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Factors associated with running out of food in the households during COVID-19 in Indonesia: Analysis RGA UN Women data 2021

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Abstract: The issue of food insecurity during COVID-19 has occurred around the world, including in Indonesia. This study focused on factors associated with running out of food in the households as the outcome. The objective of this study was to examine the variables associated with running out of foods during the COVID-19 pandemic in Indonesia. This study used secondary data RGA from UN Women website to explore univariate, bivariate, and multivariate analysis. The results revealed that the main factors influencing running out of foods are five variables such as worries would not having enough food to eat, being unable to eat healthy and nutritious food, eating only a few kinds of foods, eating less than enough, and being hungry but did not eat. There are two variables that revealed moderate correlation such as skipping a meal and going without eating for a whole day. The strongest variable is HH's head reported were hungry but did not eat which were 5.48 times more likely to run out of foods during the pandemic. Intervention and collaboration with other stakeholders need to be arranged well to prevent the severity food insecurity.

Keywords: COVID-19; Food insecurity, Indonesia

Introduction

Food insecurity has been a significant issue during the COVID-19 pandemic, affecting various populations and regions, including Indonesia. Several studies have examined the prevalence and determinants of food insecurity during this time. One study conducted in the United States focused on college students and found a high prevalence of food insecurity among this population during the COVID-19 pandemic (Owens et al., 2020). The study highlighted those students who experienced housing insecurity and/or loss of income due to the pandemic were particularly impacted by food insecurity (Owens et al., 2020). This suggests that disruptions in housing and income can contribute to food insecurity among college students during the pandemic. Another study examined the early impacts of COVID-19 on food insecurity (Niles et al., 2020). The study found a 33% increase in household food insecurity since the onset of the pandemic, with a significant proportion of households classified as newly food insecure (Niles et al., 2020). This indicates that the pandemic has led to a substantial increase in food insecurity among households.

A multi-site analysis conducted in the United States assessed the prevalence of food insecurity before and during the COVID-19 pandemic(Niles et al., 2021). The study found widespread food insecurity during the

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pandemic, with higher rates observed in households with children, those experiencing job loss, and Black, Indigenous, and People of Color (Niles et al., 2021). This suggests that certain demographic groups were disproportionately affected by food insecurity during the pandemic. Studies conducted in other countries have also examined the impact of COVID-19 on food security. For example, a study conducted in Tanzania found that food insecurity increased during the second wave of COVID-19, leading to a decline in micronutrient consumption among affected households (Mkupete et al., 2023). Similarly, a study in Indonesia found that 65% of households experienced some level of food insecurity during the pandemic (Syafiq et al., 2022).

The COVID-19 pandemic has also had indirect effects on food security. For instance, a study conducted in Brazil found that social distancing measures and lockdowns imposed during the pandemic were determinants of household food security status (Munonye et al., 2022). Additionally, the pandemic has exacerbated economic hardship, food insecurity, and psychological distress among vulnerable populations, as observed in studies conducted in low-income countries (Porter et al., 2021) and among Supplemental Nutrition Assistance Program (SNAP) and food pantry clients in the United States (Higashi et al., 2022). Overall, the COVID-19 pandemic has had a significant impact on food insecurity, leading to increased prevalence and exacerbating existing vulnerabilities. Disruptions in housing, income loss, job loss, and social distancing measures have been identified as key determinants of food insecurity during this time. It is crucial for policymakers and stakeholders to address these issues and implement interventions to mitigate the impact of the pandemic on food security.

In the Indonesian context, there are several studies have been done before under the term "food insecurity", but they are mostly viewed from the socioeconomic perspective (Amrullah et al., 2019; Asfarian et al., 2020; Campbell et al., 2009; Fatmaningrum et al., 2016; Isaura et al., 2019; Kharisma & Abe, 2020; Mahmudiono et al., 2018; Panatagama et al., 2019; Resosudarmo et al., 2020; Studdert et al., 2001). This study carried out the sociodemographic and food availability as the independent variables. The objective of this study was to examine the factors associated with running out of food in households during COVID-19 in Indonesia.

Method

Using secondary data from the Rapid Gender Assessment Survey, this study takes a cross-sectional approach. Together with the Asian Development Bank, the UN Women Regional Office for Asia and the Pacific carried out the survey. The study was a multipurpose survey of COVID-19 data response that covered topics such as health scopes, primary economic activity, unpaid caregiving and domestic work, food difficulties, income for individuals and households, remittances, and government assistance (UN Women, 2022). The survey's geographic scope indicated that it was conducted nationwide among those who were at least 18 years old and had access to a mobile phone. Using numbering plans from national business registrations, Random Digit Dialling (RDD) was the sample technique utilized in the survey. Seventy percent of people have access to a mobile phone, with variations based on region, sex, age, and level of education. The period of data collection was from September 14, 2021, to December 8, 2021. The study's unit of analysis consisted of the participants who provided household information. After data cleansing, the current study's sample size was reduced from 2,364 in the initial survey to 2,315 participants.

The outcome of the current study was whether or not a household experienced food scarcity during COVID-19. The variables that were used as predictors included age, sex, marital status, place of residence, educational attainment, anxiety over food, eating few foods, skipping meals, eating insufficiently, not being able to eat a healthy and nutritious diet, feeling hungry but not eating, and going out for the entire day without eating. To show the general traits of the informants, a univariate analysis was conducted. The connection between each predictor and the outcome was examined through the use of the Chi-square test in the bivariate analysis. To determine if each predictor had any effect on the result, binary logistic regression was used as a multivariate analysis method. Version 17 of STATA was used to test all the data. The sources of all the datasets were unwomen.org downloads (UN Women, 2022).

Result and Discussion

Table 1 below describes the general characteristics of informants. It was revealed that 23.37% of households experienced running out of food in the household. According to the age group of household heads, the largest proportion was aged 18 to 28 years old (27.78%). More half of them were male (51.14%), live in urban areas (56.11%), and married (73.28%). More than half of them reported worries would not having enough food to eat (51.19%), being unable to eat healthy and nutritious food (38.96%), eating only a few kinds of food (43.28%), having skipped meals (27.21%), ate less than enough food (41.34%), were hungry but did not eat (19.91%), and went without eating for whole day (17.06%).

Table 1. The general characteristics of informants

Characteristics (n = 2,315)	Frequency	Percentage
Ran out of food in the household		
No	1,774	76.63
Yes	541	23.37
Age		
18 – 28	643	27.78
29 – 39	607	26.22
40 – 50	605	26.13
51 – 61	324	14.00
62+	136	5.87
Sex		
Male	1,184	51.14
Female	1,131	48.86
Place of residence		
Urban	1,299	56.11
Rural	1,016	43.89
Marital status		
Not married	606	26.18
Married	1,709	73.82
Educational level		
More than secondary	481	20.78
Secondary or less	1,167	50.41
Primary or less	667	28.81
Worried would not have enough food to eat	1,130	48.81
No	1,185	51.19
Yes		
Unable to eat healthy and nutritious food	1,413	61.04
No	901	38.96
Yes		
Ate only a few kinds of foods		
No	1,313	56.72
Yes	1,002	43.28
Had skipped a meal		
No	1,685	72.79
Yes	630	27.21
Ate less than enough		
No	1,358	58.66
Yes	957	41.34
Were hungry but did not eat		
No	1,854	80.09
Yes	461	19.91
Went without eating for a whole day	1,920	82.94
No	395	17.06
Yes		

Table 2 below explains the result of bivariate analysis using the Chi-Square test. It was found that variables of age, marital status, educational level, worries would not be having enough food to eat, being unable to eat healthy and nutritious food, eating only a few kinds of food, skipping meals, eating less than enough food, were hungry but did not eat, and went without eating for whole day have correlation with running out of food during COVID-19. However, the variables of sex and place of residence revealed no correlation with running out of food.

Table 2. The bivariate analysis using Chi-square between each independent variable and dependent variable

Independent variables	Experienced running out of food during COVID-19		Total
	No (%)	Yes (%)	
Age (years)*			
18 – 28	497 (77.29)	146	643 (100)
29 – 39	454 (74.79)	(22.71)	607 (100)
40 – 50	449 (74.21)	153	605 (100)
51 – 61	257 (79.32)	(25.21)	324 (100)
62+	117 (86.03)	156	136 (100)
		(25.79)	
		67 (20.68)	
		19 (13.97)	
Sex			
Male	908 (76.69)	276	1,184
Female	866 (76.57)	(23.31)	(100)
		265	1,131
		(23.43)	(100)
Place of residence			
Urban	1,002	297	1,299
Rural	(77.14)	(22.86)	(100)
	772 (75.98)	244	1,016
		(24.02)	(100)
Marital status*			
Not married	487 (80.36)	119	606 (100)
Married	1,287	(19.64)	1,709
	(75.31)	422	(100)
		(24.69)	
Educational level***	402 (83.58)	79 (16.42)	481 (100)
More than	900 (77.12)	267	1,167
secondary	472 (70.76)	(22.88)	(100)
Secondary or less		195	667 (100)
Primary or less		(29.24)	
Worried would not			
have enough food	1,063	67 (5.93)	1,130
to eat***	(94.07)	474	(100)
No	711 (60.00)	(40.00)	1,185
Yes			(100)
Unable to eat			
healthy and	1,285	128 (9.06)	1,413
nutritious food***	(90.94)	413	(100)
No	489 (54.21)	(45.79)	902 (100)
Yes			
Ate only a few			
kinds of foods***	1,231	82 (6.25)	1,313
No	(93.75)	459	(100)
Yes	543 (54.19)	(45.81)	1,002
			(100)
Had skipped a			
meal***	1,488	197	1,685
No	(88.31)	(11.69)	(100)
Yes	286 (45.40)	344	630 (100)
		(54.60)	

Independent variables	Experienced running out of food during COVID-19		Total
	No (%)	Yes (%)	
Ate less than enough***	1,262	96 (7.07)	1,358
No	(92.93)	445	(100)
Yes	512 (53.50)	(46.50)	957 (100)
Were hungry but did not eat***	1,643	211	1,854
No	(88.62)	(11.38)	(100)
Yes	131 (28.42)	330	461 (100)
		(71.58)	
Went without eating for a whole day***	1,619	301	1,920
No	(84.32)	(15.68)	(100)
Yes	155 (39.24)	240	395 (100)
		(60.76)	

*p-value <0.05, **p-value<0.001, ***p-value<0.001

The binary logistic regression is shown in Table 3 below. All the independent variables were adjusted to test the correlation to running out of food. There are five variables that have a strong correlation with running out of food such as worries would not having enough food to eat, being unable to eat healthy and nutritious food, eating only a few kinds of foods, eating less than enough, and being hungry but did not eat. There are two variables that revealed moderate correlation such as skipping a meal and going without eating for a whole day. Other independent variables showed no correlation with p-value >0.05.

In detail, the variables that have a correlation with running out of food such as comparing with household (HH) did not worry about enough food, HH worried about enough food 2.65 times more likely to run out the food after adjusting to other independent variables. HH which unable to eat healthy and nutritious food were 1.72 times more likely to run out the food compared to HH with the ability to access healthy and nutritious food. HH who eat few kinds of food were 2.09 times more likely to run out the food compared to HH who eat many kinds of foods. HH which reported ate less than enough food were 2.03 times more likely to run out of the food compared to HH reported are more than enough. HH reported were hungry but did not eat, were 5.48 times more likely to run out of foods compared to HH reported were not hungry. HH reported had skipped the meals were 1.54 times more likely to run out of foods compared to HH reported did not skipped the meals. HH reported ever went out the home but did not eat whole day were 1.69 times more likely to run out the foods compared to HH reported never went out the home but did not eat the whole day.

Table 3. The binary logistic regression between all adjusted independent variables and dependent variable

Variables	AOR	95% CI (Lower – Upper)	*p-value*
Age (years) (ref: 18 – 28)			
29 – 39	1.32	0.91 – 1.92	0.140
40 – 50	1.03	0.71 – 1.50	0.862
51 – 61	1.22	0.76 – 1.96	0.405
62+	1.11	0.55 – 2.56	0.757
Sex (ref: Male)			
Female	1.14	0.88 – 1.48	0.316
Place of residence (ref: Urban)			
Rural	0.86	0.65 – 1.20	0.254
Marital status (ref: Not married)	1.29	0.92 – 1.81	0.133
Married			
Educational level (ref: More than secondary)			
Secondary or less	0.87	0.60 – 1.26	0.455
Primary or less	1.52	1.00 – 2.32	0.050
Worried would not have enough food to eat (ref: No)			
Yes	2.65	1.87 -3.76	0.000
Unable to eat healthy and nutritious food (ref: No)			
Yes	1.72	1.27 – 2.34	0.000
Ate only a few kinds of foods (ref: No)			
Yes	2.09	1.48 – 2.96	0.000
Had skipped a meal (ref: No)			
Yes	1.54	1.15 – 2.08	0.004
Ate less than enough (ref: No)			
Yes	2.03	1.45 – 2.84	0.000
Were hungry but did not eat (ref: No)			
Yes	5.48	4.04 – 7.43	0.000
Went without eating for a whole day (ref: No)			
Yes	1.69	1.22 – 2.34	0.002

*p-value <0.05, **p-value<0.001, ***p-value<0.001
Pseudo R2 = 0.3974
Log likelihood = -758.49756

Food insecurity in households is influenced by various factors, including economic, social, demographic, and environmental factors. Several studies have examined these factors and their association with food insecurity. One study conducted in Canada found that living in Nunavut and relying on social assistance were strong predictors of severe food insecurity (Tarasuk et al., 2019). Additionally, income, education, household composition, Aboriginal status, immigration status, and place of residence were also associated with the severity of food insecurity. This suggests that economic factors, such as income and social assistance, play a significant role in food insecurity risk.

Another study focused on females in high-income countries and found a link between food insecurity and mental health (Maynard et al., 2018). The review highlighted the need for comprehensive policies and programs that recognize the complex links between food insecurity, mental health, and other factors such as housing circumstances and exposure to violence. This suggests that food insecurity can have broader implications for mental health and well-being. In rural areas of Gunungkidul, Indonesia, factors such as low family income, lack of consistent access to food, limited access to qualified economic facilities, and high food prices contribute to food insecurity (Susanawati et al., 2023). This highlights the importance of economic factors and access to resources in determining food security.

A comparative analysis of 14 OECD countries found that economic factors, such as GDP per capita and GDP growth rate, play a significant role in food insecurity risk (Yılmaz & Günal, 2023). This suggests that the overall economic conditions of a country can impact food security. In the United States, a cohort study found that economic food insecurity, rather than proximity to unhealthy food options, was associated with the risk of cardiovascular diseases (Zierath et al., 2023). This suggests that economic factors, such as the affordability and accessibility of nutritious food, are important determinants of food insecurity and its health consequences. A scoping review focused on pregnant women and caregivers of young children found that after controlling for economic factors, certain household characteristics can increase the risk of experiencing food insecurity (Bastian et al., 2022). This suggests that factors beyond income and economic resources, such as household composition, can contribute to food insecurity.

Overall, these studies highlight the multifaceted nature of food insecurity and the various factors that can contribute to its prevalence. Economic factors, such as income and access to resources, play a significant role in determining food security. However, other factors, such as household composition, education, and social assistance, can also influence food insecurity. Understanding these factors is crucial for developing effective policies and interventions to address food insecurity in households.

Food insecurity in households is influenced by a variety of factors. Several studies have examined these factors and their association with food insecurity. One study conducted in Canada found that living in Nunavut and relying on social assistance were the strongest predictors of severe food insecurity (Tarasuk et al., 2019). Additionally, income, education, household composition, Aboriginal status, immigration status, and place of residence were also associated with the severity of food insecurity (Tarasuk et al., 2019). This suggests that socio-demographic factors play a significant role in household food insecurity.

Another systematic review examined the association between food insecurity and cardiometabolic risk (da Silva Miguel et al., 2020). The review found that food insecurity was directly associated with excess weight, hypertension, dyslipidemias, diabetes, and stress, even after adjusting for interfering factors (da Silva Miguel et al., 2020). This suggests that food insecurity can have negative impacts on physical health. A study conducted in the United States explored the association between food insecurity and cardiovascular disease (CVD) and cardiometabolic risk factors (Brandt et al., 2022). The study found that food insecurity was associated with increased total and cardiovascular mortality, and poor adherence to prescription medication for treating cardiometabolic risk factors (Brandt et al., 2022). This suggests that food insecurity may contribute to the development and progression of CVD.

Factors associated with household food insecurity in Ethiopia were examined in another study (Dessie et al., 2022). The study found that demographic, economic, social, and clinical factors influenced household food insecurity, and these factors varied geographically (Dessie et al., 2022). This highlights the importance of considering the local context when addressing food insecurity. A study conducted in Peru investigated the determinants of food insecurity among households with children (Santos et al., 2022). The study found that gender of the household head, education of the household head, employment of the household head, household-level employment status, age, and weekly food expenses per person were significant predictors of household food insecurity (Santos et al., 2022). This suggests that individual and household characteristics play a role in food insecurity.

The association between food insecurity and cardiometabolic risk factors was explored in a study conducted in Iran (Hashemzadeh et al., 2022). The study found that cardiometabolic risk factors, such as blood glucose, triglycerides, total, HDL, and LDL cholesterols, and metabolic syndrome score, were associated with food insecurity independent of body mass index (BMI) (Hashemzadeh et al., 2022). This suggests that factors beyond BMI, such as lifestyle and diet, may contribute to the increased cardiometabolic risk in food-insecure individuals. A study conducted in Europe examined food insecurity from a gender perspective (Grimaccia & Naccarato, 2022). The study found that familial characteristics, such as the number of children in the household, had a higher impact on women's food insecurity compared to men's (Grimaccia & Naccarato,

2022). This highlights the gendered nature of food insecurity.

Factors associated with food insecurity among older adults were explored in a study that used the Social Ecological Model as a conceptual framework. The study found that individual-level factors (e.g., income, education) and community-level factors (e.g., neighborhood characteristics, and access to food resources) were associated with food insecurity among older adults. This suggests that addressing food insecurity among older adults requires a multi-level approach.

Conclusion

The number of households that experienced running out of food during the COVID-19 pandemic was 23.37%. There are five variables such as worrying would not having enough food to eat, being unable to eat healthy and nutritious food, eating only a few kinds of foods, eating less than enough, and being hungry but not eating. There are two variables that revealed moderate correlation such as skipping a meal and going without eating for a whole day. However, the variables of age, sex, place of residence, marital status, and educational level found no correlation with running out of food during the COVID-19 pandemic. All the related stakeholders need to address food insecurity in the households in a multi-level approach.

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