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**CORRELATION BETWEEN USAGE FREQUENCY OF ONLINE FOOD DELIVERY SERVICES AND
DIET QUALITY AMONG UNIVERSITAS GADJAH MADA STUDENTS**

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Abstract

Introduction: Recent technological developments have presented online food delivery applications that can be used to order food from home. These applications help the community, including students, especially after Covid-19 pandemic. However, these services tend to provide a variety of unhealthy foods which is associated with a low-quality diet. This study aimed to determine the correlation between usage frequency of online food delivery services and diet quality among Universitas Gadjah Mada students. **Methods:** This was an observational study with a cross-sectional design. The study involved 135 active students among Universitas Gadjah Mada at the diploma and undergraduate levels in the 2021/2022 academic year who had used online food delivery services at least once in the last 1 month. Sampling used cluster and consecutive sampling techniques. Data were collected using an online questionnaire then diet quality was assessed using the Diet Quality Index-International (DQI-I). The statistical tests used to analyze correlation were Chi-Square and Spearman Correlation. **Results:** Most subjects rarely used online food delivery services (57.8%) and had a low-quality diet (84.4%). It was found that there was no significant correlation between usage of online food delivery services and diet quality ($p=0.860$, $p>0.05$). **Conclusion:** There is no significant correlation between usage frequency of online food delivery services and diet quality among Universitas Gadjah Mada students.

Keywords: usage frequency, online food delivery, diet quality, students

INTRODUCTION

Recent technological developments can cause changes in social behavior (Mumtaha & Khoiri, 2019). One of the most significant behavioral changes is the pattern of human communication. This phenomenon occurs along with the rise of digital applications on smartphones (Nurbayti, 2019). In this digital era, smartphones equipped with internet networks are starting to be involved in people's lives for various purposes, such as communicating, obtaining information, and looking for online transportation (Suryaningsih, 2019). The current growth in online communication patterns is also based on the conditions of the Coronavirus Disease 2019 (Covid-19) pandemic. The pandemic required people to practice social distancing or stay at home when there was no urgent need to prevent the transmission of Covid-19 (Mukti, 2020). It made people tend to choose a more practical way through the usage of digital technology compared to using conventional methods to reach their daily needs, including the need for food (Novita & Wijaya, 2021).

Online food delivery services are an alternative that can be used to order food without having to leave the house, simply by using a smartphone that has an application installed with a food delivery feature, such as GoFood, GrabFood, and ShopeeFood. Ordering food online has advantages in practicality, time, and cost. Several conditions make people prefer online food delivery services compared to conventional methods, including laziness, busyness, and efforts to avoid traffic jams and queues at places to eat (Nurbayti, 2019). These services can provide convenience for the general public in accessing food, especially for people who are often busy or have a busy schedule and don't have time to prepare food or look for food directly, such as students (Puspita & Aprilia, 2020).

In addition to offering a variety of menu variants that are selectable and accessed freely and easily, online food delivery services also provide promos, vouchers, discounts, and 24-hour services that will make students more interested in using these services. It causes students to be able to buy food with uncontrolled types and quantities (Suryaningsih, 2019). These services tend to provide a variety of unhealthy foods, such as fast food. Research conducted by Abdullah, et al. (2014) and Yahia, et al. (2016) showed that among students, especially students under 24 years, there was an increased consumption of fast food every month. So many types of fast food in online food delivery services make usage of these services tend to impact the diet quality of students (Maretha, Margawati, Wijayanti, & Dieny, 2020).

Previously, Taher, et al. (2018) researched the relationship between the frequency of takeaway food consumption and diet quality in British adolescents. This study found that

takeaway food consumption tends to harm the diet quality of adolescents. Research by Carabaza, et al. (2021) also reported that takeaway food consumption increased trans fat intake and decreased diet quality in American faculty staff. These studies showed that the diet quality of Westerners could be affected by the consumption of takeaway food and tends to decline when the consumption of takeaway food increases.

In Indonesia, research conducted by Maretha, et al. (2020) reported that there was no relationship between usage of online food delivery applications and the quality of students' diets. The same result was also reported by Latifah (2019). It was found that there was no significant relationship between usage of food delivery services on online transportation applications and changes in eating habits in students. Previous research in Indonesia had different results from researchers in England and America. The frequency of food consumption from online food delivery services of subjects in studies conducted in Indonesia was in the rare category (Latifah, 2019; Maretha, Margawati, Wijayanti, & Dieny, 2020). Therefore, further researches are necessary to find whether there are differences in the diet quality among Indonesian people, especially students, who have a low frequency and those who have a high frequency of using online food delivery services. This study aimed to determine the correlation between usage frequency of online food delivery services and diet quality among Universitas Gadjah Mada students.

METHODS

This was an observational study with a cross-sectional design. Data collection was carried out in June 2022. This research was held not only in the Universitas Gadjah Mada campus area but in any area where Universitas Gadjah Mada students live. The inclusion criteria in this study were active students among Universitas Gadjah Mada at the diploma and undergraduate levels who had used online food delivery services at least once in the last 1 month. Meanwhile, the exclusion criteria in this study were subjects who were on a specific diet and/or did not complete the answers in the questionnaire. Researchers used the Slovin formula to determine the sample size of the population. The research population was active students among Universitas Gadjah Mada at the diploma and undergraduate levels in the odd semester of 2021, which was 37,938 people. The researcher used a confidence level of 90% so that the error tolerance limit was 10% or 0.1. The calculation of the sample size in this study was as below.

$$n = \frac{N}{1+Ne^2} = \frac{37.938}{1+(37.938)(0,1)^2} = 99,7 \approx 100$$

Sampling used cluster sampling to determine the proportion of each cluster, consisting of

Health and Non-Health clusters, and also used consecutive sampling to take samples up to the required amount. The sample size calculation for each cluster group was as below.

Health:	Non-Health:
$n = \frac{3.902}{37.938} \times 100 = 10,3 \approx 10 \text{ students}$	$n = \frac{34.036}{37.938} \times 100 = 89,7 \approx 90 \text{ students}$

Data were collected using an online questionnaire, consisting of a Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) to measure eating habits and a questionnaire made by researchers to see the characteristics and usage frequency of online food delivery services. Diet quality was assessed using the Diet Quality Index-International (DQI-I). The statistical tests used to analyze correlation were Chi Square to see the p-value and Spearman to see the correlation coefficient.

RESULTS AND DISCUSSION

The subjects obtained in this study amounted to 158 active students among Universitas Gadjah Mada who met the research inclusion criteria. However, 23 subjects had to be dropped out of the study because they were on a specific diet and/or did not complete the answers in the questionnaire. Thus, the subjects who met the criteria and were analyzed according to the objectives of this study amounted to 135 people. The general characteristics of the subjects of this study are in Table 1.

Table 1. General Characteristics of The Subjects

Variable	Frequency (f)	Percentage (%)
Age		
Late Adolescence (16-18 years)	7	5,2
Young Adults (19-29 years)	128	94,8
Total	135	100,0
Gender		
Male	39	28,9
Female	96	71,1
Total	135	100,0
Domicile		
Yogyakarta	126	93,3
Outside Yogyakarta	9	6,7
Total	135	100,0
Usage Frequency of Online Food Delivery Services		
Frequent ($\geq 3x/\text{week}$)	57	42,2
Rare ($< 3x/\text{week}$)	78	57,8
Total	135	100,0
Diet Quality		
Low (DQI-I ≤ 60)	114	84,4

High (DQI-I >60)	21	15,6
Total	135	100,0

The subjects in this study were dominated by young adults (19-29 years) which amounted to 128 people (94.8%). There were more female subjects, which amounted to 96 people (71.1%). Most subjects were domiciled in Yogyakarta, with as many as 126 people (93.3%). The subjects categorized as rarely using online food delivery services were more than the subjects categorized as frequent. Subjects with a rare frequency of using online food delivery services were 78 people (57.8%). Most subjects had a low-quality diet, as many as 114 people (84.4%).

The foods most ordered by the subjects using online food delivery services were chicken for the animal-based foods category, totaling 133 subjects; fried rice for the one-dish meals category, totaling 89 subjects; cap cay for the vegetable category, totaling 65 subjects; and tea for beverages category, totaling 68 subjects who frequently order it. The other foods most ordered using these services for each group are in Figure 1.

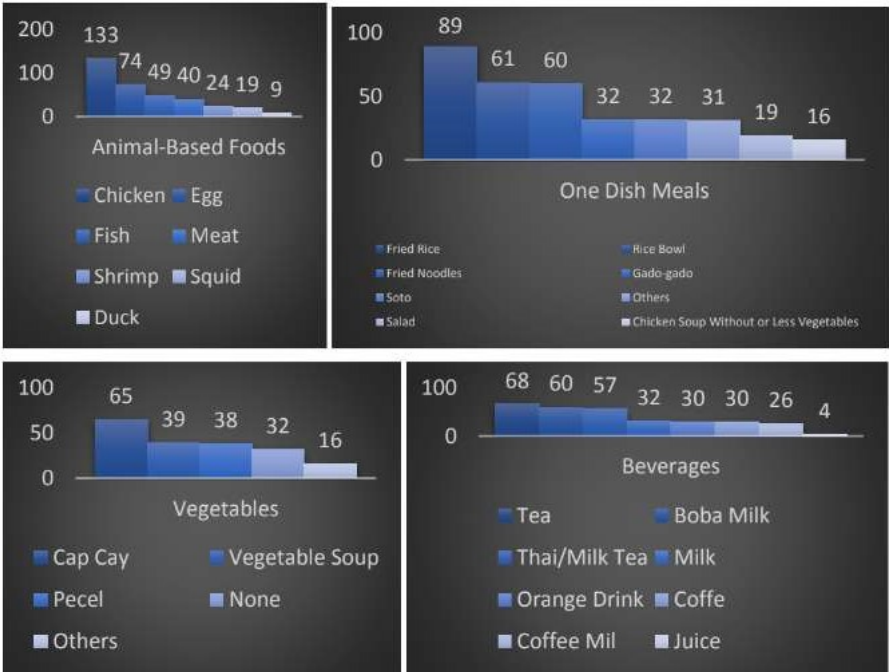


Figure 1. Food Most Ordered by The Subjects Using Online Food Delivery Services

Furthermore, bivariate analysis was carried out to determine the correlation between usage frequency of online food delivery services and diet quality. Bivariate analysis

was performed using the Chi-Square test and Spearman correlation. The results of the analysis can be seen in Table 2.

Table 2. Correlation Between Usage Frequency of Online Food Delivery Services and Diet Quality

Usage Frequency of Online Food Delivery Services	Diet Quality				Total		r_s	p-value
	Low		High		F	%		
	F	%	F	%				
Frequent	49	86,0	8	14,0	57	100,0	0,036	0,860
Rare	65	83,3	13	16,7	78	100,0		
Total	114	84,4	21	15,6	135	100,0		

The Chi-Square test showed that $p\text{-value} = 0.860$ ($p\text{-value} > 0.05$). It meant that there was no significant correlation between usage frequency of online food delivery services and diet quality. Based on the Spearman Correlation test, the correlation coefficient value (r_s) = 0.036 indicated that the two variables had a weak positive correlation (0.00-0.199). The positive relationship between the two variables meant that the more often someone used online food delivery services, the lower the quality of their diet, and vice versa.

The results of this study were in line with the research conducted by Maretha, et al. (2020). There was no significant relationship between usage of online food delivery applications and diet quality. The online food delivery application did not affect the diet quality of the research subjects because the food purchased through the application only contributed a little to the subject's consumption pattern. However, this study only looked at usage state of online food delivery services without looking at the level of usage frequency. The higher the contribution of online food delivery services to the subject's consumption pattern, the higher the quality of the subject's diet.

Research conducted by Taher, et al. in England (2018) and Carabaza, et al. in America (2020) analyzed the correlation between the frequency of takeaway food consumption and diet quality. The results showed a significant relationship between the two variables. Differences in the results of this study might occur due to differences in the subject's characteristics. Indonesians had different consumption patterns from the British and American people. Research in England reported that students who frequently consumed takeaway food had a history of higher intake of LDL cholesterol, total cholesterol, and fat than students who rarely consumed takeaway food (Donin, et al., 2017). Takeaway food usually contains high saturated fat, sugar, and calories (Taher, Evans, & Evans, 2018). In America, fast food had become part of the daily intake of Americans (Fryar, Hughes, Herrick, & Ahluwalia, 2018). Fast food has poor quality compared to other types of takeaway food so it will affect the quality of the diet of people who consume it (Prentice & Jebb, 2003 in Taher, et al., 2018).

Based on this research, it was known that the consumption patterns of subjects through online food delivery services were slightly different from the consumption patterns of British and American people. Most of the study's subjects still made vegetables and some vegetable and fruit-based dishes as one of the food categories that were usually ordered through online food delivery services. The consumption pattern of subjects through online food delivery services was not much different from their daily eating habits. In addition, most of the study's subjects rarely used online food delivery services, so these services' usage might not have much effect on the subjects' eating habits and diet quality.

This study had a limitation. The online method using a questionnaire for collecting data on subjects' eating habits led to a high possibility of bias. Some information regarding the subject's food intake might be overestimated, underestimated, or not obtained at all.

CONCLUSION

There is no significant correlation between usage frequency of online food delivery services and diet quality among Universitas Gadjah Mada students.

RECOMMENDATION

Students should be wiser in choosing the type of food to be consumed, whether using online food delivery services or not, considering that most students are still on a low-quality diet. It is recommended to make food selections based on Balanced Nutrition Guidelines. Therefore, nutrition and health workers should be more active in providing nutrition education, especially about balanced nutrition guidelines. Because one of the limitations of this study related to the data collection method, it is recommended that similar studies be conducted in the future using other methods which have a lower risk of bias, such as using the food recall method or the SQ-FFQ interview to collect food intake data.

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