

Impact of COVID-19: Dietary Consumption Patterns and Family Nutritional Intake

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ABSTRACT

The COVID-19 pandemic has caused various very drastic changes related to the nutritional and economic needs of families in Indonesia. The existence of differences in instant food consumption dominates to cause nutritional intake of nutrients that do not meet the body's needs. This research aims to identify patterns of food consumption and family nutritional intake. This research method uses a quantitative type and the design is survey analytics. The population was 500 people, because of the pandemic red zone area, a limited study sample of 30 respondents was taken with purposive sampling on the head of the family in Ronowijayan Siman Ponorogo. Food consumption patterns and nutritional intake were determined based on interviews with respondents using a 24-hour Recall questionnaire. The research data were analysed using Kendall-Tau with a value of $\alpha > \alpha$ sig value of $0.05 > 0.010$ so that it was stated to have a significant relationship with the value of the coefficient of very weak correlation of consumption patterns with family nutritional intake. Good consumption patterns and nutritional intake can strengthen immunity, indirectly reducing COVID-19 infection transmission for families.

Pandemi COVID-19 menjadikan berbagai perubahan yang sangat drastis terkait kebutuhan nutrisi dan ekonomi keluarga di Indonesia. Adanya perubahan konsumsi makanan instant mendominasi menjadi penyebab asupan gizi nutrisi tidak sesuai kebutuhan tubuh, Riset ini memiliki tujuan untuk mengidentifikasi bagaimana pola dari konsumsi makanan dan asupan gizi keluarga. Metode penelitian ini menggunakan jenis kuantitatif dan desainnya adalah analitik survey. Adapun populasi 500 orang, karena wilayah zona merah pandemi sampel penelitian terbatas 30 responden diambil dengan purposive sampling pada kepala keluarga di Ronowijayan Siman Ponorogo. Pola konsumsi makanan dan Asupan gizi ditentukan berdasarkan wawancara dengan responden menggunakan kuesioner Recall 24-jam, data penelitian di analisa menggunakan Kendall-Tau dengan nilai $\alpha > \alpha$ nilai sig yaitu $0,05 > 0,010$ sehingga dinyatakan memiliki hubungan signifikans dengan nilai koefisien korelasi sangat lemah dari pola konsumsi dengan asupan gizi keluarga. Pola konsumsi dan asupan gizi yang baik dapat memperkuat imun yang secara tidak langsung dapat menekan angka kejadian penularan infeksi Covid-bagi keluarga.

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Introduction

Food consumption patterns are food arrangements that include the type and amount of food ingredients on average per person per day (Mekonnen et al., 2021). Nutritional intake contains macronutrients, micronutrients, and energy, which is part of a food group (Al-Jawaldeh et al., 2020). Food consumption patterns and nutritional intake that are not in accordance with standards will lead to the prevalence of double-burden cases of malnutrition. Issues of consumption patterns and nutritional

status can occur due to various factors such as socioeconomic status, culture, food security, and community environment with wrong habit patterns (Khuri et al., 2022). A high prevalence of stunting, underweight, and anaemia was also attributed to these dietary patterns, especially among children. Additionally, a dual impact of malnutrition was identified both among and within investigations. The dietary intake and nutritional status of refugees are impacted by various factors that occurred both before and after their resettlement, as they make the transition to their host countries. A conceptual model summarizing and presenting these elements—pre-resettlement experiences, resources of the host country, socioeconomic status, acculturation, and food security—was undertaken. (Khamees et al., 2022).

People in Indonesia have adopted a variety of drastically altered lifestyles as a result of the COVID-19 pandemic. The majority of people have to spend more time at home and experience changes in food consumption patterns that are more junk food and instant because it is easy to store in the refrigerator and the long-lasting impact of social restrictions that trigger reduced quality nutritional intake (Unicef et al., 2021). Changes in health conditions make people consume more supplements than natural foods, which worsens the quality of family food (Kristiandi et al., 2021). In this case, of course, food consumption patterns that do not meet nutritional standards can affect the quality of a person's nutrition with family members, where cases like this are the effects of a pandemic (O'Connell et al., 2022). People who become inactive in behaving in fulfilling daily needs have bad habits in accessing fresh and nutritious food. They tend to have new habits in consuming carbohydrates, sugar intake, and snacks (Khamees et al., 2022).

According to World Bank estimates, Indonesia is projected to have a poverty rate ranging between 8.2% and 11.6% in 2020, depending on the severity of the impact of COVID-19 on the economy and the scope of government social assistance programs. Ponorogo is one of the many areas also seriously affected by the COVID-19 outbreak. Based on news and facts on the ground, the affected communities in question are those who have not been covered in assistance programs such as the *Hope Family Program*, as well as *Cashless Food Assistance* for around 15,000 people (Nugraha et al., 2020). Four per cent of families with children have difficulty meeting their nutritional needs, with many consuming lesser portions than usual. (Unicef, 2021).

Indonesia is part of a country that has had three burdens of malnutrition since before the emergence of the pandemic, and even during the pandemic, this problem is part of the main case and has an increasing value of problems from nutritional intake and fulfilment patterns of food consumption, namely cases of underweight and obesity, which is where this case most occurs in toddlers who have an unbalanced height with less weight. In 2019, the World Health Organization explained that Indonesia also has a prevalence of malnutrition of 3.90%, malnutrition of 13.80% and nutrition of more than 3.10% of the number of toddlers, as many as 23,604,923 people (WHO, 2019). Based on Indonesian data from 7 million children with stunting cases. Currently, Indonesia is part of the 5th country in the world with stunting cases. There are more than 2 million children with malnutrition status due to thinness, besides

that almost half of the total pregnant women have cases of anaemia due to nutritional intake and consumption of foods that do not have enough vitamins and minerals (Unicef, 2020).

In addition to nutritional cases in toddlers, nutritional problems in adolescents also have a fairly high percentage, namely 32%, with 3-4 out of 10 Indonesian adolescents experiencing Iron Nutrition Anemia. Iron Nutrition Anemia occurs due to insufficient nutritional intake, especially iron and protein micronutrients. Iron Nutrition Anemia due to a lack of iron micronutrients (Fe) and a lack of protein intake (Mukti et al., 2021). This is reinforced by Dewi (2020), that almost half of the respondents aged 20-22 years rarely consume nutritious food, almost half of the respondents consume nutritious food, and almost half of 108 respondents rarely consume fruit and vegetables every day (Dewi et al., 2020).

Social restrictions that occur in the community during the pandemic have an impact on changing lifestyles and patterns, especially in efforts to procure and provide foodstuffs and consumption patterns. Before the pandemic, people preferred real food ingredients that could be processed immediately because the nutritional levels were still intact, not from processed foodstuffs. But there was a change currently, prefer food that is biased to be stored for a long time and ready-to-eat real food because of limited activities, besides that, it also prefers fast food and processed food such as packaged snacks, packaged foods, packaged drinks in bottles or cans (AIMI, 2020). The implementation of Work from Home (WFH) also has an unhealthy impact on changes in efforts to select food types. Workers who have limitations in preparing food prefer to consume foods that are easier to cook or that are directly eaten easily, namely packaged foods or frozen foods that only need to be heated. The phenomenon of frozen and fast food is indeed increasing because it can last longer and can be processed anytime and anywhere. In addition, this type of food product has different variations and innovations (Fajar, 2020). Part of the changes are the impact of COVID-19 on nutritional intake due to disruptions that occur in the implementation of programs from the government, namely nutrition and health services, for example, Posyandu (Integrated Service Post) activities, where the government reduces Posyandu activities during its operating hours and is even partially closed during the Covid-19 pandemic. Posyandu has become an important part of supplementary feeding programs (for example, fortified biscuits) and dietary supplements for toddlers as well as pregnant women and lactating mothers (Arif et al., 2020). Such activities are one of the government's efforts to fulfil food consumption patterns and nutritional intake even though it can indirectly meet (Zulfa, 2023). Dietary consumption patterns affect nutritional status and health. Good consumption patterns will improve the health status of both individuals and communities. Conversely, poor consumption patterns are risk factors for various nutritional problems such as being underweight, overweight, wasting, obesity, and stunting (Safitri et al., 2017).

The Ponorogo Regency area itself has not had significant data on food consumption patterns and nutritional intake in families during the pandemic. Therefore, there is a need for research related to this phenomenon. In this case, as an urgency from the impact of the Covid-19 pandemic, especially in the Ponorogo regency area, whether it can trigger and affect the quality of the family economy so that it also affects the quality of food consumption patterns and nutritional intake, this needs to be explored

because the Covid-19 pandemic has occurred already 1.5 years ago, of course, it has a negative value for growth and development, especially for pregnant women, infants and toddlers as a welfare effort for mothers and Children in particular who are the spearheads of the welfare and success of the nation and state in the future.

Method

This research has received legality from the ethics committee with No.99/ER/KEPK/2021, this research was a quantitative research with an analytical survey design. Location of Siman Village, Siman District, Ponorogo Regency, July 2021 - September 2021. The population of 500 heads of family, as for the sample of this study, was taken by purposive sampling on the head of the family in Ronowijayan Siman Ponorogo, the reason samples and sampling techniques because during the study, the Ponorogo area was in the red zone of the pandemic, so there were obstacles in meeting the number of respondents so that researchers could collect a number of 30 heads of families as samples for this study. In the data collection technique, food consumption patterns based on the results of information analysis in the form of the type, quantity, and frequency of food ingredients consumed and nutritional intake are measured based on the amount of each nutrient that must be met from the food determined based on an online survey using video calls with respondents using a 24-hour Recall questionnaire about the amount of energy and macronutrients (carbohydrates, fats, and proteins) consumed are calculated from the conversion of daily food intake(Sirajudin et al., 2018). The amount of energy consumed was expressed in units of calories/day. The amounts of macronutrients (carbohydrates, fats, and proteins) consumed were expressed in grams/day. The conversion of food intake was then compared with the *Nutritional Adequacy Rate* or *Recommended Dietary Allowances* (RDA) of energy and macronutrients and multiplied by 100%. The level of energy and nutrition adequacy was then categorised into several groups (WNPG, 2012): deficit (<80% RDA); adequate (80-110% RDA (*Recommended Dietary Allowances*)); and excess (> 110% RDA (*Recommended Dietary Allowances*)). The data that has been collected, then data processing was carried out using analysis The data results are analysed using *Kendall Tau* because it provides a multilevel measure of correlation association levels.

Results

The following was an overview of the Respondents:

Table 1. Characteristics of Respondents

	Demographic Data	Frequency	Percentage
Age	25-30 years old	5	16.7
	36 - 40 years old	5	16.7
	36 - 40 years old	6	20.0
	41-45 years old	4	13.3
	46-50 years old	3	10.0
	51 - 60 years old	3	10.0
	> 61 years old	4	13.3
Gender	Male	28	93.3
	Female	2	6.7

Reference Primary Data 2021

Based on Table 1, it was concluded that the age of respondents who dominated this study was 36

– 40 years, with the gender of the male head of the family.

Table 2. Nutritional Intake (AKG)

	Frequency	Percentage
normal energy, normal protein	22	73.3
normal energy, less protein	3	10.0
less energy, normal protein	2	6.7
less energy, less protein	1	3.3
very less energy, normal protein	2	6.7
Total	30	100.0

Reference Primary Data 2021

Based on the results of the research data above, it shows that the highest number of respondents with good nutritional intake was normal energy and normal protein was 22 respondents, and the least number with less nutritional intake was less energy and protein was less than 1 respondent, where for the size range of energy needs per day was 1500 – 2725 calories/day, protein needs of men 55 g/day and women 45 g/day.

Table 3. Nutrition Types for Food

Parameter	Frequency	Percentage	
Amount of Meals 3x, intake of energy, fat, protein, minerals according to URT and amount according to BB/Kg (Good)	26	86.7	
Amount of Meals < 3x, energy intake, fat, protein, mineral amount according to BB/Kg (Medium)	3	10.0	
Eating < 3x, energy intake, fat, protein, and minerals do not match BB/Kg (Less)	1	3.3	
Types of Carbohydrates	Rice	28	93.3
	Bread	2	6.7
Types of Proteins	chicken meat	6	20.0
	Fish	3	10.0
	Egg	8	26.7
	Fermented Soybean tofu	13	43.3
Types of Fats	Milk	1	3.3
	Meat	4	13.3
	Egg	6	20.0
	Junk food	1	3.3
	Fried Food	18	60.0
Types of Minerals	Plain water	25	83.3
	Tea water	2	6.7
	Coffee water	3	10.0

Reference Primary Data 2021

Table 3, it was known based on the results of the research data above, shows that most respondents have good food consumption patterns where the food assessment method to determine the amount of food consumed and calculate nutrient consumption using the 24-hour recall technique, namely the number of meals 3 times, the food consumed contains energy intake, fat, protein, minerals according to URT (*Household Size*) and the amount according to BB/Kg was 26 respondents. The results of the research data with the least number of respondents were consumption patterns that were lacking with eating < 3x, energy intake, fat, protein, and minerals did not match BB/Kg a total of 1 respondent. Then,

the type of carbohydrate food that respondents predominantly consumed was rice, with the type of tempeh tofu protein food, the type of fat food derived from fried foods, and mineral water.

Table 4. Analysis Results *Kendall Tau*

		Consumption Patterns	Nutritional Intake (AKG)
Consumption Patterns	Correlation Coefficient	1.000	.452**
	Sig. (2-tailed)	.	.010
	N	30	30
Nutritional Intake (AKG)	Correlation Coefficient	.452**	1.000
	Sig. (2-tailed)	.010	.
	N	30	30

Reference Primary Data 2021

Based on the results of processing using the Kendall Tau analysis method with software computer, the results of correlation analysis were obtained between consumption patterns and nutritional intake, correlation analysis if the significance value < 0.05 , then the hypothesis (H_0) was rejected, which means there was a relationship between the variables studied. The results of the analysis between consumption patterns and nutritional intake, namely $0.010 < 0.05$, can be concluded that there was a relationship between consumption pattern variables and nutritional intake with very weak correlation coefficient values.

Discussion

Nutrition problems in Indonesia are increasingly complex, the problem of malnutrition is still high, but on the other hand, the problem of overnutrition is increasing, especially in big cities (Yunitasari et al., 2019). In this study, there was a limitation, namely having the number of respondents who enter the minimum limit because, during the research period, the population and sample areas were red zone areas during the pandemic, so they could not conduct wider research with more samples, so it could be that the data obtained in SPSS data processing became very limited. Based on the results of processing SPSS data using the Kendall Tau analysis method, the results of the correlation analysis between consumption patterns and nutritional intake can be concluded that there was a significant (real) relationship between consumption pattern variables and nutritional intake with weak correlation coefficient values. Consumption of balanced nutrition was needed to increase immunity, keep the body productive, and reduce the risk of contracting infectious diseases, including COVID-19. Balanced nutritional needs can be met by utilizing food ingredients around. One of the impacts of the COVID-19 pandemic was related to food availability, which can affect consumption patterns and balanced nutritional needs (Ulfa & Perdana, 2021).

A regular and regular diet with balanced nutrition will affect the quality of nutritional intake needed for metabolic processes, cell growth processes, cell development processes and blood and oxygen circulation, as well as hormone circulation (Sparrow et al., 2021). Likewise, the body's immune system is also influenced by the quality of nutritional intake, by paying attention to food consumption patterns that contain micronutrients and macronutrients, The process will run optimally. Balanced Nutrition Guidelines have special messages for the public, including washing hands, consuming food

regularly 3 times a day, consuming high protein such as fish and other side dishes and consuming lots of vegetables and fruits. Consume enough drinking water for the body and limit the consumption of snacks and fast food (Agustina et al., 2021). Food consumption is an essential human requirement that has the potential to impact an individual's nutritional status. The quality of one's nutritional status is influenced by food consumption patterns, which encompass the quantity, frequency, and duration of food intake within a specified period. Typically, food consumption patterns are determined by the satisfaction of requirements, which encompass attitudes, beliefs, and food preferences. In addition to knowledge, gender, age, education, and occupation all influence food consumption.

Kristiandi (2021) states that the frequency of the main meal can affect the total daily intake of energy and nutrients (Kristiandi et al., 2021). Nutrition was a basic necessity of life. Eating habits can be influenced by sociological, psychological, and physiological factors. The height of the COVID-19 pandemic status has affected all of that; high rates of spread have led to changes in human behaviour, such as eating habits (Yılmaz et al., 2020). Characteristics of eating activities that individuals do repeatedly or eat each person in meeting their eating needs Diet was said to be good if it contains food sources of energy, sources of building agents and regulators because all these nutrients are needed by the body to maintain the body's metabolic system in its role as a producer of energy, as growth and maintenance of the body as well as brain development and work productivity, and need to be consumed in eating in sufficient quantities according to needs (Nurwulan et al., 2017). A balanced and secure daily diet facilitates the attainment and maintenance of optimal health and nutritional status (Amaliyah et al., 2021). This can be strengthened by the results of the study, that the number of respondents consuming rice as much as 93.3% with the most types of side dishes tempeh tofu as much as 43.3%. Diet and lifestyle modifications can threaten health. Maintaining a balanced nutritional status was very important, especially during a pandemic when the immune system was needed to fight viruses that harm the body. Maintaining food patterns, planning time for meals, amount of food nutrients, and portions were good sources of immune support. The fulfilment of macronutrients, including carbohydrates, proteins, fats and minerals, was the main thing for the body's metabolism with a proportion of carbohydrate of 60%, protein of 15% and fat of 25%, in this case, the composition of these nutrients needs to be consumed regularly and regularly, but must still maintain the amount of nutrients consumed so that there was a balance and does not have excessive levels so that it can be harmful to the health of the body.

In all countries, the food categories with the highest rates of change are frozen food, canned food, as well as cakes and biscuits; among the food categories with lower rates of change are bread and dairy products (Dieny et al., 2020). People shop less frequently during social distancing to meet the need for the consumption of fresh food (Janssen et al., 2021). Although overall food consumption has not changed, there was a shift in food consumption patterns towards staple foods and away from vegetables. Relative price changes can partially explain this shift. However, there are potential explanations that cannot be ruled out (Hirvonen et al., 2021).

The majority of individuals do not appear to have altered their food consumption patterns for major food categories since the onset of the pandemic; however, they do report snacking more frequently since then. This trend is counterbalanced by a significant decrease in fast food consumption (Hirvonen et al., 2021). The results of the study showed that respondents consumed more fried foods as much as 60%. Fried foods contain saturated fats and trans fats, which, if consumed excessively will trigger hypertension, heart attack, and obesity, which can trigger death if the individual contracts the COVID-19 virus, which is a comorbid disease. Based on the results of the research data, it shows that the most number of respondents with good nutritional intake, namely normal energy and normal protein, was 22 respondents, and the least number with less nutritional intake was less energy and protein was less than 1 respondent. Normal energy and protein intake was part of the indicator of good nutritional intake. Good nutritional intake can trigger the immune system to function and work more actively when there are pathogens in the body. Immune activation requires the availability of energy intake, such as carbohydrates, proteins and fats, with the addition of microelements, namely vitamins and minerals. Insufficient nutritional intake in the diet can lead to cases of malnutrition, on the contrary, people whose nutritional intake is excessive will suffer from more nutrition. Nutrition can be known by measuring several parameters, and then the measurement results are compared with standards or references. The problem was basically that the gap between the desired expectations does not correspond to reality. Likewise, nutritional problems are defined as gaps that occur due to the expected nutritional conditions that are not in accordance with the existing nutritional conditions.

Food consumption with excessive and wrong patterns will trigger hypertension, heart attack, and obesity, which can trigger death if the individual contracts the COVID-19 virus, which is a comorbid disease. Based on the results of the research data, it shows that the most number of respondents with good nutritional intake, namely normal energy and normal protein, was 22 respondents, and the least number with less nutritional intake was less energy and protein was less than 1 respondent. Normal energy and protein intake was part of the indicator of good nutritional intake. Good nutritional intake can trigger the immune system to function and work more actively when there are pathogens in the body. Immune activation requires the availability of energy intake, such as carbohydrates, proteins and fats, with the addition of microelements, namely vitamins and minerals. (Janssen et al., 2021). Insufficient nutritional intake in the diet can lead to cases of malnutrition, on the contrary people whose nutritional intake is excessive will suffer from more nutrition. Nutrition can be known by measuring several parameters, and then the measurement results are compared with standards or references. The problem is basically that the gap between the desired expectations does not correspond to reality. Likewise, nutritional problems are defined as gaps that occur due to the expected nutritional conditions that are not in accordance with the existing nutritional conditions (Lima et al., 2021).

Adhering to a well-balanced and secure diet can enhance immune system function and reduce the likelihood of developing chronic and infectious diseases. Try to make variations in the food menu when at home so that the family does not become bored with the same food menu (Taki, 2018). WHO has recommended a balanced nutrition menu during the COVID-19 pandemic. That is, every food menu

must include complete nutrition, which includes macronutrients such as carbohydrates, proteins, and fats, as well as micronutrients from vitamins and minerals. However, to create a strong foundation of endurance (building block), we must focus on protein intake (Akbar, 2020). The assessment of dietary consumption, including the quantification of essential nutrients, minerals, and other compounds, is employed to discern nutritional trends and identify potential issues (Moguel et al., 2019). Intake of micronutrients and macronutrients, as well as total energy intake, vary between men and women. To evaluate the sufficiency of dietary consumption, an analysis was conducted to compare the calorie macronutrient and micronutrient intake of each individual. It is important to note that actual daily nutritional requirements may differ due to factors such as age, gender, level of physical activity, medical history, and others (Ratsavong et al., 2020).

Conclusions

From the results of the study, it can be identified that food consumption patterns are related to nutritional intake for family members. During this pandemic, with a good food consumption pattern, you will get good nutritional intake as well and will be able to achieve a degree of family health.

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