

## Factors influencing unable to eat healthy and nutritious food among Indonesian onset COVID-19 pandemic

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### ABSTRACT

Nearly every aspect of household life has been touched by the coronavirus disease (COVID-19) pandemic, including the amount and quality of food consumed by the family. This study aimed to examine the factors associated with unable to eat healthy and nutritious food onset of the COVID-19 pandemic in Indonesia. This study used data from Rapid Gender Assessment Survey developed by United Nations Women from September to December 2021. Totally 2,285 respondents aged >18 years old with access to mobile phones have been selected by random digit dialing (RDD). The multivariate analysis revealed living in the town, who graduated from secondary, primary, and no education, households with five or more members, income changes during the pandemic, and those who had not completed vaccine COVID-19 were 1.44; 1.57; 1.73; 2.06; 1.26; 2.74; 1.29 times more likely to be unable to eat healthy and nutritious food. In conclusion, 39.17% of respondents were unable to eat healthy and nutritious food, and factors of changes in income had the biggest impact. Future research could examine the impact of the pandemic on people's capacity to access and buy wholesome food.

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## 1. INTRODUCTION

The coronavirus disease (COVID-19) pandemic has impacted all parts of human life in economic and non-economic sectors, including the household power to purchase food. The slowdown in the economic sector was found due to the lockdown and many sectors including tourism, oil, aviation, finance, and healthcare also faced slow action [1]. At the level of household, the situation is related to food insecurity because of decreased purchasing power and a low supply of food [2]. According to eating behavior and physical activity, during COVID-19, there were found changes based on the study in the United Kingdom [3]. The COVID-19 pandemic could lead people to eat more snacks and less physical activity than the body mass index (BMI) and also tend to be obese. From the root of food, there is the role of agricultural sectors in which the systems nowadays are producing enough food to feed the planet, but the problem is about access and how it can be well distributed [4].

There was a complex element of agricultural systems to ensure food security for households, it was related to agricultural factors and determinants of health to bolster household food security in low-middle-income countries.

The impact of COVID-19 on social and economic issues was reported in most of the headline news in the world [5]. It means all the countries were concerned about the economic sectors. On the macro level, the impact of the COVID-19 pandemic was very bad and many investments were lacking in the stock market. The study in Bangladesh also noted that the short-term effects of the pandemic included a lack of working capital, product expiration, and limited distributor actions, while the long-term effects included a decline in return on investment by businesses, employee size, and the contribution of businesses to the gross domestic product (GDP) [6]. Moreover, the implications for economic growth, jobs, and welfare need to be a concern for the policymakers in Indonesia [7].

In the Indonesia context, the report on the impact COVID-19 outbreak on poverty revealed that the 9.7% poverty rate was increasing by the end of 2020 and 8.5 million people became poor [8]. The level of households faced the most effect of economic changes due to the pandemic, besides the sectors of transportation, tourism, trade, and health [9], [10]. Besides the impact on the economy, it was revealed that the pandemic also influences human behavior including health, relationships, lifestyle, online education, screen time, and income [11]. The policy analysis described that the Indonesian Government responded slowly at the beginning of the pandemic but then issued the policy about the lockdown and social restrictions [12]. The “new normal” is also introduced as the term for the adaptation process while in the COVID-19 pandemic.

In Indonesia, the government established the enactment of a physical distancing and lockdown, called large-scale social restrictions (PSBB), policy that has limited people's activities [12], [13]. This policy aims to reduce the risk of transmission, which is higher for social and physical activities, especially outside the home [14]. Additionally, the government also required people to wear masks and always wash hands with water and soap or use hand sanitizers [15], [16]. Apart from those changes, changes also occurred in household activities, such as people tending to cook compared to visiting restaurants, selecting healthy food, and eating more vegetables and fruit [17].

As mentioned earlier, the impact of the change in socioeconomic factors of the COVID-19 pandemic is directly felt by the seller which the changes from selling offline to online [18]. Unemployment and poverty rates increased while telecommunication and communications grew rapidly [19]. For food needs for people with high incomes, it will be better for the resilience of their families compared to poor people who live in urban areas [20]. The role of the government in providing food assistance to every poor household and sufferer of COVID-19 is expected to be able to strengthen food security in every household in Indonesia [21]. The accessibility to healthy and nutritious food during the pandemic was also affected by the distance to the shop/market, price, and quality of food [22]. However, millennials tend to access information about food more easily from trusted sources [23]. According to accessibility to healthy and nutritious food during the pandemic, there is a need the sufficient information provided by the government [24]. This study aimed to examine the factors influencing unable access to healthy and nutritious food during the COVID-19 pandemic in Indonesia.

## 2. METHOD

This study is a cross-sectional approach using secondary data entitled Rapid Gender Assessment Survey. The survey was implemented by collaboration between the United Nations Women's Regional Office for Asia and the Pacific and the Asian Development Bank. The study was a multipurpose survey of COVID-19 data response, including health scopes, main economic activity, unpaid domestic and care work, food hardship, personal and household income, remittances, and government support [25]. According to geographic coverage, the survey was national coverage with a targeted population aged 18 years and above with access to a mobile phone. The sampling method used in the survey was following random digit dialing (RDD) using numbering plans from national business registers. Mobile phone coverage was 70% with differences according to sex, age, educational attainment, and location. The data collection was done from September 14, 2021, to December 8, 2021. The unit of analysis of this study was individuals who gave the information about household. The total sample in the original survey was 2,364, but after cleaning the data, this current study only included 2,285 participants.

This current study focused on the inability to eat healthy and nutritious food during COVID-19 (yes, no) as the outcome. The predictors were carried out from the variables of sex, area of residence, the highest level of education, marital status, total household members, receiving at least two doses of COVID-19 vaccines, household income change because of COVID-19, and personal income. The univariate analysis was done to display the general characteristics of informants. The bivariate analysis was done using the Chi-square test to examine the correlation between each predictor to the outcome. The multivariate analysis which is binary logistic regression was done to test the influence of all predictors on the outcome. All the data was tested using STATA version 17. All the datasets were downloaded from unwomen.org [25].

### 3. RESULTS AND DISCUSSION

The results of this study were distinguished into univariate, bivariate, and multivariate. Table 1 displays the univariate test result that showed 39.17% of respondents were unable to eat healthy and nutritious food since the COVID-19 pandemic. The proportion between women and men is relatively the same, but the majority of respondents were female (51.05%). According to the area of residence more than one-third of their residents are in rural areas (43.74%). More than half of the respondents graduated from secondary school (50.63%). Around three-fourths of all sample were married (73.31%). Regarding the total number of household members, most of them live in a household with one to four members (59.39%) and have a personal income (58.69%). During the COVID-19 pandemic, most of the respondents faced a changing income (75.62%). About 63% of them have not received the COVID-19 vaccine and about 70% of them did not receive food and agricultural inputs from the government.

The percentage of being unable to eat healthy and nutritious food in this study is in line with the study in Southern Ethiopia which found 62% of the households were food insecure [26]. According to a study in Canada, it was found 15% of all food-insecure households in Canadian surveys were not income-poor [27]. This study is not in line with the current study that income change is the most influencing factor in finding insecurity.

Table 1. General characteristics of the respondents

Variables (n = 2,285)	Frequency	Percentage
Unable to eat healthy and nutritious food		
No	1,390	60.83
Yes	895	39.17
Sex		
Male	1,145	48.95
Female	1,194	51.05
Area of residence		
City	823	35.19
Town	493	21.08
Rural	1,023	43.74
Level of education		
University	473	20.70
Secondary	1,157	50.63
Primary	614	26.87
No education	41	1.79
Marital status		
Married	1,698	73.31
Unmarried	587	25.69
Household member		
1 to 4	1,357	59.39
5 and more	928	40.61
Have personal income		
Yes	1,341	58.69
No	944	41.31
Income changed during the pandemic		
No	557	24.38
Yes	1,728	75.62
Completed vaccine COVID-19 dose 2		
Yes	862	36.93
No	1,472	63.07
Received food/agriculture input from the government during the pandemic		
Yes	669	29.28
No	1,616	70.72

Table 2 describes the results of the bivariate analysis which was the Chi-square test in order to examine the correlation between each predictor and outcome. It was found that the variables of the area of residence, level of education, marital status, total household members, faced changes in income due to COVID-19, and completing the COVID-19 vaccine at least 2 doses significantly associated with the experience of being unable to eat healthy and nutritious food. The rest of the predictors which were sex, having a personal income, and receiving food or agricultural inputs from the government were not significantly associated with being unable to eat healthy and nutritious food. In line with the result of this study, a previous study in Indonesia among health personnel did not show an association between sex and awareness to care about COVID-19, including how the person accesses healthy and nutritious food [28].

Table 2. Result of bivariate analysis between each independent variable and dependent variable

Variables	Unable to eat healthy and nutritious food		Total	p-value
	No (%)	Yes (%)		
Sex				0.980
Male	681 (48.99)	438 (48.94)	1,119 (48.97)	
Female	709 (51.01)	457 (51.06)	1,166 (51.03)	
Area of residence				0.005
City	523 (37.63)	280 (31.28)	803 (35.14)	
Town	272 (19.57)	207 (23.13)	479 (20.96)	
Rural	595 (42.81)	408 (45.59)	1,003 (43.89)	
Level of education				0.000
University	339 (24.39)	134 (14.97)	473 (20.70)	
Secondary	677 (48.71)	480 (53.63)	1,157 (50.63)	
Primary	350 (25.18)	264 (29.50)	614 (26.87)	
No education	24 (1.73)	17 (1.90)	41 (1.79)	
Marital status				0.005
Married	1,004 (72.23)	694 (77.52)	1,698 (74.31)	
Unmarried	386 (27.77)	201 (22.46)	587 (25.69)	
Household member				0.002
1 to 4	861 (61.94)	496 (55.42)	1,357 (59.39)	
5 and more	529 (38.06)	399 (44.58)	928 (40.61)	
Have personal income				0.744
Yes	812 (58.42)	529 (59.11)	1,341 (58.69)	
No	578 (41.58)	366 (40.89)	944 (41.31)	
Income changes during the pandemic				0.000
No	433 (31.15)	124 (13.85)	557 (24.38)	
Yes	957 (68.85)	771 (86.15)	1,728 (75.62)	
Completed vaccine COVID-19 dose 2				0.000
Yes	923 (66.40)	519 (57.99)	1,442 (63.11)	
No	467 (33.60)	376 (42.01)	843 (36.89)	
Received food/agriculture input from the government during the pandemic				0.133
Yes	391 (28.13)	278 (31.06)	669 (29.28)	
No	999 (71.87)	617 (68.94)	1,616 (68.94)	

Table 3 displays the result of binary logistic regression. It was revealed that some variables such as living in town, graduating from secondary and primary school, not attending education, living in a household with 5 or more members, facing the changing of income during the COVID-19 pandemic, and having not received the COVID-19 vaccine have the association with being unable to eat healthy and nutritious food after adjusted with others predictors. In detail, those living in the town were 1.44 times more likely to be unable to eat healthy and nutritious food compared to those living in the city. Compared with those who graduated from university, those who graduated from secondary, primary, and no education were more likely to be unable to eat healthy and nutritious food with odds 1.57, 1.73, and 2.06, respectively.

Furthermore, those who lived in a household with 5 or more members were 1.26 times more likely to be unable to eat healthy and nutritious food compared to those living in households with one to four members. In terms of the income change since COVID-19, it was found that those experiencing changes in income were 2.74 times more likely to be able to eat healthy and nutritious food compared to those without any changes in their income. Additionally, those who have not received at least 2 doses of the COVID-19 vaccine were 1.29 times more likely for unable to eat healthy and nutritious food compared to those who have received at least 2 doses of COVID-19 vaccines. However, the variables including sex, living in rural areas, marital status, have personal income, and receiving food or agricultural inputs from the government were found no association with being unable to eat healthy and nutritious food after adjusting with all predictors.

The condition of food insecurity and low access to food is also mentioned by the study in Indonesia that recommends food price control from the government and subsidies provided especially for the farmer [2]. It also mentioned the importance of giving the house the old opportunity to benefit from a greater variety of food items in the market [29]. According to the Indonesian context, the Indonesian government needs to expand the social protection program to assist the new poor. According to the factors associated with food insecurity, the findings from the study in Ethiopia were a bit different which showed that a household with a female as a head was more likely to experience food insecurity compared to men [30], [31]. The access to food in this study is similar to the study in Southern Ethiopia which revealed that level of education, household size, and income changes were associated with purchasing power to food [32], [33]. In line with the previous study, it was found that households led by younger, low educated, single, widowed/divorced, have children in the households had a higher tendency for being food insecure [34].

As mentioned by previous studies, household size was also found as the main important determinant of food insecurity based on the study in Ecuador, but it was not found based on the study in Nigeria [33], [35]. Different from the result of this study, the study in Ecuador found that food insecurity has the most implications on rural areas, however, in this study those living in rural areas found insignificant associations with food insecurity [35]. The study in India found a correlation between infrastructure dimensions and water connection with food insecurity [32]. The study in Canada found some variables correlated with food insecurity but those variables did not include in this study. It was found that chronic diseases were present, and coming and gambling behavior were significantly associated with food insecurity [36]. Finally, it can be concluded that the factors associated with being unable to eat healthy and nutritious food such as living in the town, graduating from secondary school, having primary school and no education, having a household has five or more members, experiencing income changes, and have not vaccinated. Other variables were found to be insignificantly associated with being unable to eat healthy and nutritious food since the COVID-19 pandemic.

Table 3. The binary logistic regression result

Variables	AOR	95% C.I.	p-value
Sex (ref. Male)			
Female	0.99	0.83-1.18	0.949
Area of residence (ref. city)			
Town	1.44	1.13-1.83	<b>0.003</b>
Rural	1.13	0.92-1.39	0.232
Level of education (ref. University)			
Secondary	1.57	1.23-1.20	<b>&lt;0.001</b>
Primary	1.73	1.31-2.28	<b>&lt;0.001</b>
No education	2.06	1.04-4.08	<b>0.039</b>
Marital status (ref. married)			
Unmarried	0.82	0.67-1.01	0.058
Household members (ref. 1 to 4 persons)			
5 and more	1.26	1.05-1.50	<b>0.010</b>
Have personal income (ref. yes)			
No	0.92	0.77-1.11	0.386
Income changes during the pandemic (ref. no)			
Yes	2.74	2.19-3.44	<b>&lt;0.001</b>
Completed vaccine COVID-19 dose 2 (ref. yes)			
No	1.29	1.08-1.55	<b>0.005</b>
Received food/agriculture input from the government during the pandemic (ref. yes)			
No	0.93	0.77-1.13	0.507

Log likelihood = -1455.081; LR chi2 (12) = 149.43; Prob > chi2 = 0.0000; Pseudo R2 = 0.0488

#### 4. CONCLUSION




It was shown that out of all study participants, 40% of them had trouble eating a balanced diet. Living in the town, having completed primary and secondary school, having no education, having five or more members in the home, going through economic changes, and not being immunized were the characteristics that were substantially linked to not being able to eat good and nutritious meals. According to the multivariate study, changes in income had the biggest impact. Future research must look at how the COVID-19 epidemic affected the availability of wholesome food. The results can be more consistent by adding a qualitative investigation.

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