

Original Research Article

Determining Orthorexia Nervosa Tendency Among the Students of Health Sciences

Faculty: The Case of Artvin Coruh University

Short title: Orthorexia Nervosa Tendency

ABSTRACT

Eating disorders is a general term used for grouping all the problems related to eating attitudes under one title and for expressing these problems. Orthorexia nervosa (ON), also known as “obsession of healthy eating” recently happened to be the research topic of clinicians worldwide. This study was conducted to evaluate association between eating attitudes and orthorexia nervosa in university students. The research population was comprised of 379 university students in the departments of nutrition and dietetics and nursing. The data was collected by the survey form questioning some of the socio-demographic and anthropometric properties of the students; and as for the data collection tool, ON tendency was determined by ORTHO-11 test and the information regarding anorexia and bulimia nervosa was gathered by “Eating Manner Test (EAT-40). Mean age of the students was found as 20.09 ± 1.47 years, mean body weight as 60.55 ± 10.01 kg, and mean height as 168.08 ± 7.91 cm. Mean BMI of the all participating students is found as 21.6 ± 2.12 as normal weight (18.5-24.9). EAT-40 points of the female was found to be significantly higher in comparison to that of the male ($p < 0.05$). ORTHO-11 points of the male students were found to be significantly higher as compared to that of female students ($p < 0.05$). Eating disorders will tend to increase as long as the concepts of beauty, good look and appeal are based on low body mass index. We also believe that the young population who are most influenced by such popular trends need to acquire truly healthy nutrition habits through training and increase their quality of life.

Keywords: Eating Attitudes Test-40, ORTHO-11, University Students

33

34 1.INTRODUCTION

35 Eating disorders is a general term used for grouping all the problems related to eating attitudes
36 under one title and for expressing these problems. Eating disorders are among the diseases
37 inherited from prehistoric times to the present, with a rapidly increasing prevalence. The
38 change in aesthetic perception along with the concepts of weakness, attractiveness and
39 slimness that affect the people psychologically has led to an increase in eating disorders. The
40 fashion sense claiming that it is more attractive and beautiful to be thin and slim whereas
41 overweight reflects an older and repulsive look is more effective on female population in
42 particular [1,2].

43 **Orthorexia Nervosa (ON)**, also known as “obsession of healthy eating” recently
44 happened to be the research topic of clinicians worldwide. The term Orthorexia Nervosa was
45 first used in 1997 and it consists of the combination of the words ‘orthos’ (correct,
46 appropriate) and ‘orexia’ (appetite) of ancient Greek [3,4]. Bratman, the coiner of **Orthorexia**
47 **Nervosa**, who also described himself as a patient in the process of healing orthorexia, stated
48 that the intent of these patients was not slimness, unlike the other cases of eating disorders [5].
49 Although ON is not categorized in the same group of eating disorders with anorexia nervosa
50 and bulimia nervosa, as the diagnostic criteria are specified and more and more studies on
51 ON are made, relevant information is getting accumulated [6]. Under the light of such
52 information, ON is recognised as an eating disorder characterized by consumption of healthy
53 foods, and it is regarded as a natural dietary consumption interfering in the personal life of the
54 individual [7].

55 Actually, ON is not pathologic. However, as it turns into a kind of excessive or long
56 term effort or as it leads to adverse effects in daily life, then healthy nutrition obsession can
57 reportedly be regarded as a disorder associated with personality and behavioral dimensions as
58 well [8]. In case of **Orthorexia Nervosa**, the individuals obsessively refrain from artificial
59 colors and tastes, preservative agents, pesticide residues or genetically modified materials,
60 unhealthy oils, salt/sugar containing nutrients and food having such ingredients. These people
61 gradually develop their own rules and limit themselves with a peculiar dietary regimen [9].
62 Since the quality of the food of such people gradually overwhelm their private lives and social
63 relations, the individuals with ON disorder become isolated and lonely in the course of time
64 [10,11].

65 The obsession of eating healthy foods prevailing in all social groups have recently
66 become more dominant particularly among young population. For this reason, in this study,
67 we evaluate association between eating attitudes and orthorexia in university students.

68 2. MATERIALS AND METHODS

69 This cross-sectional study was conducted between March and May 2018, with the students of
70 Health Sciences Faculty Nutrition and Dietetic and Nursing Departments of Artvin Coruh
71 University. There are 320 students in the Nursing Department and 260 students in the
72 Nutrition and Dietetic Department of the mentioned faculty. A total of 184 students from
73 Nutrition and Dietetic Department and 195 students from Nursing Department were included
74 in the study. The research population was comprised of 379 students in the first 4 classes of
75 these departments. The surveys of totally 379 students were considered for assessment where
76 115 students were from 1st classes, 99 from 2nd classes, 121 from 3rd classes and 44 from 4th
77 classes, respectively. Written approval of the Ethics Committee of Artvin Coruh University
78 was obtained before commencing the study. In the study, the data was collected by the survey
79 form questioning some of the socio-demographic and anthropometric properties of the
80 students; and as for the data collection tool, ON tendency was determined by ORTHO-11 test
81 [12,13] and the information regarding eating disorders were gathered by “Eating Attitude Test
82 (EAT-40) [14].

83 “ORTHO-11 test” is an assessment scale comprising 15 items. The items are written in
84 such a way that the answers can be expressed in a 4 grade format and in the present time. In
85 the scale, the individuals are asked to express themselves by selecting one of the options of
86 “always”, “frequently”, “sometimes” and “never” regarding frequency of the feelings
87 described in the items. Each item is graded by one of the 1, 2, 3 and 4 points. One can get 15
88 points at minimum and 60 points at maximum out of the test. As it can be understood, the
89 ones favouring healthy eating, namely orthorexic ones, will get lower points out of this test.
90 According to the result of the ORTHO-11 test, those with 40 points and below are defined as
91 “Orthorectic” (having extremely sensitive eating behaviors). Eating behavior is approaching
92 normal as the score increases.

93 Eating Attitude Test (EAT-40) is a self-report scale composed of 40 items, developed
94 for objective assessment of anorexia indications. The items are scored on a 6-point Likert-
95 type scale. The items have taken the format of multiple-choice and 6-point scale as “always”,
96 “frequently”, “usually”, “sometimes”, “seldom”, and “never”, in its second version. The
97 assessment from pathology point of view is implemented by assigning 3 points for both

98 extreme answers, and 2 and 1 points for other options. Total point is obtained by adding the
99 points for each answers, and its minimum value is 40 whereas maximum is 120. The obtained
100 point is proportional to eating disorder pathology. Thirty points and above imply risk for
101 having eating disorder. In EAT-40 risk profiles, in case of EAT-40 total point is less than 21 it
102 is regarded as low-risk, between 21-30 it is medium-risk and above 30 is high-risk.

103 **Body Mass Index (BMI)** of the students were calculated in accordance with the
104 formula “Body Weight/(Body Height)² (kg/m²)” based on the obesity classification of World
105 Health Organisation, where data was obtained by the self-declaration of the participants
106 regarding their weight and height [15].

107 **2.1. Statistical Analysis**

108 The data obtained from the questionnaire was evaluated by the SPSS (The Statistical Package
109 for The Social Sciences) 20.0 program. In order to assess whether there is a difference
110 between more than two or more group averages, **ANOVA one-way variance** analysis was
111 used. In statistical analyses, in case where sample size proves inadequate, Pearson Chi-
112 Square test results were used. In case of normally distributed variables, Independent Samples
113 T-test was used, among parametric comparison tests. $p < 0.05$ level was regarded as
114 statistically significant.

115 **3. RESULTS**

116 Totally 379 students of Artvin Coruh University, Health Sciences Faculty participated in the
117 study where 48.5% (n=184) were from Nutrition and Dietetics Department and 51.5%
118 (n=195) were from Nursing Department (Table 1). **Of the included students 75.2% (n=285)**
119 **were female and 24.8% (n=94) were male.** And 30.3% (n=115) were 1st class students,
120 26.1% (n=99) were 2nd, 31.9% (n=121) were 3rd and 11.6% (n=44) were 4 th class students.

121 The ages and the anthropometric data of the participating students are shown in Table
122 2. Mean age of the students was found as **20.09±1.47 years**, mean body weight as
123 60.55±10.01 kg, and mean height as 168.08±7.91 cm. According to calculated BMI values,
124 mean BMI of the all participating students is found as 21.6±2.12 **at normal weight range**
125 (18.5-24.9). Of the included students, **14.0% (n=54) were found to be underweight,** **73.6%**
126 **(n=276) normal weight,** **11.6% (n=45) overweight** and 0.8% (n=4) obese. Mean BMI of
127 female students was found as 19.2±1.83 with normal weight, while as 22.8±3.08 with normal
128 weight in male students. Statistically significant difference was not determined between the
129 BMI values of female and male students ($p > 0.05$). **Mean ORTHO-11 point of the university**

130 students was found to be 38.00 ± 3.41 and mean EAT-40 point was 17.92 ± 7.76 (Table 3). In
131 the EAT-40 risk profiles, the total scores are classified as follows: 30 and above are high risk
132 (abnormal eating behavior), between 21 and 30 are moderate risk, and below 21 are low risk
133 (27). For the aim of this study, the mean score of the ORTHO-11 (35 points) was used as the
134 cut-off point, with scores lower than this value being considered an indication of orthorexic
135 tendency. When we analyse EAT-40 points of the university students with respect to gender,
136 it was 21.62 ± 8.35 in female and 14.22 ± 7.18 in male (Table 4). EAT-40 points of the female
137 was found to be statistically significantly higher in comparison to that of the male ($p < 0.05$).
138 Orthorexia nervosa tendency of the university students was analysed with respect to gender
139 that students were compared in regard to having orthorexia nervosa risk (Table 5). ORTHO-
140 11 points of the male students were found to be significantly higher as compared to that of
141 female students ($p < 0.05$). In Table 6, the correlation between the EAT-40 and orthorexia
142 nervosa of the university students were presented. As the points obtained in ORTHO-11 scale
143 decrease, the affinity to disorder increase, for this reason, although the correlation coefficient
144 have negative values they were interpreted as positive, and assessments were implemented
145 duely. As it can be seen in Table 6, a statistically significant difference was found between the
146 university students having signs of eating disorders and displaying orthorexic signs ($r = -.234$,
147 $p < 0.001$).

148 4. DISCUSSION

149 Media, dieticians and psychiatrists worldwide are drawing attention to a new type of eating
150 disorder for a long time. The individuals with orthorexia nervosa having the obsession of
151 healthy eating spend a big deal of their time for thinking about their food, shopping, preparing
152 and consuming the kind of food they consider healthy. The individual feels that his/her own
153 type of eating manner is the only possible option and his/her own choice ranks the topmost
154 level in comparison to the other people [16,17]. Gradually in time, the individuals with ON
155 would even prefer a kind of hunger by their own strict dietary regimens and abstain from
156 eating if they are not sure that the food is healthy. Food selection of the university students
157 and their eating manners are influenced by various biological, psychological and sociocultural
158 factors. In our study, healthy eating obsession of the students in Health Sciences Faculty were
159 evaluated by ORTHO-11 and EAT-40 tests.

160 It was demonstrated in the study of Korinth et al. [18] that the students studying in
161 nutrition related branches have a more explicit tendency for healthy eating in comparison to
162 their colleagues in other branches. Again in the same study, those students had the inclination

163 of limiting their food intake for their body weight control and their disposition for healthy
164 nutrition would increase as their knowledge of nutrition increased. In the study of Meister
165 [19] where the tendency of university students to orthorexia nervosa was investigated,
166 ORTHO-11 scale revealed higher ON tendency among female students than male students. In
167 the study of McInerney-Ernst [20] on the university students aged between 18-25 years,
168 68.55% of the female students and 43.18% of the male students were determined to have
169 tendency for ON.

170 Also in our study that we implemented ORTHO-11 and EAT-40 scales, the results
171 were compliant with the literature. When we evaluated ORTHO-11 results in general, our
172 students displayed orthorexic properties. When we evaluated with respect to gender,
173 ORTHO-11 scores of the female were statistically significantly higher than that of the male.
174 The fact that the greater number of our female student than male students had an effect on our
175 overall ORTHO-11 results. While evaluating EAT-40 results, we found a lower level risk
176 result for male but a higher level risk for female. While the risk of eating behavior disorders
177 was found to be low risk among university students in this study. Besides, increase in the risk
178 of ON was found to be related with the decrease in the risk of eating manner disorder, in our
179 study results.

180 While interpreting our results in regard to the factor of gender, the reason that eating
181 disorders are more prevalent in females than males can be attributed to the physical changes
182 they experience in their adolescent phase. In this period, body fat ratio shows changes which
183 leads to significant changes in outer appearance and most of the women begin putting on
184 weight in this phase. This fact removes the individual from the ideal size imposed by the
185 society [21,22].

186 In the study of Arslantas et al. [23] on university students, it was reported that the
187 university students are under a higher risk regarding disorders in eating manners. Since
188 women were in majority in their study sample, this risk was expressed higher. In the study of
189 Unalan et al. [24] to determine eating manners of the university students studying in Health
190 College, potential eating disorder ratios of female students were found to be significantly
191 different than those of male students. Also in the study by Altug et al. [25] EAT-40 test was
192 applied on female students and it was reported that the students displayed eating manner
193 disorders. In the same study, the disorder in eating manners and behaviours was related with
194 the factors such as conservatism and perfectionism of the parents.

195 The studies conducted in our country as well as the other countries reveal similar
196 results. When we evaluate the results in the literature, we can state that the prevalence of
197 orthorexia nervosa is increasing and this increase is particularly based on the slimness of the
198 ideal women concept. Printed press as well as audiovisual media is also effective all around
199 the world in describing slim, aesthetic and thin image frequently in recent years regarding
200 concept of beauty [20,26]. Additionally, the information we come across everyday in media
201 and in our neighbourhood about the dietary regimens and products, and the fact that some of
202 these products contain carcinogenic ingredients such as additives, colorifying materials and
203 hormones, may also be one of the reasons that increase the prevalence of orthorexia nervosa,
204 in our opinion.

205 **5. CONCLUSION**

206 In conclusion, when we evaluate the studies conducted in our country as well as in the other
207 countries, we have the conviction that eating disorders will tend to increase as long as the
208 concepts of beauty, good look and appeal are based on low body mass index. **While the risk of**
209 **eating behavior disorders was found to be low risk among university students in this study.**
210 Meanwhile, we also believe that the young population who are most influenced by such
211 popular tendencies need to acquire truly healthy nutrition habits through training and
212 increase their quality of life.

214 **CONFLICT OF INTEREST**

215 The authors declared no conflicts of interest.

216 **FUNDING**

217 This study did not receive any funding and the authors have no financial relationships to
218 disclose.

220 **REFERENCES**

- 221 1. Fairburn CG, Harrison PJ. Eating disorders. *The Lancet*. 2003; 361:407–416.
- 222 2. Ramacciotti CE, Perrone P, Coli E et al. Orthorexia nervosa in the general population:
223 a preliminary screening using a self-administered questionnaire (ORTO-15). *Eat Weight*
224 *Disord*.2011; 16(2):e127–e130.
- 225 3. Asil E, Surucuoglu MS. Orthorexia Nervosa in Turkish Dietitians. *Ecol Food Nutr*.
226 2015; 54:303–313.

- 227 4. Vandereycken W. Media hype, diagnostic fad or genuine disorder? Professionals'
228 opinions about night eating syndrome, orthorexia, muscle dysmorphia, and emetophobia. *Eat*
229 *Disord.* 2011; 19:145–155.
- 230 5. Bratman S, Knight D, *Health Food Junkies: Overcoming the Obsession with*
231 *Healthful Eating*, Broadway Books, New York, 2000
- 232 6. Bonaechea BB, Rial BR, Sanchez GF et al (2005) Orthorexia Nervosa. A New Eating
233 Behavior Disorder? *Actas Esp Psiquiatr* 33(1):666- 668.
- 234 7. Furth EF, Varga M, Szabo SD et al. When Eating Healthy is not Healthy: Orthorexia
235 Nervosa and Its Measurement with the ORTO-15 in Hungary. *BMC Psychiatry.* 2014;
236 2014:14-59.
- 237 8. Fidan T, Ertekin V, Işıkay S et al. Prevalence of orthorexia among medical students in
238 Erzurum, Turkey. *Compr Psychiatry.* 2010; 51(1):49-54.
- 239 9. Duran S. The risk of orthorexia nervosa (healthy eating obsession) symptoms for
240 health high school students and affecting factors. *Pamukkale Med J.* 2016; 9(3):220-226.
- 241 10. Bosi AT, Çamur D, Çağatay G. Prevalence of orthorexia nervosa in resident medical
242 doctors in the faculty of Medicine in Ankara, Turkey. *Appetite.* 2007; 49:661-666.
- 243 11. Koven NS, Abry AW. The clinical basis of orthorexia nervosa: emerging perspectives.
244 *Neuropsychiatr Dis Treat.* 2015; 11:385–394.
- 245 12. Donini LM, Marsili D, Graziani MP et al. Orthorexia Nervosa: Validation of a
246 diagnosis questionnaire. *Eat Weight Disord.* 2005; 10:e28-e32.
- 247 13. Ogur S, Aksoy A, Gungor S. Determination of the Orthorexia Nervosa Tendency in
248 University Students. *BEU Journal of Science.* 2015; 4(2):93-102.
- 249 14. Garner DM, Garfinkel PE. The eating attitudes test: an index of the symptoms of
250 anorexia nervosa. *Psychol Med.* 1979; 9:273-279.
- 251 15. WHO 2006. BMI Classification. <http://apps.who.int/bmi/index.jsp>
- 252 16. Bartrina JA. Orthorexia or when a healthy diet becomes an obsession. *Arch Latinoam*
253 *Nutr.* 2007; 57(4): 313-315.
- 254 17. Donini LM, Marsili D, Graziani MP et al. Orthorexia nervosa: a preliminary study
255 with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon.
256 *Eat Weight Disord.* 2004; 9:151-157.
- 257 18. Korinth A, Schiess S, Westenhofer J. Eating behaviour and eating disorders in
258 students of nutrition sciences. *Public Health Nutr.* 2009; 13(1):32–37.

- 259 19. Meister SE. The Occurrence of Highly Sensitive Attitudes and Behaviors Toward
260 Eating among Undergraduate Students at a Midwestern University. M.S. thesis, Northern
261 Illinois University, 150 pages, DeKalb County, 2010, Illinois.
- 262 20. McInerney-Ernst EM. Orthorexia nervosa: Real construct or newest social trend?
263 Doctoral Dissertation, ProQuest Dissertations and Theses Database (AAI-3465913), 2012.
- 264 21. Jimerson SR, Pavelski R, Orlist M. Helping children with eating disorders: quessential
265 research on etiology, prevention, assesment and treatment. Handbook of Crisis Counseling,
266 Intervention and Prevention in the Schools, 2nd Edition, Lawrence Erlbaum Associates,
267 Publisher., 2002.
- 268 22. Brytek-Matera A, Donini LM, Krupa M et al. Orthorexia Nervosa and Self-Attitudinal
269 Aspects of Body Image in Female and Male University Students. *J Eat Disord.* 2015; 3: 2-2.
- 270 23. Arslantas H, Adana F, Ogut S et al. Relationship Between Eating Behaviors of
271 Nursing Students and Orthorexia Nervosa (Obsession with Healthy Eating): A Cross-
272 Sectional Study. *J Psychiatr Nurs.* 2017; 8(3):137–144.
- 273 24. Ünalın D, Oztop BD, Elmalı F et al. The Relationship Between the Halthy Lifestyle
274 Behaviors and Eating Behaviors of a Group of Health High School Students. *J Inonu Uni Med*
275 *Faculty.* 2009; 16 (2):75-81.
- 276 25. Altuğ A, Elal G, Slade P et al. The Eating Attitudes Test (EAT) in Turkish university
277 students: relationship with sociodemographic, social and individual variables. *Eat Weight*
278 *Disord.* 2000; 5(3):152-60.
- 279 26. Erol A, Toprak G, Yazıcı F et al. Comparison of Locus of Control and Self-Esteem as
280 Predictors of Severity of Anorexic Symptoms. *J Clin Psy.* 2000; 3:147–52.
- 281 27. Agopyan A, Kenger EB, Kermen S et al. The relationship between orthorexia nervosa and
282 body composition in female students of the nutrition and dietetics department. *Eating and*
283 *Weight Disorders - Studies on Anorexia, Bulimia and Obesity.* doi.org/10.1007/s40519-018-
284 0565-3.

285

286

287

288

289

290

291 **Table 1.** Distribution of demographic data of the participating university students

292

Demographic features	n	%
Gender		
Female	285	75.2
Male	94	24.8
Department		
Nutrition and Dietetic	184	48.5
Nursing	185	51.5
University class		
First class	115	30.3
Second class	99	26.1
Third class	121	31.9
Fourth class	44	11.6
Residence		
Home	110	29.0
Dorm	269	71.0
Smoking		
Yes	68	17.9
No	311	82.1
Alcohol consumption		
Yes	51	13.5
No	328	86.5

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308 **Table 2.** Age and anthropometric data of the participating university students

	Mean ±SD	n
Age	20.09±1.47	379
Weight	60.55±10.01	379
Height	168.08±7.91	379
BMI	21.6±2.12	379
Female BMI	19.2±1.83	285
Male BMI	22.8±3.08	94

309 Abbreviation: BMI; body mass index, SD; standart deviation

310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329

330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357

Table 3. ORTHO-11 ve EAT-40 points of the university student

	n	Mean±SD
ORTHO-11	379	38.00 ±3.41
EAT-40	379	17.92 ±7.76

Abbreviations: EAT-40; Eating Attitudes Test-40, ORTHO-11; Orthorexia Nervosa Assessment Scale, SD; standart deviation

UNDER PEER REVIEW

358 **Table 4.** Comparison of Eating Attitudes Test of the of the university students

Gender	Mean \pmSD	n	p
Female	21.62 \pm 8.35	285	<0.05
Male	14.22 \pm 7.18	94	

359

360

361

362

363

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

383

384

385 **Table 5.** Comparison of ORTHO-11 results of the university students with respect to gender

386

Gender	Mean \pmSD	n	p
Female	29.40 \pm 3.50	285	<0.05
Male	46.22 \pm 4.24	94	

387

388

389

390

391

392

393

394

395

396

397

398

399

400

401

402

403

404

405

406

407

408

409

410

411

412 **Table 6.** Comparison of Orthorexia Nervosa states of the university students with respect to
413 risk groups

Scales	EAT-40	ORTHO-11
EAT-40	1	
	-	
ORTHO-11		-.234
		.000

414 EAT-40 = Eating Attitudes Test-40; ORTHO-11 = Orthorexia Nervosa Assessment Scale

415 * $p < 0.001$

416

417

418

419

UNDER PEER REVIEW