Household Food Security During The COVID-19 Pandemic in Urban and Semi-Urban Areas in Indonesia.

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Research article

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Abstract

Background

One of the impacts of the COVID-19 pandemic was the weakening of the community's economic condition. The weak economy of the community will have an impact on household food security. This study aims to determine food security in the COVID-19 pandemic situation and the impact of the pandemic on food security in urban and semi-urban areas.

Methods

A cross-sectional study with a total sample of 517 people who live in urban (Jakarta) and semi-urban (Depok) areas. The research data was collected online and purposively through *Posyandu* cadres who have access to family/community. Data analysis used the chi-square test and multiple logistic regression.

Results

There were 65.0% of households had food insecurity during the COVID-19 pandemic. The results of the multivariate analysis showed that family income during the COVID-19 pandemic (AOR = 4.2; 95%CI = 2.7–6.7), the impact of the COVID-19 pandemic (AOR = 2.6; 95%CI = 1.6–4.1), and the age of the respondent (AOR = 1.7; 95%CI = 1.1–2.5) was significantly related to household food security after being controlled by husband's work status during the pandemic.

Conclusions

The COVID-19 pandemic has an impact on employment and income which then decreasing the level of household food security.

Background

Currently, the world is facing a COVID-19 pandemic whose cases are increasing every day. The COVID-19 pandemic has had a very broad impact, not only health and psychological impacts but also impacts on the economy of society and the country. The implementation of physical distancing, work from home, travel banned and other closures had an impact on the disruption of the economy [1]. Not a few companies finally terminated their employees to keep the company's economy. The Ministry of Manpower reports that the workforce affected by COVID-19 has reached $\pm$ 3.05 million people as of June 2, 2020, and unemployment is estimated to reach 5.23 million [2]. Groups who are more at risk of losing their jobs and income are from poor and vulnerable households (shop workers, waiters, cleaners, etc.) as well as from the informal sector [3].

The weakening of the community's economic conditions will certainly have an impact on purchasing power and consumption, especially in terms of food so that it will affect household food security. Several studies had shown that the low economic condition of the family was significantly associated with household food insecurity [4–6]. The condition of low household food security will have an impact on child feeding. Studies report that food insecurity was significantly associated with child feeding practices [7–9]. Children living in food-secure households were significantly more likely to achieve appropriate feeding practices than children in food-insecure households [7].

Feeding the child should be in accordance with the recommendation because children need adequate nutrition to support growth and development. Nutrient intake in toddlers, both macro and micro, has a major role in growth, and intake in sufficient quantities can prevent growth faltering in children [10–12]. If the child's feeding is not in accordance with the recommendations, it will affect the child's growth and cause nutritional problems such as stunting. Before the pandemic, the number of malnutrition in children under five in Indonesia was already high. Based on Riskesdas data in 2018, the prevalence of stunting was 30.8%, underweight was 17.7%, wasting was 10.2% [13]. The high number of nutritional problems in Indonesia can be caused by many factors, one of them is the lack of energy and protein intake which is the impact of improper feeding on children.

This study aims to determine food security and the impact of the pandemic on food security in urban and semi-urban areas in Indonesia.

Methods

This study was quantitative research with a cross-sectional approach. The research was conducted in Jakarta and Depok in October-December 2020. The Jakarta area represents people from urban areas (urban) with middle to upper economies and the Depok area represents people in semi-urban areas with heterogeneous socio-economics, some were middle to upper and middle to lower.

Samples were taken from people who live in Jakarta and Depok in accordance with the inclusion criteria (have family that one of its members consisting of infant, toddlers, pregnant women, lactating mothers, and come from families with middle and low income (< minimum salary level Jakarta and Depok). The selection of a family that has one of them is an infant/toddler/under-five/pregnant mother/lactating mother because the food security seen is from the vulnerable group in 1000 HPK whose nutrients must be met. The sample size in this study was obtained using the formula for the two-proportion difference hypothesis test sample and based on previous research, it was found that the sample size was 500 people, and in this study, the respondents obtained were 517 people.

The dependent variable in this study was food security. Independent variables were the impact of the COVID-19 pandemic, wife's education, husband's education, wife's work status during the pandemic, husband's work status during the pandemic, number of family dependents during the pandemic, family income during the pandemic, family expenses during the pandemic and the number of people working during the pandemic. The impact of the COVID-19 pandemic in this study was categorized into 2

categories, namely affected (reduced income and stopped working); and less affected (other than reduced income and stopped working). Food security is measured using the HFIAS (Household Food Insecurity Access Scale) method, reflecting physical access (food availability at the household level) [14]. Respondents were given 9 questions, each of which had a score of 0–3. In this method, food security was categorized into four levels, namely food security if the total score was 0–1, mild food insecurity if the total score was 2–7, moderate food insecurity if the total score was 8–14, and severe food insecurity if the total score was 15–27 [15]. From that categories, then categorized into 2, namely food security and food insecurity.

Data was collected purposively, namely respondents who live in the Jakarta and Depok areas and meet the research inclusion criteria were asked to fill out online questionnaires. Contact respondents were made in two ways, namely advertisements on social media and lists of *Posyandu* cadres. The first method was carried out at the beginning of data collection was distributed research advertisements through social media Facebook and Instagram. To anticipate fraud (one respondent can fill out the questionnaire several times), screening was carried out first and then the link is personally distributed to candidate research respondents. However, this step was less effective because the number of respondents who fill out the questionnaire was very small so that data collection was very slow. Due to the limited time of the study, further data collection was carried out in a second way, namely from a list of *Posyandu* cadres. *Posyandu* cadres from Jagakarsa Village, Tanjung Barat District in Jakarta and Beji Village, Beji District in Depok areas who were considered to have enough access to families/communities were selected purposively based on their willingness to collaborate in conducting research in the pandemic era and their willingness to share links to screening research questionnaires to families/communities in their environment. Furthermore, respondents (from the list of *Posyandu* cadres) who have filled out the screening link were checked and if they meet the inclusion criteria, a complete questionnaire link was given. This second method gives better results. Respondents who meet the criteria were easier to found so that data collection proceeds faster.

Multivariate analysis used multiple logistic regression. The odds ratio (with 95% confidence interval, CI) was calculated to determine the relationship between food security and the independent variable. Collinearity and interactions between independent variables were checked and no collinear variables were found. The test results are stated to be significant if the p-value is ≤ 0.05 .

Results

A total of 517 respondents participated in this study whose data were collected through social media and *Posyandu* cadres. Respondents obtained from advertisements on social media amounted to 167 people consisting of 115 people in the Jakarta area and 52 people in the Depok area. Respondents obtained from the list of *Posyandu* cadres were 350 people consisting of 143 people in the Jakarta area and 207 people in the Depok area (Table 1).

Table 1
Number of respondents by data source and region

Data Source	Region		Total
	Jakarta	Depok	
Social Media	115 (44.6%)	52 (20.1%)	167 (32.3%)
<i>Posyandu</i> cadres	143 (55.4%)	207 (79.9%)	350 (67.7%)
Total	258 (100%)	259 (100%)	517 (100%)

As many as 75.2% of households in urban and semi-urban areas had the impact of the COVID-19 pandemic. The impacts that occur in urban and semi-urban areas are relatively similar. Felt the most impact was the reduction in income, with the percentage of each being 63.2% (Jakarta) and 62.2% (Depok). Other impacts felt were not being able to leave the house (18.2% in Jakarta and 17.8% in Depok), stopping work (13.6% in Jakarta and 11.6% in Depok), the price of household necessities became expensive (4.7% in Jakarta and 6.2% in Depok), food prices became expensive (only happened in Depok area which was 2.3%), and lack of public transportation (only happened in Jakarta area which was 0.4%).

The impact of the COVID-19 pandemic began to be felt in Jakarta and Depok in March 2020 (62.8% and 68.3%). In terms of food shortages during the pandemic, most said sometimes it was 50.8% in Jakarta and 47.1% in Depok. The cause of food shortages was mainly due to reduced family income (81.3% in Jakarta and 81.6% in Depok). The results showed that in total in Jakarta and Depok there were 15.5% of households had severe food insecurity, 28.2% moderate food insecurity, 21.3% mild food insecurity, and only 35.0% food insecurity (Table 2). From these results, it was categorized that 35.0% were food insecure and 65.0% of respondents were food insecure.

Table 2
The situation of the impact of the pandemic and food security during the pandemic

Variable	Jakarta	Depok	Total
Impact of the COVID-19 Pandemic			
Affected	198 (76.7%)	191 (73.7%)	389 (75.2%)
Less affected	60 (23.3%)	68 (26.3%)	128 (24.8%)
First impact suffered			
Income reduced	163 (63.2%)	161 (62.2%)	324 (62.7%)
Can't leave the house	47 (18.2%)	46 (17.8%)	93 (18.0%)
Stop working	35 (13.6%)	30 (11.6%)	65 (12.6%)
The price of household needs is expensive	12 (4.7%)	16 (6.2%)	28 (5.4%)
Food prices are expensive	0 (0.0%)	6 (2.3%)	6 (1.2%)
Others (lack of public transportation)	1 (0.4%)	0 (0.0%)	1 (0.2%)
First impact of the pandemic			
March 2020	162 (62.8%)	177 (68.3%)	339 (65.6%)
April 2020	60 (23.3%)	53 (20.5%)	113 (21.9%)
May 2020	1 (0.4%)	0 (0.0%)	1 (0.2%)
June 2020	8 (3.1%)	3 (1.2%)	11 (2.1%)
July 2020	4 (1.6%)	3 (1.2%)	7 (1.4%)
August 2020	3 (1.2%)	1 (0.4%)	4 (0.8%)
September 2020	1 (0.4%)	0 (0.0%)	1 (0.2%)
October 2020	19 (7.4%)	22 (8.5%)	41 (7.9%)
Food shortages during pandemic			
Yes always	28 (10.9%)	21 (8.1%)	49 (9.5%)
Yes, often	28 (10.9%)	31 (12.0%)	59 (11.4%)
Yes, sometimes	131 (50.8%)	122 (47.1%)	253 (48.9%)
No	71 (27.5%)	85 (32.8%)	156 (30.2%)
Cause food shortage			
Expensive food prices	18 (9.6%)	18 (10.3%)	36 (10.0%)
Decreased income	152 (81.3%)	142 (81.6%)	294 (81.4%)

Variable	Jakarta	Depok	Total
Don't have income	16 (8.65)	14 (8.0%)	30 (8.3%)
Food security during a pandemic			
Severe food insecurity	45 (17.4%)	35 (13.5%)	80 (15.5%)
Moderate food insecurity	77 (29.8%)	69 (26.6%)	146 (28.2%)
Mild food insecurity	54 (20.9%)	56 (21.6%)	110 (21.3%)
Food security	82 (31.8%)	99 (38.2%)	181 (35.0%)
Food security during a pandemic			
Food insecurity	176 (68.2%)	160 (61.8%)	336 (65.0%)
Food security	82 (31.8%)	99 (38.2%)	181 (35.0%)

Based on research data, information was also obtained that during the pandemic in Jakarta and Depok an average of 90% of families reduced the variety of food consumption when experiencing food shortages. In addition, at the family level, an average of 83.9% of respondents also had a condition of not eating their preferred food, 72.0% consuming less food than needed, 68.4% consuming less food in a day, 65.1% consuming food that they do not want to eat, 28.8 % did not eat anything in a day, 23.0% had experienced sleep in hunger at night and 12.5% did not eat anything a day and night because there was not enough food (Table 3).

Table 3
Food Consumption Conditions in Households Experiencing Food Shortage During a Pandemic

Variable	Jakarta	Depok	Total
Not eating favorite foods due to lack of resources			
Yes	157 (84.0%)	146 (83.9%)	303 (83.9%)
No	30 (16.0%)	28 (16.1%)	58 (16.1%)
Eating less varied food due to lack of resources			
Yes	168 (89.8%)	325 (90.2%)	325 (90.0%)
No	19 (10.2%)	17 (9.8%)	36 (10.0%)
Eating food that you don't want to eat due to lack of resources to get other food			
Yes	126 (67.4%)	109 (62.6%)	235 (65.1%)
No	61 (32.6%)	65 (37.4%)	126 (34.9%)
Eating less food than needed because there is not enough food			
Yes	133 (71.1%)	127 (73.0%)	260 (72.0%)
No	54 (28.9%)	47 (27.0%)	101 (28.0%)
Eating less food in a day because there is not enough food			
Yes	129 (69.0%)	118 (67.8%)	247 (68.4%)
No	58 (31.0%)	56 (32.2%)	114 (31.6%)
Not consuming anything as a result of food unavailability at home due to lack of resources to obtain food			
Yes	58 (31.0%)	46 (26.4%)	104 (28.8%)
No	129 (69.0%)	128 (73.6%)	257 (71.2%)
Sleeping in hungry condition at night because there is not enough food			

Variable	Jakarta	Depok	Total
Yes	46 (24.6%)	37 (21.3%)	83 (23.0%)
No	141 (75.4%)	137 (78.7%)	278 (77.0%)
Do not eat anything day and night because there is not enough food			
Yes	28 (15.0%)	17 (9.8%)	45 (12.5%)
No	159 (85.0%)	157 (90.2%)	316 (87.5%)

Changes in food consumption during the pandemic also occurred in vulnerable groups such as infants, toddlers, under-five, pregnant women, and lactating mothers in the family. Based on research data, it was known that changes in eating patterns were more common in pregnant women, which was 68.5%. Most of the changes in eating that occurred were in the reduction of the types of food eaten (Table 4).

Table 4
Changes in the diet of vulnerable groups in households during the pandemic

Variable	Infant	Toddler	Under-five	Pregnant Women	Lactating Mother
Changes in family diet					
Yes	18 (16.2%)	51 (44.0%)	138 (43.0%)	50 (68.5%)	87 (46.3%)
No	93 (83.8%)	65 (56.0%)	183 (57.0%)	23 (31.5%)	101 (53.7%)
Changes in eating patterns that occur					
The type of food eaten is reduced	9 (50.0%)	35 (68.8%)	88 (63.8%)	30 (60.0%)	54 (62.1%)
Reduced amount of food eaten	7 (38.9%)	10 (19.6%)	30 (21.7%)	9 (18.0%)	23 (26.4%)
Decreased number of meals per day	1 (5.6%)	4 (7.8%)	18 (13.0%)	11 (22.0%)	9 (10.3%)
Others (unable to buy nutritious food, eat potluck, change brands)	1 (5.6%)	2 (3.9%)	2 (1.4%)	0 (0.0%)	1 (1.1%)

Multivariate analysis was carried out by including nine independent variables, namely the impact of the COVID-19 pandemic, wife's education, husband's education, wife's work status during the pandemic, husband's work status during the pandemic, number of family dependents during the pandemic, family income during the pandemic, family expenses during the pandemic and respondent's age. The results of

the analysis show that the variables that were significantly related to food security were family income during the COVID-19 pandemic (AOR = 4.2; 95%CI = 2.7–6.7), the impact of the COVID-19 pandemic (AOR = 2.6; 95%CI = 1.6–4.1).), and respondent's age (AOR = 1.7; 95%CI = 1.1–2.5) after being controlled by husband's work status during the pandemic (Table 5).

Table 5
Multivariate Final Model

Variable	P value	OR (95% CI)
Impact of the COVID-19 pandemic	< 0.001	2.6 (1.6–4.1)
Family income during the pandemic	< 0.001	4.2 (2.7–6.7)
Respondent age	0.011	1.7 (1.1–2.5)
Husband's work status	0.171	1.8 (0.8–4.1)

Discussion

The COVID-19 pandemic had an impact on the community's economy. As many as 75.2% of households in urban (Jakarta) and semi-urban (Depok) areas were affected. The results of this study indicate that there was no significant difference in the impact of the pandemic on the community's economy between urban and semi-urban areas. In both urban and semi-urban areas, the impact of the COVID-19 pandemic that was most felt was a reduction in income with an average of 62.7%. The same thing is also reported by a study conducted in Vietnam which stated that the majority of respondents (66.9%) had a decrease in household income due to COVID-19 [16]. A study on American society conducted by the Pew Research Center [17] also reports that 60% of respondents had lower incomes than before the COVID-19 pandemic due to job losses, reduced worked hours, or pay cuts.

The results of this study show that only 35% of respondents were food secure, the remaining 65.0% of respondents had food insecurity during the COVID-19 pandemic. Food insecurity during the COVID-19 pandemic also occurs in various countries in the world with the prevalence not much different. In Bangladesh, there was an increase in the number of families experiencing food insecurity during the COVID-19 pandemic lockdown by 51.7% [18]. Adams et al. [19] in California also reported that there was an increase in food insecurity conditions during the COVID-19 pandemic. A study conducted in the United States showed that out of 3219 respondents, 32.3% of households had very low food security and 67.7% of households had low food security since COVID-19 [20].

Food shortages during the pandemic affected household food consumption. In this study, households that had food shortages tend to consume less varied foods. In addition, there were those who eat less food and some even do not eat any food in a day. Changes in household food consumption during the pandemic also occurred in Uganda and Kenya. Research conducted by Kansiime [21] indicate that during a pandemic COVID-19, a reduction in the frequency of consumption of a variety of food groups and

mainly occurs in low-income families. Jafri et al. [22] also reported that during the COVID-19 pandemic there was less access to food so respondents tended to reduce the size and amount of food.

Changes in food consumption in vulnerable groups such as infants, toddlers, under-five, pregnant women, and lactating mothers also occur in this study. Based on the results of the study, it was found that pregnant women were the most experienced changes in eating during the pandemic, and the changes that occurred the most were the reduced types of food eaten. Reducing the type of food on pregnant women was worrying because it will affect the low adequacy of nutrients recommended for consumption by pregnant women such as protein, fat, iron, and calcium that can be affected the fetus [23]. Currently the prevalence of iron deficiency anemia among pregnant women in Indonesia is high, namely 48.9% [13], thus the phenomenon of reducing the type of food consumed will worsen the anemia status of pregnant women because iron-rich foods will be obtained if the mother eats a variety of foods including animal source foods.

Research conducted by Jafri et al. [22] reported that vulnerable groups such as children, pregnant women and the elderly are struggling to obtain adequate food during the COVID-19 pandemic, and one way to do this was to reduce the amount of food eaten. Changes in food consumption in vulnerable groups during the pandemic in this study risked the emergence of nutritional problems in each of these groups. Groups of parents are at risk of experiencing malnutrition and decreased body resistance so that it will increase the morbidity and mortality of the elderly [24]. Meanwhile, food reduction in vulnerable groups such as infants, toddlers, under-five, pregnant women, and lactating mothers is at risk of increasing stunting prevalence because these groups are in need of adequate nutrition to support child growth and development [25].

The results showed that family income during the pandemic had a significant relationship with household food security. Households with incomes below the Jakarta/Depok minimum salary level are 4 times more likely to experience food insecurity than households with incomes equal to or more than the Jakarta/Depok minimum salary level. Study in Bangladesh show that income loss was positively correlated with household food insecurity [26]. Study in Bangladesh show that income loss was positively correlated with household food insecurity [21]. Family income can affect the family's purchasing power [27]. Low family incomes tend not to be able to provide a variety of foodstuffs [28, 29] and at risk of food insecurity [30].

The impact of the COVID-19 pandemic (reduced income and stopped working) also had a significant relationship with food security. Households who have experienced the impact of the pandemic have reduced income and stopped working have a 3 times higher risk of experiencing food insecurity. In line with the research conducted Kundu et al. [31] which shows that employment and income are potential predictors of low food security scores. Unicef [32] also emphasized that job losses and reduced income made it difficult to access food.

The results showed that the age of the respondents had a significant relationship with household food security. In this study, respondents aged < 31 years had a 2 times higher risk of experiencing food

insecurity. Similar results were also reported by Elshahry et al. [33] in Jordan, age is associated with food insecurity status, with younger respondents (18–30 years old) 1.8 times more likely to experience severe food insecurity. Research by Abdullah et al. [34] in Malaysia also shows that the age of the household's head was significantly related to household food insecurity, namely that households with older household's heads were more food insecure than households with younger household's heads. Age is associated with the economic condition of the family, namely the age of older respondents tends to have a more established economy when compared to younger ages [34].

Husband's work status during the pandemic in this study became the control variable in the relationship between the independent variables and food security. This can happen because the husband's work affects the amount of income received by the family which then affects the household's food security. Charvadeh et al. [35] reported that during the COVID-19 outbreak, the household head's work status was directly related to food security. Research in Bangladesh also shows that husband's employment status was significantly related to food security [31].

Conclusion

The COVID-19 pandemic had an impact on decreasing the level of household food security through negative impacts on people's work and income. In this study, the variables that were significantly related to food security were family income during the COVID-19 pandemic (AOR = 4.2; 95%CI = 2.7–6.7), the impact of the COVID-19 pandemic (AOR = 2.6; 95%CI = 1.6–4.1), and respondent's age (AOR = 1.7; 95%CI = 1.1–2.5) after being controlled by husband's work status during the pandemic.

Declarations

Ethics approval and consent to participate

This research has received ethical approval from the Committee for Research Ethics and Community Service, Faculty of Public Health, University of Indonesia (Reference Number 582/UN2.F10.D11/PPM.00.02/2020).

Consent for publication

Not applicable

Availability of data and materials

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interest

No conflict of interest.

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Authors' contributions:

Syafiq A, conducted data analysis and interpretation, reviewed and revised the manuscript; Fikawati S, concepted and design the study, prepared draft of manuscript; Gemily SC, collected, analyzed and added new related references for manuscript.

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