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The Association between Fast Food Consumption and Obesity among College Students in Indonesia

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A B S T R A C T
Background: In Indonesia, the total percentage of obese adults rose from 10.5% in 2007 to 21.8% in 2018. College students are the highest consumers on most food purchasing applications with fast food options. This study investigated the association between fast food consumption and obesity among college students in Indonesia. Methods: A Google Form was used to conduct a cross-sectional study with 1086 participants from March to June 2023. Food consumption was measured with the Semi-Quantitative Food Frequency Questionnaire (SQFFQ). Chi-square and Kruskal-Wallis tests were utilized. Results: The results showed that 25% of the college students were overweight and obese. Most college students (30.9%) eat fast food >4 times per week. Furthermore, 33.5% eat traditional fast food, and 28.1% eat Western fast food >2 times a week. There were significant differences in the frequency of traditional and Western fast food and energy intake of fast food after adjusting the covariates (p<0.01). The total energy consumption of fast food among obese college students in Indonesia (800.01 kcal (343.73, 1324.93)) was significantly higher than underweight (411.21 kcal (316.37, 852.13)), normal weight (417.23 kcal (311.49, 980.18)), and overweight college students (600.80 kcal (336.07, 1152.46)). Conclusions: Consuming fast food is substantially linked with obesity among college students in Indonesia. To avoid and lessen obesity among college students, eating a greater variety of healthful foods and learning to cook are necessary.

INTRODUCTION

Most people define health as the absence of disease. This definition of health solely considers the body's capacity to function, which can occasionally interfere with it. Health is free from sickness or infirmity and physical, mental, and social well-being. Obesity is one of the growing health issues. Obesity is a metabolic disorder marked by an excessive build-up of fat that can lead to musculoskeletal, cardiovascular, and diabetic illnesses (Shah et al., 2014; Zeng et al., 2012). Causal reasons for obesity include hereditary, monetary, and social influence factors (Wójcik & Kozioł-Kozakowska, 2021). Other factors that lead to obesity include lifestyle factors such as diet, sleep patterns, and daily activities (Charlot et al., 2021). Obesity is a health danger all around the world, experienced by as many as 400 million people (Apovian, 2016). So, pervasive obesity is referred to as a pandemic. Indonesia surpassed Thailand as the second-largest nation in Southeast Asia, with the greatest incidence of obesity. Obesity prevalence in adults is still rising, going from 10.5% in 2007 to 14.8% in 2013, and the latest survey was 21.8% in 2018 (Kemenkes, 2018) A person's body mass index (BMI) indicates whether or not they are obese. Obese people have a 30 kg/m2 BMI or higher (WHO, 2021).

Obesity due to nutritional problems is a cause for concern because eating is essential for the sustenance of human life. The rapid development of the culinary world has made food choices as varied as fast food. Fast food is characterized by its high-calorie content and speed of serving. There are two types of fast food: traditional fast food and Western fast food. Western fast food includes hamburgers, pizza, etc.

Meanwhile, traditional fast-food products include meatballs, tempe mendoan, etc. However, there needs to be an adequate and generally accepted definition of the meaning of fast food among academics (Racine et al., 2022). Excessive sugar intake, overeating, and frequent fast-food consumption can increase body weight (Alhashemi et al., 2022). Apart from that, consuming fast food can also trigger obesity. It can become a big societal health problem (Dunn et al., 2012).

Asian food, in general, comprises minimal energy due to the system's preparation by boiling or steaming. High water content can reduce energy density and contribute to the weight and volume of meals without providing more energy (Rolls, 2010). The usual type of meal offered is rice or a collection of grains in huge servings, while Western fast food contains a larger volume, density, and more energy (Clinton et al., 2020). Traditional fast food is often easy to find at school areas such as canteens, in front of gates, or on the side of the road at inexpensive costs. College students are the young generation who can contribute to overcoming the problem of obesity by providing correct and accurate information based on knowledge obtained from sources, including that excessive intake of fast food can cause obesity. However, many college students still often consume fast food. Too much motivation throughout the study period results in harmful habits and raises the risk of physical problems (Mamurov et al., 2020). This study is a first-of-its-kind look into the relationship between fast food consumption and obesity among Indonesian college students.

METHODOLOGY

Ethical Approval

The Xiangya School of Public Health at Central South University's Ethics Committee has approved this study (XYGW-2023-34).

Study Design, Site, and Participants

A cross-sectional study was undertaken. Participants in this research were Indonesian college students from some universities. The data was obtained online from March to June 2023. The following are the inclusion criteria for the participants: undergraduates from first to fourth year who were at least eighteen years old voluntarily took part and signed informed consent forms. College students on weight-loss diets, individuals with hematologic, digestive, or chronic illnesses, and those with severe organ lesions were among the exclusion criteria.

Sample Size

Regarding the investigation study, the case of obesity with age ≥18 years in Indonesia was 21.8% (Kemenkes, 2018). In the cross-sectional survey (tolerance error of 0.15 p), a minimum sample size of 1061 was needed. Considering the 10% non-response rate, 1167 questionnaires were distributed in this study. College students who took part in the study were 1113, and 1086 completed the questionnaire.

Data Collection

A Google Form was made for this survey and shared online via the college's social media platforms.

Demographic Characteristics

College students' gender, age, ethnicity, residence, year of study, pocket money per month, height, and weight.

Diagnostic Criteria for obesity

According to WHO standard categorization, a BMI of less than 18.5 kg/m^2 is considered underweight, while the normal weight ranges from 18.5-24.9 kg/m^2. 25 to 29.9 kg/m^2 on a BMI scale is considered overweight. Obesity class 1 is defined as having a BMI of 30 to 34.5 kg/m^2, class 2 as having a BMI of 35 to 39.9 kg/m^2, and class 3 as having a BMI of more than 40 kg/m^2. In this study, obesity classes 1–3 are categorized into one obesity group.

Patterns of Dieting

The Semi-Quantitative Food Frequency Questionnaire (SQFFQ) was employed to collect data on the frequency and intake of various foods by college students throughout the preceding month (Sun et al., 2022). Numerous codes were used to categorize the intake assessment, including 0 for never or 2-3 times each month, 1 for 1-2 times in a week, 2 for 3-4 times in a week, 3 for 5-6 times in a week, 4 for every day, and 5 for more than once per day. An

Indonesian food composition table book was used to determine the energy intake, and a collection of food photo books was used to determine the portion (Kemenkes, 2017)

Statistical Analyses

All data gathered has been converted to Microsoft Excel. The statistical analysis was done using IBM SPSS 26.0 software (IBM Corp., Armonk, NY, USA). Several questions were answered using frequencies and percentages. In this research, rates were compared using the chi-square test, and data that did not follow a normal distribution was compared using the Kruskal-Wallis test. The Kruskal-Wallis test was performed to examine if there is a statistically significant difference in calorie consumption between fast food and dietary intake without fast food in each BMI category. The test level was set at $\alpha=0.05$, while the statistical significance criteria were $p<0.05$.

RESULTS RESEARCH

Participant Characteristics

In our study, 1086 Indonesian college students participated in this research, and 990 (91.2%) college students consumed fast food on the meal menu. Of these, 235 (21.6%) were male and 851 (78.4%) were female. The majority were 587 (54.1%), between 20 and 21 years old. Furthermore, students of Javanese ethnicity numbered 701 (64.5%), and 884 (81.4%) lived in dormitories. Again, most of the sample, 478 (44%), were first-year college students and college students who were with a monthly allowance limit of <1,500,000 Indonesian Rupiah (IDR) (57.4%). Of the total sample, 146 (13.4%) were obese, 112 (76.7%) were female, and 34 (23.3%) were male (see Table 1).

Table 1. Descriptive Characteristics of College Students in Indonesia.

Variables	**Total** n (%)	**Male** n (%)	**Female** n (%)
Total	1086	235 (21.6)	851 (78.4)
Age			
18-19	275 (25.3)	67 (24.4)	208 (75.6)
20-21	587 (54.1)	119 (20.3)	468 (79.7)
22-23	190 (17.5)	39 (20.5)	151 (79.5)
24-25	34 (3.1)	10 (29.4)	24 (70.6)
Ethnicity			
Javanese	701 (64.5)	152 (21.7)	549 (78.3)
Sundanese	96 (8.8)	14 (14.6)	82 (85.4)
Another	289 (26.6)	69 (23.9)	220 (76.1)
Residence			
With family	202 (18.6)	50 (24.8)	152 (75.2)

Dormitory	884 (81.4)	185 (20.9)	699 (79.1)
Year of Study			
1 st year	478 (44.0)	99 (20.7)	379 (79.3)
2 nd year	147 (13.5)	29 (19.7)	118 (80.3)
3 rd year	220 (20.3)	48 (21.8)	172 (78.2)
4 th year	241 (22.2)	59 (24.5)	182 (75.5)
Pocket money/month			
<1,500,000 (IDR)	623 (57.4)	133 (21.3)	490 (78.7)
1,500,000-2,000,000 (IDR)	228 (21.0)	43 (18.9)	185 (81.1)
>2,000,000 (IDR)	235 (21.6)	59 (25.1)	176 (74.9)
BMI			
Underweight	290 (26.7)	56 (19.3)	234 (80.7)
Normal	524 (48.3)	111 (21.2)	413 (78.8)
Overweight	126 (11.6)	34 (27.0)	92 (73.0)
Obesity	146 (13.4)	34 (23.3)	112 (76.7)

Age: (years old).

The Relationship of socio-demographics with Body Mass Index on college students in Indonesia.

The years of study and monthly pocket money of college students were found to significantly affect the incidence of obesity, as Table **2** below demonstrates. The obesity rate was the highest among college students in the fourth year of study (28.6% vs 7.9% vs. 5.4% vs. 14.1, p <0.01). There were 107 (45.5%) obese college students and 104 (44.3%) overweight college students having pocket money per month >2,000,000 (IDR), which had a more significant proportion compared to other college students having pocket money <1,500,000 (IDR) (4.7% obese; 12.1% overweight) and in-between (4.4% obese; 3.9% overweight) (p<0.01). The prevalence of obesity among college students did not significantly differ based on gender (p=0.341), age (p=0.162), ethnicity (p=0.289), or place of residence (p=0.155).

Table 2. The relationship of socio-demographics with body mass index on college students in Indonesia.

Variables	**Underweight** n (%)	**Normal Weight** n (%)	**Overweight** n (%)	**Obesity** n (%)	***p***
Gender					0.341
Male	56 (23.8)	111 (47.2)	34 (14.5)	34 (14.5)	
Female	234 (27.5)	413 (48.5)	92 (10.8)	112 (13.2)	
Age					0.162

18-19	69 (25.1)	153 (55.6)	23 (8.4)	30 (10.9)	
20-21	158 (26.9)	267 (45.5)	78 (13.3)	84 (14.3)	
22-23	52 (27.4)	90 (47.4)	23 (2.1)	25 (13.2)	
24-25	11 (32.4)	14 (41.2)	2 (5.9)	7 (20.6)	
Ethnicity					0.289
Javanese	183 (26.1)	341 (48.6)	74 (10.6)	103 (14.7)	
Sundanese	33 (34.4)	42 (43.8)	12 (12.5)	9 (9.4)	
Others	74 (25.6)	141 (48.8)	40 (13.8)	34 (11.8)	
Residence					0.155
Family	61 (30.2)	101 (50.0)	15 (7.4)	25 (12.4)	
Dormitory	229 (25.9)	423 (47.9)	111 (12.6)	121 (13.7)	
Year of Study					<0.01
1 st year	132 (27.6)	253 (52.9)	55 (11.5)	38 (7.9)	
2 nd year	48 (32.7)	83 (56.5)	8 (5.4)	8 (5.4)	
3 rd year	57 (25.9)	107 (48.6)	25 (11.4)	31 (14.1)	
4 th year	53 (22)	81 (33.6)	38 (15.8)	69 (28.6)	
Pocket money/month					<0.01
<1,500,000	223 (35.8)	358 (57.5)	13 (12.1)	29 (4.7)	
1,500,000-2,000,000	59 (25.9)	150 (65.8)	9 (3.9)	10 (4.4)	
>2,000,000	8 (3.4)	16 (6.8)	104 (44.3)	107 (45.5)	

Comparison of Fast Food Frequency among Underweight, Normal, Overweight, and Obese College Students in Indonesia.

Three variables were utilized to compute the frequency: average fast food consumption, traditional fast food consumption, and Western fast food consumption. The frequency of fast food intake is connected to the prevalence of obesity. College students who ate fast food more than four times per week were more obese than those who ate less than four times per week (35.4% vs. 3.6%, p<0.01). Regarding traditional fast food intake, it was shown that college students who consumed more than two times per week were substantially more obese than those who consumed less than two times a week (30.8% vs. 4.7%, p<0.01). It was found to have the same effect regarding Western fast food consumption (37% vs. 4.2%, p<0.01). (Table 3)

The preference for fast food among Indonesian college students in this research was exceptionally high, with 990 (91.2%) of the total participants. College students who are obese preferred to eat Western fast food (29.8%) compared to traditional fast food (9.6%). The three most popular reasons for consuming fast food are its delicious taste (43.9%), good smell (17.7%), and time efficiency (15.7%). Contrary to that, a good place is the least stated reason for eating fast food. In addition, college students got information about fast food from the Internet (53.5%), which is higher than television (26.3%), friends (8.8%), family (2.3%), magazines (1.7%), and others (7.3%).

Table 3. A comparison of the frequency of fast food, traditional fast food, and Western fast food among different BMI categories of college students in Indonesia.

Variables	Total	Underweight	Normal Weight	Overweight	Obesity	X^2	*p*
	n (%)	n (%)	n (%)	n (%)	n (%)		
Fast food						350.83	<0.01
<4x per week	750 (69.1)	246 (32.8)	439 (58.5)	38 (5.1)	27 (3.6)		
>4x per week	336 (30.9)	44 (13.1)	85 (25.3)	88 (26.2)	119 (35.4)		
Traditional Fast Food						262.46	<0.01
<2x per week	722 (66.5)	228 (31.6)	422 (58.4)	38 (5.3)	34 (4.7)		
>2x per week	364 (33.5)	62 (17.0)	102 (28)	88 (24.2)	112 (30.8)		
Western Fast Food						390.84	<0.01
<2x per week	781 (71.9)	250 (32.0)	462 (59.2)	36 (4.6)	33 (4.2)		
>2x per week	305 (28.1)	40 (13.1)	62 (20.3)	90 (29.5)	113 (37.0)		

The Average of Traditional Fast Food Frequency Consumption Per Week among College Students in Indonesia

Based on the average traditional fast food intake, college students consumed at least one sort of fast food in the last month, and the top three forms of traditional fast food that were consumed the most frequently were tempe mendoan (4.71 times per week), fried noodles (3.96 times in a week), and noodle soup (3.80 times in a week).

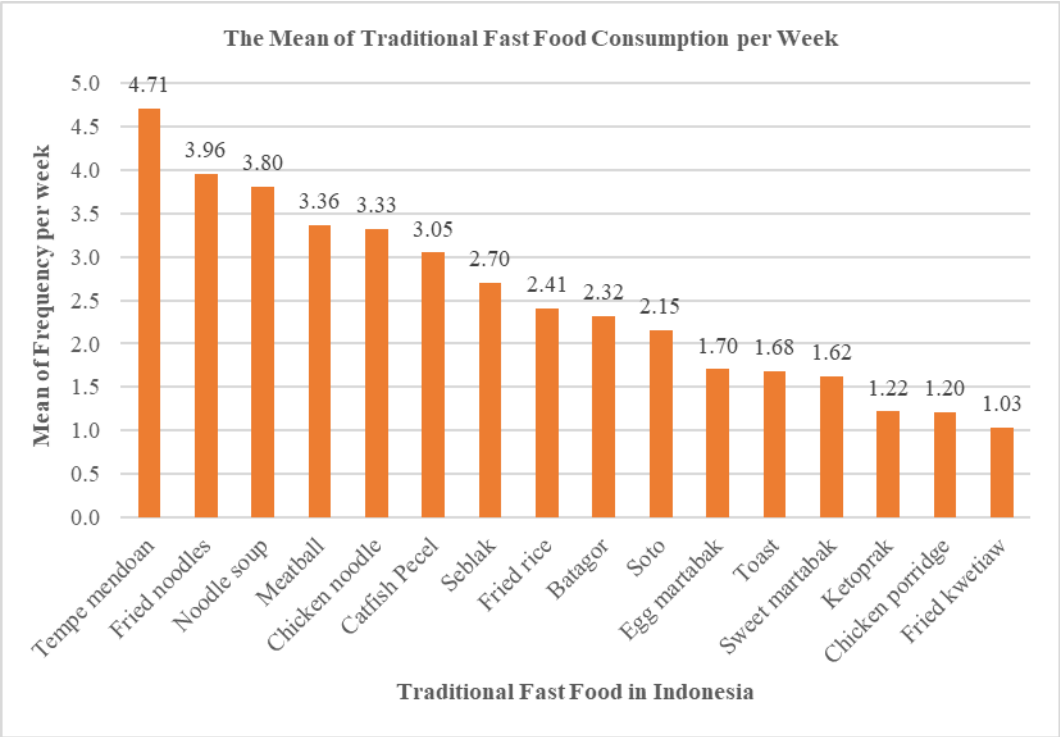

Figure 1. The average consumption frequency of traditional fast food in a week among college students in Indonesia.

The Average Western Fast Food Consumption Frequency Per Week among College Students in Indonesia.

On average, the top three most frequently consumed Western fast food were french fries (2.58 times per week), fried chicken (2.54 times per week), and donuts (1.92 times per week).

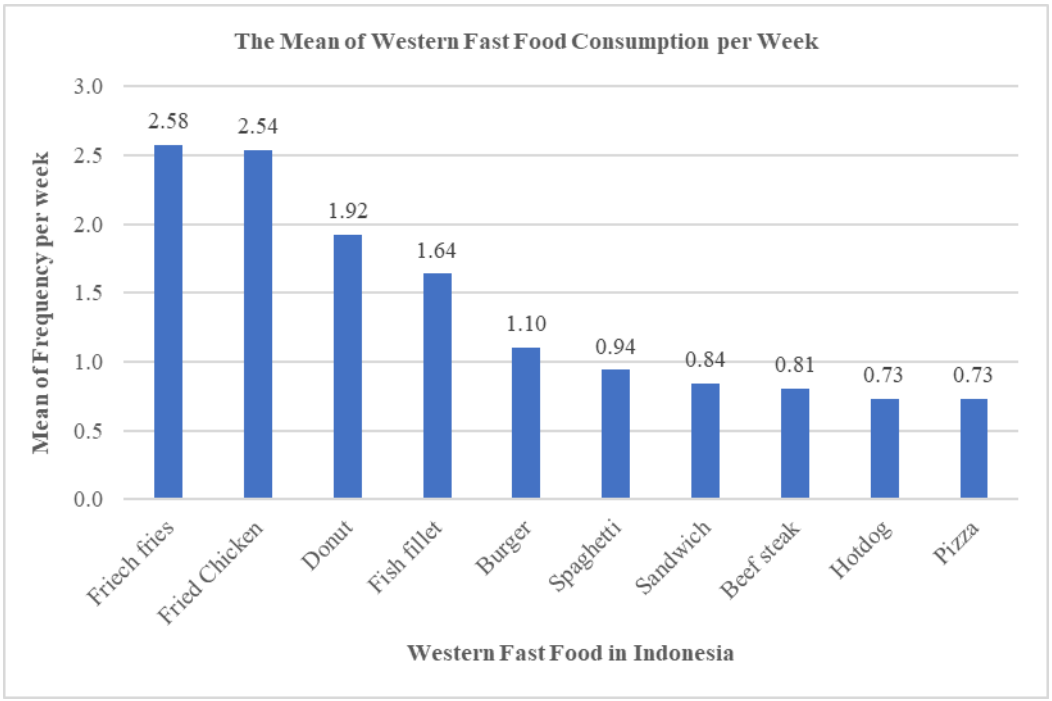

Figure 2. The average consumption frequency of Western fast food per week among college students in Indonesia.

The Differences in Energy Intake of College Students in Indonesia.

The total energy intake of fast food among obese college students in Indonesia was 800.01 kcal (343.73, 1324.93), which was higher than the college students who were overweight 600.80 kcal (336.07, 1152.46), normal weight 417.23 kcal (311.49, 980.18), and underweight 411.21 kcal (316.37, 852.13). There is no significant difference in total energy intake (p=0.436) among Indonesian college students in different weight groups. However, there was a substantial difference between the average intake of fast food (p<0.01), traditional fast food (p=0.048), and Western fast food (p=0.033) in different weight groups. (see table 4).

Table 4. The difference in energy intake according to BMI on college students in Indonesia.

Variables	**Underweight (kcal/day)**	**Normal Weight (kcal/day)**	**Overweight (kcal/day)**	**Obesity (kcal/day)**	***p***
Total	2268.76 (1914.90, 2786.62)	2334.80 (1961.39, 2852.64)	2410.09 (2052.09, 2921.52)	2297.15 (1865.02, 2842.16)	0.436
Fast food	411.21 (316.37, 852.13)	417.23 (311.49, 980.18)	600.80 (336.07, 1152.46)	800.01 (343.73, 1324.93)	<0.01
Traditional Fast Food	220.50 (168.90, 408.25)	219.59 (177.34, 453.88)	277.13 (178.27, 800.98)	273.78 (185.39, 871.92)	0.048
Western Fast Food	145.22 (108.75, 182.99)	143.31 (107.91, 182.47)	141.56 (113.56, 184.94)	160.82 (114.40, 604.18)	0.033

DISSCUSSION

This research aims to evaluate the association between fast food consumption and obesity among college students in Indonesia. Of 1086 participants who participated in this research, a quarter of them (25%) were overweight or obese. This study found a significant relationship between year of study, pocket money per month, and obesity among Indonesian college students. The obesity rate was higher among college students in the fourth year of study (28.6% vs 7.9% vs. 5.4% vs. 14.1, p <0.01). These results aligned with prior research by Tapera et al. (2017), who discovered that obesity and overweight increased with study level (Tapera et al., 2017). In addition, Allen (2013) found that college students in the fourth grade (32.1%) had a greater incidence of obesity when it came to academic standing (Allen, 2013). The possible explanation for this difference was that as the academic burden

increased, leisure time for exercise decreased, causing the students in the higher grades to have a more sedentary lifestyle.

The pocket money each month (>2,000,000 IDR) was similarly connected to obesity ($p<0.01$). A prior research study discovered that those who received their monthly pocket money from 201,000 to 500,000 Ugandan Shilling were more inclined to be obese or overweight. The college students who had more pocket money had a 45–90% higher likelihood of being overweight or obese because they routinely ate at street food stalls, sweetened beverages, snacks, and fast food (25-89%). Pocket money increases the chance of unhealthy eating and obesity.(Kolawole et al., 2017) The results were equivalent to the prior researches from Korea and Vietnam (Guo et al., 2015), (Perelman et al., 2015), (Abdalla et al., 2020).

Furthermore, as many as 8% of students consume fast food daily (Yardimci et al., 2012). In this study, 119 (35.4%) obese participants reported eating fast food more than four times weekly. Fast food was categorized into two categories: traditional fast food and Western fast food. The data analysis findings suggested that obese college students consumed more Western fast food (37.0%) more than two times per week. In comparison, traditional fast food consumption was 30.8%. This result is corroborated by statistics on the preferences of obese students who prefer to consume Western fast food compared to traditional fast food: 33.5% versus 23.2%.

College students (43.9%) like fast food because fast food tastes delicious. This result is supported by prior research, which states that taste is the critical attraction factor of fast food consumption (Vaida, 2013). Hence, many people are interested in consuming fast food (Mandoura et al., 2017). On the other hand, Indonesian college students prefer and consume fast food because of its excellent scents, cozy places, inexpensive costs, and efficient time. In contrast, some research suggests that the primary reasons behind eating fast food are desire (42.1%), ease of finding (30.5%), lack of other appropriate choices (13.7%), and the influence of peers (13.2%) (Bipasha & Goon, 2014). Other studies also indicated that this was the cause of consuming fast food, which was easy and faster to serve. Another reason stated was the absence of cooking abilities (Park et al., 2013).

The average consumption of the most common traditional fast food is tempe mendoan, while the average consumption of Western fast food is French fries. This research is confirmed by prior research, which shows a link between fried food intake and an inclined body mass index. The amount of information influences the calories consumed, influencing the body mass index (Susanti, 2016). Due to their deep-frying preparation method, these fast food options were heavy in fat and energy.

Tempe mendoan is one of the favorite foods among students since it tastes great, is affordable, and is easy to find. Adding carbohydrates such as wheat flour and rice flour to processed plant-based foods resulted in more carbohydrate and fat intake than the daily energy requirements. Other findings also demonstrate that fat sources typically consumed by students with high-fat content come from local snacks and fast food, such as tempe mendoan. These

foods are classified as sources of saturated and trans fat, which should be consumed in a limited manner because they can significantly increase daily fat intake (Hartriyanti, 2020; Kurdanti et al., 2015).

Obesity is linked to the frequency of fast food consumption.(Rosenheck, 2008) BMI rises due to calorie accumulation by eating fast food more frequently. Fast food is heavy in carbohydrates, fat, cholesterol, salt, and poor fiber. Fast food is manufactured with high technology and addictive compounds, including preservatives and gifts of food taste. Most of the time, it is feared that it could increase the body mass index value. Based on the findings, there were significant differences between the frequency and quantity of fast food intake among college students in Indonesia.

The total energy intake of fast food among obese college students in Indonesia (800.01 kcal (343.73, 1324.93)) was higher than overweight (600.80 kcal (336.07, 1152.46)), normal weight (417.23 kcal (311.49, 980.18)), and underweight (411.21 kcal (316.37, 852.13)). There is no significant difference in total energy intake among Indonesian college students in the different groups (p=0.436). However, the factors contributing to obesity are multifaceted and can include a combination of genetic and environmental factors. One specific aspect that is a potential risk indicator for obesity is the consumption of fast food. Although energy intake may not differ significantly in different groups, fast food is often connected with a higher risk of obesity than other food types. This is because fast food frequently has extra sugar, extra fat, a high-calorie content, and low quantities of essential nutrients. Regularly consuming these foods can result in excessive calorie intake and encourage weight gain. The complex nature of obesity means that it cannot be solely attributed to energy intake or any single factor. It is important to remember that although fast food can increase the risk of obesity, other factors such as genetics, lifestyle, socioeconomic status, cultural influences, physical activity level, overall diet, and individual metabolism also play a role in obesity. In addition, there was a significant difference between Western fast food (p=0.033), traditional fast food (p=0.048), and fast food (p<0.01) in different weight groups. An enhanced fast food supplied only once a week generates an increased daily energy intake of 234.4 KJ and a 0.72 kg rise in weight (Schröder et al., 2007).

According to our findings, students who consume fast food more than four times per week are likelier to be overweight or obese (119 (35.4%). The research reveals that eating fast food more than four times each week is a substantial risk factor for overweight and obesity. These findings were corroborated by researchers among college students in Bangladesh (Bipasha & Goon, 2014) and other countries (Shah et al., 2014), (Al Muktadir et al., 2019), (Karmakar et al., 2016). Frequently, fast food consumption is connected with greater weight gain owing to increased daily energy consumption from saturated and trans fatty acid absorption in fast food. (Larson et al., 2011; Mohammadbeigi et al., 2018). Other research study has shown a link between BMI and fast food intake (Mohammadbeigi et al., 2018). Obesity and overweight are closely linked to the frequency of fast food consumption (Al-Otaibi & Basuny, 2015). Our findings corroborate the assumption that obese

college students eat more Western fast food since the most favorite forms of Western fast food have a higher calorie density than traditional fast food (300+kcal vs. 200+kcal) (Bonita, 2017; Donald's, 2015; Ministry, 2017).

Consumption of Western fast food such as sandwiches, fried chicken, and pizza is connected with an increase in BMI, which contributes to the occurrence of obesity. Then, fried foods and hotdogs raise the chance of obesity. Another study indicates a strong link between fast food intake and obesity (Jeffery et al., 2006). Fast-food restaurant meals have more than double the energy density of healthful cuisine (Prentice & Jebb, 2003). Studies have shown that non-communicable diseases such as hypertension, metabolic syndrome, hyperlipidemia, hypercholesterolemia, cardiovascular disease, and type 2 diabetes are the primary causes of obesity (Athens et al., 2016; Bahadoran et al., 2012; Hassanzadeh et al., 2012; Williams et al., 2014).

Fast food has become increasingly popular due to its accessibility, and consumption has risen rapidly. The presence of an obesogenic environment, namely increased exposure to and consumption of fast food (Athens et al., 2016; Xu et al., 2013), increases total daily calorie intake, mainly when consumed in large portions.(Block et al., 2013) Fast food accounts for 425 kcal per day for young adults, or 19% of their daily calorie intake (Dunn et al., 2021). Increased BMI is connected with high-fat foods such as fast food (Chao et al., 2014; Gearhardt et al., 2014). Insulin resistance and reduced leptin release are two examples of endocrine dysfunction contributing to poor appetite control in obese individuals (Wang et al., 2004).

The majority of college students consume fast food, particularly obese students who consume fast food over four times each week. College students should know and convey correct information about the dangers of fast food. Yet, it cannot be denied that college students are the highest fast food consumers (Braithwaite et al., 2014). Other research presents the view that individuals can do psychological therapy, such as mindfulness, if standard nutritional counselling fails to help them (Arch et al., 2016). However, educational institutions have vital functions, such as providing healthier foods for students to make healthier choices (Opoku-Acheampong et al., 2018).

It is advised that college students decrease the amount and frequency of traditional or Western fast food consumption and sustain a healthy weight. Intake of fruits and vegetables is essential, too. There is one on every meal menu since both are strong sources of fiber, which can make the stomach feel full for a longer duration. So that can lessen the risk of gaining excess weight. Besides, vegetables and fruit are rich in vitamins and minerals that support the body's metabolic functions. Cooking skills also need to be enhanced so that college students can decline fast food consumption because there are more food menu choices accessible every day. The results showed that traditional fast food consumption frequency was relatively high. There were 364 out of 1086 college students who consumed traditional fast food more than twice per week, and 30.8% of them were obese. Therefore, in addition to Western fast food, it was required to raise awareness in regulating the consumption frequency of traditional fast food through increasing the healthy eating publicity effort so

that more students could start to be more aware of fast food consumption and, thus, behavioral change.

CONCLUSIONS AND RECOMMENDATION

In our study, 990 out of 1086 (91.2%) college students consume fast food on the meal menu. They prefer Western fast food (29.8%) to traditional fast food (9.6%). However, based on the BMI determined, the total number of college students who were overweight or obese was 272 (25%). Obese students consume fast food more than four times a week, and there was a difference between the frequency and total energy intake of fast food consumption among college students in Indonesia. There is a significant association between fast food consumption and obesity. Many types of traditional and Western fast food in Indonesia are straightforward choices for college students; therefore, special attention is needed to choosing healthy foods to prevent and reduce cases of obesity.

FUTHER STUDY

This study has limitations, such as the fact that females comprised the majority of participants in this research, so care must be taken in future research by choosing samples of the same size for males and females. College students may underreport or overreport their calorie intake, making detecting significant differences between weight categories difficult. It is worthwhile to explore the health hazards of food consumption with different energy densities in future studies. It is hoped that further research can complete the shortcomings of this research. To date, no research has proven the recommended limits on traditional fast food intake to avoid obesity. Understanding the influences of different types of food on energy balance and weight regulation can provide valuable insights into obesity prevention and management strategies.

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