The Effects of Eating Habits, Physical Activity, Nutrition Knowledge and Self-efficacy Levels on Obesity[i]

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Abstract   The aim of this study was to investigate the effects of eating habits, physical activity, nutrition knowledge and self-efficacy levels on obesity. The participants of the research were the students of Kafkas University Physical Education and Sports College and Sarıkamış Vocational School. Research includes eating habits, physical activity (PA), nutrition knowledge and self-efficacy questionnaire. The cases were divided into normal weight (NW) and overweight - obese (OW) groups based on age, gender, and body mass index percentages. The obtained data were analyzed using SPSS. According to the findings; approximately 35.5% of participants were identified as overweight or obese. Significant differences were observed between the OW and NW groups in terms of gender, weight control (P <0.01). OW group women were found to exhibit less desirable behaviors compared to NW. In comparison between OW group and NW group, it was determined that women participated in less physical activity than men. There was no significant difference in nutritional information between OW and NW groups. In particular, the self-efficacy level of the PA was significantly lower in the OW group than in the NW group (P <0.01). Conclusion: this study reveals eating habits, PA and self-efficacy differences among university students. It should focus on improving the self-efficacy of university students, changing eating habits and increasing PA levels by organizing programs to combat obesity.

Keywords   Student, Obesity, Weight Control, Physical Activity, Nutrition Knowledge

1. Introduction

According to the World Health Organization (WHO) report, the prevalence of obesity doubled worldwide between 1980 and 2014 [30]. Many countries have embraced and implemented various national policies to prevent obesity and to reduce obesity and socio-economic burden, since obesity has been shown to be a risk factor for chronic diseases such as cardiovascular disease, type II diabetes and some cancers [10]. Throughout the period corresponding to early adulthood in college, social and emotional development is complemented by physical maturity and one's eating habits are determined [35].

However, the increasing risk of chronic illness due to changes in nutrition habits by university students is not adequately considered. Obesity in college students is seen as the first indication of the risk of future chronic diseases of obesity [15]. For this reason, it is very important to actively control obesity from the first years of university. Although the cause of obesity is complicated, nutrition habits or lifestyle play an important role in the development of obese conditions [13, 19]. Physical activity deficiency and inadequate nutrition of university students are considered as an important public health problem. Physical activity may continue during adolescence and during adulthood [5, 23]. It is emphasized that especially after the students enter and graduate from college, they have experienced a significant decrease in their physical activities [20]. There are reports that 50% of university students are not at the recommended level of physical activity [13, 22].

Physical inactivity is among the most important causes of the increase in the number of obese people. In addition, there is a close relationship between obesity and cardiovascular diseases, diabetes, osteoporosis, some types of cancer, mental problems, and many health problems in studies conducted [16, 17]. Increasing physical activity has a positive effect on obesity, and therefore it is suggested that there are many studies emphasizing the effect of treatment with the preventive effect on the above mentioned diseases [28]. Factors related to eating or physical activity should also be defined in order to help students adopt healthy behaviors [26]. Knowledge of eating or physical activity is necessary to make the behavior, but it needs to be combined with the skills. Self-efficacy represents perceived ability to perform behavior and is known to be important in describing health behaviors such as eating and physical activity [15, 13]. The aim of this study is to examine the eating habits, physical

activities, nutrition knowledge and self-sufficiency of university students and to investigate whether these characteristics differ according to obesity status.

2. Materials and Methods

2.1. Subject and Participants

This study was planned to examine the factors related to eating habits, physical activities and nutrition knowledge of students of Kafkas University. Inclusion criteria: does not having musculoskeletal problems that could affect chronic disease and physical activity, being older than 18. The participants of the research were the students of Kafkas University Physical Education and Sports College and Sarıkamış Vocational School. The researchers explained the work to the school principals or teachers and asked every student to participate in the study. A written consent was obtained for the students to participate in the study. 220 male and female healthy university students participated in the study. Participants were divided into two groups, normal weight (NW) and overweight obese (OW), according to their age, gender and body mass index percentages. The study was conducted in accordance with the Helsinki declaration [33].

2.2. Procedures

The study questionnaire was based on university students' eating habits, physical activity and nutrition knowledge, and literature review to determine self-efficacy levels [30, 8, 14]. General features include the items of age, gender, height, weight, body mass index (BMI). The body mass index was calculated based on the weight and the dye reported. Participants' height measurements were measured by the millimetric height scale and body weight measurements by electronic scales. Body weight and height measurements were formulated by adding them to personal information forms. BMI = Body Weight (kg) / Boy2 (m). BMI values were obtained by dividing the body length by body weight after taking the length of the body length. Overweight-obese (OW) with BMI $\geq$ 25 and BMI 18.5 <BKI <25 were determined as those with normal weight (NW).

2.4. Eating Habits

Eating habits included diverse foods, regular meals, size of food, frequency of breakfast meals, eating and snacks, behavior during meals, unbalanced diet and unfavorable food [25, 9]. These variables were measured using 5-point scales or by asking them to record the frequency of their behavior or to check the categories.

2.5. Physical Activity

Physical activity is measured based on seven factors: the frequency of physical activity for at least 30 minutes per day, the frequency of walking or cycling, the frequency of exercise, weekday or weekend walking times, weekday or weekly moving time, by the number of activities they have performed [12,7]. The time spent walking was measured using four categories: "less than 30 minutes a day" or "more than 2 hours a day." The inactive time spent was measured using the categories "from less than one hour a day" to "no more than 4 hours a day".

2.6. Nutrition Knowledge

Nutrition knowledge was measured on 10 items, including general nutrition (six items) and information about obesity (four items) [25, 9], information about obesity, definition of obesity, adequate weight control, fruit and energy and the effects of regular exercise. For each nutritional information item, the number and percentage of correct answers of the subjects were examined. The total score of the nutrition knowledge was the total score of the correct answers for 10 nutrition knowledge items.

2.7. Self-efficacy

Self-efficacy obesity status in eating or physical activity was assessed using 10 items [25,18,14]. Self-efficacy in physical activity was measured using four items. They regularly participate in sports exercises, perceived efficacy on tired or bad weather conditions, driving at short distances, exercising at lunch or in the malls. Each item was measured on a 4-item scale between 'very difficult' (1) and 'very easy' (4). The total score for self-efficacy was calculated as a total of 10 item points.

2.8. Statistical Analyses

SPSS (PASW Statistics 18.0; SPSS Inc., Chicago, IL, USA) was used for statistical analyses. Descriptive statistics including frequency, percentages, mean and standard deviation were calculated. Body weight and height measurements were formulated by adding them to personal information forms. BMI = Body Weight (kg) / Boy2 (m). BMI values were obtained by dividing the body length by body length after taking the body length. In this study T-test was used for parametric variables to examine the differences between the eating habits, physical activity, nutrition knowledge and self-efficacy according to obesity status. Chi-square analyses were conducted for non-parametric variables. Statistical significance was examined at P <0.05.

3. Results

Participants were found to have an average age of 21.97 and approximately 64.5% (142) of them were in the normal weight (NW) group and 35.5% (78) of them were in the overweight - obesity (OW). Gender is significantly different according to obesity status; In the OW group, the

rate of famale (64.1%) was higher than that of the NW group (56.3%, P <0.01) (Table 1).

Table 1. General Descriptive Characteristics of University Students

Variables	Obesity status[1]		Total (n=220)
	Normal (n = 142)	Overweight & Obesity (n = 78)	
Age	22.0±1.7	21.95±2.2[2]	21.97±1.95
Weight (kg)	66.4 ± 14.8	78.5 ± 11.8	72.45±13.3
Height (cm)	175.0 ± 10.3	169.0 ± 10.1	172±10.2
BMI	22.6 ± 4.1	28.2 ± 3.4	25.4±3.7
Male	62 (43.7)	28 (35.9)	90 (39.8)
Famale	80 (56.3)	50 (64.1)[3]**	130 (60.2)

** P < 0.01, [1]) BKİ ≥25 overweight - obesity (OW) ve BKİ 18.5 < BKİ < 25 normal weight (NW), [2]) Mean ± SD, [3]) n (%)

The average rate of having breakfast was 5.0 ± 1.6. The frequency of breakfast both sexes in the AO group was lower compared to the NA group (P <0.05). While the frequency of eating outside did not differ according to obesity status in men, AO women NA was found to eat less than women (P <0.01). The mean prevalence of snacks in both sexes was 1.6 ± 1.3 fold in the NA group and 1.2 ± 0.8 ** fold in the AO group (P <0.01).Approximately 27% of respondents indicated that they did not eat a variety of foods or a wide variety of foods, while 43% of them reported that they ate various foods or ate a wide variety of foods very frequently. Approximately 34% of participants were fed with irregular food, while the rate of regular eating was about 35%. The proportion of those who responded as 'small' or 'very small' according to the size of the meal ratio was significantly higher in the AO group (P <0.001) compared to the NA group both in boys and girls. With respect to the eating behavior, 50.5% of the participants were chatting with family members. Approximately 39.1% of the participants were fed an unbalanced diet (Table 2). The proportion of women fed an unbalanced diet was 41.2% lower in the AO group (36.0%) than in the NA group (P <0.001). No significant difference was observed between the participants regarding the unfavorable foods (Table 2).

Table 2. Eating habits according to obesity status in university students

Variables	Male (n=90)		Female (n=130)		Total (n=220)
	Normal (n= 62)	Overweight & Obesity (n =28)	Normal (n= 80)	Overweight & Obesity (n =50)	
Breakfast frequency (times/week)	5.6 ± 1.4	4.5 ± 1.6[3]*	5.7 ± 1.6	4.4 ± 1.7*	5.0 ± 1.6
Frequency of eating out (times/week)	1.3 ± 1.1	1.1 ± 0.8	1.4 ± 0.7	1.1 ± 0.8**	1.2 ± 0.8
Frequency of eating snacks (times/day)	1.6 ± 1.3	1.2 ± 0.8**	1.6 ± 1.2	1.2 ± 0.8**	1.4 ± 1.0
Variety of foods					
Do not eat a variety of foods at all	7 (11.3)	3 (10.7)[4]*	11 (13.7)	4 (8.0)*	25(11.4)
Do not eat a variety of foods	8 (12.9)	5 (17.9)	13 (16.3)	9 (18.0)	35(15.9)
Average	17 (27.4)	7 (25.0)	26 (32.5)	14 (28.0)	64(29.0)
Eat a variety of foods	16 (25.8)	8 (28.5)	18 (22.5)	13 (26.0)	55(25.0)
Eat a variety of foods very often	14 (22.6)	5 (17.9)	12 (15.0)	10 (20.0)	41(18.7)
Regular meals					
Very irregular	6 (9.7)	4 (14.3)	9 (11.2)	8 (16.0)**	27(12.3)
Irregular	12 (19.3)	6 (21.5)	18 (22.5)	12 (24.0)	48(21.8
Neither irregular nor regular	17 (27.4)	8 (28.5)	25 (31.3)	16 (32.0)	64(29.0)
Regular	18 (29.0)	7 (25.0)	20 (25.0)	9 (18.0)	54(24.5)
Very regular	9 (14.6)	3 (10.7)	8 (10.0)	5 (10.0)	25(11.4)
Size of meals					
Very small/ small	18 (29.0)	5 (17.9)**	15 (18.7)	17 (34.0)**	55(25.0)
Adequate	24 (38.7)	16 (57.1)	43 (53.8)	23 (46.0)	106(48.1)
Large/very large	20 (32.3)	7 (25.0)	22 (27.5)	10 (20.0)	59(26.9)
Behavior during meals					
Just eating	15 (24.1)	7 (25.0)	12 (15.0)	7 (14.0)	41(18.6)
Conversation with family members	25 (40.3)	13 (46.4)	48 (60.0)	25 (50.0)	111(50.5)
Playing games or watching TV	13 (20.9)	5 (17.9)	13 (16.3)	10 (20.0)	41(18.6)
Reading a book or others	9 (14.7)	3 (10.7)	7 (8.7)	8 (16.0)	27(12.3)
Unbalanced diet					
Yes	25 (40.3)	10 (35.7)	33 (41.2)	18 (36.0)**	86(39.1)
No	37 (59.7)	18 (64.3)	47 (58.8)	32 (64.0)	134(60.9)
Foods that they dislike[1]					
Grains and starches	11(17.7)[5]	8 (28.4)	16 (20.0)	12 (24.0)	47(21.4)
Meat	7 (11.3)	3 (10.7)	11 (13.7)	8 (16.0)	29(13.2)
Fish	3 (4.8)	2 (7.2)	5 (6.3)	4 (8.0)	14(6.3)
Eggs	6 (9.7)	2 (7.2)	8 (10.0)	5 (10.0)	21(9.5)
Beans	11 (17.7)	3 (10.7)	13 (16.3)	7 (14.0)	34(15.5)
Vegetables	8 (12.9)	2 (7.2)	7 (8.7)	5 (10.0)	22(10.0
Fruits	6 (9.7)	3 (10.7)	6 (7.5)	4 (8.0)	19(8.6)
Dairy products	4 (6.5)	3 (10.7)	5 (6.3)	3 (6.0)	15(6.9)
Seaweeds	0	0	0	0	0
Others[2]	6 (9.7)	2 (7.2)	9 (11.2)	2 (4.0)	19(8.6)

* P < 0.05, ** P < 0.01, 1) Multiple answers, 2) Shellfish, soy bean paste, greasy foods, spicy foods, etc. 3) Mean ± SD
4) n (%), 5) The number in parentheses is the percentage of total subjects in each group.

Physical activity variables in women and men were significantly different between OW and NW groups. The percentage of those who stated they did not walk or bike on weekends was higher in males and females of the OW groups (P <0.05). In the OW group 71.5% of males and 76% of females were less than 3 hours per day during the weekend, 28.7% of NW females performed more than 3 hours at the weekend (P <0.01). Approximately 30% of OW women participated in physical activity for at least 30 minutes a day. The proportion of OW women exercising three or more times per week was lower than NW women (P <0.01). Approximately 90% of OW women walked less than an hour during weekdays or weekends, which was significantly higher than NW men (weekday and weekend p <0.01). Participants spent 29.5% and 28.7%, respectively, 3 hours or more per day on sedentary activity. About 72% and 71.3% of the OW women spent 3 hours or less on weekdays and weekends (P <0.01) (Table 3).

Table 3. The level of physical activity according to obesity status of university students

Variables	Male (n=90)		Female (n=130)		Total (n=220)
	Normal (n= 62)	Overweight & Obesity (n =28)	Normal (n= 80)	Overweight & Obesity (n =50)	
At least 30 minutes of physical activity per day (days/week)					
No	13(20.9)	6 (21.5)	15(18.7)	13 (26.0)**	47(21.4)
1-2	18(29.0)	8 (28.5)	25(31.3)	11 (22.0)	62(28.2)
3-4	17(27.4)	6 (21.5)	18(22.5)	16 (32.0)	57(25.9)
5-6	8(12.9)	5 (17.9)	14(17.5)	6 (12.0)	33(15.0)
7	6(9.7)	3 (10.7)	8(10.0)	4 (8.0)	21(9.5)
Walking or riding a bicycle (days/week)					
No	9(14.6)	11 (39.2)*	24(30.0)	14 (28.0)*	58(26.4)
1-2	10(16.2)	4 (14.3)	10(12.5)	7 (14.0)	31(14.1)
3-4	15(24.1	3 (10.7)	9(11.2)	8 (16.0)	35(16.0)
5-6	17(27.4)	5 (17.9)	20(25.0)	11 (22.0)	53(24.0)
7	11(17.7)	5 (17.9)	17(21.3)	10 (20.0)	43(19.5)
Time spent walking during weekdays (hours/day)					
< 30 min	12(19.3)	6 (21.5)	19(23.7)	15 (30.0)**	52(23.6)
30 min ≤ < 1 hour	27(43.6)	14 (50.0)	24(30.0)	20 (40.0)	85(38.6)
1 hour ≤ < 2 hours	10(16.2)	6 (21.5)	20(25.0)	8 (16.0)	44(20.0)
2 hours ≤	13(20.9)	2 (7.0)	17(21.3)	7 (14.0)	39(17.8)
Time spent walking during the weekend (hours/day)					
< 30 min	11(17.7)	7 (25.1)	18(22.5)	16 (32.0)**	52(23.7)
30 min ≤ < 1 hour	28(45.2)	15 (53.5)	25(31.3)	19 (38.0)	87(39.5)
1 hour ≤ < 2 hours	10(16.2)	5 (17.9)	21(26.2)	9 (18.0)	44(20.0)
2 hours ≤	13(20.9)	1 (3.5)	17(21.3)	6 (12.0)	37(16.8)
Sedentary activity during weekdays (hours/day)					
< 3	42(67.7)	22 (78.5)**	55(68.7)	36 (72.0)**	155(70.5)
3 ≤	20(32.3)	6 (21.5)	25(31.3)	14(28.0)	65(29.5)
Sedentary activity during the weekend (hours/day)					
< 3	46(74.1)	20 (71.5)**	53(66.2)	38 (76.0)**	157(71.3)
3 ≤	16(25.9)	8 (28.5)	27(33.8)	12 (24.0)	63 (28.7)
Number of days for exercise (times/week)					
No	8(12.9)	3 (10.7)	12(15.0)	8 (16.0)**	31(14.1)
1	14(22.6)	6 (21.5)	18(22.5)	11 (22.0)	49(22.3)
2	18(29.0)	9 (32.1)	24(30.0)	15 (30.0)	66(30.0)
3 ≤	22(35.5)	10 (35.7)	26(32.5)	16 (32.0)	74(33.6)

* P < 0.05, ** P < 0.01, 1) n (%)

Table 4. Nutritional knowledge and self-efficacy levels according to obesity status in university students

Variables	Male (n=90)		Female (n=130)		Total (n=220)
	Normal (n= 62)	Overweight & Obesity (n =28)	Normal (n= 80)	Overweight & Obesity (n =50)	
Nutrition Knowledge					
General nutrition knowledge score[1]	4.2 ± 0.7	3.8 ± 0.6	4.2 ± 0.7	3.8 ± 0.6	4.0 ± 0.7
Obesity knowledge score	3.2 ± 0.7	3.1 ± 0.6	3.4 ± 0.8	3.3 ± 0.7	3.3 ± 0.7
Nutrition knowledge total score	7.8 ± 1.4	7,9 ± 1.2	7.8 ± 1.4	7.9 ± 1.2	7.9 ±1.3
Self-efficacy					
Eating self-efficacy score	17.2 ± 2.8	18.2 ± 2.9	18.4 ±3.0	19.1 ± 3.1	18.2±2.9
Physical activity self-efficacy score	12.8 ± 2.1	11.2 ± 2.7**	12.7 ±2.2	11.1 ± 2.7**	11.9±2.4
Self-efficacy total score	31.7 ± 4.1	31.7 ± 4.2	31.8 ±4.1	30.7 ± 3.7**	31.4±4.0

Mean ± SD, ** P < 0.01

There was no significant difference between the OW and NW groups in both genders regarding nutrition knowledge. OW was found to have a total self-efficacy score (P <0.01) and a physical activity self-efficacy score (P <0.01) in women. OW women had significantly lower physical activity self-efficacy scores than NW women (P <0.01). However, there was no significant difference in eating habit between self-efficacy score between OW and NW groups in both genders (Table 4).

4. Discussion

The aim of this study is to examine the eating habits, physical activities, nutrition knowledge and self-sufficiency of university students and to investigate whether these characteristics differ according to obesity status. Participants were found to have an average age of 21.97 and approximately 64.5% (142) of them were in the normal weight (NA) group and 35.5% (78) of them were in overweight - obesity (OW). Gender is significantly different according to obesity status; In the OW group, the rate of female (64.1%) was higher than that of the NW group (56.3%). In a study conducted (Yahia et al., 2008), the majority of university students had normal weight. Normal weight women (76.8%) and men (49%) are overweight and obese than males. In the United States, 35% of the college students are reported to be overweight or obese (BMI≥25) [22].

According to our research results, eating habits according to obesity status of university students were lower than the NW group of both sexes. While eating out does not differ from obesity in men, OW consumes less women than women. The eating rate was significantly higher in the OW group than in the NW group both in boys and girls. It was determined that 50.5% of the participants talked about eating behavior with family members, about 39.1% of them were fed with an unbalanced. In a study [29], it was found that the proportion of individuals with regular eating patterns in young Japanese was low. Skipping breakfast is associated

with low nutritional status and the risk of cardiovascular disease. It has been reported that adequate breakfast habits may contribute to the development and further development of obesity [27]. These findings support our findings. Another study reported that approximately 40% of male students (527 males, 462 females) and 23% of female students of Crete University reported BMI> 25 kg / m2 [4]. A cross-sectional survey of 300 male students in the United Arab Emirates reported that the prevalence of obesity in men was 35.7%, which is higher than in women [24]. These findings are different from our findings.

This study shows that; physical activity variables in women and men were significantly different between OW and NW groups. The percentage of those who said that they did not use hiking or cycling on weekends was higher in male OW and female OW groups. On weekends, men and women participated in physical activity less than 3 hours a day, and on weekends NW group participated in physical activity for at least 30 minutes a day. The rate of OW women exercising three or more times a week is lower than NW. OW women walked less than an hour on weekdays or weekends. OW women spent 3 hours or less on weekdays and weekends. In a study conducted, the nutrition and physical activity habits and obesity cases of the university students were investigated, only 8.5% of girl students and only 28.1% of male students had sufficient physical activity level [2]. Similarly, in the previous study [31] obese children were reported to have negative attitudes and are less likely to participate in physical activity than normal weight children. Baek [3] reported that obese children often exercise, but do not exercise vigorously or prefer to sit and have fun. Obviously, obesity is the result of modern life styles such as irregular physical activity and sedanter.

This study revealed that there was no significant difference between the OW and NW groups in both genders regarding nutrition knowledge. The OW women had significantly lower physical activity self-efficacy scores than NW women. However, there was no significant difference in eating habit between self-efficacy score between OW and NW groups in both genders. This finding

suggests the importance of self-sufficiency that explains obesity or healthy behavior. Studies of self-efficacy in obese children [1, 11] have found that children have difficulties with psychosocial adaptation and that they are able to perform or perceive their physical activity more negatively with increasing obesity. In a study examining health-related physical fitness, [19] it was found that as children increased in their obesity levels, their physical fitness for health decreased. Contrary to our expectation, perceived confidence in eating behavior was not significantly different from obesity in boys or girls. This was finding unlike a previous study of self-efficacy for nutritional behavior [21].

As a result, it was determined that OW group students less often participated in physical activity than NW students in this study. Healthy eating habits such as having breakfast and the size of an adequate meal seemed to be less preferred in OW group students and especially in women. Nutritional information does not show any significant difference between OW and NW groups, while physical activity self-efficacy is lower in OW group than NW group. For this reason, physical education programs for the prevention of obesity in children should attach importance to increasing the confidence in performing exercise or physical activity. Physical education programs should focus on providing practical tips for increasing physical activity and changing eating behavior. In addition, they should include adequate methods of body image, body satisfaction and weight control. In addition, university students are at risk because of the lack of nutrition knowledge, psycho-social and economic reasons, TV and peer interaction and similar reasons. In this context it is important to give information to young people, families and trainers about this issue and to raise awareness.

Conflicts of Interest

There isn't any conflict of interest to be declared regarding the manuscript.

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