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# Being a Substantial Out of Home Eater: Affecting Factors and Evidence on Daily Nutritional Intake Among University Students

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ABSTRACT

In this cross-sectional study, it was aimed to investigate the factors affecting the choice of out of home (OH) eating in university students. A questionnaire containing the sections of age, accommodation and education status was applied to the participants (n = 399). The 24h dietary records were obtained from the participants. The participants were asked to write the locations where they consume the meals. The percentages of substantial OH eaters were 16.7% and 17.7% in males and females, respectively ($p>0.05$). Staying in dormitory status was found to be increased the probability of being a substantial eater compared to the reference of staying with family (odds ratios were 9.93 for females and 14.79 for males; $p<0.05$ for both genders). Substantial OH eaters had a higher protein, a higher carbohydrate, and a higher starch intakes than at home eaters ($p<0.05$ for all nutrients). It has been shown that university students mostly prefer fast food restaurants for OH eating.

KEYWORDS: Nutrition, obesity, university students, health.

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# Ser un gran consumidor fuera de casa: Factores que afectan y evidencia sobre la ingesta nutricional diaria entre estudiantes universitarios

RESUMEN

En este estudio transversal, el objetivo fue investigar los factores que afectan la elección de comer fuera del hogar (FH) en estudiantes universitarios. Se aplicó a los participantes (n = 399) un cuestionario que contenía los apartados de edad, alojamiento y nivel educativo. Los registros dietéticos de 24 horas se obtuvieron de los participantes. Se pidió a los participantes que escribieran los lugares donde consumen las comidas. Los porcentajes de consumidores sustanciales de FH fueron 16,7% y 17,7% en hombres y mujeres, respectivamente (p>0,05). Se encontró que permanecer en un dormitorio aumentó la probabilidad de ser un consumidor sustancial en comparación con la referencia de permanecer con la familia (las razones de probabilidad fueron 9,93 para las mujeres y 14,79 para los hombres; p <0,05 para ambos sexos). Los comedores sustanciales de FH tenían una mayor ingesta de proteínas, carbohidratos y almidón que los comedores domésticos (p<0,05 para todos los nutrientes). Se ha demostrado que los estudiantes universitarios prefieren en su mayoría los restaurantes de comida rápida para comer FH.

PALABRAS CLAVE: Nutrición, obesidad, estudiantes universitarios, salud.

## Introduction

In recent years, lifestyle change and prolonged working hours have led to result in job interviews, family gatherings, and friend meetings at meal times outside the home. The fact that many individuals do not have time to prepare meals for reasons other than these such as unwillingness to prepare meals, has also increased the consumption of out-of-home meals (Naska et al., 2011; FAO, 2008; Seguin et al., 2016; Jabs and Devine, 2006; Myhre et al., 2013). All these preferences have also led to an increase in out-of-home eating options such as fast food restaurants, full service restaurants and the other places where food items including chips, croissants, various sandwiches and wraps can be obtained (An, 2016; Chan et al., 2014; PHE, 2017). In addition to these, many ready-to-eat dishes are sold in supermarkets (Elgueta et al., 2019). The expansion of the product range that can be preferred as out-of-home eating has also made it difficult to define the terminology of "out-of-home (OH) eating". "Out-of-home eating" is defined as all consumption made in any places outside the home in some studies (Orfanos et al., 2007; 2009; Kearney et al., 2001),

while in other studies it is defined as the consumption of meals prepared outside the home (Llanaj et al., 2018; Binkley, 2008). Although the choice to be made from these options affects the dietary quality according to the meal content, in the studies, completely OH eating have been shown to associate with increased energy intake and obesity (Binkley, 2008; TNNHS, 2019; Patel et al., 2017). The characteristics of the consumers such as age, gender, income level, nutrition knowledge and health status also affect the energy, macro and micro nutrients contribution of OH eating (Patel et al., 2017; Aloia et al., 2013; Nawab et al., 2014).

In university students, OH eating is preferred for reasons such as living away from their families, staying in dormitories, lack of skills and abilities to prepare meals and being hard working during the midterm and final exams (Vadeboncoeur et al., 2015; Deliens et al., 2014; Kandiah et al., 2006). Moreover, it is very easy to access food kiosks, fast food restaurants and high-energy-dense foods around universities in addition to online food delivery services. Studies have shown that there is a relationship between the increase in exposure to such foods around the living area and the frequency of OH eating (Shen et al., 2019; Shabani et al., 2013; Tam et al., 2017). Nutritional habits shaped by university students during this period are an important determinant of their nutritional preferences, nutritional and health status in later stages of life (Watts et al., 2016; Langley-Evans, 2015; Kant et al., 2015). In order to prevent obesity, it is important to determine the factors affecting OH eating and the contribution of OH eating to daily dietary intake in university students. In young adults, OH eating has been shown to contribute approximately 40% to daily energy intake (FSRG, 2010). In other studies, it has been found that the increase in the frequency of OH eating is associated with and increased in body weight and poor diet quality (Seguin et al., 2016; Bezerra et al., 2012; 2015; Da costa Louzada t al., 2015). In a study, it has been revealed that individuals who receive at least one quarter of their daily dietary energy from OH eating have similar diets with individuals who consume food at home in terms of food groups. However, it has been found that individuals who receive at most one fourth of their daily dietary energy from OH eating consume more food such as sweets, savory baked goods, and non-alcoholic beverages and less of meat, seafood, and vegetables than individuals who consume food at home (Naska et al., 2015). This situation raises further concerns, given the fact that there is an increasing obesity trend in Turkey according to National Nutrition and Health Survey data among young adults (TNNHS, 2017).

In addition, the fact that OH eating is associated with high energy intake regardless of whether it is made in a fast food restaurant or full service restaurant makes the effects of OH eating on health more worth studying (Patel et al., 2017).

The aims of the present study are to investigate (1) the prevalence of OH eating, (2) the parameters including age, body mass index (BMI), accommodation status and education level about nutrition on OH eating preference and (3) the contribution of OH eating to daily energy, vitamin and mineral intake among university students.

## 1. Definitions of OH Eating

Different definitions are used in different studies to define "OH eating". In some of these studies, OH eating refers to food and beverages consumed in all places outside the home irrespective of the preparation process (Myhre et al., 2013; Orfanos et al., 2009; 2007; Naska et al., 2015; Vandevijvere et al., 2009), while in others they are defined as all foods and beverages prepared outside the home (Zang et al., 2018; O'Dwyer et al., 2005; Kant and Graubard, 2004; Llanaj et al., 2018). In the present study, OH eating is defined by including all the consumption made in places outside the home. At-home (AH) eating included the consumption at home, regardless of where the food is prepared. While defining "substantial OH eaters", the percentages of the mean energy intake that the participants obtain on a daily basis from outside the home were evaluated. The participants who consumed one-fourth or more of their daily energy intake from OH eating were grouped as "substantial OH eaters". The participants who consumed less than 25% of their average daily energy intake from OH eating were grouped as "not substantial OH eaters" (Orfanos et al., 2007; Nasha et al., 2015; Vandevijvere et al., 2009; Myhre et al., 2013).

## 2. Materials and Methods

### 2.1. Study design

This cross-sectional study was conducted on 399 university students (243 females, 156 males) aged between 18-34 years. All study steps were carried out in accordance with the Helsinki Declaration. The study protocol was approved by the Ethical Committee of the Gazi University of Ankara/Turkey (Document no: E-77082166-604.01.02-224533). All participants signed the voluntary informed consent form. The sample size of this study was calculated by using G power program (version 3.1) to investigate the differences in energy,

macro and micro nutrient intakes between substantial OH eaters and AH eaters. Random sampling method was used to select the participants. The high number of female participants is not due to selection bias, but because the majority the excluded individuals were males (97 males). The main reason for exclusion was the errors or deficiencies in the 24h dietary record. Students who live in Ankara, the capital city of Turkey; without chronic disease diagnosis and are not registered to master or PhD programs were invited to participate in the study because these programs are not usually full-time. So, students in these programs do not fully experience student life. A questionnaire containing the sections of age, accommodation and education status was applied to the participants by the researchers through face-to-face interviews. Body weight (kg) and height (cm) of the individuals were measured by the researchers using appropriate methods. The participants were categorized into two groups according to their ages, between the ages of 18-24 and 25-34 years. The accommodation locations of the students who participate in the study were gathered in three groups as "with family", "at home with friends or alone" and "in the dormitory". After the departments and lessons taken by the students were questioned in detail, they were classified into two groups as the students who have taken the basic lessons related nutrition and those who have not. Body mass indexes of the participants were obtained by dividing their body weight (kg) by the square of their height in meters. The BMI classification was made in three categories due to not being obese participants found in the study: underweight (‹18.5 kg/m$^2$); normal weight (18.5-24.99 kg/m$^2$) and overweight (≥25-29.99 kg/m$^2$). The 24h dietary records were obtained from the participants for three consecutive days including two weekdays and one weekend. In addition, the participants were asked to write the locations where they consume the meals. The locations where the meals were eaten were recorded regardless of the preparation places. The determined locations were home, dormitory dining halls, canteens, restaurants, fast food outlets, pita outlets, cafes, buffets selling Turkish bagel. While analyzing the data, eating locations were categorized as home, full service restaurants (dormitory dining halls, restaurants and cafes) and fast food restaurant (canteens, fast food outlets, pita outlets and buffets selling Turkish bagel). The energy, macro and micro nutrients were analyzed using the BeBiS (Nutrition Information System) program (version 8.2). Total daily intakes of energy, micro and macro nutrients were shown in two categories as "substantial OH" and "AH". The contributions of the energy, micro and macro nutrient intakes from OH eating to

daily total intakes were presented as percentage. All calculations were made by excluding dietary supplements.

### 2.2. Statistical analyses

Statistical analyses were performed using the SPSS software version 22.0. The percentages of substantial OH eaters were presented by gender, age, accommodation status, weight status, education and location of eating using cross tabulation. The Chi-square test was used to compare these percentages in different groups. A multivariable logistic regression model was used to identify independent predictors including age, BMI, energy intake, accommodation status and education of substantial OH eating. To compare the odds of being a substantial OH eater at specified referent including "with family" and "taking the lesson related general nutrition" for categorical variables; and for continuous variables per specific intervals were used. The model fit was assessed using appropriate residual and goodness-of-fit statistics. A 5% type-I error level was used to infer statistical significance. The fractions of total mean energy and nutrient intakes from OH eating were calculated by dividing the amount of energy and nutrients intake from OH eating to the total amount of daily energy and nutrients intake. Descriptive analyses were presented using means and standard deviations for normally distributed variables. Since all energy and nutrients values were normally distributed; the independent samples *t* test was used to compare these parameters between substantial OH eaters and AH eaters groups. A p-value of less than 0.05 was considered to show a statistically significant result.

## 3. Results

The percentages of substantial OH eaters were shown by gender, age, accommodation status, weight status, education and location of eating in Table 1. While 16.7% of males were substantial OH eaters, 17.7% of females were substantial OH eaters ($p>0.05$). Although there was no difference in the percentages of substantial OH eaters between the age groups, this percentage was higher in the group of 25-34 years than in the 18-24 years age group (21.4% and 17.1%, respectively; $p>0.05$). Considering the percentages of being substantial OH eaters in university students according to accommodation status, in the students staying at dormitory, it was significantly higher compared to other accommodation places including "with family" and "at home with friends or alone" (26.6%, 3.2% and 9.1%,

respectively; p<0.05). No significant difference was found in the percentages of substantial OH eaters among BMI groups (p>0.05). It was found that the percentage of substantial OH eaters was higher in the students who had not taken any basic lesson related nutrition than those who had taken nutrition-related lesson (18.4% and 15.6%, respectively, p>0.05). Compared to the locations preferred by students for OH eating, substantial OH eaters were shown to be significantly higher in the group who preferred fast food restaurants than in the full service restaurant group (44.6% and 40.4%, respectively, p<0.001).

Table 1. Comparison substantial out-of-home eaters according to sociodemographic characteristics of university students

| Sociodemographic characteristics | Total | | Substantial OH | |
|---|---|---|---|---|
| | n | % | n | % |
| **Gender** | | | | |
| Female | 243 | 60.9 | 43 | 17.7 |
| Male | 156 | 39.1 | 26 | 16.7 |
| | | | *P* value = 0.791 | |
| **Age** | | | | |
| 18-24 years | 385 | 96.5 | 66 | 17.1 |
| 25-34 years | 14 | 3.5 | 3 | 21.4 |
| | | | *P* value = 0.677 | |
| **Accommodation status** | | | | |
| With family | 93 | 23.3 | 3 | 3.2 |
| At home with friends or alone | 88 | 22.1 | 8 | 9.1 |
| At dormitory | 218 | 54.6 | 58 | 26.6 |
| | | | ***P* value < 0.001** | |
| **Weight status** | | | | |
| Underweight | 20 | 5.0 | 3 | 15.0 |
| Normal | 296 | 74.2 | 52 | 17.6 |
| Overweight | 83 | 20.8 | 14 | 16.9 |
| | | | *P* value = 0.951 | |
| **Education** | | | | |
| Taking the basic lesson related nutrition | 160 | 40.1 | 25 | 15.6 |
| Not taking the basic lesson related nutrition | 239 | 59.9 | 44 | 18.4 |
| | | | *P* value = 0.471 | |
| **Location of eating** | | | | |
| Home | 234 | 58.6 | - | - |
| Full service restaurant | 109 | 27.4 | 44 | 40.4 |
| Fast food restaurant | 56 | 14.0 | 25 | 44.6 |
| | | | ***P* value < 0.001** | |

*OH: out-of-home.

The odds ratios (OR) of being a substantial OH eater according to different potential predictors were shown in Table 2 by gender. In categorical variables with an OR higher than one, it is stated that the odds of being substantial OH eaters were higher than the reference group. In continuous variables, it means that this odd were getting higher per specified interval. The probability of being a substantial OH eater increased with increasing age among females, while decreasing among males (ORs were 1.09 and 0.99, respectively among females and males; $p>0.05$ in both genders). Being a substantial OH eater declined with increasing BMI in both genders (ORs were 0.99 for females and 0.97 for males; $p>0.05$ in both genders). It was shown that dietary total energy intake did not affect the probability of being a substantial eater in both genders. In both genders, it was found that staying with friends or alone and staying in dormitory status increased the probability of being a substantial eater compared to the reference of staying with family. This finding was statistically significant for the status of "at dormitory" in both genders ($p<0.05$). The probability of being a substantial OH eater was higher among university student not taking the basic lesson related nutrition than the reference group of students taking the basic lesson related nutrition (OR 1.03 for females and 1.76 for males; $p>0.05$ for both genders).

Table 2. Contrasting substantial out of home (OH) eaters to not-substantial ones in female and male university students by the variables

| Predictors | Random effects | | P values |
|---|---|---|---|
| | OR | 95% CI | |
| **Female** | | | |
| Age (per 1 year) | 1.09 | 0.89; 1.34 | 0.377 |
| BMI (per 1 kg/m$^2$) | 0.99 | 0.93; 1.05 | 0.727 |
| Energy intake (per 100 kcal) | 1.00 | 1.00; 0.01 | 0.248 |
| Accommodation status | | | |
| With family | Ref | | |
| At home with friends or alone | 3.30 | 0.33; 33.02 | 0.310 |
| At dormitory | 14.79 | 1.97; 110.96 | **0.009** |
| Education | | | |
| Taking the basic lesson related nutrition | Ref | | |
| Not taking the basic lesson related nutrition | 1.03 | 0.53; 2.01 | 0.922 |
| **Male** | | | |
| Age (per 1 year) | 0.99 | 0.82; 1.21 | 0.978 |
| BMI (per 1 kg/m$^2$) | 0.97 | 0.86; 1.09 | 0.588 |
| Energy intake (per 100 kcal) | 1.00 | 1.00; 1.01 | 0.050 |
| Accommodation status | | | |
| With family | Ref | | |
| At home with friends or alone | 2.88 | 0.53; 15.64 | 0.222 |
| At dormitory | 9.93 | 2.18; 45.16 | **0.003** |
| Education | | | |
| Taking the basic lesson related nutrition | Ref | | |
| Not taking the basic lesson related nutrition | 1.76 | 0.66; 4.71 | 0.257 |

*BMI: body mass index; CI: confidence interval; OH: out of home; OR: odds ratio.

In Table 3, besides the mean daily energy and nutrients intake in substantial OH eaters and AH eaters the contribution of daily energy and nutrients intake from out of eating to daily total intakes were presented. Daily energy intake was higher in substantial OH eaters than AH eaters (1799.1±418.1 and 1674.3±471.5, respectively; p=0.030). Substantial OH eaters had a higher protein, a higher carbohydrate, a higher starch, a higher vitamin $B_2$ and $B_{12}$, Zn and Fe intakes than AH eaters ($p<0.05$ for all nutrients), while AH eaters had a higher added sugar, vitamin A and Ca intakes than substantial OH eaters ($p<0.05$ for all nutrients). Nutrients that contributed most to daily total intakes were found as Ca (72.8%), folate (34.0%), vitamin A (28.4%), potassium (27.3%), PUFA (23.2%), starch (23.0%), Na (22.6%), cholesterol (21.2%) and SFA (20.6%) followed by other nutrients below 18% contributions to daily intakes, respectively.

## 4. Discussion

In the present study, a higher frequency of substantial OH eaters was shown in the university students who prefer fast food restaurant compared to full service restaurant. Moreover, the probability of being a substantial eater was significantly higher among the university students staying in the dormitories regardless of gender. When the differences in energy and nutrient intakes between substantial OH eaters and AH eaters were analyzed, energy, protein, carbohydrate, $B_2$ and $B_{12}$ vitamins and the minerals including zinc and iron were found to be significantly higher in the substantial OH eaters.

The availability of healthy foods has changed between fast food restaurants and full service restaurants (Saelens et al., 2007). Therefore, the contribution of OH eating energy intake to daily energy intake of individuals who prefer to eat in a fast food restaurant is also different compared to a full service restaurant. This situation is consistent with the present study where substantial OH eaters are defined as the individuals who intake more than 25% of their daily energy intake from OH eating. In this study, the frequency of substantial OH eaters preferred fast food restaurant and full service restaurant have been found 44.6% and 40.4%, respectively ($p<0.001$). Similarly, An (2016) has been found that the increase in daily energy intake of the energy from fast food restaurant was higher compared to full service restaurants. Considering the high prevalence of fast food consumption among university students (Mohammadbeigi et al., 2018; Nixon and Doud, 2016; Al-Otaibi and Basuny, 2015), the high contribution of fast food to energy intake can be a risk for obesity

(Block et al., 2004; Mohammadbeigi et al., 2016). In this study, fast food restaurant (14.0%) preference was determined to come in third place after the consumption preferences at home (58.6%) and in the full service restaurants (27.4%). In addition, the majority of university students (74.2%) in the study were found to have the normal body weight. Compared to other studies (Mohammadbeigi et al., 2018; Nixon and Doud, 2016; Al-Otaibi and Basuny, 2015), university students in this study have been shown to have less frequent preference for fast food restaurants. Females were found to be substantial OH eaters more frequently than males (17.7% and 16.7%, respectively, $p>0.05$). Conversely, Larson et al. (2011) have been determined that the use of any fast food restaurants was higher in males than females. Considering that individuals' OH eating preference are listed as characteristics such as lack of time and cooking skills (Al-Otaibi and Basuny, 2015), it may be an expected result that OH eating in men is high. However, in the other studies, the reason for the high preference of OH among females has been expressed as having less time due to widespread use of social media etc (Mohammadbeigi et al., 2016; 2017; 2018). Although there was no statistically significant difference in the frequency of being substantial OH eater between 18-24 and 25-34 years age groups, this percentage was found to be higher in the ages between 25-34 years. Similarly, in a study, the mean age was significantly higher in the group which the frequency of OH eating was higher in (Bes-Rastrollo et al., 2009). Inversely, Larson et al. (2011) has been determined that use of any restaurant or fast food restaurant was significantly higher among the age group of 20-24 compared to 25-31 years. In the present study, it is thought that the percentages of substantial OH eaters were higher in the students who were older age due to the limited time because they work after studying at the university. Conversely, in a study conducted by Vandevijvere et al. (2009), it was reported that probability of being a substantial OH eater decreased with age in both genders. Similarly, Larson et al. (2011) have been found that older age group reported the percentage of eating OH in any fast food restaurant was higher in younger age group than elderly age group. Moreover, Naska et al. (2015) have been found the same association between substantial OH eating and age. The other reason for not having a statistically significant relationship between age and substantial OH eating in the present study may be due to the narrower age range compared to the other studies (Naska et al., 2015; Vandevijvere et al., 2009; Larson et al., 2011).

Table 3. Daily energy, macronutrient and micronutrient intake in substantial out of home eaters and not substantial out of home eaters (at home-AH) and fraction of intake out of home in university students

| Energy and nutrients | Fraction OH (%) Mean±SD | Substantial OH Mean±SD | AH Mean ± SD | P values |
|---|---|---|---|---|
| Energy (kcal) | 16.7±8.7 | 1799.1±418.1 | 1674.3±471.5 | **0.030** |
| Protein (g) | 17.3±10.1 | 67.8±20.8 | 61.7±19.6 | **0.026** |
| Carbohydrates (g) | 16.4±9.9 | 206.3±58.9 | 189.8±58.3 | **0.037** |
| Starch (g) | 23.0±19.5 | 116.6±34.2 | 115.8±34.8 | 0.867 |
| Added sugar (g) | 16.9±92.2 | 16.6±11.7 | 21.1±14.6 | **0.007** |
| Fibre (g) | 16.2±10.4 | 18.0±6.3 | 17.4±6.3 | 0.469 |
| Fat (g) | 17.2±10.3 | 75.9±22.6 | 71.5±27.2 | 0.153 |
| SFA (g) | 20.6±19.2 | 18.5± 6.1 | 19.9±6.9 | 0.080 |
| MUFA (g) | 17.5±10.8 | 22.2±7.1 | 22.2±8.4 | 0.967 |
| PUFA (g) | 23.2±16.2 | 16.1±6.4 | 16.9±9.7 | 0.342 |
| Cholesterol (mg) | 21.2±18.8 | 172.2±89.5 | 192.7±93.5 | 0.090 |
| Vitamin A (µg) | 28.4±139.5 | 565.0±1.3 | 681.8±496.6 | **0.020** |
| Vitamin $B_1$ (µg) | 16.3±12.2 | 1.2±1.3 | 1.1±1.4 | 0.412 |
| Vitamin $B_2$ (mg) | 4.2±3.6 | 7.8±3.6 | 4.5±3.2 | **‹0.001** |
| Vitamin $B_6$ (mg) | 17.3±11.3 | 1.3±0.4 | 1.2±0.4 | 0.129 |
| Vitamin $B_{12}$ (µg) | 7.1±6.4 | 11.6±5.9 | 8.1±5.3 | **‹0.001** |
| Vitamin C (mg) | 15.7±16.2 | 72.6±53.3 | 74.7±48.4 | 0.764 |
| Folate (µg) | 34.0±251.2 | 188.3±72.9 | 206.9±73.1 | 0.056 |
| Na (mg) | 22,6±39,3 | 1373.6±596.9 | 1413.1±586.7 | 0.618 |
| K (mg) | 27.3±13.9 | 1572.2±510.7 | 1706.03±533.4 | 0.052 |
| Ca (mg) | 72.83±43.5 | 449.8±161.8 | 498.7±177.8 | **0.027** |
| Zn (mg) | 0.8±0.4 | 304.8±101.9 | 166.6±114.7 | **‹0.001** |
| Fe (mg) | 3.1±1.4 | 76.4±27.9 | 42.4±27.4 | **‹0.001** |

*AH: at home; MUFA: monounsaturated fatty acids; OH: out of home; PUFA: polyunsaturated fatty acids; SD: standard deviation; SFA: saturated fatty acids.

In this study, the percentage of substantial OH eaters staying at the dormitories was higher than those staying with family or at home with friends/alone (26.6%, 3.2% and 9.1, respectively; $p<0.001$). Moreover, in this study, the probability of being a substantial OH eater increased with the statue of staying at dormitory for both males and females. This finding is thought to be obtained as it is more costly to supply the equipments and foods required for cooking in the dormitory kitchens than eating in the most of restaurants such as fast food ones. This implication in terms of the low cost in some restaurants is consistent with previous researches conducted in the students (Mohammadbeigi et al., 2018; Park et al., 2013; Shah et al., 2014). Furthermore, it is predicted by the researchers of the present

study that basic nutritional knowledge will reduce the percentages of substantial OH eating. Supporting this prediction, the percentage of the substantial OH eaters was higher among the students without basic nutritional knowledge than the others (18.4% and 15.6%, p›0.05). Some positive, though not consistent, associations were also found between substantial OH eating and not taking the basic lesson related nutrition in both genders. Similar to our estimate, it has been reported that lack of nutritional knowledge constitutes the basis of nutritional health problems (Worsley, 2002; Kearney et al., 2001).

Eating OH is associated with higher energy intake compared to AH eating (Bezerra et al., 2015). Llanaj et al. (2018) has been demonstrated that the density of energy, carbohydrates, proteins, fats, SFA, cholesterol and sodium increased, but sugars decreased with the contribution of OH eating. Similarly, in the present study, mean intakes of energy, carbohydrates, proteins and fats were found to be significantly higher, but added sugar intake was significantly lower among substantial OH eaters than AH eaters. These findings are consistent with the results of Oh et al. (2015); Ayala et al (2008) and An (2016). Conversely, in this study, lower intakes of SFA, cholesterol and sodium, though not consistent, were reported among substantial OH eaters. It is thought that this may be due to the fact that the participants did not indicate the table salt they added, so sodium intakes may be underestimated among substantial OH eaters. The reason for the higher intake of cholesterol in AH eaters than substantial OH eaters is that in Turkey, many of the recipes used at home included eggs such as bakery products, and soups. The reason why added sugar is higher in the AH eaters is thought that sugary products such as jam, honey, molasses are consumed frequently at home breakfasts, while breakfast is completed only with products such as Turkish bagel and cheese or cheesy pastry when the breakfast consumed OH. In line with these findings, Zang et al. (2018) has been demonstrated that there was a positive relationship between eating OH and intakes of dietary energy, protein, carbohydrate, fat, and iron. In the present study, iron intake was significantly higher among substantial OH eaters. It is thought that this finding is due to egg-based recipes prepared at home which are widely in Turkey.

The major strengths of this study are being the first study evaluating OH eating among university students in Turkey according to our current knowledge and that nutrient intakes based on three days 24h-dietary records. Moreover, dietary records and other

information about the participants were collected through both face to face and telephone interviews for three days 24h-dietary records.

One of the limitations of this study is that the definition of eating OH was used as occasions regardless of the place of food preparation. Moreover, eating OH can include eating at dormitory. But, eating at dormitory is a complicated situation, as it can include foods which are produced similar to home process or similar to OH eating places.

## Conclusion

In conclusion, university students, especially staying at the dormitories ones, are at the risk of being substantial OH eaters. Considering that substantial OH eaters consume much more energy and macro nutrients than AH eaters, the increase in obesity risk is inevitable in the long term. In order to prevent this, it is extremely important to have cafeterias around the universities that provide healthy meal alternatives at more affordable prices.

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