

## Food security and sociodemographic factors during COVID-19 pandemic in Indonesia

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### ABSTRACT

The condition of the COVID-19 pandemic led to the government implementing the large-scale social restrictions regulation. It was implemented to overcome the spread of COVID-19 and also have an impact on community food security. This cross-sectional study aimed to examine socio-demographic factors and food security among communities during the COVID-19 pandemic in Indonesia. A total of 1,017 respondents involved in this rapid online survey. The result of this study found the strong factors related to food security were having stress or depression, poor dietary habits, and living alone. Furthermore, the low factors found such as being a female, unemployed, and living in Java Island. The government should give intervention for communities that got stressed, have poor dietary habits, and those who live alone without family during pandemic COVID-19.

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## 1. INTRODUCTION

Starting from 2020, the world is experiencing a major disaster, namely the COVID-19 pandemic so it had an impact on business and research [1]. The spread of this virus was very fast and could attack several people at once and even the entire population or community [2]. There were several common symptoms of the COVID-19 virus, including fever, fatigue, and dry cough, which were usually mild and appear gradually [3], [4]. In addition, there were also infected people who did not show symptoms and stay healthy, they are called people without symptoms (in Indonesia called *orang tanpa gejala/OTG*) [5]. Luckily, as many as 80% of people infected with this virus (*OTG*) recover without the need for special treatment [3].

The Indonesian government seemed undecided in determining policies for handling COVID 19 when it first entered Indonesia [6]. Although in the effort to break the chain of the spread of the COVID-19 pandemic, the government had issued an appeal to reduce social interactions by social and physical distancing [7]. So Indonesian people take various methods of prevention behavior to the transmission of COVID-19 [8]. In several regions in Indonesia, large-scale social restrictions (*pembatasan sosial berskala besar/PSBB*) and temporary restrictions on the operation of land, sea, and air transportation facilities have

been established [9]. The implementation of *PSBB* has been regulated in Government Regulation (*peraturan pemerintah/PP*) Number 21 of 2020 which was signed by the President of the Republic Indonesia, on Tuesday, March 31, 2020. In addition, there was a Regulation of the Minister of Health (*peraturan menteri Kesehatan/Permenkes*) RI Number 9 of 2020 concerning Guidelines for large-scale social restrictions (*PSBB*) in the context of the Acceleration of Handling of Corona Virus Disease 2019 (COVID-19) and solving the problem of spreading COVID-19. This certainly has an impact on the socio-economic life of the community, especially in fulfilling the necessities of life, especially food needs [10], [11].

The poverty rate in Indonesia was predicted to increase on average at the end of 2020 and it will cause around eight million people to experience new poverty caused by this COVID-19 pandemic [12]. This certainly had an impact on food needs in the community that turned into food insecurity and the cause of malnutrition was poverty [13]. Nutritional problems caused food security problems in the family, namely the ability of the family to obtain food [14]. This reflects the lack of family accessibility to obtain food, one of which was caused by poverty, and that low-income families will increase the risk of food insecurity [15].

The government has also predicted that the economic impact of the COVID-19 outbreak will have an impact on decreasing the purchasing power of foodstuffs, the psychologically unstable people will cause stress/depression which in turn will affect their diet. Dealing with the COVID-19 problem, especially on the socio-demographic impacts, could not be from government assistance, but every family must try to be able to overcome their problems, especially in terms of fulfilling food. The purpose of this study was to examine socio-demographic factors and their correlation with Indonesia's food security situation during the COVID-19 pandemic.

## 2. RESEARCH METHOD

The study design was a cross-sectional online survey with a population of Indonesian people. The number of participants obtained was 1,017 from 34 provinces in Indonesia. This research was conducted using a quick survey from 10 to 24 April 2020. This quick survey was conducted by distributing questionnaires through social media via Facebook, Instagram, and WhatsApp. The data were collected after obtaining an ethical approval certificate from the Health Research Ethics Committee, the National Institute of Health Research and Development, Ministry of Health Indonesia (No.LB.02.01/KE.330/2020). An online self-reported questionnaire (Google Form) was handed out to respondents with informed consent. The first page of the questionnaire notified all respondents about the background and objectives of the study and supplied the consent form according to ethical requirements. Respondents could attract anytime without giving reasons if they did not desire to take part. Completing the questionnaire shall not influence their jobs; all data were kept confidential, and the results were provided in general terms.

The data collected in this study included the level of food security as measured by the Food INSECURITY ACCESS SCALE (HFIAS) method and the diet of Indonesians during the COVID-19 pandemic. The HFIAS method was obtained from a questionnaire consisting of nine questions, namely: i) In the past month, have you worried that your household did not have enough food ?; ii) In the past month, have you or other members of your household been unable to eat the type of food you like due to lack of resources ?; iii) In the past month, have you or other members of your household consumed a less varied diet due to lack of resources ?; iv) In the past month, have you or any other member of your household consumed some food that you really don't want to eat due to lack of resources to get other food ?; v) In the past month, have you or other members of your household had to eat less food than necessary because there was not enough food ?; vi) In the past month, did you or other members of your household have to eat less food in a day because there was not enough food ?; vii) In the past month, have you or other members of your household not consumed anything as a result of not having food available at home due to lack of resources to get food ?; viii) In the past month, have you or other members of your household slept hungry at night because there was not enough food ?; and ix) In the past month, have you or other members of your household not consumed anything a day and a night because there was not enough food? [16].

Respondents answered each question with a score of 0-3. A score of 0 said never, 1 said rarely (1-2 times in 4 weeks), 2 said sometimes (3-10 times in 4 weeks) and 3 said often (>10 times in 4 weeks). In this method, food security was categorized into two categories, namely good and poor. Good is food resistant if the total score obtained was 0-1 and poor or food insecurity if the total score obtained was 2-17. This scoring was modified from a study by Salarkia *et al.*, [17]. Respondents in this study were the WHO adult group (20-60 years). Educational level was divided into three levels: high (university level), middle (senior high school), and low (junior high school and below). Employment status was who the respondent unemployment and have employment. The area of respondents divided into Java Island area and out of Java Island (because 60% of Indonesian people live in Java Island).

Stress or depression variable was adopted self-reporting questionnaire (SRQ) from the Ministry of Health Indonesia (29 questions). This questionnaire contains questions related to issues that have been bothering the respondents for the last 30 days. Based on the categorical standard, stress or depression is divided into two categories 'Yes' and 'No'. Clean and healthy behavior (in Indonesia called PHBS) was in 10 questions about the standard from the Ministry of Health Indonesia. The categories were "good" and "poor". Good was who the respondent has the correct of all answer. Dietary habit data were obtained from a questionnaire consisting of 12 questions about the type and frequency of eating the respondents and the categories were "good" and "poor", too. Physical activity was high (more than 3 days a week), middle (3 days a week), and low (less than 3 days a week). Living with who? could affect food security at home. Because stay alone or together with family have different needs.

### 3. RESULTS AND DISCUSSION

Table 1 describes the general information of the main variables, including the dependent variable which is food security and several independent variables. According to food security, more than half of the respondents in this study had poor food security (64.5%). About three fourth of the total respondent were female and more than half of the respondents were age 26 years old or older. More than half of the respondents in this study attended a low educational level. In terms of working status, the majority of respondents were working. Most of the respondents in this study live in Java Island and more than a half of the respondents experienced stress or depression. In terms of clean and healthy life behavior and dietary habit, more than half of respondents had poor behavior and poor habit. Almost all of the respondents had a low level of physical activity. According to a living arrangement, almost all of the respondents lived with their families.

Table 1. General characteristics of respondents during COVID-19 pandemic

Variables	Frequency	Percentage
Food security		
Good	364	35.8
Poor	653	64.2
Sex		
Male	255	25.1
Female	762	74.9
Age group (years)		
<26	498	49
≥26	519	51
Educational level		
High	11	1.1
Middle	423	41.6
Low	583	57.3
Working status		
Yes	530	52.1
No	487	47.9
Living on Java Island		
Yes	662	65.1
No	355	34.9
Stress or depression		
No	681	67
Yes	336	33
Clean and healthy life behavior		
Poor	570	56
Good	447	44
Dietary habit		
Poor	581	57.1
Good	436	42.9
Physical activity		
Low	934	91.8
Middle	47	4.6
High	36	3.5
Living arrangement		
Live alone	158	15.5
With family	859	84.5

Table 2 presents the result of the association analysis between independent variables and dependent variables based on the Chi-Square test. Among 10 independent variables, eight variables have an association with food security. In detail, there is a strong association between stress status with food security with a

magnitude of 3.18. The dietary habit is also found a significant association with food security with a magnitude of 2.53. The living arrangement is also found a strong positive association with food security with a magnitude of 2.18. The medium association is shown by sex that 1.54 significantly influences food security. The education level is also revealed that middle and low education have a positive association with food security. The low association is presented by age group, working status, and living in Java Island that showed the magnitude to food security about 1.42, 1.39, and 1.36 respectively. The rest of the independent variables, which were clean and healthy life behavior and physical activity did not show any association with food security.

Table 2. Distribution and analysis of the correlation between independent variables and food security

Variables	Food Security				P-value	Crude OR (95% CI)
	Poor		Good			
	n	%	n	%		
Sex						
Male	182	71.4	73	28.6	0.007**	1.54 (1.13–2.097)
Female	471	61.8	291	38.2		
Age group (years)						
<26	340	68.3	158	31.7	0.010*	1.42 (1.09–1.83)
≥26	313	60.3	206	39.7		
Education levels						
High	9	81.8	2	18.2	0.004**	1.97 (0.4–9.27) 2.99 (0.6–13.99)
Middle	294	69.5	129	30.5		
Low	350	60	233	40		
Working status						
Yes	321	60.6	209	39.4	0.014*	1.395 (1.08–1.81)
No	332	68.2	155	31.8		
Living on Java Island						
Yes	244	68.7	111	31.3	0.033*	1.36 (1.03–1.79)
No	409	61.8	253	38.2		
Stress or depression						
No	270	80.4	66	19.6	0.0001***	3.18 (2.34–2.34)
Yes	383	56.2	298	43.8		
Clean and healthy life behavior						
Poor	376	66	194	34	0.21	1.19 (0.92–1.54)
Good	277	62	170	38		
Dietary habit						
Poor	426	73.3	155	26.7	0.0001***	2.53 (1.95–3.29)
Good	227	52.1	209	47.9		
Physical activity						
Low	600	64.2	334	35.8	0.889	0.93 (0.5–1.72) 1.14 (0.6–2.26)
Middle	31	66.0	16	34		
High	22	61.1	14	38.9		
Living arrangement						
Live alone	123	77.8	35	22.2	0.0001***	2.18 (1.46–3.25)
With family	530	61.7	329	38.3		

Note: \*p-value <0.05, \*\*p-value <0.01, \*\*\*p-value<0.00

Table 3 presents the result of binary logistic regression to estimate the correlation and causality between independent variables and dependent variables. The variables that have a strong association with food security were stress and depression; dietary habit, and living arrangement. The low association is shown by variables of sex, working status, and living on Java Island. However, the variables of age group, educational level, clean and healthy life behavior, and physical activity did not show any association with food security. Compared to those who were not stressed, those who were stressed statistically tend to have poor food security 1.94 times after being adjusted to other independent variables. Those who had poor dietary habits statistically had a tendency 1.94 times for having poor food security compared with those who had good food security after adjusting with other independent variables. In terms of the living arrangement, those who live alone had a tendency 2.19 times more likely to have poor food security compared with those who live with family after adjusting with other independent variables. For the variables with the low association, compared with males, a female had 1.47 times more likely to have poor food security. According to age group, people age 26 years or older had the tendency 0.88 times more likely to have poor food security. Those who are working had 1.45 times more likely to have poor food security after adjusting with other independent variables.

Woman who does not have a job and lives outside Java will also be at risk of food insecurity during this COVID-19 pandemic. This happens because of the COVID-19 pandemic and the government's national

social restriction policy in order to suppress the spread of the COVID-19 pandemic. Rationale, everyone who lives alone without a family will be experienced stress or depression when forced to stay at home [18]. Of course, the income will decrease, and many people lose their job [19], [20]. Meanwhile, food supplies were increasingly limited due to the closed access to food distribution between regions [21], [22]. On the other hand, poor dietary habits occur, too. Stress and depression were indeed a variable that causes food insecurity among students in a university [23]. This also happened to undergraduate students in Brazil [24]. However, other studies (meta-analysis) found the opposite relationship; food insecurity caused a person to experience stress and depression [25]. In line with the results of this study, the consistency of the relationship between variables can be recognized scientifically in the future. Therefore, the government's role in tackling mental health needs to be carried out thoroughly during this pandemic. A concrete example is reducing conspiracy issues that make people distrust the government. Then, it is also necessary for comedy content, including on television, to be increased to relieve stress or depression that occurs in society.

The previous research conducted in the United Kingdom showed that the COVID-19 pandemic increased body mass index (BMI) because they had changed dietary habits, causing food insecurity [26]. Another study found, the older a person was more at risk of having a bad diet during the current COVID-19 pandemic so the more it will cause food insecurity in certain community groups [27]. Another study also related food security to dietary habits in adults living within the United States three months post-mandated quarantine [28]. This part suggested helping public health authorities to edge measures to ease the impact of policy 'stay at home has on the dietary habit of the community. Living alone without family affected food insecurity in Indonesian society. Social restrictions made people more easily anxious, stressed, and depressed [29]. Thus, family support had a role very important role in reducing the impact both mentally and socially for those living alone during pandemic COVID-19. However, community groups that have many family members but have low incomes will also be at risk of food insecurity [30]. The problems that occur regarding food safety during the COVID-19 pandemic are very complex so the finding of this study suggests that the Indonesian government should improve its food security system for a better future.

Table 3. Multivariate analysis of independent variables and food security

Variables	SE	P-Value	AOR (95% CI)
Sex			
Male			ref.
Female	0.176	0.03*	1.47 (0.04–2.07)
Age group (years)			
<26			ref.
≥26	0.174	0.472	0.88 (0.63–1.24)
Education levels			
High			ref.
Middle	0.803	0.176	1.74 (0.36–8.37)
Low	0.805	0.332	2.31 (0.48–11.2)
Working status			
Yes			ref.
No	0.175	0.033*	1.45 (1.03–2.05)
Living on Java Island			
Yes			ref.
No	0.049	0.049*	1.35 (1.02–1.83)
Stress or depression			
No			ref.
Yes	0.166	0.0001***	2.81 (2.03–3.89)
Clean and healthy life behavior			
Poor	0.142	0.953	1.008 (0.76–1.33)
Good			ref.
Dietary habit			
Poor	0.145	0.0001***	1.94 (1.46–2.57)
Good			ref.
Physical activity			
Low	0.336	0.473	0.967 (0.5–1.87)
Middle	0.383	0.521	1.32 (0.6–2.79)
High			ref.
Living arrangement			
Alone	0.22	0.0001***	2.19 (1.43–3.375)
With family			ref.

Note: \*p-value <0.05, \*\*p-value <0.01, \*\*\*p-value<0.00, ref =reference

#### 4. CONCLUSION

In sum, this study found that female, living outside of Java Island, not having a job, experiencing stress or depression, having a bad dietary habit, and living alone without family were associated with food security intake during the pandemic in Indonesia. Based on these findings, we recommend the Indonesian government and others related stakeholders to arrange the program related to mental health such as free online consultation with the psychology under the universal health coverage. Other program to increase the food security are using the social media such as Instagram, Twitter, Facebook, and TikTok to educate the importance of having sufficient food security during the pandemic.




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