

Original Article

Balance nutrition and vaccination as efforts to prevent COVID-19 in the community: A cross-sectional study

Sausan Syadza¹, Husnah Husnah^{2*}, Sitti Hajar³, Iflan Nauval² and RM Agung Pranata Atmaja⁴

¹Faculty of Medicine, Syiah Kuala University, Banda Aceh, Indonesia; ²Department of Nutrition, Faculty of Medicine, Syiah Kuala University, Banda Aceh, Indonesia; ³Dermatology and Venereology Department, Faculty of Medicine, Syiah Kuala University, Banda Aceh, Indonesia; ⁴Department of Parasitology, School of Medicine, Universitas Syiah Kuala, Banda Aceh, Indonesia.

*Correspondence:

Husnah

Department of Nutrition,
Faculty of Medicine, Syiah
Kuala University, Banda
Aceh, Indonesia.

E-mail address:

dr_husnah@unsyiah.ac.id

Abstract

The increasing cases of COVID-19 are worrying because of its rapid spread and fatality. Efforts are needed to prevent the spread of COVID-19, such as increasing immunity of the body by enforcing vaccination programs, fulfilling balanced nutritional intake, and increasing knowledge about balanced nutrition for the community. This is a descriptive cross-sectional study conducted from August 5 to 10, 2021. A cluster sampling technique was used to recruit respondents and 106 respondents were obtained. Perceptions of balanced nutrition and vaccination were assessed by a self-composed questionnaire while nutritional intake was assessed using the Food Frequency Questionnaire (FFQ). The results of the study showed that 89 respondents (84%) had a good perception of balanced nutrition and 55 respondents (51.9%) had a good perception of vaccinations. Seventy-nine respondents (74.5%) had a good eating habits while 61 respondents (57.5%) had received vaccination. Most participants (84%) chose family/friends as sources of information about nutrition while (94.3%) chose mass media as an important sources of information on vaccination.

Keywords: Balance nutrition, vaccination, prevention, COVID-19

Introduction

According to the World Health Organization, COVID-19 is a communicable disease caused by the latest virus identified in late December 2019 in Wuhan, Hubei, China, which reported 44 cases of severe pneumonia (Handayani et al., 2020). On January 20, 2020, the pathogen was identified by using genetic code, and named the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (Yuliana, 2020).

In Indonesia, the first 2 positive cases of COVID-19 were reported on March 2, 2020. The number of confirmed cases of positive COVID-19 in Indonesia is increasing day by day. On April 17, 2021, there were 1,599,763 confirmed cases of positive COVID-19 with 43,328 deaths in Indonesia (Ministry of Health of the Republic of Indonesia, 2021). On April 19, 2021, there were 10,313 confirmed positive cases of COVID-19 in with 408 deaths in Aceh. Bireuen was the third district/city with the most positive confirmed cases after Banda Aceh and Aceh Besar with a total of 511 confirmed cases (Info Aceh, 2021).

The COVID-19 pandemic has caused many changes to society's daily life. A balanced nutritional intake is very important before, during, and after COVID-19 infection. Balanced nutrition during the COVID-19 pandemic is needed to maintain health and increase body immunity to prevent viral infection, and expectantly able to break the chain of transmission of COVID-19 (Akbar and Aidha, 2020). The persistent high confirmed cases of COVID-19, and the worsen clinical symptoms escalated the concern of the community because of its life-threatening attribute (Chhikara et al., 2020). Reinforcement of the body's immune system can be done by regulating the diet, consuming rich vitamins and minerals food, and also by promoting the consumption of fruits and vegetables containing a high level of anti-oxidants, protein, and amino acids. Balanced nutrition by fulfilling the intake of

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macronutrients, micronutrients, fluids, and nutrients plays a very important role in improving the immunomodulator, antioxidants, anti-inflammatories, and probiotic systems. This also become a reference in the preparation of balanced nutrition protocols during the COVID-19 pandemic (Taslim et al., 2020). According to the Chinese Medical Association for Parenteral and Enteral Nutrition (CMAPE), a balanced nutritional intake is very important for the prevention and therapy of COVID-19 patients as well to reduce the transmission and fatality rate due to COVID-19 infection (Stachowska et al., 2020).

The Ministry of Health of Indonesia urges the entire community to take steps to prevent COVID-19, by washing hands, wearing masks, practicing physical distancing, increasing immunity by fulfilling a balanced nutritional intake, taking supplements, and getting adequate rest (Ministry of Health of the Republic of Indonesia, 2020a). Preventions that have been recommended by the government since the beginning of the pandemic must be complemented by other preventive measures such as vaccination because SARS-CoV-2 will cause long-term consequences on the lungs (Chung et al., 2021). Some further effects that might occur due to COVID-19 are potential to become major challenges for the entire world health system with far-reaching consequences on the global economy due to the uncontrolled spread of the COVID-19 (Liu et al., 2020).

China officially joined the COVID-19 Vaccines Global Access (COVAX) and planned the allocation of the COVID-19 vaccine led by WHO to distribute the COVID-19 vaccine fairly (Zhao et al., 2020). The Indonesian government also took part in this action to provide vaccines for the entire community. The government issued a Presidential Regulation (*Perpres*) of the Republic of Indonesia Number 99 in 2021 regarding the procurement of vaccines and the implementation of vaccinations in the context of dealing with the COVID-19 pandemic (Presidential Regulation, 2021). The government encourages people to get vaccinated, however there are still many arguments for and against it in the community that cause some people to be reluctant to get vaccinated. The rejection in the community is caused by raising concerns about the efficacy of the Sinovac vaccine in Indonesia, which only reached 65% (Rahman, 2021). On the other hand, serious post-immunization adverse events in individuals receiving AstraZeneca's vaccine raised concern about vaccine safety. While the distribution and use of the AstraZeneca COVID-19 vaccine batch CTMAV547 were eventually suspended, the two fatal cases in early May raised public concerns and doubts about vaccination as an effort to prevent infection of COVID-19 (Pramudiarja, 2021).

Methods

A descriptive, cross-sectional study involving 106 respondents from three most populated sub-districts in Bireun - namely Peusangan, Kota Juang, and Jeumpa - was done from 5 to 10 August 2021. A probability sampling method with clustered sampling technique was used to select the respondents. A self-filled online form was deployed to eligible respondents. The inclusion criteria for the respondent were resided in Bireuen; registered in the civil registry; did not have COVID-19 vaccine contraindications; and was able to fill out the research questionnaire (in an online self-filled form). Perceptions of balanced nutrition and vaccination were assessed by self-composed questionnaire while nutritional intake was assessed using the Food Frequency Questionnaire (FFQ).

Results

Data on the characteristics of the respondent's age, place of residence, gender, occupation, and education are presented in Table 1.

Table 1. Background characteristics of respondents.

Characteristic	Frequency (n=106)	Percentage (%)
Age (year)		
17-25	11	10.4
26-35	43	40.6
36-45	31	29.2
46-55	21	19.8
Place of residence		
Jeumpa	28	26.4
Kota Juang	38	35.8
Peusangan	40	37.7
Gender		
Male	55	51.9
Female	51	48.1
Occupation		
College student	6	5.7
Housewife	10	9.4
Farmer/fisherman	3	2.8
Entrepreneur	26	24.5
Government employee	61	57.5
Education		
Elementary school	1	0.9
Middle school	4	3.8
Highschool	40	37.7
College	61	57.5

In the Table 1, majority of the respondents was male (51.9%), aged 26-35 years old (40.6%), resided in Peusangan District (37.7%), worked as government employees (57.5%), and were college graduates (57.5%).

Table 2. Respondents' perceptions about balanced nutrition intake and vaccination as efforts to prevent COVID-19.

Perception	Frequency (n=106)	Percentage (%)
Balance Nutrition Perception		
Good	89	84
Not good	17	16
Vaccination Perception		
Good	55	51.9
Not good	51	48.1

The results in Table 2 show that 89 respondents (84%) had a good perception of balanced nutrition and 55 respondents (51.9%) had a good perception of vaccination as an effort to prevent COVID-19.

Table 3. Distribution of eating habits and vaccinations in respondents.

Distribution	Frequency (n=106)	Percentage (%)
Eating Habits		
Good	79	74.5
Not good	27	25.5
Vaccination		
Yes	61	57.5
No	45	42.5

The results from Table 3 showed that 79 respondents (74.5%) had good eating habits and 61 respondents (57.5%) had been vaccinated.

Table 4. Distribution of vaccination to respondents based on the distribution of vaccination perceptions.

Vaccination Perception		Total	Vaccination
Good	Not good		
43 (70.5)	18 (29.5)	61 (100)	Yes
12 (26.7)	33 (73.3)	45 (100)	No

The results from Table 4 showed that from 61 respondents who had been vaccinated, 43 respondents (70.5%) had a good perception of vaccination. Meanwhile, from 45 respondents who had not been vaccinated, only 12 respondents (26.7%) had a good perception of vaccination as an effort to prevent COVID-19.

Table 5. Sources of Information on Balanced Nutrition Intake and Vaccinations obtained by Respondents during the COVID-19 Pandemic

Source of Information	Balance Nutrition		Vaccination	
	Yes	No	Yes	No
Mass Media	51 (48.1)	55 (51.9)	100 (94.3)	6 (5.7)
Village Officials	39 (36.8)	67 (63.2)	43 (40.6)	63 (59.4)
Health Workers	75 (70.8)	31 (29.2)	65 (79.5)	41 (38.7)
Family/Friends	89 (84)	17 (16)	79 (74.5)	27 (25.5)
No Source of Information	27 (25.5)	79 (74.5)	15 (14.2)	91 (86.8)

The results from Table 5 showed that family/friends were the main source of information about balanced nutrition chosen by most respondents (84%) while mass media was the main source of information about vaccination mentioned by majority of respondents (94.3%).

Discussion

This study revealed that 84.0% of respondents had a good perception toward balanced nutrition as an effort to prevent COVID-19. The majority of respondents admitted that balanced nutrition provides well-maintained stamina, which leads to stronger immunity (Wib and Gusti, 2020). The potential of macronutrients and micronutrients such as omega-3 fatty acids and several water-soluble minerals such as Fe, Zn, and Se to increase immunity is by directly affect the immune response pathway to fight viruses (Sumarni, 2020). A study in Palembang (2021) showed adequate food intake could provide energy for the body, increase concentration in the new normal period, and improve physical conditions, all of which are important factors to prevent the transmission of COVID-19 (Arinda et al., 2021). The Ministry of Health of Indonesia in regards to balanced nutrition during the COVID-19 pandemic explained that one of the keys to fight various kinds of organisms such as viruses is by increasing the immune system by consuming balanced nutrition (Gerakan Masyarakat Hidup Sehat, 2021). Our previous study demonstrated that the immunological cell's response to pathogens to avoid inflammation could be altered by optimal nutrition intake. Free radicals can be prevented by consuming foods that contain micronutrients and antioxidants. The immune system can work well if the balance of nutritional intake consumed is regulated properly by consuming 30% of staple foods, 20% of side dishes, 30% of vegetables, and 20% of fruits (Husnah, 2021). Consumption of balanced nutrition can also reduce the risk of infectious diseases as the nutrients that contained macronutrients and micronutrients can improve immunomodulatory system. Protein intake is needed more than usual as it plays an

important role in the formation of immunoglobulins such as IgG and IgM to fight the virus (Syarifuddin, 2021).

This study showed that 55 respondents (51.9%) had a good perception of vaccination as an effort to prevent COVID-19. This is in line with a study conducted by Zisi Lioni Argista (2021) in South Sumatera which found that 227 respondents (63%) had positive/good perceptions about vaccination as an effort to prevent Covid-19 (Zisi, 2021). Généreux (2020) in his study on 19 countries with 13,426 respondents showed that 71.5% of respondents had good perception of vaccines and wanted to do vaccination even though they still wanted to see evidence of the safety and effectiveness of the COVID-19 vaccine (Liu et al., 2020). The same result was also shown in a study by Tansya Calista and Mohammad Shihab (2021) who conducted research in a company located in Kawasan Industri MM 2100, Cikarang West Java that found more than 73% of employees had good perception and were ready to be vaccinated, while the rest (27%) had not good perception towards vaccination due to their physical condition/underlying disease (Muhammad et al., 2021). A study in Padang found that more than half of the respondents had a good perception and were willing to receive the COVID-19 vaccination. The same study also showed that respondents' willingness was not related to age, employment status, education level, or knowledge level of the respondent's (Vebrieln, 2021). The Ministry of Health of Indonesia, supported by ITAGI, UNICEF, and WHO, conducted a survey on 115,000 respondents from 34 provinces in November 2020, and found that 74% of the respondents were willing to receive vaccinations, which means they had a good perception of vaccination, while respondents who refused to get vaccinated mentioned several reasons such as unsure of its safety or the effectiveness of the COVID-19 vaccine, fear of the side effects and distrust towards the vaccine in general (Ministry of Health of the Republic of Indonesia, 2020b).

Vaccination can form body's immunity. At the time of the first dose of vaccination, the immune system is introduced to the virus, and the content in the vaccine will trigger an immune response and memory of the Sars-Cov2 virus. In the second dose of vaccination, the previously formed immune response will trigger an antibody response that is more effective and stronger than before (Monardo et al., 2021). However, the result of this study was not in line with a research by Akarsu et al. (2021) in Turkey where 51.8% of respondents did not have a good perception of COVID-19 vaccination and decided not to be vaccinated. A contrary result was also found in a survey by the JAKPAT Survey Report in 2020 on 1252 respondents, which showed that 77.1% respondents had a bad perception of the effectiveness of the COVID-19 vaccination to prevent COVID-19 infection (JAKPAT Survey Report, 2020). Moreover, a research by Arumsari et al. (2021) in Semarang found that 54.1% of the public disagreed that COVID-19 vaccination was safe to use and 59.9% of respondents felt COVID-19 vaccination would not reduce the spread of the COVID-19 virus (Arumsari et al., 2021). The public's bad perception of vaccination can be caused by side effects that might occur, as explained by the Centers for Disease Control and Prevention (CDC) that there might be some side effects of vaccination such as aches, pains, swelling, fever, fatigue, headaches, and others. However, the side effects that occur due to COVID-19 vaccination will be disappeared after a few days of vaccination. Although the types of vaccines used in the national immunization program have been confirmed for safety and effectiveness, there is still not a single vaccine that is free from Post-Vaccination Adverse Events (AEFI), such as reactions due to vaccine products, vaccine quality defects, incorrect vaccination procedures, and even vaccines accidental event (Monardo et al., 2021).

Our data showed that the majority of respondents (74.5%) had good eating habits. This study showed that more respondents already had good eating habits, by fulfilling a balanced nutritional intake in the form of various types of food every day. Balanced

nutrition is a composition of food consumed every day, which contains nutrients in the type and amount according to the body's needs (Yuniar, 2019). Everyone needs energy/calories, protein, iron, calcium, zinc, vitamins, and minerals that can be obtained from the food consumed. These needs must be met to carry out daily activities. The energy obtained from food will replace the energy that is already out of one's body (Winarsih, 2018). Some nutritional problems might occur as a result of improper nutritional behaviour such as an imbalance between nutrition and the recommended nutritional adequacy rate (Hafiza et al., 2020). Nutritional problems and infection are two things that have a strong relationship. If a person is malnourished, it will be very easy for infection to occur because of the low immune system. In addition, if a person has been infected, the appetite will decrease. Infectious diseases also consume a lot of calories/energy and protein needed by the body (Nuzul, 2018). Protection of the body to fight the virus can be obtained from consuming a variety of foods and balanced nutrition. Regarding the nutrient composition of meal serving, it is recommended to consume staple foods such as rice and side dishes which contain protein, vitamins, and minerals (Fachruddin et al., 2021).

Moreover, our findings showed that the main source of information on balanced nutrition intake was family/friends. This is in line with a study by Saifah (2017) that showed the importance role of family in nutritional behaviour. Family/friends are important as the source of information about balance nutrition by providing health promotion, and as providers. The family influences individuals knowledge on balanced nutrition because family is a social institution that has the greatest influence on its members. If families often promote health and nutrition, the nutritional behaviour of family members will likely be better (Lestari et al., 2021).

The main public source of information about vaccination during the pandemic is the mass media. This finding is in line with a study by Vinka and Michaele (2021) that showed (42.6%) of the respondents often got information about vaccination through mass media. A study by Anggraini and Saptatia (2021), showed that, 756 respondents (70.56%) agreed on the important role of the mass media as a source of information on the COVID-19 vaccine during the pandemic. The mass media is important in reducing the number of COVID-19 and suppressing the spread of COVID-19 in the UK and Germany by providing information regarding preventive measurements. Vast majority of mass media ensure that they are responsive towards the government and the public in regards to the COVID- 19 pandemic. They also support the government's program to carry out vaccinations and several precautions that have an impact on reducing the spread of COVID-19 in the UK and Germany (Anggraini and Saptatia, 2021). Mass media hold a key in increasing public knowledge regarding information about the COVID-19 pandemic in Indonesia. Research done in Lombok showed mass media is the most frequently accessed source of information by the public to obtain information about COVID-19 and increase their knowledge about the symptoms, modes of transmission, and ways to prevent transmission. Public knowledge is important in controlling and decreasing the number of COVID-19 in Indonesia because knowledge is a very important domain required to form an action (Muhammad and Sastrawan, 2021). Triyaningsih's research in Pamekasan, Madura, found a strong/powerful role of mass media in reducing COVID-19 cases in the cognitive aspect of knowledge of the public who received information as instruction to wear masks, use hand sanitizers, ensure adequate nutritional intake and maintain distance (Triyaningsih, 2020). Era Purike's research (2021) in Bandung explained the important role of the mass media in information and vaccination programs for COVID-19 in Indonesia as there are several factors affecting public trust in vaccinations, such as the lack of reliable information so that people trust fake news (hoaxes) spread around the world. However, mass media might also negatively affect

attitude towards COVID-19 vaccine, for example by spreading the news of side effects after vaccinations that might increase public's fear towards vaccination. Therefore, to minimize the negative impact of the mass media on the COVID-19 pandemic, it requires the cooperation of experts and the government to mobilize the mass media to divert the public's attention to scientific information, which will have reduce the amount of false information circulating on the social media (Purike and Baiti, 2021).

Conclusion

Majority of respondents had a good perception of balance nutrition (84%) and vaccination (51.9%) as efforts to prevent COVID-19. Most respondents had balanced nutrition (74.5%) and had received vaccination (57.5%). The main source of information about balanced nutrition were family/friends (84%) while the main source of information during a pandemic was mass media (94.3%).

Authors' contributions

Conceptualization: SS and HH; Data curation: SS, HH, SH, IN, and RA; Formal analysis: SS and HH; Funding acquisition: SS and HH; Investigation: SS and HH; Methodology: SS and HH; Project administration: HH; Resources: SS; Supervision: HH, SH, IN, and RA; Validation: SS and HH; Writing-original draft preparation: SS and HH; Writing-review and editing: SS and HH.

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Conflict of interest

There is no conflict of interest was reported by the authors.

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