

A SCOPING REVIEW OF FEEDING 250 MILLION INDONESIANS

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Abstract

Covid-19's pandemic impacts on the Indonesians food system pose risks to human health. Little attention has been paid to food insecurity of 250 million Indonesians, resulting in a public health concern. The aim of the study is to conduct a scoping review on food security in Indonesia. Google Scholar and the Pubmed Research Documents were used to search for relevant primary research using the following terms: "food security", "access", "availability", "utilisation", "Indonesia", and "Covid-19". A totalled seven articles from Google Scholar and the Pubmed Research Documents were finally selected. The articles revealed three types of research approaches, those that nutritious food intake of Indonesians (n=1), those that quantified food security (n=2), and articles that addressed at least one pillar of food security during covid-19 pandemic in Indonesia (n=4). Research investigating dietary intake of carbohydrate foods is more prevalent among Indonesians, though many differences exist among participant age groups and geographical areas. Future research should include direct measurements of food intake and food security to provide a more complete picture of food security in Indonesia.

Keywords: food insecurity, food availability, Indonesia.

1. Introduction

The COVID-19 pandemic has interrupted the financial pressure and daily life of many families. Many countries have implemented lock down policies to reduce the spread of COVID-19, which have had a considerable impact on food security in Indonesia (Djalante *et al.*, 2020). The pandemic situation is unique because it is global—all food's exporter and importer countries are affected (Paslakis, Dimitropoulos and Katzman, 2020).

When the pandemic escalated to become an economic, health and social crisis, thus, the crisis led to increasingly unemployment, poverty, food insecurity and malnutrition. Despite social uncertainties, the Indonesian Government has taken prompt action to prevent a worsening of the hunger situation by massive imports of food and instituting food price subsidies for the poor to cope with food shortages and malnutrition (Warr, 2005). However, closures of airport and port due to the COVID-19 pandemic has disrupted markets, displaced workers, and interrupted food supply chains (Cullen, 2020). These disruptions have critical impacts for food supply within a country, including for Indonesia.

Indonesia's population totaled more than 250 million with an annual growth rate of 1.31% has created a large demand of food (Badan Kependudukan dan Keluarga Berencana Nasional (BKKBN) *et al.*, 2018). However, rapid population growth will not incompatible with food growth. The Malthusian Trap had emphasized that there must be a stage in which the food supply is inadequate for feeding the population

(Lueger, 2018). Malthusian's theory had declared that human population grows at an exponential rate while the agricultural output could not keep up with the exponential growth in human population (Lueger, 2018). During the long-term pandemic, the future of food security can also be disrupted (Paslakis, Dimitropoulos and Katzman, 2020). Apart from population growth factors, changes in the composition of the urban population are outnumber the rural population adding to pressure on food security due to the decreasing number of food land (Schroeder and Smaldone, 2015).

While numerous research has explored changes in health behaviors due to COVID-19, limited research has examined the impact of COVID-19 on food insecurity. The aim of the study is to map relevant literature on food security in Indonesia.

2. Literature Review

The United States Department of Agriculture (USDA) refers food security to "access by all people at all periods to sufficient food for an active, healthy life" (Wolfson and Leung, 2020). Food security refers as a condition where all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary preferences for an active and healthy life (Baer-Nawrocka and Sadowski, 2019). Food insecurity, in contrast, is identified by lack of food security (Peltz and Garg, 2019). It is currently estimated that 20.8% of Indonesian households, or 52,000,000 individuals, are food insecure (Amrullah *et al.*, 2019). This problem is not unique to Indonesia; food insecurity is a global crisis.

Food insecurity exists when people have limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways (Borch and Kjærnes, 2016). Severe food insecurity will result in hunger or malnutrition (Peltz and Garg, 2019). Hunger, referring to the involuntary lack of food which can occur in many situations, such as dieting or being too busy to eat (Pollard and Booth, 2019). Malnutrition refers to a lack of, or imbalance in, protein, calories, vitamins, or minerals, including unbalanced diets leading to diseases of over-nutrition and obesity (Grammatikopoulou *et al.*, 2019). Hunger or malnutrition caused by food insecurity is a condition resulting from legal, economic, practical, social, and psychological constraints hindering access to food (Charkhchi, Dehkordy and Carlos, 2018). Food insecurity is not necessarily the result of limited food production or supply, but also focuses instead on access at the household level (Schroeder and Smaldone, 2015). Even though the food insecurity was a multifaceted phenomenon, it was generally accepted to be the result of supply-side factors (Gundersen, 2016). Thus, the response was to develop policies aimed at ensuring a sufficient and stable global food supply.

3. Data and Methods

In November 2020, a wide variety of literatures were searched to identify studies addressing food insecurity in Indonesia. Keywords for searching articles included "food security", "access", "availability", "utilisation", "Indonesia", and

“Covid-19”. This included gray literature, conference proceedings, dissertations and theses, as well as peer-reviewed journal articles. Search engines used were Google Scholar and the Pubmed Research Documents. Gray literature records were included if the full text was accessible (conference proceeding, website). There was restriction on language, in which, this study utilized only English and Bahasa literatures.

The inclusion criteria for searching articles abstracts in the review are: (1) written in Bahasa or in English, (2) addressed the issue of food insecurity, (3) location in Indonesia, (4) during pandemic Covid-19. Articles that did not address food security were excluded from the study.

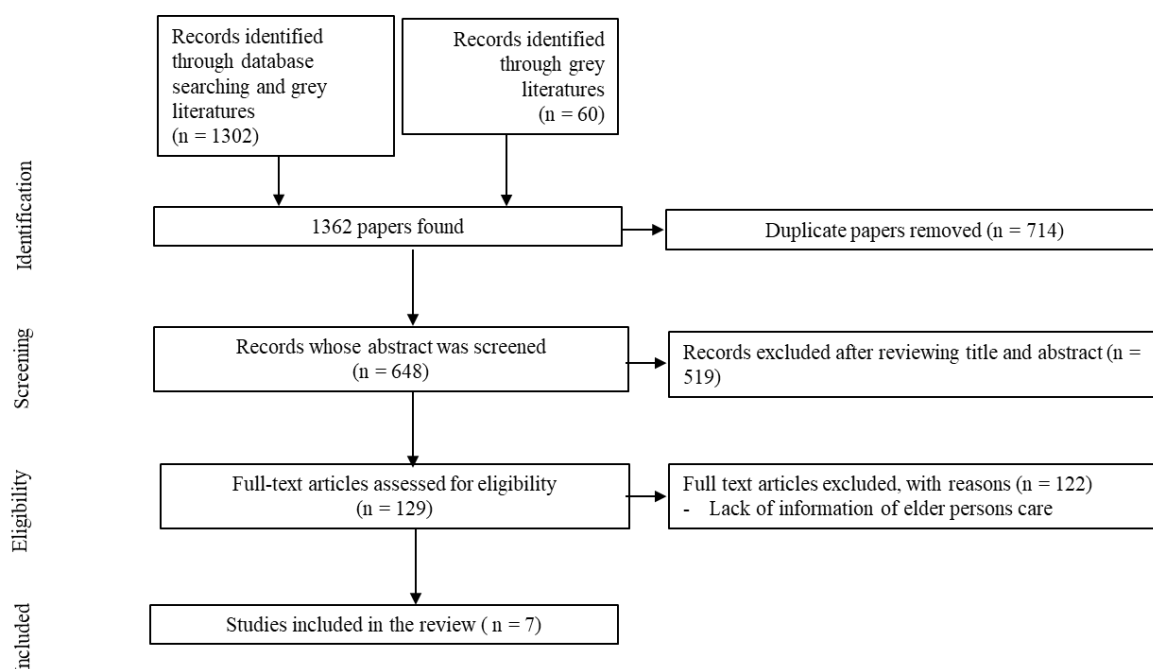


Diagram 1. The Study's Selection Process

The search of Google Scholar, Pubmed Research Documents and grey literature resulted many thousands of records. These search strategies resulted 1362 records altogether (Diagram 1). Duplicate (n = 714) records were removed. The next step considered title and abstracts, and a further 519 records were judged to be out of scope and were excluded. Afterwards, 120 articles were excluded as the result of full analysis. Therefore, there were 7 articles which classified into (1) nutritious food intake of Indonesians (n=1); (2) those that quantified food security (n=2), and (3) articles that addressed at least one pillar of food security during covid-19 pandemic in Indonesia (n=4). To provide a structure for subsequent content analysis and narrative review, records were categorized according to whether combination food insecurity issue occurred or part of a treatment program. Thematic analysis was conducted to describe the main findings of the records grouped in broad themes.

4. Result and Discussion

The initial search of Google Scholar, Pubmed Research Documents and grey literature yielded 1362 hits. Abstracts were scrutinized for inclusion criteria, starting with the most relevant hint. After reviewing the title and abstract of the first 648 articles, 519 articles were excluded. In total, nine articles that meet inclusion criteria were deeply analyzed. Table 1 summarised the results by the type of the research, geographic location and study population.

Table 1. Characteristics, Objectives and Outcomes of Selected Articles

No	Author (ref) publication's year	Design study	Objective(s)	Main outcome(s)
1	(Amrullah <i>et al.</i> , 2019)	Cross sectional study	to clarify the socioeconomic determinants of household food insecurity in Indonesia using individual household data obtained from the 2015 nationwide household socioeconomic and expenditure survey called Survei Sosial Ekonomi Nasional.	The results from the cross-analysis between calorie consumption and share of food expenditure to total household expenditure (Engel coefficient) indicate that 20.8 percent of households were in the "food insecure" category, 21.5 percent in the "lack of food" category, 26.6 percent in the "vulnerable" category and the remaining 31.2 percent in the "food secure" category.
2	(Timmer, 2010)	Review study	Identify the impact of rice prices on the poor, on real wages in rural and urban areas, and on the broader macroeconomic consequences for investments in labor-intensive manufacturing.	The need of "supermarket revolution," which is rapidly changing the basic structure of Indonesia's food marketing system. Within a decade well over half of Indonesia's rice is likely to be sold in supermarkets, thus transferring to the private sector a supply-management role that had historically been a public sector activity
3	(Salim, 2010).	Descriptive study	To identify the factors of food insecurity in Indonesia.	The problem of food insecurity in the country is not necessarily due to the lack of food supplies in the domestic market, but has more to do with the inability of people to access the food that is available. The problem of food access in the country is further heightened by poor infrastructure, which prevents the smooth transportation of affordable food products throughout

				the vast geographical space of the country
4	(Bodamaev and Tuwo, 2020)	Descriptive study	To identify the food insecurity in Indonesia during Covid-19 pandemic.	The Government of Indonesia (Gol) has allocated IDR 405.1 trillion for COVID-19 response measures, including IDR 110 trillion for social protection of the most vulnerable population to prevent food insecurity.
5	(Manurung, 2020)	Descriptive study	To identify solution in preventing food insecurity during Covid-19 pandemic in Indonesia.	The Government should prioritize and limit which food product be substitute by other foreign countries supply, thus, national food security is granted fully at least till the end of 2020.
6	(Widyaningrum <i>et al.</i> , 2020)	Intervention study	To explore the complementary feeding practice and its related factors during the COVID-19 outbreak through an online cross-sectional study of the mothers of children aged 6 to 24 months in Daerah Istimewa Yogyakarta.	The results showed that a child's age ($P = .019$), household food security ($P = .006$), and mother's complementary feeding knowledge ($P = .002$) had an association with complementary feeding practices. We concluded that a child's age, household food security, and mother's complementary feeding knowledge are the determinant factors for appropriate complementary feeding practices during the outbreak.
7	(Perdana <i>et al.</i> , 2020)	Intervention study	discusses an optimization model for handling the impact of the COVID-19 pandemic based on food supply network through regional food hubs (RFHs) under uncertainty.	Regional Food Hub is introduced to connect producers in rural areas and customers in urban areas particularly the location and capacity of RFHs, the food supply network, the sum of maximum food supplies, and minimum logistics cost. This is done via a Multi-Objective Many-to-Many Location-Routing Problem model.

In this scoping review, this study has identified that rice is the most important commodity in Indonesia, especially for the poorest members of society. It is not surprising that, in the short run, the level of rice prices is the single most important determinant of poverty at the household level. The typical Indonesian household gets over half of its food energy from rice, and expends about ten percent of its income procuring it. Poor households allocate 20-25 percent of their total expenditures to rice (Timmer, 2010).

Rice production in the first half of 2020 in Indonesia is estimated to be 13.2% lower than during the same period last year, but it should still exceed domestic demand by 6.4 million tons by the end of June 2020 (Bodamaev and Tuwo, 2020). The lower rice harvest in the main 2020 harvest season sustains the declining trend observed since 2018 (Bodamaev and Tuwo, 2020). It has also been indicated to be an effect of the prolonged drought in 2019, which delayed planting and shifted the

peak harvest period from March to April, as well as the result of crop damage due to floods (Bodamaev and Tuwo, 2020).

Despite an expected surplus in Semester I 2020, there are concerns regarding the sufficiency of domestic rice supply towards the end of the year and early next year, as dry season harvests typically only contribute 35% to annual production (Bodamaev and Tuwo, 2020). If rice production during Semester II decreases compared to 2019 by the same proportion as during Semester I (-13.2%), and assuming a monthly consumption of 2.5 million tons, the rice surplus by the end of Dec 2020 would stand at 3.5 million tons (Bodamaev and Tuwo, 2020). Another estimate by the Coordinating Ministry of Economic Affairs suggests end-of-year rice stocks to reach 4.7 million tons (Bodamaev and Tuwo, 2020). These estimated levels would only cover an additional month of consumption. Hence the Government may need to be ready to cover any potential deficit with timely imports.

However, due to social restriction during the Covid-19's pandemic, the food's distribution face many triggers. Previous studies had revealed that the disruption of food distribution to food security such as the skyrocketing rise in rice prices during the 1997 to 1998 economic crisis has evolved into a multidimensional crisis, has triggered social unrest threatening the economic stability and national stability (Salim, 2010).

Indonesia relies on imports to meet the domestic demand of several commodities, particularly wheat (IDR=100%), garlic (IDR=93.7%), soybean (IDR=72.5%), and sugar (IDR=69.9%) (Bodamaev and Tuwo, 2020). In addition, for three of these four commodities, the imports are derived primarily from a single country. In 2019, China supplied 100% of Indonesia's garlic imports, while the USA and Thailand supplied 94.1% of soybean and 86.5% of sugar imports respectively (Bodamaev and Tuwo, 2020). Due to the COVID-19 pandemic, several countries have imposed limitations on food exports to ensure domestic supplies (Cullen, 2020). Ukraine, the largest wheat exporter to Indonesia in 2019 (3.0 million tons), announced that it would limit wheat exports in the 2019/20 season to 20.2 million tons and might consider imposing a complete ban if deemed necessary (Bodamaev and Tuwo, 2020). Vietnam, which supplied 34.0% of Indonesia's rice imports in 2018 and 7.5% in 2019, had previously implemented a rice export ban on 24 Mar 2020, but then began to alleviate the restriction by allowing the export of 400.000 tons of rice in April 2020 (Bodamaev and Tuwo, 2020). Thailand and Pakistan, Indonesia's largest rice import sources in 2018 and 2019, respectively, have not placed any restriction policy on rice exports (Bodamaev and Tuwo, 2020). In contrast, Thailand, the source of 86.5% of Indonesia's sugar imports in 2019, reported the lowest sugarcane harvest in the past 10 years due to prolonged drought in 2019 (Bodamaev and Tuwo, 2020).

Covid-19 had greater impact on purchasing style of Indonesians. The rise in unemployment and pay-cuts are expected to reduce purchasing power. According to a survey by McKinsey, 55% of consumers worry regarding the impact of COVID-19 on household income and 40% plan to reduce their discretionary spending. In annual terms, the sales of non-essential items such as clothing and entertainment has witnessed a steep decline, by 40.4% and 16.8%, respectively, while sales for food, beverages, and tobacco increased mildly (3.2%) (Bodamaev and Tuwo, 2020).

Reduced operations of traditional markets Most Indonesians prefer to purchase groceries from traditional markets, with the proportion increasing in lower income groups. In 2019, traditional markets supplied 70% of groceries in Indonesia,

followed by mini-markets (23%) and supermarkets (5%) (Amrullah *et al.*, 2019). Social distancing measures have led to reduced operating times for traditional markets and closure of markets which had been found to be hotspots of the COVID-19 spread (Salim, 2010). Many traditional markets suffer from losses in revenues due to a decline in the number of customers (Paslakis, Dimitropoulos and Katzman, 2020).

During the pandemic, some members of the upper- and middle-income groups have shifted to supermarkets and hypermarkets, particularly those in the capital cities. Based on various reports during the pandemic, over 45% of consumers shop more frequently in convenience stores than before (Paslakis, Dimitropoulos and Katzman, 2020). There has been limited information regarding the implications of the pandemic on the ability of lower economic groups to access and choose their food. During Covid 19, there is also an increasing number of online platforms to buy some foods (Baer-Nawrocka and Sadowski, 2019).

Traditional market management bodies in several regions, such as DKI Jakarta, Purbalingga, Palembang, Pontianak, Balikpapan, and Denpasar have utilized social media to arrange home delivery of food items in cooperation with online transportation services (Amrullah *et al.*, 2019). Over 30% of consumers plan to shop for groceries online more often. Online markets, however, still access only a small share of the market, less than 5% (Bodamaev and Tuwo, 2020). As most restaurants are closed due to social distancing measures, there has also been a shift from eating out to take-away, food delivery, and home-made meals. The sales of staples and fresh produce have increased compared to pre-pandemic levels (Paslakis, Dimitropoulos and Katzman, 2020).

There has been a heightened consumer awareness regarding food safety and hygiene, as supply chain disruptions are expected to hamper trade and the distribution of major commodities (Salim, 2010). During a pandemic, consumers tend to prefer home delivery. Farmers who have good means of transportation and communication networks get an increase in income (Manurung, 2020).

Furthermore, the diversification of food consumption, for example, has been observed in a number of relatively poor provinces in Indonesia (Bodamaev and Tuwo, 2020). Local foods that are a source of complex carbohydrates, low on the glycemic index: cassava, sweet potato, potatoes, porang (iles-iles), ganyong, arrowroot, etc. Sources of protein, vitamins and minerals: Fish, beef, goat, chicken, and eggs. Types of green vegetables: Spinach, kale, mauve, sweet potato leaves, Moringa leaves, etc. Local types of fruit: Bananas, mangoes, papayas, oranges, guavas, persimmons, juwet etc.

Disparities in food security increase the complexity of food policy. During the Covid19 Pandemic, farmers must be adequately protected. The Government should support to increase production, productivity and efficiency must be continued price stabilization to maintain purchasing power, an important element of access to food. Changes in technology, climate-smart, modern biotech, precision agriculture, upstream-downstream integrated value chains, marketplaces for price access and stabilization (Manurung, 2020). Investing human capital, including in agriculture and rural areas, to meet the rapidly changing technological changes, as well as to avoid the middle income trap (MIT) (Amrullah *et al.*, 2019)f.

4.2. Limitation of the study

Rapid reviews are a form of knowledge synthesis in which components of the systematic review process are simplified or omitted to produce information in a timely manner. Yet, rapid reviews might be susceptible to biased results as a consequence of streamlining the systematic review process.

5. Conclusions and suggestions

In conclusion, numerous rapid review approaches were identified and few were used consistently in the literature. Food security is clearly an important public health issue for many Indonesians, yet there is insufficient meaningful primary research investigating unique Indonesians food security issues. In a country with vast geographical areas, many rural Indonesia individuals face challenges attaining adequate, safe and culturally appropriate foods. To further understand the causes and consequences of food insecurity in Indonesia, and to increase efforts necessary to promote local food security, future research should use a common tool to directly measure food access and availability across all communities in the country.

Working with and across disciplines (and across arctic borders) will be necessary to aid in the efforts. Examples include working with legislators and other policymakers to write and pass applicable laws to promote traditional food security, developing culturally appropriate nutrition education to promote traditional foods for those receiving food and nutrition assistance and collaborating with circumpolar colleagues to design shared food-related studies that acknowledge and measure the unique contributions of traditional foods to better health and increased food security in Indonesia.

Disclosure statement

The authors have no conflicts of interest to disclose.

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