



Using Online Food Ordering Applications Relationship with College Students's Nutritional Status

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ABSTRACT

College students are group who experience various physical changes, which can be measurement through body mass index (BMI). Uncontrolled eating behavior and habits can affect nutritional conditions. Supported by technological advances can make more easier to order food through applications. The aim is to assess using online food ordering application relationship with college students's nutritional status. This study was using an observational analytic design with cross sectional approach. Total respondents are 174 college students. The study was held in Universitas Trisakti, West Jakarta, Indonesia. The inclusion criteria were aged 17-22 years, studying in the Faculty of Economics and Bussiness, have history of using online food ordering applications, willingly to participate. The exclusion criteria were history of heart disease, hypertension, diabetes, cancer, smoking dan drinking alcohol. We used simple random sampling and the measurement of using online food ordering application by questionnaire and BMI measurement using weight and height. The conclusion showed that using onling food ordering applications had no relationship with college students's nutritional status ($p=0.739$; $p>0.05$)

INTRODUCTION

College students are early adulthood group or late adolescence with age around 18-25 years, which at this stage will experience various physical changes. (Salsabilla & Wahyuningsih, 2023) BMI is an index used to showed nutritional status . Height and weight are the most simple and widely used to measure BMI, with weight/height (kg/m²). (Handayani & Khomsan, 2023; Salsabilla & Wahyuningsih, 2023) According to WHO Asia Pasific classification of nutritional status based on BMI are underweight (BMI<18.5kg/m²), normal (BMI 18.5-22.9kg/m²), overweight at risk (BMI 23-24.9kg/m²), obese I (BMI 25-29.9kg/m²), and obese II (BMI≥30kg/m²). (Bolang et al., 2021) Data from WHO there were more than 1.9 billion adults aged >18 years were diagnosed overweight, and data from Riskesdas showed that prevalence overweight were increasing from 11.5% to 13.6% in 201. (Astuti et al., 2022)

Condition where an individual's body weight is more than normal due to an imbalance between the amount of energy consumed and the amount of energy expended is defined as overweight or obesity. (Amalia et al., 2016; Yuniyah et al., 2023) The problem of overnutrition in school and university students can adversely affect the quality of human resources due to the increased risk of diseases such as cancer, heart disease, hypertension, and diabetes in overweight and obese individuals as they age. In addition, it also can cause psychological problems such as social limitations due to a lack of confidence in appearance. (Lestari et al., 2023)

Uncontrolled eating behavior and habits are some of the elements that affect an individual's nutritional condition. (Amalia et al., 2016) The existence of these factors and supported by technological advances that make it easier for a person to access various things, one of which includes ordering foods and drinks through the application. Online food ordering applications provide convenience for users in arranging the amount, type, and frequency of food consumption to be purchased and can be accessed for 24 hours. (Yuniyah et al., 2023)

Online food ordering applications can have both good and bad effects, depending on their use. If students do not realize their nutritional needs and continue to order food as desires, it will result in overnutrition. In addition, there will be less or lack physical activity for a person to move to buy food directly at the restaurant. The correlation between frequency of utilization of ordering services can change the type of food eaten and there is a reduced of physical activity. Both changes can impact changes in body composition and tend to increase body weight. (Maretha et al., 2020; Shovianti et al., 2024)

LITERATURE REVIEW

According to research conducted by Romlah UH, the result showed there is relationship between overnutrition status and the use of online food delivery applications. (Romlah, 2023) The same result from Shovianti et.al., showing that there is a relationship between the frequency of using delivery applications services and body mass index in students. (Shovianti et al., 2024) Where as Abdullah et.al., showed that the prevalence of obesity didn't increase consistently with frequency of fast food consumption, so that there was no relationship between obesity and fast food consumption. (Abdullah et al., 2015)

and Handayani et.al., also showed no significant relationship between the intensity of use of online food delivery applications and nutritional status. (Handayani & Khomsan, 2023)

Based on the differences in opinion from some of these studies, researchers are interested in further research can be an addition to knowledges that can increase students' understanding to continue to limit the use of online food ordering applications so that daily consumption is adjusted to calorie needs. (Abdullah et al., 2015; Handayani & Khomsan, 2023; Romlah, 2023; Shovianti et al., 2024)

METHODOLOGY

The research design used in this study was an observational analytic study with a cross-sectional approach. The respondents were selected using simple random sampling. This research was conducted in Jakarta, located at Universitas Trisakti. This research was conducted for 3 months starting from March-May 2024. The respondents were calculated using finite-infinite formula with prevalence of overweight was 13.6% for adults, and the results obtained 174 respondents. Inclusion criteria were male and female students of Faculty of Economics and Business majoring in Accounting, Universitas Trisakti, aged 18-22 years, have a history of using online food ordering applications, willing to participate and sign informed consent. Exclusion criteria were history of cancer, heart disease, hypertension, diabetes, having a habit of smoking and drinking alcohol.

The materials and instruments of this study were questionnaires and BMI measurement. The questionnaire used is a food ordering applications by classifying categories based on low: 0-5 times/month, medium: 6-10 times/month, and high: >10 times/month. (Handayani & Khomsan, 2023) Respondents' weight and height were measured using digital scales and microtoises that had been calibrated before hand to calculate BMI. BMI measurement is used to measure nutritional status and classifying categories based on underweight: <18.5 kg/m², normal: 18.5-22.9 kg/m², and overweight: ≥ 23 kg/m². (Bolang et al., 2021)

The research data were analyzed using Fisher and Spearman test with a 95% confidence degree with a meaning limit of 0.05. The results of the study if $p < 0.05$ then the results of statistical calculations indicate a significant relationship between the two variables.

This research has received ethical review from the research ethics committee of the Faculty of Medicine, Universitas Trisakti with number: 8/KER-FK/II/2024

RESULTS AND DISCUSSION

The distribution of subject characteristics found that from 174 subjects, the most gender were female with a total of 107 (61.5%) students. In the category of using food ordering applications, the average subject is included in the low category as many as 73 (42.0%) students with a frequency of using online food ordering applications 0-5 times/month. Nutritional status in this research

averaged normal nutritional status as many as 107 (61.5%) students. The data can be showed in table 1.

Table 1. Distribution of Respondents Based on Characteristics (n=174)

Variable	Total (n)	Percentage (%)
Gender		
Male	67	38.5
Female	107	61.5
The usage of food ordering application		
Low (0-5 times/month)	73	42.0
Medium (6-10 times/month)	65	37.4
High (>10 times/month)	36	20.6
Nutritional status		
Underweight (< 18,5 kg/m ²)	9	5.2
Normal (18,5 - 22,9 kg/m ²)	107	61.5
Overweight (≥ 23 kg/m ²)	58	33.3

Based on table 2, the female sex group showed a greater distribution in the normal nutritional status (69.2%) group while the male sex group showed a greater distribution in the overweight nutritional status group (50.7%). The analysis showed that there was significant relationship between gender and college students's nutritional status ($p=0.001$; $p<0.05$)

Table 2. Relationship Gender and Nutritional Status

Variable	Nutritional Status			<i>p-value</i>
	Underweight n (%)	Normal n (%)	Overweight n (%)	
Gender				
Female	9 (8.4)	74 (69.2)	24 (22.4)	0,001 ^(a)
Male	0 (0.0)	33 (49.3)	34 (50.7)	

^(a) Fisher Test ($p \leq 0.05$)

Based on table 3, the distribution in the group using online food ordering applications with the highest frequency of use in the medium group was 44 (67.7%) respondents with normal nutritional status. The group using online food ordering applications with the lowest frequency group amounted 42 (57.7%) with normal nutritional status, while in the group using online food ordering applications with highest frequency, there were 21 (58.3%) with normal nutritional status. The results showed that there was no significant relationship between using online

food ordering applications with college students' nutritional status ($p=0.739$; $p>0.05$).

Table 3. Relationship Using Online Food Ordering with Nutritional Status

Variable			Nutritional Status	<i>p-value</i>
	Underweight n (%)	Normal n (%)	Overweight n (%)	
Using online food ordering applications				
Low	6 (8.1)	42 (57.5)	25 (34.2)	
Medium	1 (1.5)	44 (67.7)	20 (30.8)	0,739 ^(b)
High	2 (5.6)	21(58.3)	13 36.1)	

^(b) Spearmen Test ($p>0,05$)

This study assessed sociodemographics factors in the form of gender. The results of the study were dominated by female gender, total 107 respondents (61.5%). In the place where this research took place, the number of women enrolled in the Accounting Departement was more than male. According to Badan Pusat Statistik Indonesia, the number of college students in 2024 based on gender is 35.23% female and 28.89% male. (Angka Partisipasi Kasar (APK) Perguruan Tinggi (PT) Menurut Jenis Kelamin - Tabel Statistik - Badan Pusat Statistik Indonesia, n.d.)

In this research, respondents with using online food ordering applications were found to fall more into the low category, totaling 73 respondents (42.0%), because most of respondents who took part in this research live with their parents. In addition, they also spend a lot of time on campus. Students who spend a lot of time on campus, no longer need to order food through the applications because there are canteens available. Students using online food ordering applications only to but different snacks and drinks which not in sale in canteens, also buying food in canteens more cheaper than in applications unless their had promos. This results same with Maretha et.al., which also show that food ordering applications are only used as an alternative to getting food if respondents do not have much time to buy directly. Some respondents buy food through applications if there are discount vouchers or shipping costs. Therefore, consumers are very sensitive about the price so that price can determine the decision to buy something. (Maretha et al., 2020)

In nutritional status, respondents in this research mostly had normal nutritional status with a total of 107 respondents (61.5%). Nutrition is influenced by several factors such as lifestyle, socio-economics, level of knowledge, genetics, environment and demographics. The selection of types of foos, especially those high calories, frequency of using online food ordering applications, amount of food is related to a person's nutritional status. (Lestari et al., 2023; Romlah, 2023) Research conducted by Wulandari et.al., is in line with the results of this research based on the calculation that half of the respondents have normal nutritional

status and the rest have underweight and overweight status, although when compared with national and global averages, the prevalence of overweight in this respondents is still relatively low. (Wulandari et al., 2023) According on Riskesdas's data in 2018, Indonesia has a prevalence of overweight nutritional status of 13.6% and obesity of 21.8% in adults aged over 18 years, and WHO in 2016 reported that developing countries had the highest prevalence in the world with overweight reaching 27%. (Astuti et al., 2022)

This research showed their had relationship between gender with nutritional status ($p=0.001$). The research showed differences, where the nutritional status of female was better than the nutritional satatus of male. This is because gender is included in one of the internal factors that can affect a person's nutritional needs. The manifestation of central (android) or peripheral (gynoid) obesity is determined by gender. Gender is related through adipose tissue distribution. (Muscogiuri et al., 2024) Women has tendency to self-confidence and satisfied with their appearance and thin body shape. (Duralı & Duran, 2023) Each has a different weight loss strategy. Appearance can be influenced by physical activity and diet, so women often go on extreme weight-loss diet. Women are more likely join a weight-loss program, take diet pills, follow a special diet, and eat more vegetables and fruits. There is a tendency to limit their type and amount of food excessively, because of that, their nutritional needs not be met according to their needs. (Irfani & Noerfitri, 2021; Komarudin et al., 2023) Men, on the other hand, tend to pay less attention to their outward appearance and do not focus on health issues. In addition, men have the habit of eating unhealthy foods and lack nutrition knowledge. On the other side, if men want to reduce their weight, their strategy are usually exercise and eat foods that contain less fat. (Ketchem et al., 2023; Kuryłowicz, 2023; Muscogiuri et al., 2024) Obese men tend to have no concern about their weight, dissatisfaction with their weight, or weight loss efforts. (Dwimawati, 2020) Sex hormones affect the eating habits of men and women. During adolescence, sex hormones (estrogens, progesterone, and androgens) play a role in body composition, adipose tissue distribution and metabolism. Androgen hormones can regulate body composition by affecting adipose tissue. Subcutaneous adipose tissue had more estrogen and progesterone receptors than androgen receptors, on the contrary visceral adipose tissue had more androgen receptors. Estrogen in women can be secreted from androgens through the process of aromatization. Estrogen plays a role in reducing fat accumulation mainly in subcutaneous adipose tissue. In women, estrogen tends to increase fat storage in the subcutaneous area rather than visceral, which is considered metabolically healthier. Testosterone in men suppresses the activity of lipoprotein lipase (LPL) and acyl-coenzyme A synthetase (ACS), which are involved in fatty acids storage, thereby reducing fat accumulation in the body. (Ketchem et al., 2023; Kuryłowicz, 2023; Muscogiuri et al., 2024) This research result is line with research conducted by Dwimawati, showing female have normal nutritional status than male.(Dwimawati, 2020) In addition, research conducted by Budiman, et.al., also states that there is a significant relationship where men are more obese than women. (Budiman et al., 2022) However, according to the National Health and Nutrition Examination

Survey (NHANES) in 2005-2014, the prevalence of obesity is higher in women. (Muscogiuri et al., 2024)

The results of this research indicate that using online food ordering applications has no significant relationship with college students' nutritional status ($p = 0.739$). In this research showed that 67.7% college students using online food ordering applications had normal nutritional status. Students with high using online food ordering applications 58.3% had normal nutritional status and 36.1% had overweight nutritional status. It's showed that students who has a nutritional issue status doesn't frequently use online food ordering applications. A person's nutritional status cannot be seen only from how often a person uses online food ordering applications, but there're many factors can affect it. (Yuniah et al., 2023) There are many factors related to a person's nutritional status, including parenting patterns, education level, gender, age, family income level, types of food consumed, eating habits, physical activity etc. (Lestari et al., 2023; Romlah, 2023) Since the Covid-19 pandemic, many countries, including Indonesia have implemented activity restriction policies, which until now led to a tendency to easier order food and caused lack of activity. The changes in activity patterns cause changes in eating patterns. (Irfani & Noerfitri, 2021) Technological advances have caused changes in a person's behavior, especially making it easier for a person to order various products at anytimes, including online food ordering. As a result, it has an impact on a person's physical activity which will have an impact on changes in nutritional status. College students use online food ordering applications during lectures, assignment, and off-campus activity. (Romlah, 2023) However, in this research, mostly college students spend a lot of time on campus and sometimes they spend time on campus until evening, especially organizational activities and doing their assignments in the park inside university or canteen, so it is more easier to order food. This is showed that most of college students (42%) had low using online food ordering applications. This results is similar to those conducted by Handayani et.al, Kurniawati et.al., and Irfani et.al., which state that there is no relationship between the frequency of use of food delivery applications and nutritional status, which means that someone who has an overweight nutritional status does not necessarily often order food through online applications, but the types of foods, dietary pattern and various kinds of processed food are more related to nutritional status. (Handayani & Khomsan, 2023; Irfani & Noerfitri, 2021; Kurniawati et al., 2021) Similar research conducted by Abdullah et.al., showed that there was no relationship between obesity and fast food consumption. (Abdullah et al., 2015) This results contradict with the research conducted by Romlah, who said there was a relationship between online food delivery applications with the incidence of obesity and similar through the research conducted by Shovianti et.al., said the frequent using of online food applications is related to nutritional status, especially in BMI. (Romlah, 2023; Shovianti et al., 2024)

This research had limitation, we did not investigate confounder of overweight, such as types of food delivery especially those high or low calories, the frequency and type of physical activities performed. Someone who has low

physical activity tends to have more nutritional status issue. The types of foods must also be noted, although tasty and cheap, fast food has significant social and health consequences. Eating fast food regularly can increase the risk of weight gain and obesity in adolescents and adults with high energy density by consuming a lot of fat, sugar, low fiber, and protein. (Abdullah et al., 2015; Durah & Duran, 2023; Romlah, 2023) Regular physical activity can reduce the risk of being overweight for both men and women. Frequent physical activity leads to higher calorie burn and hence weight loss. Physical activity will prevent the body from storing a lot of fat. The lack of physical activity can effect amount of fat in a person's body which will lead to decrease muscle mass and increase fat mass, resulting in decrease of body basal metabolic rate. As a result, the body becomes more prone to obesity because the body basal metabolism is not balanced the intake of calories in the energy out. (Romlah, 2023; Shi et al., 2023)

CONCLUSIONS AND RECOMMENDATIONS

The conclusion showed that using online food ordering applications had no relationship with college students's nutritional status ($p=0.739$; $p>0.05$). Reseacher recommendations to adding foods recall for online food ordering applications.

FUTHER STUDY

In the future, we can connect the types, total calories of food consumed when using online food ordering applications, the frequency, type of physical-activity that is often carried out and amount of income with college students's nutritional status.

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