https://doi.org/10.46389/rjd-2022-1147
www.rjdnmd.org

Rom J Diabetes Nutr Metab Dis
2022; volume 29, issue 4, pages 457-462

Original Article

The impact of online food delivery on the nutritional status of work-from-home workers during the COVID-19 pandemic

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Received: 18 March 2022 / Accepted: 4 October 2022

Abstract

Social restriction policies increase the risk of obesity in society because it is influenced by increasingly narrow space for movement so that physical activity is reduced and consumption increases due to feeling bored at home. The effects of the COVID-19 pandemic have caused people's lifestyles to change from those previously operating offline to online, including how to get food. Large-scale social restriction policies make food service providers cooperate with the Online Food Delivery (OFD) platform to make it easier to reach consumers. This study aimed to analyze the effect of using an online food delivery application on improving the nutritional status of office workers during the COVID-19 pandemic. This research is an analytic observational study with a cross-sectional design. The study involved 408 workers in Jakarta who experienced the impact of COVID-19. The data analysis technique used SPSS 20, which adjusted test results to the variable data scale. It is known that there was an increase in body weight and nutritional status ($p<0.05$) during the large-scale social restriction policy implementation. There is a correlation between physical activity and nutritional status ($p<0.05$). There is no significant correlation between the frequency of ordering food online with nutritional status. There is an increase in body weight and an increased risk of obesity during the COVID-19 pandemic.

Keywords: online food delivery application, nutritional status; office workers; COVID-19 pandemic.

Introduction

Coronavirus disease (COVID-19), caused by a novel virus (SARS-CoV-2), was first identified in Wuhan, China, at the end of 2019. The World Health Organization (WHO) determined severe acute respiratory syndrome-coronavirus (SARS-CoV-2) as a pandemic on March 11, 2020. The impact of this pandemic is that almost all countries in the world were implementing several social restrictions and policies to suppress the spread of the COVID-19 virus [1]. Based on WHO data on November 2021, the pandemic, which emerged in December 2019, has infected 184,8 million people and killed more than 3,94 million people worldwide.

Indonesia is one of the countries affected by this pandemic. Indonesia announced its first case in March 2020. This triggered various policies issued by the government, such as Large-Scale Social Restrictions (PSBB), closing public facilities, and imposing schools and working from home. As a result, people's social life changes, spending more time at home, which causes longer internet exposure. Based on a survey conducted by the Association of Indonesian Internet Service Providers (APJII) in 2020, the number of internet users in Indonesia increased to 196,7 million people or 73.7% of the population. This number has increased by around 25,5 million users compared to 2019. This increase was driven by the presence of fast internet infrastructure that is increasingly evenly distributed and the massive digital transformation due to the COVID-19 pandemic since March 2020. Changes in work practices and socialization that switched to online interactions during the COVID-19 pandemic have made many people spend their time online and imply that Indonesia's largest internet usage dominates smartphones and social media devices [2].

The social restriction policy in Indonesia to control the spread of COVID-19 has resulted in various internet-based cellular services via smartphones being significantly developed and implemented in various industries, including the culinary field. As a result, many commercial food companies, including restaurants, are migrating to take-out and delivery services [3]. These online food delivery services are often referred to as Mobile Food Ordering Applications (MFOA). Online food delivery platforms also use intensive marketing strategies, such as photos, discounts, free delivery and combinations of food and/or beverage items offered at discounted prices [4].

Based on the research of Horta, de Paula Matos, & Mendes (2020) in Brazil, the amount of food advertising has been shown to increase obesity rates. The increased food advertising through online delivery and promotions and decreased physical activity due to the narrowing of public space during the pandemic have increased the obesity rate. Consumers, especially relatively younger ones, are becoming more dependent on social media and online services. Another factor in the increase in online food ordering is hygiene and delivery without direct contact with users, both of which are highly supported in the era of the COVID-19 pandemic [5].

Online food delivery applications can have both good and bad effects, depending on how users use them. Application users can choose and buy food according to their needs easily and quickly. Food intake with good quality and quantity can positively affect health. However, currently, there is an increase in consuming fast food every month among those aged 24 years and over. Online food delivery applications with full access affect the uncontrolled type and amount of food purchased. It causes excess nutritional status when the individual is unaware of nutritional needs and consumes more than his needs.

Material and methods

This research is an analytic observational study with a cross-sectional design. This design is used to determine the correlation between eating habits ordered online and the incidence of nutritional status by using a survey method simultaneously. The data used are primary because it is obtained directly from respondents. Data collection is carried out from October to December 2021 at the Jakarta regional office. The subject's characteristics are permanent employees aged 20–45 years, can communicate well, have an online food delivery application on their cellphones and are not on a special diet. The ethics committee has approved this research of Esa Unggul University Jakarta under the number 0377-21,377/DPKE-KEP/FINAL-EA/UEU/XI/2021.

The data collected included pre-pandemic weight, current body weight, height, daily food intake using 24-hour recall, eating frequency using a food frequency questionnaire, and research questionnaires related to the frequency of using online delivery applications.

Ordering online food delivery is categorized as frequent if the respondent makes more than seven weekly orders. In contrast, it is categorized as infrequent if the respondent orders less than seven times. Nutritional status was obtained through anthropometric measurements of weight and height with Body Mass Index (BMI) of 18.5 (thin); BMI=18.5–22.9; (normal); BMI=23.0–24.9 (overweight) BMI=25–29.9 (obese I); BMI 30 (obese II). Physical activity was measured using interviews using the International Physical Activity Questionnaire (IPAQ) and then categorized into light physical activity (<600 MET minutes/week), moderate physical activity (600–1500 MET minutes/week), and heavy physical activity (>1500 MET minutes/week)

The data analysis used in this research is Univariate and Bivariate analysis. Univariate analysis was used to see the description and characteristics of the respondents. Meanwhile, Bivariate Analysis was used to determine the correlation between the independent variables (free), namely online food delivery, energy intake, and physical activity, with the dependent variable (bound), namely nutritional status. Data processing uses SPSS 20 computerized assistance.

Results

From Table 1, it is known that 64% of respondents are female. 45% of respondents use GrabFood as an online food delivery application. Two m-commerce companies in Indonesia have delivery sourcing services, namely Gojek and Grab, whose names for food delivery services are GoFood and GrabFood, respectively. Both food delivery services use their drivers to purchase and deliver consumer food. Its use increased during social restrictions imposed in Indonesia during the pandemic.

There were 133 respondents who experienced weight loss, 45 respondents whose body weight remained constant and 230 respondents who experienced weight gain during the pandemic. Based on Table 2, it is known that there is a significant difference between

 https://doi.org/10.46389/rjd-2022-1147

Table 1: Frequency of Respondents' data.

Profile	Frequency	Percentage
Gender		
Woman	261	64%
Man	147	36%
Profession		
Government employees	163	40%
Private employees	198	48%
Businessman	47	12%
Age		
18–25	156	38%
26–34	171	42%
35–43	45	11%
44–52	30	7%
Over 52	6	1%
Income per month		
2–3,9 million	48	12%
4–5,9 million	107	26%
6–8 million	195	48%
more than 8 million	58	14%
Average expenditure per month		
10–25% of income	45	11%
26–50% of income	161	39%
More than 50% revenue	202	50%
Frequently used food delivery app		
Grab food	183	45%
Go food	155	38%
E-commerce	44	11%
Delivery order from restaurant	21	5%
Other	5	1%

body weight before the pandemic and after the COVID-19 pandemic ($p<0.05$).

There were 133 respondents who experienced a decrease in nutritional status, 45 respondents whose nutritional status remained unchanged, and 230 respondents who experienced an increase in nutritional status during the pandemic. Based on Table 3, it is known that there is a significant difference between the body mass index before the pandemic and after the COVID-19 pandemic ($p<0.05$).

Based on Table 4, it is known that of 113 obese respondents, 59% had light activity. Meanwhile, respondents who have normal nutritional status have moderate to heavy activity. Based on the results of the chi-square test, there is a significant correlation between physical activity and nutritional status ($p<0.05$).

Table 5 shows that 88% of respondents often use online delivery applications, which means ordering more than five times a week. Based on the results of the chi-square test, there was no significant correlation

Table 2: Changes in body weight before and after the pandemic.

	Mean±SD	P-value
Weight before the pandemic	60.88 kg±12.71	0.001
Weight after the pandemic	61.78 kg±12.95	

Note: Wilcoxon test.

Table 3: Changes in body mass index before and after the pandemic.

	Mean±SD	P-value
BMI before the pandemic	23.13±4.18	0.001
BMI after the pandemic	23.48±4.33	

Note: Wilcoxon test.

between the frequency of ordering food online and nutritional status (p=0.24)

Discussion

The correlation between nutritional status before and after the pandemic

Based on the analytical test conducted, there was a significant increase in body weight and nutritional status during the COVID-19 pandemic. Based on the survey, respondents consume food because they are bored and there are many promotions from food delivery applications that are widely used during large-scale social restrictions policies. Dietary changes during the COVID-19 outbreak could also be driven by the fear and anxiety that many people around the world experience. Convincing evidence shows that dietary habits are influenced by stress, distress, and emotional disorders, with increasing difficulty levels associated with unhealthy dietary patterns and poor diet quality.

Table 4: Correlation between physical activity and nutritional status.

Physical activity during a pandemic	Nutritional status						P-value
	Normal		Overweight		Obesity		
	n	%	n	%	n	%	
Light activity	28	13.9	42	45.2	59	52.2	0.03
Moderate activity	92	45.5	44	47.3	39	34.5	
Strenuous activity	82	40.6	7	7.5	15	13.3	
Total	202	100	93	100	113	100	

Note: Chi-square test for trend.

Table 5: The correlation between the frequency of ordering food online and nutritional status.

Order food online	Nutritional status						P-value
	Normal		Overweight		Obesity		
	n	%	n	%	n	%	
Seldom	26	12.9	12	12.9	9	8	0.24
Often	176	87.1	81	87.1	104	92	
Total	202	100	93	100	113	100	

Note: Chi-square test for trend.

https://doi.org/10.46389/rjd-2022-1147

In addition, emotions such as fear and sadness are associated with reduced desire or motivation to eat and with reduced enjoyment of eating. Recently, it has been proven that isolation causes many people to be more active in exposure to food advertisements, causing greater consumption patterns [6]. As a result, this phenomenon illustrates the tendency of increasing obesity rates in society due to the pandemic.

The increase in weight and nutritional status in this study can occur due to environmental factors during the COVID-19 pandemic, which requires respondents to limit outdoor activities so that it triggers boredom resulting in consuming more food, one of which is obtained through online delivery messaging applications. The results of this study are in accordance with the study of Zachary *et al*. in 2020, which explained that 22% of the research subjects experienced an increase in body weight of 5–10 pounds (2.5–5 kg) compared to before the pandemic. This is due to decreased physical activity and longer time at home so that respondents snack more. Increased time at home may provoke additional eating in response to cues of saturation and stress [7].

The correlation between physical activity and nutritional status

The results showed a significant correlation between physical activity and nutritional status ($p<0.05$). Based on the research results, respondents with light activities have the nutritional status of overweight (45.2) and obese (52.2%), while respondents with normal nutritional status have moderate to heavy activities. This can happen because self-isolation at home directly affects a person's lifestyle, including eating habits, dietary habits, and physical activity. Self-isolation promotes sedentary behavior involving activities with very low energy expenditure, performed primarily in a sitting or supine position [1]. Low levels of physical activity, even for short periods of time, can have a negative impact on physical and mental health. The state of isolation can also lead to irregular dietary habits and frequent eating of dry foods, both of which are associated with higher caloric intake and an increased risk of obesity [8].

In a clinical review study, Nogueira-de-Almeida *et al*., 2020 concluded that various factors that increase the risk of obesity due to social restrictions include stress, sleep disorders, sedentary behavior, fast food and the use of ultra-processed foods, lack of exposure to sunlight, thereby reducing vitamin D level, more screen time, and increased consumption of high-sweetened beverages [8, 9]. Physical distancing demands drastic changes in activities in daily life. Changes in physical activity patterns are a decrease in physical activity and an increase in the subject's sedentary behavior. It is feared that it will have an impact on increasing the risk of obesity and even non-communicable diseases if this behavior continues. This needs attention so prevention efforts can be carried out [1].

The correlation between online food delivery applications and nutritional status

Based on the results of statistical tests can not prove a significant correlation between the frequency of online food delivery with nutritional status. This is because the distribution of the frequency levels of respondents is homogeneous, where as many as 361 respondents (88%) often use online food delivery applications during the COVID-19 pandemic. From studies that have been carried out, it is confirmed that changes in society are due to the many restrictions on human mobilization due to the COVID-19 pandemic, which has an impact on changes in consumer behavior in food shopping. By prioritizing safety and health factors, consumers are happier shopping through online applications and, at the same time, create greater exposure to digital advertisements [5, 10]

Based on previous research to determine what factors determine consumers' continuous use of online food delivery applications during the COVID-19 pandemic period. The results of this study conclude that consumer intentions to continue using online food delivery applications during the COVID-19 pandemic are not only significantly determined by satisfaction factors but are also influenced by technological suitability, trust, and social influence [11]. Solutions that can be offered to consumers according to government policies to "stay at home" online delivery applications offer contactless delivery, integrate technology in service delivery that minimizes human contact, provide useful tips during the ordering process, including small notes on handling procedures for food in package delivery, training of employees for safe food handling with certification, and so on [12]. Hence, those messages can be included in digital advertising programs to increase consumer interest.

In the research, Hastiningsih and Sari (2020) conducted a study of culinary buying behavior via digital due to the increasing COVID-19 pandemic in Indonesia. This is because consumers feel anxious in determining

the culinary transaction process during the pandemic era, so they are more comfortable ordering food digitally and not leaving the house. Two m-commerce companies in Indonesia have delivery sourcing services, namely Gojek and Grab, whose names for food delivery services are GoFood and GrabFood, respectively. Both food delivery services use their drivers to purchase and deliver consumer food. In this study, more respondents used the grab food application (45%). This can be caused by several things, including the number of restaurants listed in each application, the prices offered, and discount vouchers [13].

Conclusions

The study involved 408 workers in Jakarta who experienced the impact of COVID-19. It is known that there was an increase in body weight and an increase in nutritional status ($p<0.05$) during the large-scale social restriction policy implemented in Indonesia. Based on a survey of respondents, it is known that the increase in consumption is due to boredom and the number of promotions from the delivery application. There is a correlation between physical activity and the nutritional status of respondents ($p<0.05$). This can happen because self-isolation at home directly affects a person's lifestyle, including eating habits, dietary habits, and physical activities that are only done at home. Based on the results of statistical tests can not prove a significant correlation between the frequency of ordering food online with nutritional status. This is because the distribution of the frequency levels of respondents is homogeneous, where 361 respondents (88%) often use online food delivery applications during the COVID-19 pandemic.

Conflict of interest

The authors declare no conflict of interest.

Funding

The authors received funding from research and community service institutions Universitas Singaperbangsa Karawang.

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