight than in those who are not (OR = 0.53, CI 95% = 0.32–0.89) and in those who say that contents are important in product selection than those who say the

opposite (OR = 0.41, CI 95% = 0.18–0.92). There is no significant relationship in other variables (Table 3).

Discussion

It has been seen that “highly sensitive behavior” towards healthy and proper nutrition is quite prevalent among the medical doctors involved in the research.

Orthorexia prevalence was identified as 6.9% in the research done by Donini et al. Orthorexia prevalence is higher in males. Those with a low education level are not many in the orthorexic group (Donini et al., 2004).

It is thought that the reason behind the high prevalence in our research is that the medical professionals that form the research group may have highly sensitive behavior towards healthy and proper nutrition. In our study, the ORTO-15 score is a bit lower in women than in men and the difference between the groups is not statistically significant ($F = 2.78$, $p = 0.09$). As the education level increases, so does the ORTO-15 score; however, there is no statistical significance ($F = 0.4$, $p = 0.71$). Twenty percent of the male subjects and 38.9% of the female subjects stated that their choice of food stuffs have been influenced by TV programs on healthy eating habits. It is most interesting to note that such a large number of people with a high level of education can be so heavily influenced by the media. It is clear that our eating habits can be adversely affected by the media especially when people, whose main concern is to attract attention, send out misleading messages to the public. Therefore, it is of utmost importance that the mass media presents accurate, unexaggerated and clear information about proper and healthy eating habits.

The topic of healthy nutrition has been current and extensively covered in the Turkish media for the past 10–15 years. It is thought that the frequently aired views of experts from scientific circles and revered members of the public have had a cautionary effect. Furthermore, the socio-economic backgrounds of the subjects in this research group are of a higher level than the majority of the general public in Turkey. Additionally, the resident doctors who work as research assistants at this hospital are among the most successful in the nation and achieved the highest grades in the national university entrance examinations. Being a medical doctor in Turkey also necessitates being a role-model for the general public both in terms of one’s physical appearance and lifestyle.

Therefore, the fact that all the subjects in the research group are medical doctors lends an additional factor of uncertainty to the study, especially since due to their profession, medical doctors tend to have a far better knowledge of the effects of nutrition upon our health. This may be the reason why they are more sensitive to these issues. It is striking to note that the prevalence of highly sensitive attitudes to healthy eating at this high socio-economic level shows that medical doctors are also in need

of education about the principles of a balanced and proper nutritional diet.

The correlation between the BMI and weight control was analyzed and the correlating coefficient was determined as $r^2 = 0.21$. Therefore, there is no relationship between BMI and weight control. The reason why some people may be controlling their weight even though they fall into the normal weight category in terms of BMI may be due to this difference in the self-perceptions of their bodies. A recent study conducted in Turkey shows that only 25% of the total number of subjects who perceived themselves to be overweight had a normal BMI, and that the percentage of people who both had a normal BMI and a normal perception of their bodies was actually 79% of the research group (Aslan et al., 2004). It is thus likely that the scores on the ORTO-15 test showing BMI and weight control have not been affected in similar ways due to this difference between the subjects' actual BMI and their body perceptions.

The variables of doing food shopping themselves, looking at product contents and being affected by the product contents were determined to be $OR < 1$ and were deemed to have no significant effect on the ORTO-15 scores because the confidence interval values includes the "1".

Obsessive–compulsive tendency was not evaluated in this study. Analysis of obsessive–compulsive properties would strengthen the study while studying orthorexia prevalence. The results of this study reveal that it would be useful to conduct studies to identify the prevalence of "orthorexia nervosa—highly sensitive behavior" towards healthy and proper nutrition in the public. Rapid development within society, developments in the food sector, the increase in food advertisements and programs prepared by people that are not experts play a role in an increased risk of orthorexia in sensitive people. Furthermore, some challenges have been met in making comparisons and finding scientific resources since this subject has not drawn a lot of attention in scientific circles.

Despite its limitations, this study is significant in that it draws attention to orthorexia nervosa. It underlines the increasingly over-sensitive attitudes towards healthy nutrition, which is a major concern in the field of public health. One major limitation of this study is the fact that the research group was made up of subjects with a higher

educational level than the norm of the general public in Turkey and that they were experts in the field of medicine. All doctors in Turkey are given education in "healthy nutrition" throughout their undergraduate studies and throughout their internship. Moreover, the eating habits of individuals are affected by their different body perceptions. A second limitation is that the ORTO-15 has not yet been tested for validity and reliability. However, despite all its limitations, the research data obtained has enabled us to perform the regression analysis and has shed light on the eating habits and attitudes of experts in the field of health.

This study also implicates that it would be beneficial to conduct further research that would be representative of the general public to reveal the prevalence of over-sensitive attitudes to healthy and proper nutrition, using tests that are valid and reliable.

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