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Determining the Risk Factors Related with Obesity and Overweight in Junior High School Students: A Case-Control Study

Ortaokul Öğrencilerinde Obezite ve Fazla Kiloluluk ile İlişkili Risk Faktörlerinin Belirlenmesi: Vaka Kontrol Çalışması

Belgin AKIN,[a]
Deniz KOÇOĞLU,[a]
Tuba ÖZAYDIN,[a]
Emine ERGİN[a]

[a]Department of Public Health Nursing, Selcuk University Health Science Faculty, Konya

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Correspondence:
Emine ERGİN
Selcuk University Health Science Faculty, Department of Public Health Nursing, Konya,
TURKEY/TÜRKİYE
eminesariselcuk@gmail.com

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ABSTRACT Objective: This study was designed as a case control study with the purpose of determining the causes of obesity and being overweight in Turkish junior high students. **Material and Methods:** The case group included 72 students in the sixth, seventh and eighth grades who were observed to be obese or overweight. The control group included 72 students who were considered to be of normal weight, study sample included totally 144 students. The study data were collected during personal interviews using the survey form. The researchers used estimated relative risk and confidence interval calculations, to determine the risk factors of obesity. Logistic regression analysis was performed. **Results:** The important risk factors found in this study were: 1) not having breakfast (OR:3.8.40, CI:1.798-8.200), 2) skipping meals (OR:2.949, CI:1.466-5.937), 3) having obese family members (OR:2.471, CI:1.264-4.833), 4) being physically inactive between lessons (OR:2.588, CI:1.297-5.167), 5) coming from a family of at least five members (OR:2.101, CI:1.075-4.108), and 6) watching tv or using the computer two hours or longer daily (OR:2.2004, CI:1.313-4.096). There was no correlation between obesity and sex, education levels of parents, birth weight, having been breast fed , eating while watching TV, daily duration of sleep, perception of income, school achievement, being certified in sports activities, and the frequency of being active. **Conclusion:** In this study, the risk factors for obesity were: Not having breakfast, a lack of physical activity between lessons, having five or more members in the family, and watching TV or using the computer two hours or longer daily.

Keywords: Overweight; school nursing; obesity; case control study

ÖZET Amaç: Çalışma ortaokul öğrencilerinde obezite ve fazla kiloluluğun nedenlerinin belirlenmesi amacıyla vaka-kontrol çalışması türünde planlanmıştır. **Gereç ve Yöntemler:** Vaka grubunda obez ve fazla kilolu kabul edilen altıncı, yedinci ve sekizinci sınıfta okumakta olan 72 öğrenci, kontrol grubunda normal kiloda olan 72 öğrenci olmak üzere çalışmanın örnek sayısı toplam 144 öğrencidir. Veriler anket formu kullanılarak yüz yüze görüşme tekniğiyle toplanmıştır. Obezite için risk faktörlerinin belirlenmesinde tahmini rölatif risk ve güven aralığı hesaplamalarından yararlanılmıştır. Lojistik regresyon analizi yapılmıştır. **Bulgular:** Bu çalışmada önemli risk faktörleri; 1) kahvaltı yapmama (OR:3.8.40, GA:1.798-8.200), 2) öğün atlama (OR:2.949, GA:1.466-5.937), 3) ailede obez bireyin olması (OR:2.471, GA:1.264-4.833), 4) ders arası fiziksel aktivitede bulunamama (OR:2.588, GA:1.297-5.167), 5) ailede yaşayan birey sayısının beş ve üzerinde olması (OR:2.101, GA:1.075-4.108), 6) televizyon izleme/bilgisayar kullanma süresinin iki saat ve üzerinde olması (OR:2.2004, GA:1.313-4.096) olarak bulunmuştur. Cinsiyet, anne-baba eğitim durumu, doğum kilosu, anne sütü alma, televizyon izlerken bir şeyler yeme, günlük uyku süresi, gelir algısı, okul başarı durumu, sportif faaliyetlerine yönelik sertifikanın olması ve aktivite sıklığı ile obezite riski arasında ilişki bulunamamıştır. **Sonuç:** Çalışmamızda obezite için risk faktörleri; kahvaltı yapmama, ders arasında fiziksel aktivitede bulunmama, ailede yaşayan birey sayısının beş ve üzerinde olması ve TV izleme/bilgisayar kullanma süresinin iki saat ve üzerinde olması olarak belirlenmiştir.

Anahtar Kelimeler: Fazla kiloluluk; okul hemşireliği; obezite; vaka kontrol çalışma

According to the World Health Organization (WHO), obesity is "the abnormal and excessive accumulation of fat in the human body to the extent in which it could cause a deterioration of health", and it is widely predicted that obesity will rapidly become more common in the upcoming years.[1] According to the WHO data, there were more than 600 million obese individuals and approximately 1.9 billion overweight individuals in the world in 2014. The 2014 data also indicates that more than 41 million children who are younger than five years are obese or overweight. Most of the world's population live in countries where overweight and obesity kills more people than underweight. Although the prevalence of childhood obesity was high in developed countries initially, today childhood obesity is a serious problem in developing countries as well .[2]

The international studies of this issue have determined that childhood obesity is a serious public health problem that should be thoroughly addressed soon. [3,4] and more likely to develop non-communicable diseases like diabetes and cardiovascular diseases at a younger age.[3]

Many studies of this issue were conducted in Turkey. It was found that the prevalence of obesity was equal (1.0%) among school children aged 9-17 in the province of Diyarbakır and the surrounding area. A study of the prevalence of obesity among school children aged 6-15 living in Muğla, Turkey determined that 17.0% of all students were overweight and 7.1% were obese. Among them, 18.1% of the girls were overweight and 6.6% were obese, while 16.0% of the boys were overweight and 7.6% were obese.[5,6] In the province of Konya, the prevalence of being overweight and the prevalence of obesity among children aged 11-16 were 17.8% and 3.8%, respectively.[7] A study conducted in Karaman with the purpose of determining the prevalence of obesity among 26,025 school children found that the rate of being overweight was 8.6%, and the rate of obesity was 7.9%.[8] Another study conducted in Mardin among primary and middle school children aged 6-15 found that the prevalence of obesity was 4.4% among girls and 4.3% among boys. The prevalence of being overweight was 16.9% among girls and 12.7% among boys. It was also determined that the prevalence of obesity increased in direct proportion with age in both sexes.[9] National and international studies show that the rate of obesity increases as people get older.[4,6-9]

The relevant literature also includes studies aimed to determine the risk factors of obesity and being overweight, in addition to the studies on their prevalence. According to these studies, the risk factors of obesity are genetics, age, sex, ethnic background, medical history of the family, birth weight, education levels of parents, residence, nutritional habits, physical activity levels, socio-economic and cultural status, and psychological factors.[10-12] In the study by Uğuz and Bodur, the factors related to being overweight and obese were: 1) being an adolescents, 2) the presence of an obese mother or sibling, 3) the occupation of the father, and 4) a high economic level of the family.[7] In addition to the factors stated above, it was determined that other factors that lead to obesity include 1) the nutritional habits created by modern life in which people consume high amounts of fat and carbohydrates, 2) a decrease in physical activity among adolescents, while more time is spent watching TV and playing computer games.[13] A systematic review of 14 different studies that included multiple risk factors for childhood obesity among Asian Americans were reported, including acculturation, generational status, and family functioning.[14]

Obesity is a health problem in itself, and it is also seen as the cause of many other health problems. In children, obesity leads to psychological problems including loss of self-confidence, avoiding relationships with peers, becoming withdrawn, and the sense of being excluded all the time.[3,4] Obesity not only causes psychological problems, but it may also lead to heart disease, hyperlipidemia, diabetes, hypertension and atherosclerosis in later years. The fight against obesity, which is accepted as an important public health issue that will remain as serious in the upcoming years as it is today, has become a remarkable part of health policies and targets. The WHO aims to develop programs which

promote a healthy diet and increased physical activity in order to reduce the rate of death and disease across the world. In Turkey, the Ministry of Health has been making plans to fight obesity with the aim of preventing it.[15]

School health services play an important role in the struggle against childhood obesity, since the school environment has a direct influence on health because of its physical and social setting. The school environment can have an influence on the development of positive health attitudes and behaviors.[16,17] Children can be prevented from becoming obese in later years when precautions are taken regarding the factors that are determined to be related to obesity and being overweight. Case-control studies can re-evaluate the risk factors which are assessed by cross-sectional studies. This is an important epidemiological step in thoroughly evaluating the role of the risk factors in the emergence of obesity. For all these reasons, this study aimed to determine the risk factors related to obesity and being overweight among junior high school students

MATERIAL AND METHODS

STUDY DESIGN

This study was designed as a case-control study with the aim of determining the risk factors related to obesity and being overweight among junior high school students. It was conducted during the 2013 spring semester.

THE LOCATION OF THE STUDY AND ITS CHARACTERISTICS

The study was conducted in three junior high schools in the Selcuklu district of the province of Konya, Turkey. The families who reside near these junior high schools have similar socio-demographic characteristics. These three schools provide education at the primary and elementary levels. In total, there are 3,924 students and 182 teachers in these schools. The schools provide half-day schooling. Junior high school students attend classes in the morning, and primary students attend classes in the afternoon.

STUDY POPULATION, SAMPLE SELECTION, AND SAMPLE SIZE

In total, there were 1,246 students in the sixth, seventh and eighth grade from three junior high schools.

Case Group and Control Group: The researchers randomly selected 72 students among the children that were determined to be overweight or obese according to the obesity screening conducted at these schools by the Ministry of Health. The screening calculated the children's body mass index (BMI). The case group consisted of these 72 students selected randomly. The control group consisted of 72 students that were considered to have a normal weight according to the children's BMI calculation by the Ministry of Health. The subjects in the control group were assigned randomly among the students who had a normal weight, and who were similar to the students in the case group regarding age and sex. In total, 144 students participated in the study. The students who had a chronic disease and were taking medication regularly, as well as those who were thin and very thin according to the BMI calculation index, were not included in the study.

THE METHODS AND TOOLS FOR DATA COLLECTION

The study data were collected during personal interviews conducted during home visits and in the classrooms. The interviews were conducted by senior nursing students in the Health Sciences Faculty who had been trained beforehand in obesity measurements and in the administration of the survey form, under the supervision of implementation authorities. The BMI indices were calculated after height and weight measurements were taken at the schools. A scale was used to measure the children's weight, and a measuring tape was used to measure their height. When measuring height, the nursing students instructed the students to take off their shoes, and stand leaning on the wall, keeping their feet together, and having the back of their heads, back, bottom and the back of their heels touch the wall. The weights of the children were taken using a digital scale. The children were weighed without shoes and with light clothes. The BMI values were

calculated based on the children's BMI calculation system of the Ministry of Health.[18]

The obesity characteristics of participating students were determined using a survey form. The survey form was created by the researchers based on the relevant meta analyses in the literature.[19-22]

The survey form consisted of four sections and 30 questions about socio-demographic characteristics, nutritional status, activity levels and obesity characteristics. The socio-demographic characteristics section included questions about sex, age, grade, education levels of parents, income level of the family, number of family members, and whether the parents lived together. The nutritional status section provided information on whether the children were breast fed, the number of meals they consumed each day, whether they ate breakfast regularly, snacks, and their favorite foods. The activity section included questions related to the frequency of physical activities, leisure time, frequency of using the computer and watching tv, and daily duration of sleep. The obesity characteristics section asked about birth weight, the presence of any overweight members in the family, body weight, height, and BMI. Some questions in the survey were answered by the students. The data about birth weight, whether they were fed with breast milk, and the economic status of the family were collected from the parents during home visits. The data were collected based on self-report, it is the limitation of the research.

DATA ANALYSIS

The study data were analyzed using SPSS 20 software. The data were summarized in forms of numbers, percentages, and the analysis was conducted using chi square and the logistic regression analysis was performed with the variables which were significant according to the odds ratio calculation.

ETHICAL CONSIDERATIONS

The researchers obtained the approval of the ethics board and written permission from the Konya National Education Directorate. Ethics committee approval dated December 25, 2013, and numbered 34967403-10 was obtained. The students and their families were informed about the objective of the study.

RESULTS

Among all the students in the study, 65.3% were girls and 41.7% were sixth grade students. Approximately half of the students (50.7%) said that their economic status was good, and 2.1% said that it was poor. Also, 61.0% of the students said that they skipped breakfast, 35.6% skipped lunch, and 3.4% skipped dinner. In the case group, 52.8% were overweight and 47.2% were obese.

An analysis of the correlation between the socio-demographic characteristics of the case group and control group students (Table 1) indicated that 52.8% of the case group students had five or more family members living with them, while 47.2% of

TABLE 1: The students in the case and control groups by socio-demographic characteristics.

Variables	Control Group (%)	Case Group (%)	Chi-square p	OR CI (95%)
Mother education				
Primary or junior high school	66.7	68.1	X^2=0.032	1.065
High school or above	33.3	31.9	p = 0.859	(0.531-2.138)
Father education				
Primary or junior high school	38.8	50.7	X^2=2.018	1.616
High school or above	61.1	49.3	p = 0.155	(0.832-3.140)
Household				
1-4 individuals	65.3	47.2	X^2=4.769	2.101
5 or more individuals	34.7	52.8	p = 0.029	(1.075-4.108)

*OR; Odds ratio

*CI; Confidence interval *p < 0.05

the control group students had five or more members in their family. This difference is statistically significant ($p < 0.05$). There is no significant correlation between case and control groups regarding whether their parents lived together, or regarding their education levels ($p > 0.05$).

An evaluation of the correlation between case and control group students regarding nutritional characteristics (Table 2) showed that 45.8% of the case group students did not have breakfast, while 18.1% of the control group students did not have breakfast. This difference is statistically significant ($p < 0.05$). The rate of skipping meals among the case group students (51.4%) is higher than that of the control group students (26.4%); there is a significant difference between the groups ($p < 0.05$). There was no significant correlation between case and control groups and the status of having been fed with breast milk, eating snacks, and eating something when watching tv and used the computer ($p > 0.05$). In the control group, 33.3% of the students said that they ate snacks, while this rate was 44.4% in the case group.

The study found that the students in the case group consumed candies and fast food as snacks (candies: 42.3%; fast food: 15.5%) more frequently than the students in the control group (candies: 38.2%; fast food: 12.7%), yet the students in the control group (49.1%) consumed fruit and dairy products as snacks more frequently than the students in the case group (42.3%).

The study also evaluated the correlation between case and control group students regarding physical activities (Table 3), and found that 56.9% of the students in the case group watched tv and used the computer more than two hours a day, while 37.5% of the students in the control group watched tv and used the computer more than two hours a day. This difference is statistically significant ($p < 0.05$). Among the participants, 44.1% of the case group students and 67.2% of the control group students play games during the breaks between lessons; this difference is statistically significant ($p < 0.05$). However, there was no significant difference between the case and control groups in terms of physical activities, leisure time activities, duration of sleep, participating in gymnastics or swimming courses, and the grades in their reports ($p > 0.05$). The rate of participation in gymnastics or swimming courses among case group students (23.6%) and that of engaging in physical activities after school (23.6%) were lower than the rates of the control group students regarding gymnastics or swimming courses (37.5%) and physical activities

TABLE 2: The students in the case and control groups by nutritional characteristics.

Variables	Control Group (%)	Case Group (%)	Chi-square p	Relative Risk CI (95%)
Having been fed with breast milk				
Yes	98.6	97.9	X^2=0.560	2.029
No	1.4	2.1	**p = 0.340**	(080-22.883)
Having breakfast				
Yes	81.9	54.2	X^2=12.777	3.840
No	18.1	45.8	**p = 0.000**	(1.798-8.200)
Skipping meals				
Yes	26.4	51.4	X^2=9.468	2.949
No	73.6	48.6	**p = 0.002**	(1.466-5.931)
Having snacks				
Yes	33.3	44.4	X^2=1.870	1.600
No	66.7	55.6	**p = 0.171**	(0.814-3.144)
Eating something while watching TV				
Always or sometimes	83.3	87.5	X^2=0.502	0.714
Never	16.7	12.5	**p = 0.479**	(0.281-1.817)

TABLE 3a: The students in the case and control groups by physical activities traits.

Variables	Control Group (%)	Case Group (%)	Chi-square p	Relative Risk CI (95%)
Frequency of physical activities				
Occasionally	63.9	76.4	X^2=2.686	1.829
Most of the time	36.1	23.6	**p = 0.101**	(0.885-3.779)
Leisure time activities				
TV, computer, book	69.8	73.4	X^2=0.202	1.194
Outside activities	30.2	26.6	**p = 0.653**	(0.551-2.586)
Duration TV or computer				
One or two hours	62.5	43.1	X^2=5.461	2.204
more than two hours	37.5	56.9	**p = 0.019**	(1.131-4.296)
Daily duration of sleep				
From 6 to 9 hours	84.5	76.4	X^2=1.496	1.686
9.5 hours or longer	15.5	23.6	**p = 0.221**	(0.726-3.913)
Attendance in gym or swim				
Yes	37.5	23.6	X^2=3.273	1.941
No	62.5	76.4	**p = 0.070**	(0.942-4.002)
Activities between lessons				
Sitting or eating	32.9	55.9	X^2=7.414	2.588
Playing games	67.1	44.1	**p = 0.006**	(1.297-5.167)

TABLE 3b: The students in the case and control groups by socio-demographic characteristics.

Achievement in report grades			Chi-square p	Relative Risk CI (95%)
Very good or good	88.9	81.9	X^2=1,394	1.763
Fair or poor	11.1	18.1	**p = 0.238**	(0.682-4.554)

*OR; Odds ratio

*CI; Confidence interval *p < 0.05.

after school (36.1%). Regarding their achievement in lessons, 88.9% of the control group students and 81.9% of the case group students had either high or very high achievement levels. Among all students participating in the study, the average daily duration of watching tv or using the computer was 2.58 ± 1.13, the average duration of daily sleep was 8.27 ± 1.32, and the average number of householders were 4.45 ± 1.04.

Also among all of the students participating, 46.4% had an overweight or obese mother, 16.9% had an overweight or obese father, and 7.0% had an overweight or obese sibling. Of the case group students, 73.4% spent their leisure time watching TV, playing computer games and reading books, and 26.6% spent it doing sports. Of the control group students, 69.8% spent their leisure time watching tv, playing computer games and reading books, and 30.2% spent it participating in sports.

The rate of overweight family members in the case group students (59.7%) was higher than control group students (37.5%), and there is a significant difference between the groups ($p < 0.05$). There is no significant difference between the birth weights and the groups ($p > 0.05$) (Table 4). The rate of overweight or obese family members in the case group students (mother: 46.1%, father: 38.4%, sibling: 3.8%) was higher than the rate of overweight or obese family members in the control group students (mother: 30.0%, father: 26.6%, sibling: 0%).

The researchers used the estimated relative risk and confidence interval to determine the risk factors of obesity. According to these analyses, the important risk factors included: 1) not having breakfast (OR:3.840, CI:1.798-8.200), 2) skipping meals (OR:2.949, CI:1.466-5.937), 3) having obese members in the family (OR:2.471, CI:1.264-4.833), 4) lack of physical activity between lessons

TABLE 4: The Students in the case and control groups by certain characteristics

Variables	Control Group (%)	Case Group (%)	Chi-square p	Relative Risk CI (95%)
Overweight individuals in family				
Yes	37.5	59.7	X^2=7.117	2.471
No	62.5	40.3	**p = 0.008**	(1.264-4.831)
Birth weight				
(<2.500 gr)or (>4.000 gr)	15.7	19.6	X^2=0.286	1.314
(2.500-3.999) gr	84.3	80.4	**p = 0.593**	(0.482-35799)

*OR; Odds ratio.
*CI; Confidence interval *p < 0.05.

TABLE 5: Risk factors for obesity (logistic regression analysis).

Variables	OR	CI (95%)	Significance Test p
Having five or more family members living in the family	2.930	1,312-6,542	**0.009**
Not having breakfast	2.827	1,008-7,928	**0.048**
Skipping meals	1.486	0.555-3,977	**0.431**
Watching TV or using the computer for more than two hours a day	3.243	1,459-7,211	**0.004**
Not doing any activities between lessons	2.486	1,120-5,515	**0.02**

*OR; Odds ratio
*CI; Confidence interval *p < 0.05.

(OR:2.588, CI:1.297-5.167), 5) having five or more family members living in the home (OR:2.101, CI:1.075-4.108), and 6) watching tv and using the computer for more than two hours a day (OR:2.204, CI:1.313-4.096).

A logistic regression analysis was completed using the variables which were significant according to the estimated relative risk calculation. In this study, the risk factors for obesity were: 1) having five or more members living in the family home (OR: 2,930, CI:1.312-6.542), 2) not having breakfast (OR:2,827, CI:1.008-7.928), 3) watching tv and using the computer for more than two hours a day (OR: 3.243, CI:1,459-7,211) and 4) lack of physical activity between lessons (OR: 2.486, CI:1.120-5.515). According to the logistic regression analysis (OR: 1.486, CI: 0.555-3.977), skipping meals is not an important risk for obesity (Table 5).

DISCUSSION

Obesity has connections to a variety of diseases, and it also shortens the lifespan of individuals. A majority of obese adults have been obese as children. Childhood obesity increases the risk of mortality and morbidity in adulthood. Thus, there should be intervention at an early stage in order to diagnose obesity and to prevent it.[3,14]

The studies of obesity have focused on prevalence, treatment and complications. However, there are fewer studies which aimed to determine the risk factors of childhood obesity. In this respect, this study was designed as a case-control study with the purpose of examining the risk factors of childhood obesity. Since

In this study, case and control groups were selected making an exact match between them in terms of age, sex and grade. Therefore, there is no difference between case and control groups according to these variables. those of the control group, and the difference between the groups was statistically significant (Table 1).

Süzek et al. determined that there was no significant difference between the number of individuals living in the family and the prevalence of obesity.[6] Researchers completing the other studies believe the children with five or more family members have a traditional family structure, and that in these families, it is a desired condition that children

are overweight or obese.[23,24] Studies have found that the rate of being overweight or obese is higher among children who have a high socio-economic status.[25,26] There was no difference in this study in socio-economic terms.

In the case group, the rate of the students who did not have breakfast was higher than that of the control group; the difference between the groups was statistically significant. The rate of skipping meals in the case group (51.4%) was higher than that of the control group (26.4%); the difference between the groups is statistically significant (Table 2). A case-control High family income (Odds ratio [OR], 2.99, 95% confidence interval [CI] 1.13-7.88), first born in family (2.73, 1.25-5.97), skipping breakfast (3.99, 1.81-8.80), consumption of fruits < 4 days per week (2.18, 1.02-4.67), screen viewing > 2 hours/ day (2.96, 1.33-6.61), energy intake (3.97, 3.19-16.36), significantly increased the risk of obesity.[27] Accordingly, the children who had a regular diet and did not skip meals had less risk of obesity. In another study, show that childhood obesity is a high-risk factor for hypertriglyceridemia.[28] Case control study among urban school children and adolescents in Bangladesh found that having at least one overweight parent (OR=2.8, p = 0.001) and engaging in sedentary activities for >4 hours a day (OR=2.0, p=0.020) were independent risk factors for childhood overweight and/or obesity while exercising ≥ 30 minutes a day at home was a protective factor (OR=0.4, p= 0.020). Public health programs are needed to increase awareness on risk factors for overweight and obesity among children and adolescents in order to reduce the future burden of obesity-associated chronic diseases.[29]

In this study, 56.9% of the case group students watched tv or used the computer for more than two hours a day, while this rate was 37.5% in the control group; the difference between the groups was statistically significant (Table 3). Studies have found out that the children who watched TV or used the computer for long hours had an increased risk of being overweight or obese.[30,31] It is believed that children are more likely to become obese since they are inactive and expend less energy while watching TV or being on the computer.

In this study, 67.2% of the students in the control group stated that they were playing gardens while having break between classes, and the difference between the groups was statistically significant (Table 3). Studies have shown that the level of physical activity is higher among children with normal weight.[26,32] Shoup et al. stated that overweight and obese children whose level of physical activity is lower have a poorer quality of life than children who have normal weights and are more active. It appears that physical activity is important in preventing children from becoming overweight and obese.[33]

The rate of obesity is higher among the students who have overweight or obese family members than that of the students who do not have overweight or obese family members; the difference between these groups was statistically significant (Table 4). In this respect, the findings of other studies support this study.[7,26,34] It is an accepted belief that genetic factors affect the emergence of obesity at a rate of 25-80%, and that the presence of obesity in the family is one of the strongest risks for childhood obesity.[11] This result implies that obesity might be related to both genetic factors and the diet habits and nutritional intake in the family. It is noteworthy that the children who have overweight or obese members in their families have a higher risk for obesity.

Table 4 shows that there was no significant correlation regarding birth weight between the case and control groups in this study. Other studies have also shown that there is no correlation between birth weight and childhood obesity.[26,32] However, there is a variety of information in the relevant literature. Several studies have indicated that high birth weight is associated with an increased risk of childhood obesity.[35-37] However, few studies have examined the extent to which birth weight is associated with obesity in young school children in high-, middle- and low-income countries. Moreover, the association between low birth weight and the risk of childhood obesity is controversial.[38]

An analysis of the characteristics that are found to be different among those students in the case and control groups indicated that: 1) having five or more members in the family home, 2) not having breakfast, 3) watching tv or using the computer for more than two hours a day, and 4) lack of physical activity between lessons are the risk factors for obesity (Table 5). Knowing about the factors related to childhood obesity is important in order to raise healthy generations.

CONCLUSION

In this study, the risk factors for obesity were: 1) having five or more family members living in the home, 2) not having breakfast, 3) watching tv or using the computer for more than two hours a day, and 4) not engaging in physical activities between lessons. In this respect, this study suggests that: The individuals living in large families should be given priority whenever education about obesity and it causes is provided. Children, their families and their teachers should be educated about the importance of having breakfast. Limited time should be spent in activities that restrict movement, such as watching tv and using the computer. Children should be encouraged to be physically active between lessons to prevent obesity.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Belgin Akın, Deniz Koçoğlu, Tuba Özaydın;* ***Design:*** *Deniz Koçoğlu;* ***Control/Supervision:*** *Belgin Akın, Deniz Koçoğlu;* ***Data Collection and/or Processing:*** *Tuba Özaydın, Emine Ergin;* ***Analysis and/or Interpretation:*** *Deniz Koçoğlu;* ***Literature Review:*** *Tuba Özaydın, Emine Ergin;* ***Writing The Article:*** *Belgin Akın, Deniz Koçoğlu, Tuba Özaydın, Emine Ergin;* ***Critical Review:*** *Belgin Akın, Deniz Koçoğlu;* ***References and Fundings:*** *Tuba Özaydın,Emine Ergin;* ***Materials:*** *Emine Ergin.*

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