

RESEARCH STUDY

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The Effect of Food Accessibility on Family Food Preference Practices in Semarang during a Pandemic

Pengaruh Aksesibilitas Bahan Pangan terhadap Praktik Pemilihan Makanan Keluarga di Kota Semarang selama Masa Pandemi

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Received: 15-09-2023

Accepted: 31-12-2023

Published online: 31-12-2023

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DOI:

10.20473/amnt.v7i2SP.2023.238-246

Available online at:[https://e-](https://e-journal.unair.ac.id/AMNT)[journal.unair.ac.id/AMNT](https://e-journal.unair.ac.id/AMNT)**Keywords:**

Food Accessibility, COVID-19,

Food Security, Diet Practices

ABSTRACT

Background: The COVID-19 pandemic has changed behavior and community's economic activities in Indonesia, resulting in a decrease in family food security. Good family food security is indicated by adequate food availability both in quantity and quality. Food resources should be safe, diverse, nutritious, evenly distributed, and accessible.

Objectives: This study aims to analyze the effect of accessibility to family groceries on family diet practices in Semarang City during the COVID-19 pandemic.

Methods: This cross-sectional study was conducted online in Semarang City in 2022. A total of 108 mothers of elementary school students were recruited using a purposive sampling technique. Data on general characteristics were obtained from an online questionnaire, while data on distance, affordability, sources of health information, and diet practices were obtained using a questionnaire which was then scored. The statistical analysis was conducted using the Chi-Square test with a significance level of 0.05.

Results: The age of the mothers ranged from 36-45 years (64.8%); most of the mothers had a bachelor's degree (93.5%); the mothers worked (50.9%); the family income level was above Rp 2,800,000 (89.8%). Accessibility to information sources was limited in most cases (57.4%); the mothers' purchasing accessibility was high (63.9%); and they mostly could access food sources (71.3%). Most of the mothers had good diet practices (66.7%). Variables that showed a significant relationship with diet practices were accessibility to foodstuff ($p = 0.001$). Other variables that contributed to diet practices were the mothers' education ($p = 0.040$), occupation ($p = 0.002$), and family income ($p = 0.006$).

Conclusions: There was a relationship between accessibility to food and diet practices.

INTRODUCTION

The World Food Program (WFP 2021) stated that 768 million people experienced chronic hunger during the COVID-19 pandemic¹. The Food Agriculture Organization (FAO) also reported that the COVID-19 pandemic caused a food crisis and disrupted world food security². Food security is a condition where the household diet is met and sufficient in terms of quantity, quality, safety, distribution, and affordability³. The availability of food supports the continuity of people's lives. Therefore, any disruption to food supply and availability will result in reduced food intake, including staple foods, fruit, and vegetables⁴.

Achieving a level of food security is demonstrated by easy access to food according to everyone's nutritional needs and a healthy life⁵. There are four main dimensions of food security. First, the availability of the food supply is determined by the production department, stock levels, and the difference in quantities between food

exports and imports. Second, access is measured based on physical quantities (sufficient food stocks) and economics (people's ability to buy food). Third, food utilization is related to nutritional adequacy and food safety. Fourth is stability between the first and third dimensions⁶.

The COVID-19 pandemic has affected all aspects of life, including changes in people's behavior and activities. One of the behaviors that has changed is the family's food consumption behavior. Changes in food choice behavior may lead to nutritional intake disorder, either undernutrition or excess nutrition⁸. Mothers as part of family members have an important role in selecting and providing food for the family. Factors that influence the mother's choice include culture, the access and availability of food, socioeconomics, personality, and information media⁹.

Accessibility is an important aspect of food selection. The form of accessibility or affordability is the

financial side and the availability of food in residence¹⁰. Limited access to food resources occurred due to social restrictions during the pandemic. Food purchasing power is influenced by employment status and income level in the family¹¹. The increase in food prices during the pandemic also affected people's purchasing power¹².

Besides, the COVID-19 pandemic affected family income levels. Many people were affected by layoffs from their jobs due to the decline of the company¹³. The effect of limited employment opportunities and work opportunities due to the government regulations and protocols for preventing the transmission of COVID-19 has led to high unemployment rates, ultimately reducing income levels and prosperity¹⁴. Decreasing income levels will result in unhealthy food consumption levels because prices are distorted due to high transportation and logistics costs of goods¹⁵.

In 2020, Indonesian Statistics recorded that the percentage of poor people on Java Island increased by 0.95% from the previous year. The change in the percentage of poverty on Java Island in 2020 was the highest increase compared to other islands¹⁶. One of the cities in Central Java that experiences an increase in poverty is Semarang City. Semarang City is a metropolitan city that has 16 sub-districts and 177 sub-districts of various social strata with a population of 1.86 million people¹⁷. In 2021, Semarang City experienced an increase in the poverty rate from 4.34% to 4.56%. About 12.86% of the working-age population experienced the impact of the COVID-19 pandemic, including 11.560 people who lost their jobs due to COVID-19 and 85.950 people who worked with reduced working hours¹⁸. Most vulnerable informal sector workers also experienced the negative impact of the pandemic because they had a daily income cycle and less savings¹⁶. The increasing level of poverty slows down the community's economy, resulting in difficulties in meeting life's needs. Household consumption decreased due to reduced income and decreased buying power during the pandemic⁷.

The COVID-19 pandemic which has been going on since early 2020 has urged the implementation of social restrictions and has disrupted access to food supplies. In 2020, the average Indonesian vegetable consumption was 38.51 kcal, which is far from what should be consumed at 62.5 kcal. The level of fruit consumption decreased from the previous year by 1.50 kcal to 45.37 kcal¹⁹. Semarang City's food consumption per capita in 2020 decreased compared to in 2019. In 2019, Consumption of marine animals (fish, squid, shrimp, and shellfish) was 43.97 kcal to 42.69 kcal; consumption of vegetables was 33.25 kcal to 31.74 kcal; and fruit consumption was 53.16 kcal to 48.10 kcal²⁰.

The impact of the COVID-19 pandemic on food supply needs to be analyzed to determine changes in food security before and after the pandemic. This study aims to prevent and handle food insecurity by providing recommendations for policy programs in Semarang City.

Based on the explanation above, this study was aimed at identifying the influence of accessibility factors on family food choices during the COVID-19 pandemic.

METHODS

This cross-sectional design was carried out in July-August 2022 in Semarang City. The research respondents were 108 mothers who were selected using purposive sampling. Data collection was carried out using a Google Form questionnaire distributed via WhatsApp. This study has been granted ethical approval by the Health Research Ethics Committee, Faculty of Public Health, Diponegoro University, No. 301/EA/KEPK-FKM/2022.

Respondents' socio-demographic data were obtained using a questionnaire asking the mothers' age, education, occupation, and family income. Data on diet practices were collected through a questionnaire consisting of 16 questions concerning the food ingredient choice for daily consumption based on the contents of my plate, balanced nutrition guidelines, and balance nutritional cone. The total score range obtained was between 0 and 80 scores; a score of ≤ 68 was categorized as "poor practice," and >68 was categorized as "good practice".

Accessibility to food resources is obtained from the score of the distance between home and traditional markets/supermarkets, the presence of mobile vegetable sellers, and the ability to purchase food. Food purchasing power was measured based on income level by the minimum wage of Semarang City. Each point is worth 1 score. The total score range is 0 – 3 with ≤ 2 categorized as "affordable" and >2 categorized as "less affordable". Various information sources were used to obtain health information, especially healthy, balanced nutritional food. Each use of the information media is worth 1 score. The total score range is 0–9 with ≤ 4 categorized as "poor" and >4 categorized as "sufficient".

Univariate data analysis was carried out descriptively to explain the distribution of the variables studied based on frequency distribution. The bivariate data analysis was conducted with the Chi-Square test with a p-value of < 0.05 defined as a significant relationship, while multivariate analysis was completed using the Binary Logistic Regression test with a p-value of ≤ 0.05 . The variables included in the logistic regression analysis were based on a significant relationship with diet practices (as the dependent variable) and had been proven theoretically by previous research²¹.

RESULTS AND DISCUSSION

Respondent Characteristics

Respondent characteristics are grouped based on maternal age, maternal education, maternal occupation, and family income (Table 1). On average, the majority of mothers were of reproductive age, well-educated, and employed. The families in this study came from a middle to upper socio-economic level.

Table 1. Frequency Distribution of Maternal Characteristics

Variable	n	%
Mother's Age		
26 – 35	23	21.3
36 – 45	70	64.8

Variable	n	%
≥ 46	15	13.9
Mother's Education		
Senior High School	7	6.5
University	101	93.5
Mother's Occupation		
Work	55	50.9
Do not work	53	49.1
Family Income		
Below city's minimum wage	11	10.2
Above city's minimum wage	97	89.8

Accessibility

Accessibility is defined as the level of ease in achieving required goods or services. High accessibility to resources can be facilitated by the availability of good facilities and infrastructure based on the distance traveled²². Food accessibility is viewed from several indicators, such as physical access, economic access, and social access. Physical access to food is calculated from the distance to markets and the physical availability of food in stalls/markets. While economic access is in the

form of respondents' income and expenses whilst social access is in the form of bartering and food aid.

The results showed the majority of mothers had decent access to food sources (Table 2). Another factor that influences mothers from intermediate to upper socioeconomic levels in this study is motorcycle ownership which makes it easier to purchase food. However, mothers do not always use online food order applications because of their financial situation.

Table 2. Accessibility of Food Sources

Overview of Accessibility to Food Sources	n	%
Distance from house to traditional/modern market		
Near (≤ 1 km)	77	71.3
Far (> 1 km)	31	28.7
Type of transportation		
On foot	13	12
Motorcycle	75	69.4
Car	20	18.6
Mobile vegetable seller at home		
Yes	96	89
No	12	11
Frequency of ordering food via online application per month		
1-5 times	82	75.9
6-10 times	14	13
11-15 times	6	5.5
16-20 times	3	2.8
>20 times	3	2.8
Food accessibility		
Less	39	36.1
Affordable	69	63.9

The research noted that the source of information regarding healthy dishes for the family also influenced mothers' knowledge regarding nutrition for their child and family. Health information can be obtained through printed media (offline) and electronic

media (online)²³. Nonetheless, fewer than half of the mothers in the study claimed that the media provided them with enough knowledge on health (42.6%). Among those who obtained information from the media, some used YouTube and Instagram (Figure 1).

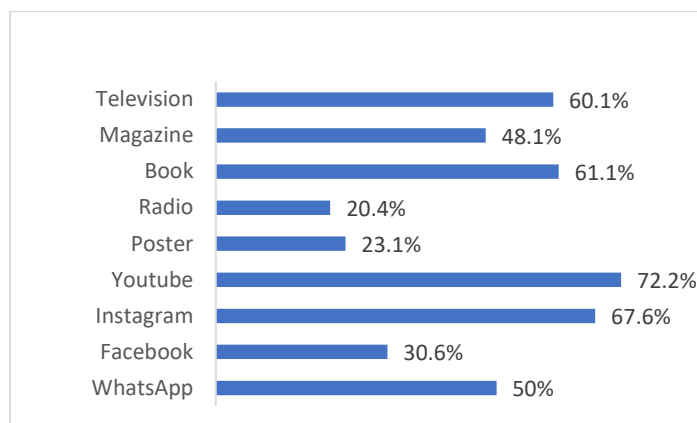


Figure 1. Use of Information Media

Diet Practices

Mothers' diet practices play an important role in shaping children's eating habits from childhood to adulthood²⁴. Good diet practice is demonstrated by selecting fresh food ingredients with good nutritional content to fulfill the family's nutritional intake. Arranging an attractive and organized menu based on the balanced nutrition needs or "fill my plate" program which is currently a program from the Indonesian Ministry of Health²⁵. Organizing good and healthy food includes planning a family meal menu, selecting fresh and clean food ingredients, selecting food ingredients according to

children's nutritional needs, as well as processing and serving food according to procedures.

Table 3 shows that most mothers have planned the menu before selecting food ingredients. Menu planning includes making a different menu every day, planning the main menus and snack menus, recording, and replacing food ingredients that cause allergies. Most mothers practice good food preparation including choosing fresh food, not using flavorings when cooking, not cooking vegetables until wilted, and preventing cross-contamination. Most mothers also serve attractive food to increase their children's and family's interest in food consumption.

Table 3. Percentage Description of Household Food Management Practices

Overview of Food Preparation Practices	n	%
Planning food menus according to balanced nutrition guidelines	97	89.8
Selecting fresh and good food ingredients	94	87
Processing food ingredients according to procedures	98	90
Attractive food presentation	100	92.6

Most mothers in this study have good food ingredient selection practices (66.7%) because on average mothers have implemented food ingredient selection practices that are adapted to the balanced nutrition guidelines or the "fill my plate and nutritional cone" program. Based on the concept of "nutritional cone" in one day, mothers prepare children's food consisting of 3-4 portions of carbohydrate sources, 3-4 portions of vegetables, 2-3 portions of fruit, food sources of animal and vegetable protein, 2-4 portions each daily. Mothers also encourage their children to get used to drinking water and limit their children's consumption of sugary, salty, and fatty food²⁶. Mothers also choose quality and fresh food, store food in the refrigerator or chiller by setting the required temperature to make the food unspoiled easily, process it hygienically, and do not mix wet food ingredients to avoid cross-contamination.

Besides, mothers ensure the cleanliness of cooking equipment before using and serving it while it is still warm and according to the planned time to produce good food at the household level²⁷.

Relationship between Respondent Characteristics, Accessibility, and Information Sources with Mothers' Diet Practices

The COVID-19 pandemic has resulted in various changes in people's lifestyles in prioritizing health with a healthy and nutritious diet²⁸. Various information media were aggressively campaigning for healthy food consumption during the pandemic, but quarantine and social distancing had made it difficult to obtain food supplies. Hence, families who experienced food insecurity would experience a decrease in food consumption and susceptibility to disease.

Table 4. Relationship between Mother's Characteristics, Accessibility, Information Sources and Diet Practices

Variables	Diet Practices				p-value	PR 95% CI
	Less		Good			
	n	%	n	%		
Mother's Age						
26-35	7	30.4	16	69.6	0.754	-
36-45	25	35.7	45	64.3		

Variables	Diet Practices				p- value	PR 95% CI
	Less		Good			
	n	%	n	%		
≥46	4	26.7	11	73.3		
Mother's Education						
Senior High School	5	71.4	2	28.6	0.040*	5.645 (1.038-30.700)
University	31	30.7	70	69.3		
Mother's Occupation						
Work	26	47.3	29	52.7	0.002*	3.855 (1.618-9.185)
Don't work	10	18.9	43	81.1		
Family Income						
Below UMR	8	72.7	3	27.3	0.006*	6.571 (1.624-26.587)
Above UMR	28	28.9	69	71.1		
Food Accessibility						
Less affordable	21	55	18	45	0.001*	4.714 (2.002-11.101)
Affordable	15	20.6	54	79.4		
Healthy Information Resources						
Less	22	35.5	40	64.5	0.582	1.257 (0.556-2.842)
Enough	14	30.4	32	69.6		

*) Significant if a p-value is < 0.05. Chi-Square test

Table 4 shows that there is no significant relationship between maternal age and diet practices. Increasing maternal age does not affect how mothers choose food ingredients. The mother's experience is based on not only age but other factors, such as level of education, level of knowledge, and use of information sources²⁹. Many young mothers implemented good dietary selection. Possibly, such young mothers are smarter and more careful in using social media; even though they lack experience, they still can be supported by the high level of nutritional knowledge learned from social media³⁰.

Education is always considered a strong factor in decision-making behavior³¹. The results of the chi-square test between mother's education and diet practices show a significant relationship. Most mothers with tertiary education had good diet practices. Most of the mothers had graduated from college. Higher education makes it easier for them to accept input and suggestions about healthy food consumption³². Education and knowledge factors will influence the choice and use of food ingredients. The level of parent's education will help develop a good and healthy eating pattern by acknowledging the nutritional content and sanitation of food and matters related to good dietary patterns³³.

Apart from the level of education, occupation also influences whether mothers have free time to take care of the family³⁴. There is a significant relationship between a mother's occupation and diet practices. Working mothers tend to spend less time preparing food, consume less healthy food, and choose to eat fast food³⁵. This is different from mothers who do not work or housewives who tend to reduce their children's snack consumption³⁴. Housewives are also better at regulating their children's eating patterns and thus good at providing their children with healthy and nutritious food³⁶. Self-cooked food can be guaranteed in terms of the cleanliness of the food, nutritional content, and freshness of the food used³⁷.

The impact of the COVID-19 pandemic has caused many people to lose their jobs and reduce their income.

This condition results in an increase in food insecurity in society³⁸. The results of the chi-square test showed a relationship between family income level and diet practices ($p = 0.006$). The research results showed that social restrictions did not affect parents' work, and thus their income remained stable. It was also found that more than 50% of respondents were financially sufficient with income above the city's minimum wage. Income level can determine the food consumed by the mother's family based on the quantity and type. The higher the income, the greater the opportunity to provide nutritious food according to children's nutritional needs³⁹. Research in East Mataram found that families with upper-middle income were more able to buy a variety of foods compared to families with lower-middle income. Low-income families tend to buy food with more attention to economic value than nutritional value, and thus intake from food cannot meet nutritional adequacy⁴⁰. Low-income levels also result in limited availability of food at home³⁴.

Accessibility to purchase food is influenced by purchasing access and purchasing power⁴¹. The results of the chi-square test analysis showed that the accessibility to food purchased is related to diet practices. The more affordable the food is to purchase, the better the mother's practice in choosing healthy and nutritious food⁴². The occurrence of social restrictions means that people cannot travel far. The close location of traditional markets and local stalls can make it easier for people to buy food ingredients. Having a mobile vegetable seller around the house also makes it easier for mothers to supply food needs and avoid crowds to prevent the spread of COVID-19 during the pandemic⁴³. Observation results showed that most mothers buy fast food less than five times per month. Most mothers cooked more often than buying ready-to-eat food. The high level of infection during COVID-19 pandemic made mothers buy less food outside the home to avoid public contact for fear of contracting the virus⁴⁴. Self-cooking is also done to ensure the nutritional content of the food consumed and the hygiene of the food ingredients used³⁴. Research in

Jakarta showed that during the COVID-19 pandemic, most mothers preferred to buy food at greengrocers (37.7%) and supermarkets (26.4%) compared to ordering delivery (10.2%). Choosing these places, mothers could choose directly and know the quality of the food they bought⁴⁵.

Information plays an important role in knowledge investment and diet practice. Information media are used to clarify information and avoid misperceptions regarding healthy living behavior based on the information conveyed⁴⁶. A mother's ability to interpret and respond to health emergencies can be influenced by how much information she obtains regarding food safety⁴⁷. Based on the chi-square test analysis, the number of information

sources used by mothers was not significantly related to diet practices ($p = 0.582$). It was known that most mothers only used ≤ 4 information media to gain an understanding of healthy food ingredients. The results showed that mothers who used insufficient and sufficient sources of information were equally likely to have good food selection practices. The most frequently used information media were YouTube and Instagram. Even though the media use was minimal, mothers' knowledge about healthy and nutritious food was very good. This is supported by their high level of education, making them have an open understanding of the information obtained. Understanding nutrition can change practices in selecting food ingredients provided to the family daily⁴⁸.

Table 5. Logistic Regression Test on Factors that Influence Diet Practices

Variable	p-value	Exp(B)	R square
Mother's Education	0.133	4.351	
Mother's Occupation	0.003*	4.446	
Family Income	0.169	2.720	0.323
Food Accessibility	0.001*	5.087	
Resource	0.892	1.069	

*) Significant if a p-value of < 0.05 . Binary Logistic Regression test

Table 5 shows that accessibility to purchasing food and the mothers' occupation are the dominant variables in diet practices. A mother's parenting style is important for fulfilling a child's food intake. This current study showed that unemployed mothers had four times better diet practices than working mothers. In line with research in Paser Regency in 2020, it was stated that working mothers pay less attention to family food consumption because they often experience stress. This is triggered by mothers having to deal with multitasking activities. They face many challenges such as parenting patterns during online schooling, working from home, and taking care of home conditions resulting in uncontrolled family eating patterns⁴⁹. In contrast to mothers who work, unemployed mothers have more free time to prepare all household needs from shopping for groceries to ensuring the health of family members.

Accessibility, affordability, and availability are needed to fulfill food intake. Affordable access to purchasing food means that mothers had five times better diet practices compared to mothers with inadequate access to purchasing food. The research results showed that most respondents had income above the city's minimum wage, thus having the ability to finance household expenses despite the COVID-19 pandemic. The existence of social restriction regulations from the government did not prevent people from meeting their family's food needs because of limited access to food outside the house and the distance between grocery shops and the house. This is supported by research in West Java in 2020 which stated that the close distance to food stalls meant that 80% of mothers were able to provide a complete food supply¹⁰. This shows that having access to affordable food increases the provision and selection of good food for families.

CONCLUSIONS

Changes in food consumption behavior can influence family food choices. Several factors include

access and availability to food, social culture, and information media. There was a significant relationship between maternal education, maternal employment, family income, and accessibility to food resources. Among these four variables, mothers' employment status and accessibility to food resources were the most dominant variables influencing their diet practices. Advice for parents is that they should pay more attention to their children's nutritious diet and activities and expand their knowledge about children's nutritional health. For further research, the current findings can be developed as a source of reference for providing nutritious food for families to ensure an adequate supply chain of nutritious food in Semarang City to minimize food shortages and spikes in food prices and help equalize access to the distribution of household food ingredients.

ACKNOWLEDGMENTS

The authors would like to thank the Faculty of Public Health, Diponegoro University, all mothers who participated in this study voluntarily, the elementary school, and all parties who supported the continuation of this study.

Conflict of Interest and Funding Disclosure

All researchers have no conflict of interest in the article publication. This study was fully funded by the researchers.

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