

Research Report

Vegetarianism and eating disorders: association between eating attitudes and other psychological factors among Turkish adolescents

Murat Baş*, Efsun Karabudak, Gül Kiziltan

Department of Nutrition and Dietetics, Health Sciences Faculty, Baskent University, Bağlica Kampusu, Eskişehir Yolu 20.km, 06530 Ankara, Turkey

Received 8 September 2004; revised 30 October 2004; accepted 18 February 2005

Abstract

The purpose of this study was to determine whether differences exist in eating attitudes, self-esteem, social trait anxiety and social physique anxiety of self-reported vegetarian and nonvegetarian Turkish adolescents. The sample for the Turkish University' students is designed to provide the estimates of vegetarian indicators and prevalence. The participants were 608 females and 597 males, in total 1205 adolescents aged between 17 and 21 years. Disturbed eating behaviors (EAT-26 \geq 20) was found in 45.2% (14 of vegetarian) of the total vegetarian sample; which included two of the male vegetarians and 12 of the female vegetarians. The mean BMI was 19.78 ± 1.49 kg/m² for female vegetarians and 20.78 ± 2.46 kg/m² for female nonvegetarians ($p < 0.05$). Male vegetarians had significantly higher score than male nonvegetarians on EAT-26 (17.25 ± 11.18 for male vegetarians and 9.38 ± 6.60 for male nonvegetarians), dieting (6.50 ± 7.65 for male vegetarians and 2.55 ± 3.87 for male nonvegetarians) and oral control (6.13 ± 4.67 for male vegetarians and 3.20 ± 3.19 for male nonvegetarians) scores ($p < 0.05$). Besides, female vegetarians had significantly higher score than female nonvegetarians on EAT-26 (22.04 ± 13.62 for female vegetarians and 11.38 ± 8.28 for female nonvegetarians), dieting (10.35 ± 9.58 for female vegetarians and 4.41 ± 5.30 for female nonvegetarians), oral control (7.78 ± 5.13 for female vegetarians and 3.33 ± 3.51 for female nonvegetarians) and STAI (51.39 ± 7.28 for female vegetarians and 47.29 ± 5.13 for female nonvegetarians) scores ($p < 0.05$).

As a conclusion, the present study indicated abnormal eating attitudes, low self-esteem, high social physique anxiety, and high trait anxiety in Turkish vegetarian adolescents. The vegetarian adolescents may be more likely to display disordered eating attitudes and behaviors than nonvegetarians.

© 2005 Elsevier Ltd. All rights reserved.

Keywords: Vegetarian adolescents; Eating attitudes; Self-esteem; Social physique anxiety; Weight control

Introduction

The term 'vegetarian' is not very straightforward, but it generally describes a range of diets that avoids animal flesh (meat, fish and poultry), with varying degrees of restriction (British Nutrition Foundation, 1995; Silverstone, 1993). Vegetarian diets are not only associated with a decreased frequency of meat consumption, moreover with a particular belief or lifestyle. Moral and ethical beliefs, consisting of rejections of killing animals and concerns for animal welfare are reported as the main reason to avoid meat in the Western world (Beardsworth & Keil, 1992; Kalof, Dietz,

Stern, & Guagnano, 1999; Kenyon & Barker, 1998). Vegetarians obviously express a certain philosophy in their choice of foods (Allen, Wilson, Ng, & Dunne, 2000; Twigg, 1983). Beside moral and ethical beliefs, health reasons seem to play an increasing important role to hold a vegetarian lifestyle nowadays (Barr & Chapman, 2002). Therefore, the rise in vegetarianism among adolescents may reflect a conscious choice of a healthy diet, a means of accomplishing requisite developmental tasks, and/or a way to maintain or lose weight (Perry, McGuire, Neumark-Sztainer, & Story, 2001). Vegetarian diets consist of low-fat, high-fiber, vitamin-rich foods but can result in deficiencies in protein, calcium, and vitamins D and B-12 unless adequate precautions are taken (Barr & Broughton, 2000; Dwyer, 1991). Furthermore, several case studies in eating disorder literature note a link between eating disorders and vegetarian eating styles, in that eating disordered individuals are often found to be vegetarians

* Corresponding author.

E-mail address: mbas@baskent.edu.tr (M. Baş).

(Alloway, Reynolds, Spargo, & Russell, 1985; Bakan, Birmingham, Aeberhardt, & Goldner, 1993; Shur, Alloway, Obrecht, & Russell, 1988). Weight control was the second most frequently chosen reason for being a vegetarian. The desire for thinness among many vegetarians was recognized by Worsley and Skrzypiec (1998), who found that vegetarians were more concerned with being slim and with restricting calories than nonvegetarians. In addition, previous studies confirm vegetarianism as a mean for weight control in young women (Gilbody, Kirk, & Hill, 1999; Perry et al., 2001). Vegetarianism is a behavior that has been associated with disordered eating attitudes and behaviors according to some studies (Freeland-Graves, Greninger, Graves, & Young, 1986; Gilbody et al., 1999; Kadambari, Gowers, & Crisp, 1986; Neumark-Sztainer, Story, Resnick, & Blum, 1997; Worsley & Skrzypiec, 1998) but not other studies (Barr & Broughton, 2000; Janelle & Barr, 1995; Larsson, Klock, Astrom, Haugejorden, & Johansson, 2002). O'Connor et al. examined the medical records of 116 patients with anorexia nervosa and found that 54% were avoiding red meat. However, only four of the patients had followed a vegetarian diet before the onset of anorexia nervosa (O'Connor, Touyz, Dunn, & Beumont, 1987). Nevertheless, the strong associations between vegetarianism and disordered eating behaviors should be considered in the counseling situation, as vegetarianism may be serving as a marker for potentially harmful weight control behaviors. Motives for embarking on a vegetarian eating style should be evaluated carefully. It is possible that the adolescent is using vegetarianism as a socially acceptable way to avoid fat intake and to reduce energy intake. Thus, weight concerns and eating patterns should be examined carefully among adolescents following a vegetarian diet.

Although the evidence is patchy it does seem that eating-disordered groups have higher rates of vegetarianism, even compared to the young female population in general. If this is so then are vegetarians more likely to be dieting, or to show higher levels of restraint than nonvegetarians (Sullivan & Damani, 2000). Neumark-Sztainer et al. (1997) found that adolescent vegetarians were twice as likely to be frequent dieters, and four times as likely to have used vomiting for weight control. They were also eight times as likely to have used laxatives for weight control, although the numbers involved were small. Gilbody et al. (1999) also found their vegetarian group had higher dietary restraint, but interestingly, were no more likely to be dieting than nonvegetarians. Conversely, in a comparison of adult female vegetarians and nonvegetarians, Janelle and Barr (1995) found that vegetarians had lower restraint scores than nonvegetarians, although this was a small, notably health-conscious sample, and, therefore, may not be representative. The aim of this study was to investigate relationship between vegetarianism and eating attitudes, self-esteem, social trait anxiety and social physique anxiety among adolescents.

Methods

Participants and sampling design

The study population included 1205 adolescents from six public and four private universities in the capital city of Turkey, Ankara. Participants were equally divided by gender (49.6% males, 50.4% females). The mean age of the study population was 21.5 ± 1.9 years (range 17–21 years). The universities were chosen from a list of all public and private universities in Ankara using a multistage cluster sampling method. The adolescents in the sample were taken in proportion of 70.71% from public and 29.29% from private universities. Data collection were conducted by face to face interview in a 6-month period between February and July 2004.

The questionnaire

The questionnaire was examined in three sections. First section asked about the socio-demographic items, including sex, age, weight and height, body mass index (BMI) (weight in kg/height in m^2) was based on self-report. BMI was assessed in accordance with the National Center for Health Statistics guidelines (Gallagher et al., 1996). The second section was contained vegetarianism question. Items concerning the subjects' experiences of vegetarianism in past and present were included in a vegetarianism questionnaire. To identify vegetarians, all students were asked on the survey to respond yes or no the question, 'Are you a vegetarian?' Those who answered yes were asked to respond to additional questions. For example; 'How long they had been vegetarians?', 'What have your reasons to become vegetarian?', etc.

The eating attitudes test

The Eating Attitudes Test (EAT-26) is a widely used self-report measure for eating disorders. It was developed by Garner and Garfinkel (1979) to measure symptoms of anorexia nervosa. The EAT-26 is based on an original Eating Attitudes Test (EAT-40). Total scores on the EAT-26 are derived as a sum of the composite items, ranging from 0 to 53, with score of 20 on the EAT-26 was used as the cut off (Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 consist of three factor scores: (F1) dieting-the degree of avoidance of fattening foods and preoccupation with being thinner; (F2) bulimia and preoccupation with food; and (F3) oral control-the degree of self-control around food and the perception of pressure from others to gain weight. The reliability of EAT-26 was also determined by a pilot study on 50 university students. The internal consistency (Cronbach's alpha) of EAT-26 was 0.70 and its interclass correlation coefficient was 0.98 in the pilot study. Participants who scored 20 or above were placed in the 'abnormal eating behavior' category and those scoring

below 20 were placed in the ‘normal eating behavior’ category.

Rosenberg self-esteem scale

The Rosenberg self-esteem scale is the most widely used measure of global self-esteem with adolescents. This self-report instrument is comprised of 10 items on a 4-point Likert scale, with responses ranging from strongly agree to strongly disagree. The reliability and validity of the instrument for Turkish adolescents were determined in a recent study carried out by Çuhadaroglu (1986).

Social physique anxiety scale

The social physique anxiety scale (SPAS) was originally designed to determine the degree to which people become anxious to the real or perceived evaluation of their physique by others (Hart, Leary, & Rejeski, 1989). The SPAS is a self-report inventory where participants respond to 12 items on a 5-point Likert scale. The reliability and validity evidence of SPAS for Turkish university students was determined by Mülazımoğlu and Aşçı (unpublished data). The test–retest reliability of social physique anxiety scale was 0.92 for females and 0.76 for males. Internal consistency for 12 items was 0.89 for females and 0.86 for males (Cronbach’s alpha).

State-trait anxiety inventory

The State-Trait Anxiety Inventory (STAI) is a self-report instrument developed by Spielberger, Gorsuch, and Lushene (1970) to measure the subjective level of anxiety both in special stations and in general. STAI was standardized by Öner and Le Compte (1985) for Turkish population and the mean values in the normative study ranged from 36 to 41,

with higher scores indicating higher level of anxiety. Internal consistency and test–retest reliability of the trait form of the STAI were 0.87 and 0.86, respectively. The criterion and construct validity analysis supported the validity of STAI (Öner & Le Compte, 1985).

Data analysis

Statistical analyses used SPSS for Windows (version 11.0; SPSS, Inc., Chicago) and the level of statistical significance for analysis was set at $p < 0.05$ unless otherwise stated. Categorical data were analyzed using Pearson χ^2 statistic and the differences between vegetarian and nonvegetarian groups mean values were determined by nonparametric (Mann–Whitney U Test) tests. Spearman correlation coefficient were used to determine relationship among BMI, SPAS, STAI, self-esteem and eating attitudes scores.

Results

As shown in Table 1, seven of the male vegetarians and three of the female vegetarians were underweight, one of the male vegetarians and 20 of the female vegetarians were in normal weight. In addition, 94 of the nonvegetarian males and 42 of the nonvegetarian females were overweight, while 13 of the nonvegetarian males and two of the nonvegetarian females were obese. The mean BMI was 19.78 ± 1.49 for female vegetarians and 20.78 ± 2.46 for female nonvegetarians ($p < 0.05$), 22.13 ± 2.05 for male vegetarians and 22.94 ± 2.82 for male nonvegetarians ($p > 0.05$). There was no significant difference in height, weight, or age between the vegetarians and nonvegetarians. Eating Attitudes Test (EAT-26) scores are also given in Table 1. Disturbed eating behaviors ($EAT-26 \geq 20$) was found in 14

Table 1
Characteristic of vegetarian and nonvegetarian adolescents ($n = 1205$)

Characteristic	Male ($n = 608$)		Female ($n = 597$)	
	Vegetarian ($n = 8$)	Nonvegetarian ($n = 600$)	Vegetarian ($n = 23$)	Nonvegetarian ($n = 574$)
Age (year)	21.5 ± 1.31	21.7 ± 1.9	20.6 ± 1.8	21.3 ± 1.8
Height (cm)	1.79 ± 0.5	1.77 ± 0.1	1.67 ± 0.1	1.65 ± 0.1
Weight (kg)	71.1 ± 7.2	72.2 ± 10.2	55.1 ± 4.7	56.8 ± 7.5
BMI (kg/m^2)	22.13 ± 2.05	22.94 ± 2.82	19.78 ± 1.49	$20.78 \pm 2.46^*$
BMI				
Below 18.5 (underweight)	7	24	3	103
18.5–24.9 (normal)	1	469	20	427
25.0–29.9 (overweight)	–	94	–	42
30.0 and above (obese)	–	13	–	2
	$\chi^2 = 0.632; p = 0.889$		$\chi^2 = 2.529; p = 0.470$	
Eating attitudes				
≥ 20 (abnormal)	2	46	12	71
10–20	4	164	5	198
0–9	2	390	6	305
	$\chi^2 = 6.432; p = 0.040^*$		$\chi^2 = 29.366; p = 0.000^*$	

BMI, body mass index. *Significant difference between vegetarians and nonvegetarians.

Table 2

The mean values of eating attitudes scores and other variables by vegetarian and nonvegetarian baseline ($n = 1205$)

	Male ($n = 608$)			Female ($n = 597$)		
	Vegetarian ($n = 8$)	Nonvegetarian ($n = 600$)	p Value	Vegetarian ($n = 23$)	Nonvegetarian ($n = 574$)	p Value
EAT-26 score	17.25 ± 11.18	9.38 ± 6.60	0.019*	22.04 ± 13.62	11.38 ± 8.28	0.000*
F1: dieting	6.5 ± 7.65	2.55 ± 3.87	0.016*	10.35 ± 9.58	4.41 ± 5.30	0.000*
F2: B&P	4.63 ± 2.67	3.63 ± 1.85	0.200	3.91 ± 1.90	3.64 ± 1.67	0.257
F3: oral control	6.13 ± 4.67	3.20 ± 3.19	0.038*	7.78 ± 5.13	3.33 ± 3.51	0.000*
RSE	23.5 ± 3.38	21.33 ± 4.59	0.121	21.26 ± 6.98	21.46 ± 4.34	0.614
SPAS	23.75 ± 11.31	27.07 ± 7.54	0.132	30.70 ± 8.58	29.40 ± 7.72	0.299
STAI	46.5 ± 5.90	46.64 ± 5.33	0.631	51.39 ± 7.28	47.29 ± 5.13	0.004*

*Significant difference between vegetarians and nonvegetarians. EAT-26, Eating Attitudes Test; B&P, bulimia and preoccupation; RSE, Rosenberg self-esteem, SPAS, social physique anxiety scale; STAI, social trait anxiety inventory.

of the total vegetarian sample; including two male vegetarians and 12 female vegetarians.

Table 2 demonstrated the mean EAT-26, dieting, bulimia and preoccupation, oral control, Rosenberg self-esteem, SPAS and STAI scores by gender and vegetarian or nonvegetarian. Male vegetarians had significantly higher scores than male nonvegetarians on EAT-26 (17.25 ± 11.18 for male vegetarians and 9.38 ± 6.60 for male nonvegetarians), dieting (6.50 ± 7.65 for male vegetarians and 2.55 ± 3.87 for male nonvegetarians) and oral control (6.13 ± 4.67 for male vegetarians and 3.20 ± 3.19 for male nonvegetarians) scores ($p < 0.05$). Besides, female vegetarians had significantly higher scores than female nonvegetarians on EAT-26 (22.04 ± 13.62 for female vegetarians and 11.38 ± 8.28 for female nonvegetarians), dieting (10.35 ± 9.58 for female vegetarians and 4.41 ± 5.30 for female nonvegetarians), oral control (7.78 ± 5.13 for female vegetarians and 3.33 ± 3.51 for female nonvegetarians) and STAI (51.39 ± 7.28 for female vegetarians and 47.29 ± 5.13 for female nonvegetarians) scores ($p < 0.05$).

Discussion

In this sample, the overall prevalence of vegetarianism among Turkish adolescents was 2.6% (eight males and 23 females). Sixteen of the participants reported being semivegetarian (six males and 10 females), eight reported being lacto-ovo vegetarian (two males and six females) and two reported being vegan (only females). Similarly, the prevalence of male vegetarians reported here was somewhat lower than 1.7–2.5% of males that were previously reported. (Beef Information Centre, 1998; Cohen, Evers, Manske, Bercovitz, & Edward, 2003). As is known the prevalence of vegetarianism is more common in female subjects than males. One possible reason for this may be that females are more concerned about their body image and weight, because they pay more attention on body shape and weight control than males (Larsson, Klock, Astrom, Haugejorden, & Johansson, 2001). Estimates of adolescent vegetarianism

from population-based surveys outside of Canada have ranged from 2.4 to 6.5% for males. For female adolescents, vegetarian estimations ranged from 4.0% up to 25.0% for those in Umea, Sweden (Larsson et al., 2001; Perry, McGuire, Neumark-Sztainer, & Story, 2002; Worsley & Skrzypiec, 1998).

Klopp, Heiss, and Smith (2003) found that the most common reason given for choosing vegetarianism was health/nutrition (37.5%), followed by weight control (18.8%) and animal ethics (14.6%) in adolescent population. In their study, weight control was the second most frequently chosen reason for being a vegetarian. Contrarily, in our study, the most common reason given for choosing vegetarianism was taste preferences (58.1%), healthier diet (19.4%) and followed by weight control (9.6%). Other reasons reported included healthier diet, animal ethics, religious belief and parental influence. Weight control was the third most frequently chosen reason for being a vegetarian. The adolescent vegetarian is more likely to be female, in middle school, conscious of her weight and body, dissatisfied with her body and involved in a variety of healthy and unhealthy weight control behaviors, previously diagnosed by her physician with an eating disorder and was more likely to have contemplated and attempted suicide (Perry et al., 2002). Adolescent vegetarians are at increased risk for involvement in unhealthy and extreme weight control behaviors, especially adolescent male vegetarians (Perry et al., 2001). Some individuals may adopt vegetarianism to mask their dieting behavior (Martins, Pliner, & O'Connor, 1999), and it has been recommended that adolescent vegetarians be screened for adequate food intake and possible disordered eating behaviors such as frequent dieting, binge eating, self-induced vomiting, and laxative use (Neumark-Sztainer et al., 1997).

A consequence of similar lifestyle practices of women studied is that if differences in body weight status, weight perceptions or dieting practices were detected, they could be more closely tied to dietary pattern. However, no differences in these variables were observed. Thus, in contrast to findings of epidemiological studies, among vegetarian females, vegetarianism was not associated with a significantly greater

degree of leanness or with fewer attempts to lose weight. Conversely, it was also not associated with dieting behavior or disturbed eating attitudes (as assessed by dietary restraint scores), as has been found in some studies (Gilbody et al., 1999; Martins et al., 1999; Neumark-Sztainer et al., 1997), in which the degree of health-consciousness may have differed between groups. For example, it has been suggested that a vegetarian eating style may mask concerns about body weight in individuals who perceive that dieting is not socially acceptable (Martins et al., 1999). In our study, we found that dieting scores (perceptions of dieting—the degree of avoidance of fattening foods and preoccupation with being thinner) of vegetarian groups were higher than nonvegetarian groups ($p < 0.05$). These findings were supported by Worsley and Skrzypiec who compared their combined vegetarian groups with nonvegetarians and found that more vegetarians were dieting, and showed more extreme dieting behaviours (Worsley & Skrzypiec, 1997).

The association between vegetarianism and weight control is therefore very complex. Adolescent vegetarians are at increased risk for involvement in unhealthy and extreme weight control behaviors, especially adolescent male vegetarians (Perry et al., 2001). Vegetarian diets are somewhat more common among adolescents with eating disorders than in the general adolescent population; therefore, dietetics professionals should be aware of young clients who greatly limit food choices and who exhibit symptoms of eating disorders. However, recent data suggest that adopting a vegetarian diet does not lead to eating disorders, rather than vegetarian diets may be selected to camouflage an existing eating disorder (Ferry, McGuire, Neumark-Sztainer, & Story, 2001; Martins et al., 1999; O'Connor et al., 1987). In our study, two of males and 12 of females vegetarians had abnormal eating attitudes scores. The mean EAT-26 score of the vegetarian participants (17.25 ± 11.18 for male and 22.04 ± 13.62 for females) was significantly higher than that of the nonvegetarian participants (9.38 ± 8.28 for males and 11.38 ± 8.28 for females) in both gender ($p < 0.05$). Similarly, Wilson, Rau, Trautmann, and Walters (2004) found that the mean EAT-26 scores of vegetarians was significantly higher than that of nonvegetarians. In addition, Klopp et al. (2003) found that vegetarians are at higher EAT score than that of the nonvegetarians. Their studies confirm vegetarianism as a means for weight control in young women. Conversely, two studies report no difference in concern about weight and weight-loss efforts by vegetarians and nonvegetarians (Barr & Broughton, 2000; Larsson et al., 2002).

In current study, nearly all male vegetarians (seven) were underweight. Therefore, vegetarian males were significantly more likely than nonvegetarian males to have high eating disturbances ($p < 0.05$). This result is similar to Perry et al. (2001) study. Their study indicated that being an adolescent male vegetarian may serve as an important marker for other unhealthy weight control behavior. Whereas, research by Davis, Elliott, Dionne, and Mitchell (1991) and Drenowski,

Kurth, and Krahn (1995) indicates that males are likely to be evenly split in their desire to lose weight vs. their desire to gain weight, whereas most females express a desire to lose weight. Certainly, the number of males who diet is substantially smaller than the number of females who diet; research indicates that women are approximately twice as likely as men to diet (Serdula et al., 1993; Way, 1995). This suggests then, that dieting for the purpose of weight loss is inconsistent with social norms for males (Serdula et al., 1993).

In our study, however, we found that bulimia and preoccupation scores of vegetarian groups (4.63 ± 2.67 of males and 3.91 ± 1.67 of females) were high than non-vegetarian groups (3.63 ± 1.85 of males and 3.64 ± 1.67 of females), but there was no significant differences between groups ($p > 0.05$). Adolescent vegetarians were significantly more likely to exhibit bulimic behaviors than nonvegetarians in a Minnesota study. Similarly, in an Australian study of 2000 teenagers, vegetarians were more concerned with being slim, and they restricted energy intake more often than nonvegetarians (Worsley & Skrzypiec, 1998). Eating disorders in general and anorexia and bulimia nervosa in particular are complex disorders, in which problems are linked on behavioral, cognitive and emotional levels (Bussolotti et al., 2002). For example, Fisher, Schneider, Pegler, and Napolitano (1991) studied suburban female high school students and found strong intercorrelations among abnormal eating attitudes, low self-esteem, high anxiety, and increased weight concerns. Furthermore, Spink (1992) has found a relationship between self-presentational concern of social physique anxiety and eating disorder correlates. Many researchers (APA, 1994; Gross & Rosen, 1988; Katzman & Woichik, 1984) reported that females with eating disorders tend to have higher need for social approval, experience high social anxiety and low self-esteem. Janda and Trocchia (2001) reported that self-esteem was not significantly associated with vegetarian-oriented attitudes. Also in our study there was no significant difference in self-esteem scores between groups ($p > 0.05$). In addition, there was a positive correlation between social physique anxiety and dieting scores ($r = 0.363$; $p < 0.05$) and a negative correlation between self-esteem and social physique anxiety scores ($r = 0.623$; $p < 0.05$) in vegetarian group.

Current study had several strengths and limitations. An important strength of this study is that it focused on a nonclinical, population-based sample. Previous studies in which associations between vegetarianism and eating disordered behaviors have been examined have focused on clinical populations and thus have examined the association from a different perspective (Neumark-Sztainer et al., 1997). Other studies of adolescent populations have employed convenient samples, in which participants were recruited via publicity in the media, at health food stores, and in schools (Donovan & Gibson, 1996). Clinical and convenient samples have the disadvantage of having biased and nonrepresentative study populations. Another strength

of the study is that the study sample was drawn from a larger population. We assume that this is the first study related with vegetarianism and eating disorders in Turkey, therefore, our study was limited by the self-reporting of vegetarianism and eating disorder behaviors, and the cross-sectional design of the study.

As a conclusion, the present study indicated abnormal eating attitudes, low self-esteem, high social physique anxiety, and high trait anxiety in Turkish vegetarian adolescents. The vegetarian adolescents may be more likely to display disordered eating attitudes and behaviors than nonvegetarians. However, health care providers that are counseling vegetarian adolescents need to be alert to their higher risk for disordered eating behaviors. Nutrition education is already commonplace in student health centers programs that have been found to be effective can be easily incorporated into eating disorder prevention.

References

- Allen, M. W., Wilson, M., Ng, S. H., & Dunne, M. (2000). Values and beliefs of vegetarians and omnivores. *The Journal of Social Psychology, 140*, 405–422.
- Alloway, R., Reynolds, E., Spargo, E., & Russell, G. F. M. (1985). Neuropathy and myopathy in two patients with anorexia and bulimia nervosa. *Journal of Neurology, Neurosurgery and Psychiatry, 48*, 1015–1020.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Bakan, R., Birmingham, C. L., Aeberhardt, L., & Goldner, E. M. (1993). Dietary zinc intake of vegetarian and nonvegetarian patients with anorexia nervosa. *International Journal of Eating Disorders, 13*, 229–233.
- Barr, S. I., & Broughton, T. M. (2000). Relative weight, weight loss efforts and nutrient intake among health-conscious vegetarian, past vegetarian and non-vegetarian women ages 18 to 50. *Journal of American College Nutrition, 19*(6), 781.
- Barr, S. I., & Chapman, G. E. (2002). Perceptions and practices of self-defined current vegetarian, former vegetarian, and nonvegetarian women. *Journal of the American Dietetic Association, 102*, 355–360.
- Beardsworth, A. D., & Keil, E. T. (1992). The vegetarian option: Varieties, conversions, motives and careers. *Sociological Review, 40*, 253–293.
- Beef Information Centre, Agriculture and Agri-Food Canada (1998). *Canadian Eating Trends Study*.
- British Nutrition Foundation (1995). *Vegetarianism. Briefing paper*. London: British Nutrition Foundation.
- Bussolotti, D., Fernandez-Aranda, F., Solano, R., Jimenez-Murcia, S., Turon, V., & Vallejo, J. (2002). Marital status and eating disorders an analysis of its relevance. *Journal of Psychosomatic Research, 53*, 1139–1145.
- Cohen, B., Evers, S., Manske, S., Bercovitz, K., & Edward, H. H. (2003). Smoking, physical activity and breakfast consumption among secondary school students in a Southwestern Ontario community. *Canadian Journal of Public Health, 94*(1), 41–44.
- Çuhadaroglu, F. (1986). Self-esteem in adolescents. Unpublished doctoral dissertation, Hacettepe University, Turkey.
- Davis, C., Elliott, S., Dionne, M., & Mitchell, I. (1991). The relationship of personality factors and physical activity to body satisfaction in men. *Personality and Individual Differences, 12*, 689–694.
- Donovan, U. M., & Gibson, R. S. (1996). Dietary intakes of adolescent females consuming vegetarian, semi-vegetarian, and omnivorous diets. *Journal of Adolescent Health, 18*, 292–300.
- Drenowski, A., Kurth, C. L., & Krahn, D. D. (1995). Effects of body image on dieting, exercise, and anabolic steroid use in adolescent males. *International Journal of Eating Disorders, 17*, 381–386.
- Dwyer, J. T. (1991). Nutritional consequences of vegetarianism. *Annual Review of Nutrition, 11*, 61.
- Ferry, C. L., McGuire, M. T., Newmark-Sztainer, D., & Story, M. (2001). Characteristics of vegetarian adolescents in a multiethnic urban population. *Journal of Adolescent Health, 29*, 406–416.
- Fisher, M., Schneider, M., Pegler, C., & Napolitano, B. (1991). Eating attitudes, health-risk behaviors, self-esteem and anxiety among adolescent females in a suburban high school. *Journal of Adolescent Health, 12*, 377–384.
- Freeland-Graves, J. H., Greninger, S. A., Graves, G. R., & Young, R. K. (1986). Health practices, attitudes and beliefs of vegetarians and nonvegetarians. *Journal of the American Dietetic Association, 86*, 913–918.
- Gallagher, D., Visser, M., Sepulveda, D., Pierson, R. N., Harris, T., & Heymsfield, S. B. (1996). How useful is BMI for comparison of body fatness across age, sex and ethnic groups? *American Journal of Epidemiology, 143*, 228–239.
- Garner, D., & Garfinkel, P. (1979). The EAT: An index of the symptoms of anorexia. *Psychological Medicine, 9*, 273–279.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine, 12*, 871–878.
- Gilbody, S. M., Kirk, S. F., & Hill, A. J. (1999). Vegetarianism in young women: Another means of weight control? *International Journal of Eating Disorders, 26*, 87–90.
- Gross, J., & Rosen, J. C. (1988). Bulimia in adolescents: Prevalence and psychological correlates. *International Journal of Eating Disorders, 7*, 51–61.
- Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport and Exercise Psychology, 11*, 94–104.
- Janda, S., & Trocchia, P. J. (2001). Vegetarianism: Toward a greater understanding. *Psychology & Marketing, 18*(12), 1205–1240.
- Janelle, K. C., & Barr, S. I. (1995). Nutrient intakes and eating behavior scores of vegetarian and nonvegetarian women. *Journal of the American Dietetic Association, 95*, 180–186.
- Kadambari, R., Gowers, S., & Crisp, A. H. (1986). Some correlates of vegetarianism in anorexia nervosa. *The International Journal of Eating Disorder, 5*, 539–544.
- Kalof, L., Dietz, T., Stern, P. C., & Guagnano, G. A. (1999). Social psychological and structural influences on vegetarian beliefs. *Rural Sociology, 64*, 500–511.
- Katzman, M. A., & Woichik, S. A. (1984). Bulimia and binge eating in college women. A comparison of personality and behavioral characteristics. *Journal of Consulting and Clinical Psychology, 52*, 423–428.
- Kenyon, P. M., & Barker, M. E. (1998). Attitudes towards meat-eating in vegetarian and non-vegetarian teenage girls in England: An ethnographic approach. *Appetite, 30*, 185–198.
- Klopp, S. A., Heiss, C. J., & Smith, H. S. (2003). Self-reported vegetarianism may be a marker for college women at risk for disordered eating. *Journal of American Dietetic Association, 103*(6), 745–747.
- Larsson, C. L., Klock, K. S., Astrom, A. N., Haugejorden, O., & Johansson, G. (2001). Prevalence and food habits of vegetarian adolescents. *Public Health Nutrition, 45*, 1005–1014.
- Larsson, C. L., Klock, K. S., Astrom, A. N., Haugejorden, O., & Johansson, G. (2002). Lifestyle-related characteristics of young low-meat consumers and omnivores in Sweden and Norway. *Journal of Adolescent Health, 31*, 190–198.
- Martins, Y., Pliner, P., & O'Connor, R. (1999). Restrained eating among vegetarians: Does a vegetarian eating style mask concerns about weight? *Appetite, 32*, 145–154.
- Newmark-Sztainer, D., Story, M., Resnick, M. D., & Blum, R. W. (1997). Adolescent vegetarians. A behavioral profile of a school-based

- population in Minnesota. *Archives of Pediatric and Adolescent Medicine*, 151(8), 833.
- O'Connor, A. M., Touyz, W. S., Dunn, S. M., & Beumont, P. J. (1987). Vegetarianism in anorexia nervosa? A review of 116 consecutive cases. *The Medical Journal of Australia*, 147, 540–542.
- Öner, N., & Le Compte, A. (1985). *State and trait anxiety inventory handbook*. Istanbul, Turkey: Bogazici University.
- Perry, C. L., Mc Guire, M. T., Neumark-Sztainer, D., & Story, M. (2001). Characteristics of vegetarian adolescents in a multiethnic urban population. *Journal of Adolescent Health*, 29, 406.
- Perry, C., McGuire, M. T., Neumark-Sztainer, D., & Story, M. (2002). Adolescent vegetarians. How well do their dietary patterns meet the healthy people 2010 objectives? *Archives of Pediatric and Adolescent Medicine*, 156, 431–437.
- Serdula, M. K., Cikkubs, M., Williamson, D. F., Anda, R. F., Pamuk, E., & Byers, T. E. (1993). Weight control practices of U.S. adolescents and adults. *Annals of Internal Medicine*, 119, 667–671.
- Shur, E., Alloway, R., Obrecht, R., & Russell, G. F. M. (1988). Physical complications in anorexia nervosa: Haematological and neuromuscular changes in 12 patients. *British Journal of Psychiatry*, 153, 72–75.
- Silverstone, R. (1993). Vegetarianism: Food for the future. *Nutrition and Food Science*, 6, 20–24.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologist Press.
- Spink, K. S. (1992). Relation of anxiety about social physique to location of participation in physical activity. *Perceptual & Motor Skills*, 74, 1075–1078.
- Sullivan, V., & Damani, S. (2000). Vegetarianism and eating disorders—partners in crime? *European Eating Disorders Review*, 8(4), 263–266.
- Twigg, J. (1983). Vegetarianism and the meanings of meat. In A. Murcott (Ed.), *The sociology of food and eating* (pp. 18–30). Aldershot: Gower Press, 18–30.
- Way, K. (1995). Never too rich or too thin: The role of stigma in the social construction of anorexia nervosa. In J. Sobal, & D. Maurer (Eds.), *Eating agendas*. New York: Adline de Gruyter.
- Wilson, M. A., Rau, S. I., Trautmann, J. A., & Walters, C. M. (2004). The prevalence of restricted and disordered eating behaviors among vegetarian and non-vegetarian college freshmen. *Journal of American Dietetic Association*, 104(Suppl. 2), 21.
- Worsley, A., & Skrzypiec, G. (1997). Teenage vegetarianism: Beauty or the beast? *Nutrition Research*, 17(3), 391–404.
- Worsley, A., & Skrzypiec, G. (1998). Teenage vegetarianism: Prevalence, social and cognitive context. *Appetite*, 30, 151–170.