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Determinants of household food security during the COVID-19 pandemic in Tulungagung, East Java

Determinan ketahanan pangan rumah tangga selama pandemi COVID-19 di Tulungagung, Jawa Timur

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Abstract

Food insecurity remains a significant problem in Indonesia, with severe levels of hunger, due to inadequate food consumption and poor quality. Since the COVID-19 pandemic, changes in the food system and possible income losses have threatened household food security in Indonesia. This study aims to assess the determinants of household food security during the COVID-19 pandemic. This descriptive-analytic research method with a cross-sectional study was conducted from May to July 2021. The sampling technique used random sampling to obtain two villages with 187 parents in Tulungagung, East Java. Data collection on sociodemographic characteristics, social assistance, the impact of COVID-19, coping strategies, and household food security used interview techniques via WhatsApp and telephone. Testing in this study used chi-square for bivariate analysis and multiple logistic Regression for multivariate analysis. The results showed that the prevalence of food insecurity in Tulungagung was 56,1%. After adjusting for several potential confounding factors, such as income (p= 0,021; OR= 2,388), type of social assistance (NGO) (p= 0,002; OR= 3,945), change in employment status (p= 0,044; OR= 2,026), and food compromise coping strategy (p= 0,008; OR= 10,134) are determinants of household food security. In conclusion, the determinants of household food security are income, change in employment status, type of social assistance (NGO), and food compromise coping strategies.

Keywords: Coping strategies, food diversity, food security, social assistance

Abstrak

Kerawanan pangan masih terjadi di Indonesia dengan tingkat kelaparan yang serius, karena konsumsi pangan yang tidak memadai dan kualitas pola makan yang buruk. Sejak pandemi COVID-19, beberapa perubahan nyata dalam sistem pangan dan kemungkinan kehilangan pendapatan telah mengancam ketahanan pangan rumah tangga di Indonesia. Penelitian bertujuan untuk mengkaji determinan ketahanan pangan rumah tangga pada masa pandemi COVID-19. Metode penelitian deskriptif-analitik dengan desain cross sectional ini dilakukan pada bulan Mei-Juli tahun 2021. Teknik pengambilan sampel menggunakan teknik random sampling sehingga diperoleh 2 desa dengan total 187 orang tua di Tulungagung, Jawa Timur. Pengumpulan data karakteristik sosial demografi, bantuan sosial, dampak COVID-19, strategi koping dan ketahanan pangan rumah tangga menggunakan teknik wawancara melalui whatsapp dan telepon. Analisis bivariat menggunakan uji chi square dan analisis multivariat menggunakan uji regresi logistik berganda. Hasil penelitian menunjukkan bahwa prevalensi kerawanan pangan di Tulungagung adalah 56,1%. Setelah disesuaikan dengan beberapa potensi pembaur, pendapatan (p= 0,021; OR= 2,388), jenis bantuan sosial (p= 0,002; OR= 3,945), perubahan status pekerjaan (p= 0,044; OR= 2,026), dan strategi koping kompromi

pangan (p= 0,008; OR 10,134) merupakan faktor determinan ketahanan pangan rumah tangga. Kesimpulannya, determinan ketahanan pangan rumah tangga adalah pendapatan, perubahan status pekerjaan, jenis bantuan sosial (LSM), dan strategi koping kompromi pangan.
Kata Kunci: Bantuan sosial, keragaman pangan, ketahanan pangan, strategi koping

Introduction

Household food security is a situation that exists all people, at all times, have physical, social, and financial access to sufficient, secure, and nutritious food that meets their dietary needs and food preferences for a lively and healthy existence (El Bilali et al., 2019). Indonesia's food security has improved from 75 to 62 out of 113 countries. However, more than 20 million Indonesians still face hunger risks, which could worsen because of the COVID-19 pandemic (Arif et al., 2020). Indonesia has succeeded in steadily reducing poverty by 9,2% in 2019, dropping 10%, but around 25 million people still have fallen into poverty (Suryahadi et al., 2020). Unfortunately, 2020 also stands as a landmark year because the COVID-19 pandemic significantly impacted the lives of many Indonesians. It confirmed that households with moderate or intense food insecurity rose to 11,7% during COVID-19 (UNICEF, UNDP, Prospera, SMERU, 2021).

The global economic outcomes of the pandemic harmed Indonesia's economy through the drop in trade of goods and offerings, loss of jobs and earnings, and reduced domestic products (Rohmi et al., 2021). There was a drastic rise in job losses, with more than 6,4 million Indonesians having filed for unemployment, and almost three-quarters of households, because of the pandemic, were earning less than they were in January 2020 (Susilawati et al., 2020). Due to the current situation, this virus can significantly affect health and socioeconomic status (Alhassan & Kilishi, 2019).

The impact of food insecurity is a high chance that malnutrition will increase throughout the country as poorer families must focus on providing sufficient quantities of food to their members instead of the quality of a diversified diet (FAO, 2021). Food insecurity also makes families lower-cost, shelf-stable foods that are often much less healthful and low in essential nutrients (Adams et al., 2020). The multiple consequences of the economic shocks included reductions in food intake and compromised diet quality and diversity (FAO, 2021). Significant reductions in the consumption of vegetables, fruits, meat, and dairy and a shift to nonperishable foods like flour, maize meal, and rice can potentially deepen malnutrition. Poverty also makes households unable to purchase food to carry out their daily activities or offer adequate housing, education, or healthcare facilities (Carducci et al., 2021; GAIN, 2020).

Food insecurity is also more likely to happen when social assistance is absent. Social assistance can lessen severe poverty and enhance food security while building household resilience in times of crisis (FAO, 2013). The Government has responded swiftly with a scaling up of social assistance programs. However, challenges with the social assistance database remain, including the risk of missing many of the most vulnerable.

The Government has responded rapidly with a scaling up of social assistance programs. However, challenges with the social assistance database remain, which includes the threat of missing many vulnerable households (ILO, 2020). Food insecure households additionally reportedly exhibit diverse coping techniques that reflect their vulnerability. Within the phase of shocks, including COVID-19, households may additionally employ food or non-food-based coping method or a combination of both to protect their basic needs (Farzana et al., 2017). While food-insecure households adopt coping strategies, they frequently also convert to a new livelihood pattern that would cause them to be more vulnerable to undernutrition (Das et al., 2020).

Tulungagung District is an area for agricultural activities, and about 60% of people's livelihoods are primarily farmers. Tulungagung has become one of the food barns in East Java Province to maintain national food security (Bappeda Tulungagung, 2015). COVID-19 restrictions adversely affected the agricultural sector as demands for foodstuff fell considerably, reduced traditional markets' operation time, and even closed them. As a result, employment in

Tulungagung District reached 4,61%, the highest in the last three years, and the poverty rate in Tulungagung increased from 6,74 to 8,11% during COVID-19 (Sujoko, 2021).

The decline in the agricultural sector and the increase in unemployment have led to increased household food insecurity. How households implement coping strategies to deal with the crisis needs further investigation. Research on food security during COVID-19 is very timely COVID-19 pandemic. Information on whether the COVID-19 pandemic may worsen this problem at the household level and what factors may involve are lacking. Therefore, this study assessed the determinants of household food security during the COVID-19 pandemic in Tulungagung, East Java.

Method

The design of this study was a cross-sectional study. The study was conducted in Indonesia, East Java Province, Tulungagung district for two months (May-July 2021). The population of this study was the parents (mother or father) in Tulungagung. Parents prioritized as respondents were parents who take care of health, food, and money in the household, which means more understanding of conditions in the household. The inclusion criteria were living in Tulungagung for the last six months and being willing to participate. They signed the informed consent, and the exclusion criteria were the presence of severe food allergy or chronic medical problem affecting food intake in the household.

The sample size was calculated using an estimated difference between two population proportions. The total sample was 170 respondents, adding 10% (17 respondents) to secure the sample from any dropout or incomplete data, resulting in a total sample size of 187 respondents.

$$n = \frac{\left\{Z_{1-\alpha/2}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P1(1-P1)} + P2(1-P2)\right\}^2}{\{P_1 - P_2\}^2}$$

Description:
n = sample size
$Z_{1-\alpha}$ = Z statistic for a level of confident (95%)
$Z_{1-\beta}$ = Power of the study (80%)
P1 = Aanticipated population proportion 1
P2 = Anticipated population proportion 2
P = P1+P2/2

Two villages in Kauman, with 100 respondents, and Mangunsari, with 87 respondents in Tulungagung district, became representatives. Subjects were selected using a probability sampling technique with random sampling. The independent variables in this study were household food security. The dependent variable were demographic data, social assistance, the impact of COVID-19, dietary diversity, and coping strategy. All variables are measured using the developed questionnaire based on conditions and articles related to the COVID-19 pandemic and have been tested for reliability. The pretesting test was carried out before the questionnaire instrument was used for data collection. The pretesting test was carried out randomly on 25 respondents in Beji village—this questionnaire's validity and reliability test.

Data collection was conducted by enumerators who had previously been trained for one week. The researcher visited the village office to get the respondents' list and the respondent's telephone numbers. The researcher and enumerators then contact the respondent to explain the research through WhatApps texts and call and then make a group that WhatApps for the respondents. The distribution of questionnaire was carried out using Google Forms and distributed in what Sapp group. The questionnaire in this study consisted of 7 sections: 1. Informed consent section; 2. Subject identity and sociodemographic data; 3. Social assistance data; 4. COVID-19 impact data; 5. Food diversity data; 6. Household food security data; 7. Data on coping strategies. The interview was taken approximately 30-40 minutes for each respondent.

Data analysis began with descriptive analysis to provide general information about the characteristics of the study population, including sociodemographics, social assistance, the impact of COVID-19, coping strategies, and household food security. The Kolmogorov-Smirnov test was used to prove that the data was normally distributed. Next, the bivariate analysis used the Chi-Square or Fisher Extract test to test the relationship between food security and its determinants. The potential variables were identified as food security predictors when the result showed a significant association ($p<0,25$). Finally, all predictors influencing food security to identify factors affecting household food security were assessed using logistic Regression with a

95% confidence interval (CI). All statistics were done using SPSS software. The Ethical Committee of the Faculty of Medicine, Universitas Indonesia-Cipto Mangunkusumo Hospital, published ethical approval for conducting this research. In addition, it had been reviewed and accepted for ethical clearance KET.425/UN2.F1/ETIK/PPM.00.02/2021.

Result and Discussion

The characteristics of parents of household food security participants can be described as follows:

Table 1. Households characteristics (n= 187)

Characteristics	n	%
Sex		
Male	6	3,2
Female	181	96,8
Age		
25-45	121	64,7
46-65	58	31
>65	8	4,3
Educational		
Elementary School-junior	56	70,1
Senior high school-university	131	29,9
Marital status		
Married	158	84,5
Divorced	29	15,5
Number of children		
≤3	142	75,9
>3	45	24,1
Number of children under five		
≤3	183	97,9
>3	4	2,1
Number of household members		
≤4	136	72,7
>4	51	27,3
Type of the family		
Nuclear	141	75,4
Extended	46	24,6
Occupation of parents		
Employed	114	61
Not employed	73	39
Income		
Below minimum wage	127	68
Above minimum wage	60	32
Food expenditure		
Below average	152	81,3
Above average	35	18,7

The respondents analyzed in this study were 25-77 years old (median= 38 years old). Respondents were 181 mothers and six fathers. Overall, the prevalence of parents who have high education is (70,1%), who are married (84%), who have <3 children (75,9%), who have children under five <3 (97,9%), number of a household member who has ≤4 members (72,7%), nuclear family (75,4%), and employed (61%), income below minimum wage (68%), and food expenditure (81,3%). The following will describe the distribution of social assistance by the Government, nongovernmental organizations, neighbors, and family.

Based on Table 2, it can be seen that most of the households received social assistance (81,3%). Most households received social assistance from the Government (71,7%), and village cash transfers were the most expected assistance (47,1%). The coronavirus outbreak sent shockwaves through the household.

Table 2. Social assistance received by the household (n= 187)

Characteristics	n	%
Social assistance received		
Yes	152	3,2
No	35	96,8
Government assistance		
Yes	134	71,7
No	53	28,3
Government's program		
Food aid	42	22,5
Village cash transfer	88	47,1
Electricity subsidy	37	19,8
Family hope program	23	12,3
Prakerja program	28	15
Internet assistance	12	6,4
Health insurance	76	40,6
Agriculture assistance	58	31
NGO assistance		
Yes	34	18,2
No	153	81,8
Neighbor assistance		
Yes	31	16,6
No	157	81,8
Family assistance		
Yes	61	32,6
No	126	67,4

Based on table 3 it is that (46%) of households have different jobs, and (81,3%) earn less than before the pandemic. More than half of the households have no change in food expenditure (53,5%). Regarding COVID-19, health facilities found more complicated in their health service procedure (46%) but no change in their response (49,7%). Drug availability during COVID-19 found no change (46%), but the drug was more expensive (67,4%). The majority of households have low dietary diversity (77,5%).

Households in a situation with urgency to meet food adopted a coping strategy (89,8%), and most did both coping strategies (89,8%)—more than half of the households were food secure (56,1%).

Table 3. Impact of COVID-19 on household (n= 187)

Characteristics	n	%
Change in job status		
No change	84	44,9
Loss of job	17	9,1
Different job	86	46
Change in income		
Earning the same	29	15,5
Earning less	152	81,3
Earning more	6	3,2
Change in food expenditure		
No change	100	53,5
Decrease	83	44,4
Increase	4	2,1
Change in the health service procedure		
No change	75	40,1
More difficult	86	46
Easier	26	13,9
Change in response by the health worker		
No change	93	49,7
Less response	58	31
More responsive	36	19,3
Drug availability		
No change	86	46
More difficult	76	40,6
Easier	25	13,4
Drug affordability		
No change	54	28,9
More expensive	126	67,4
Cheaper	7	3,7

Table 4. Household dietary diversity, coping strategy, and household food security (n= 187)

Characteristics	n	%
Household dietary diversity		
High dietary diversity	42	22,4
Low dietary diversity	145	77,5
Coping strategy adopted		
Yes	168	89,8
No	19	10,2
Food compromisation coping strategy		
Yes	117	62,6
No	70	37,4
Financial coping strategy		
Yes	137	73,3
No	50	26,7
Both coping strategy		
Yes	168	89,8
No	19	10,2
Household food security		
Food secure	105	56,1
Food insecure	82	43,9

As shown in Table 5, the multivariate analysis found that the determinant factors with food security are income (p= 0,002; aOR= 2,388), job change (p= 0,044; aOR= 2,026), type of social assistance or NGO (p= 0,002; aOR= 3,945), food coping strategy (p= 0,008; aOR= 1,134).

Regarding food security, this study showed that (56,1%) of respondents had adequate food security, and the remaining (43,9%) had food insecurity during the COVID-19 pandemic. Food insecurity during the COVID-19 pandemic also occurred in various countries with exceedingly similar prevalence. In Malaysia, there was an increase in the number of households experiencing food insecurity during the COVID-19 pandemic lockdown by 43,2% (Tan et al., 2022). Studies in India also stated increased food insecurity during the COVID-19 pandemic from 21% to 80% (Nguyen et al., 2021). A study conducted in the United States of America showed that there had been nearly an increase in household food insecurity by one-third since COVID-19, with 35,5% of food insecure households classified as newly food insecure (Niles et al., 2020).

Lockdowns and restrictions create new changes to food insecurity, making access to food more difficult for many people. It includes a lack of food in stores (i.e., food supply issues) and people's inability to shop (i.e., isolation issues). It has exacerbated people's inability to buy food and hence economic inequality. Economic issues of COVID-19 have become vital because vast numbers of formerly financially stable people have experienced job losses and drops in earnings. It has left many suffering to pay payments, and food expenditure is often the first aspect to be squeezed in times of economic strain (Goudie & McIntyre, 2021). The impact of COVID-19 on food security and poor health consequences is complicated, multilevel, and bidirectional. Food insecurity is hypothesized to be a risk element for short- and long-term health outcomes at the household and individual levels through three main pathways. These pathways

are household stress (due to worrying about health problems, job loss, limited budget, and low social support systems). The second pathway is behavioral coping mechanisms (engaging in high-risk behaviors, sacrificing healthcare facilities for food, poor mental health, and inadequate child feeding). Moreover, the third pathway is inflammatory factors. The expected poor food, nutrition, and health outcomes of vulnerable groups, young children, and pregnant and lactating women may exacerbate current social and health inequities (Pérez-Escamilla et al., 2020).

Table 5. Determinants of household food security during COVID-19

Variables	Unadjusted OR		Adjusted OR**	
	Exp (beta)	p-value	Exp (beta)	p-value
Households Characteristics				
Parent's sex	2,322 (0,929-4,129)	0,003	1,819 (0,536-7,672)	0,052
Family member	1,675 (0,410-4,870)	0,173	1,130 (0,584-2,187)	0,717
Income	2,895 (1,000-4,650)	0,001	2,890 (1,340-6,220)	0,035*
Total expenditure	3,115 (1,482-4,781)	0,044	1,347 (0,296-6,125)	0,700
Social Assistance				
Social assistance received	2,212 (1,010-3,993)	0,039	0,468 (0,116-1,884)	0,285
Number of social assistance	3,477 (0,710-9,050)	<0,001	1,461 (0,370-5,767)	0,589
Type of social assistance (NGO)	3,703 (2,490-5,470)	0,022	3,945 (1,652-9,421)	0,002*
Type of social assistance (Neighbor)	1,142 (1,038-1,213)	0,013	1,096 (0,216-5,555)	0,912
Impact of COVID-19				
Sources of nutrition information	1,019 (0,913-1,113)	0,087	1,058 (0,914-1,225)	0,451
Change of job	1,897 (0,640-5,110)	<0,001	1,060 (0,840-1,350)	0,044*
Change of income	0,796 (0,621-1,003)	<0,001	0,632 (0,171-2,336)	0,492
Change in food prices	0,886(0,652-1,098)	0,002	0,593 (0,189-1,859)	0,370
Change in food access	0,659 (0,070-1,830)	0,003	0,355 (0,115-1,090)	0,070
Change in the health service procedure	0,610 (0,560-2,300)	0,112	0,786 (0,371-1,666)	0,530
Drug availability	0,996 (0,892-1,010)	0,005	0,629 (0,261-1,518)	0,303
Drug affordability	3,484 (1,340-6,220)	0,022	3,104 (1,436-6,712)	0,052
Household dietary diversity				
Household dietary diversity score	0,845 (0,660-1,044)	0,005	0,593 (0,203-1,737)	0,341
Coping strategy				
Coping strategy food compromisation	1,123 (1,038-1,213)	<0,001	1,134 (1,816-8,567)	0,008*
Number of coping strategies	6,133 (1,340-2,520)	0,021	4,191 (1,540-6,662)	0,642

*p-value < 0,05
**Logistic Regression

Determinants of food security were income, change in job, type of social assistance (NGO), and coping strategy food compromisation. This study reveals that household income during the pandemic has become a determinant of household food security. Households with low income were three times more likely to experience food insecurity than households with higher income. This study also showed that households earn less than 81,3% during COVID-19. A study conducted in Vietnam also reported the same thing, which stated that the majority of respondents, 66,9% had a decreased income due to COVID-19 (Tran et al., 2020). A study in Nepal also reports that 33,2% of respondents had a decreased income and 5,4% job loss because of the COVID-19 pandemic (WFP, 2021). The COVID-19 outbreak is adversely affecting the economic livelihoods and revenue of households. The preventive regulations and activities towards COVID-19 resulted in the loss of employment and the decline of revenue and available money for households, which means that they face issues in meeting some of their essential needs. The low level of price and the declining purchasing power of food led to a much less varied food. The higher a household's access to food, the higher the food security (Limi et al., 2021).

Changes in job status also become determinants of household food security. The study showed that (46%) changed jobs due to

COVID-19. Households who changed jobs were 1,06 times more likely to experience food insecurity than those who did not. A Study in Bangladesh showed that employment and income are potential predictors of low food security (Kundu et al., 2021). The employment rate remained below during COVID-19. Millions reported that their households did not get enough food or were not caught up on rent payments (CBPP, 2021). Research conducted by UNICEF showed that 47,3% of those who did change jobs moved from work as employees in the formal sector into less secure work in the informal sector. It also emphasized that job losses and decreased income hindered access to food (UNICEF, UNDP, Prospera, SMERU, 2021). Another study in India showed that 60% of surveyed farms' income dropped by half during COVID-19 (Harris et al., 2020). This precarious condition could significantly affect food insecurity in a low-resource, high-agriculture district like Tulungagung. Moreover, unemployment was significantly associated with food insecurity during COVID-19. It implied decreased income and poverty would increase food insecurity during COVID-19 (Hamadani et al., 2020).

While governments are primarily responsible for ensuring social assistance, encouraging the participation of NGOs is essential in building awareness about patterns of vulnerability among different sections of the population and helping monitor the reach and efficacy of programs (Moeenian et al., 2022). The prevalence of NGO social assistance received by households was 18,2%. The study also showed that households who received social assistance from NGOs were 3,945 times more likely to experience food security than households who did not receive social assistance from NGOs. A study in Jordan showed that as a nongovernmental organization, UNICEF has effective delivery mechanisms to expand the national social protection program in response to the pandemic. UNICEF was able to help the Government swiftly roll out an emergency cash assistance program for families affected by the economic impact of COVID-19. In collaboration with the World Bank, UNICEF provided assistance that helped the Government reach almost 400,000 beneficiaries. UNICEF's support included targeting, registration, managing payments, and setting up grievance redressal mechanisms that supported identifying almost 20,000 unregistered beneficiaries. Another study in Guatemala showed that UNICEF Guatemala uses an innovative platform to obtain outcomes at scale. More than 2 million poor and vulnerable households are being reached throughout the country, representing 70% of households in Guatemala (UNICEF, 2020).

The households performed various coping techniques to overcome food insecurity through food compromisation (quantity and quality of food) and financial coping techniques. From analysis, we found that coping strategies compromisation become determinants of food security. A study in Bangladesh showed that the highest prevalence was food coping strategy at 79,2% (Farzana et al., 2017). Another study in the poorest area of South Africa found that food coping strategies carried out by the households in the region had a long-term effect, and the coping techniques used by most households rely on much less expensive commodities (Musemwa et al., 2015).

Furthermore, low-earnings households were forced to reduce their food budgets, increasing the purchase of less expensive and healthful food products. Coping strategies can help to determine the food access level and identify the most vulnerable households. It is proven that the more severe the food insecurity status of a household, the higher the proportion of coping strategies adopted (Suryahadi et al., 2020). Another study in Bangladesh showed that they consumed fewer food items (82,7%) and less quality food (78,1%) (Sinharoy et al., 2018).

Conclusion

The determinants of household food security were income, change in job, type of social assistance (NGO), and coping strategy food compromisation.

Our findings recommended that household food security deserve more attention during COVID-19, especially concerning low-income households and households whose earning persons' job has been negatively impacted during the COVID-19 pandemic. Interventions with social assistance through financial and complemented food distributions may improve household food security.

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