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Impact of Learning from Home on Food Patterns During Covid-19 Pandemic University Students in Papua

Dampak Pembelajaran di Rumah terhadap Kebiasaan Makan Selama Pandemi Covid-19 di Tanah Papua

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ABSTRACT

Background: In December 2019, the COVID-19 outbreak in Wuhan spread to 49 countries, including Indonesia. The government imposed a policy of learning at home for students. Due to activity restrictions, eating habits, and body weight changes have been reported in several countries.

Objectives: This study aimed to see the impact of learning at home on changes in eating habits during the Covid-19 pandemic in Papua.

Methods: The research design was cross-sectional, during June - July 2020, located in the Land of Papua (Papua and West Papua Provinces), Indonesia. Data was collected using Google Forms and shared through the WhatsApp group network. The analysis was carried out using non-parametric tests. The study was performed using non-parametric tests.

Results: This study showed significant changes in food frequency during learning at home, dietary patterns, how to get food, fruit frequency intake, vegetable variations, and fruit variations.

Conclusions: Learning at home during COVID-19 changed eating habits, including food frequency, dietary patterns, and fruit and vegetable variations. Although the variety of fruits and vegetables is declining, both are frequently increasing.

INTRODUCTION

In December 2019, Coronavirus Disease 2019 (COVID-19) was revealed in Wuhan, China, then spread to 49 countries, including Indonesia. At the end of March 2020, Indonesia's case fatality rate (CFR) was 8.9% higher than the original 4%[1], while in June 2020, CFR to 6.0%[2]. The high death rate due to the pandemic has resulted in the government taking preventive measures, including limiting community activities, closing public places to work, and studying from home. Through its circular letter, the Ministry of Education and Culture of Indonesia (known as Kemendikbud) enforces home learning activities for all students[3].

Along with the uncertainty of the proper treatment for Covid-19 during the pandemic, societies are trying various ways to protect themselves from being exposed to this deadly disease. Covid 19 in China changed the lifestyle in the community, including food patterns and how to get food for families or individuals. Research conducted in China shows that sudden changes affect people's psychology. The evolution of food patterns can increase or decrease the daily consumption of a family or individual[4].

Changes in social and cultural conditions lead to changes in people's food patterns. Research in Spanish society shows an increase in the consumption of sweet foods and snacks and a decrease in the consumption of fresh food during the implementation of activity restrictions. Stress and anxiety lead to emotional hunger, which causes people to consume foods high in sugar and fat[5]. Research on college students in Texas found that restrictions during the pandemic had mixed effects on college students. Students with low food security have a low healthy food index score, and it is also revealed that there are students' limitations in buying food[6]. In contrast to the study in Italy, during the lockdown, there was a change in healthy lifestyle during the pandemic, such as smokers deciding to stop smoking and increased physical activity, and the Mediterranean diet pattern[7].

Research in Indonesia occurred during a pandemic of 100 teenagers in Kepanjen Village, Jombang, illustrated an excellent diet with three meals and a balanced menu followed by 2-3 snacks[8]. Research with a larger sample size shows differences in the consumption of male and female students during the pandemic. However, the depiction of student food intake is close to

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the general guidelines for balanced nutrition and the level of awareness of health[9].

Based on Indonesian Basic Health Research (Riskesdas), vegetable consumption in Papua and West Papua is deficient; 7.25% of the population does not consume vegetables, and 57.4% consume <3 Servings of vegetables a day[10]. Papua's main agricultural products are tubers, while local vegetables are green leafy. Some vegetables still exported outside Papua were carrots, broccoli, and cauliflower. Some fruit from Papua was bananas, oranges, and papayas.

Meanwhile, other fruits such as watermelon, melon, grapes, and apples are still exported from outside Papua and are expensive. Al-Faida research conducted on students in the Nabire region of Papua found that 55% only eat two times a day. With the pandemic and various information on how to increase immunity, there will likely be a change in consumption in society[11,12]. This study aimed to see changes in food consumption before and after the pandemic in students undergoing home learning in Papua during the pandemic.

METHODS

This study used a cross-sectional design toward the changes in student food patterns during the pandemic of COVID-19, conducted in June-July 2020 and located in Papua (Including Papua and West Papua Provinces). This research sampling was the total population from all data collected in Google Forms. As many as 417 students from universities in the Papua and West Papua Provinces implementing an online system were selected as respondents. Data was collected using the Google Form application shared through the WhatsApp group network. Eating Frequency, food patterns, and ways of obtaining food were collected using a structured questionnaire. Vegetable frequency, fruit frequency, and variety of vegetables and fruits were collected using a modified Food Frequency Questioner (FFQ). Respondents answered the question through Google Forms without direct meetings or not using virtual meetings. Before the pandemic, food consumption data before the pandemic covid 19 was describe how the food pattern daily before the pandemic. Food consumption data after the pandemic covid 19 described how the food pattern daily after the pandemic breakthrough. All data were collected from Google Forms. The analysis was done using SPSS, the characteristics of data included the identity of the respondent, eating frequency, eating patterns, how to get food, and fruit-vegetables consumption of the sample were analyzed by descriptive analysis, and the data of food patterns, frequency of eating vegetables and fruit was categorical and analyzed a non-parametric test (Mann Whitney). This research obtained permission from the Ethics Committee for Poltekkes Ministry of Health, Jayapura, in April with the number 032/KEP-J/IV/2020.

RESULTS AND DISCUSSION

Table 1 shows that most respondents were female (85.4%); the largest ethnic groups of respondents were Javanese (28.1%) and Sulawesi (27.1%); more than half of the respondents studied at the Associate Degree Diploma-3 (62.4%). Also, more than half of the students (61.6%) lived with their parents, and only about 38.3% stayed in boarding houses.

Table 1. Characteristics of respondents based on age, gender, tribe, education, and dwelling

Variable	n (%)
Age	21.05 ± 4.34
Gender	
Male	61 (14.6)
Female	356 (85.4)
Tribe	
Papua	96 (23.0)
Sumatra	26 (6.2)
Java	117 (28.1)
Sulawesi	113 (27.1)
NTT	24 (5.8)
Maluku	41 (9.8)
Education	
Associate degree D-3	260 (62.4)
Associate degree D-4	74 (17.7
Bachelor degree	67 (16.1)
Professional program	16 (3.8)
Dwelling	
Boarding house	106 (38.3)
Parent house	257 (61.6)

Table 2 shows differences in the frequency of eating before and after the COVID-19 pandemic. Before the pandemic, about 246 students had an eating frequency of 3×/day (59%), which changed to 88 people (34.2%). The diet changed from a complete diet (main dishes (rice), side dishes, vegetables, and fruit) to an incomplete diet. Before the pandemic, about 8.2% of respondents bought food outside the home, down to 1.4%. Before and after the pandemic, the eating habits and how they obtained the food were significantly different.

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Table 2. Food pattern based on eating frequency, food pattern, ways of obtaining food, fruit frequency, vegetable frequency, variety of vegetables, variety of fruits

Variable	Before n (%)	After n (%)	p-value
Eating frequency (a day)			
1×	9 (2.2)	12 (4.7)	<0.001
2×	119 (28.5)	59 (23.0)	
3×	246 (59.0)	88 (34.2)	
>3×	43 (10.3)	98 (38.1)	
Food pattern (a day)			
Main dishes (rice), side dishes, vegetables, fruit	7 (1.7)	5 (1.2)	<0.001
Main dishes (rice), side dishes, fruit/ vegetables	384 (92.1)	327 (78)	
Main dishes (rice), side dishes	8 (1.9)	56 (13.4)	
Main dishes (rice), vegetables	18 (4.3)	29 (7.0)	
Ways of obtaining food			
Self-cooking	369 (88.5)	399 (95.7)	<0.001
Buy	34 (8.2)	6 (1.4)	
Given	1 (0.2)	3 (0.7)	
Delivery order	3 (0.7)	2 (0.5)	
Catering	10 (2.4)	7 (1.7)	
Fruit frequency			
Never	18 (4.3)	28 (6.7)	0.017
1-2×/day	89 (21.3)	122 (29)	
1-2×/week	223 (53.5)	165 (39.6)	
3-4×/week	87 (20.9)	102 (24.5)	
Vegetable frequency			
Never	6 (1.4)	5 (1.2)	0.091
1-2×/day	217 (52.0)	234 (56.1)	
1-2×/week	62 (14.9)	64 (15.3)	
3-4×/week	132 (31.7)	114 (27.3)	
Variety of vegetables			
≥ 6	116 (27.8)	82 (19.7)	0.001
< 6	301 (72.2)	335 (80.3)	
Variety of fruits			
≥ 3	225 (54.0)	164 (39.5)	<0.001
< 3	192 (46.0)	252 (60.4)	

The frequency of consumption of fruits and vegetables has increased. Before the pandemic, consuming fruit 1-2×/day was conducted by 89 students (21.3%), and after the pandemic, it increased to 122 students (29%) with a significant difference. Likewise, consuming vegetable 1-2×/day was about 217 students (52.0%) and increased to 234 students (56.1%), and there was no significant difference before and after the pandemic.

The variety of vegetable consumption among students during the pandemic has decreased. Before the pandemic, 301 students (72.2%) consumed less than six types of vegetables, increasing to 335 students (80.3%). According to this finding, most respondents had consumed vegetables despite being less diverse. Local vegetables such as spinach, kale, mustard greens, and cassava leaves were often consumed. There was a significant difference before and after the pandemic.

The variety of fruit consumption during the pandemic has also decreased. Before the pandemic, 192 students (46.0%) consumed less than three types of fruit; however, it became higher than 252 students (60.4%) after the pandemic. Some fruits often consumed were local such as papaya, oranges, bananas, and watermelons, while fruits imported from outside the region, such as apples, grapes, and pears, were declining. There was a significant difference in the variety of fruit consumption before and after the pandemic.

Characteristics of Respondents

During the pandemic, students carry out learning activities from home. It makes students stressed and bored due to limited activities, and they must continue at home[13]. This research included 61 males, and 356 mainly from the Javanese, Sulawesi, and Papua Tribe. The research did not look at the correlation between gender and food patterns during the pandemic, but some off study showed that women are at lower risk for viral infections than men due to differences in the immunological system related to sex. The X chromosome and female sex hormones are essential in responding to innate and adaptive immunity and the hormone progesterone. Women infected with the COVID-19 virus also have lower symptoms than men[14]. This group argues that it will be more stressful at home while the pandemic is unknown.

Women infected with the COVID-19 virus also have lower symptoms than men[14]. Research on 425 Covid-19 patients showed that 56% were male[4]. The level of education influences health behavior. This research shows that most of the respondent was an Associate degree D-3 (63,4%) and a Bachelor's degree (16,1%),

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Professional program (3,8%). Some studies show that higher education can help people change healthy living behavior and regulate consumption patterns. Higher education encourages change to implement a healthy lifestyle and positively affects food choices and nutritional intake[15,16].

Respondents Food Pattern

COVID-19 has an impact on health status and affects eating patterns. Diet describes the amount, type of food, and frequency consumed at a particular time to maintain the nutritional status and prevent/avoid disease[17]. This study measures eating patterns according to daily eating frequency, the type or composition of the food consumed, and how to obtain food before and after the pandemic in students who conducted home learning. In this study, there was a change in eating patterns from the way of obtaining food, the frequency of eating, the type of food consumed, and the quality of the food consumed during the pandemic[18].

This study showed a change in the frequency of student meals before and after the Covid-19 pandemic. This study showed an increase in eating frequency from 3×/day, but some respondents changed the frequency of eating from 3×/day to 2×/day. It is aligned with a survey by Jenssen et al. (2021) showed that some people decreased, others increased, and others did not change their consumption frequency before and after covid 19 pandemic[19]. In addition, the type of food consumed from a complete meal of main dishes (rice), side dishes, vegetables, and fruit were turned into main dishes (rice), side dishes, and fruit. Factors that affect a person's diet include gender, knowledge, peers, socio-cultural, economic, religious/belief factors, and the environment[20]. The COVID-19 pandemic has resulted in activity restrictions, distance restrictions, campus closures, and restrictions on opening times for shops, supermarkets, and restaurants. It also changes the process of accessing or obtaining food, where to eat, and how to process food[6,18,19]. Research in several countries shows differences in eating habits before and after the pandemic. Changes in eating habits include the consumption of unhealthy foods (unhealthy food), overeating (eating out of control), and snacking between meals (snacking between meals). Feelings of anxiety and boredom cause changes in eating during restrictions on activities outside the home[21,22].

Restrictions on activities outside the home affect learning activities since they have to study from home, then they should cook more of their food at home than buy food outside. It is in line with research conducted on US students; the COVID-19 pandemic has caused more students to prepare their food at home than buy food outside. Students are more comfortable cooking at home because their daily activities are mostly spent on online lectures, and they are also unsure of the safety of food that comes from outside[6]. The frequency and quality of food consumed have changed from 3× or more to 2× a day; this happened in studies in Japan and Spain, where the cause was low family financial problems[5,23].

There was a decrease in food consumption outside the home for health students in Turkey before and after the pandemic from 97.6% to 19.4%[24]. Research[25] states that snacking habits have drastically decreased from 4.36 times/week to 2 times/week after the pandemic. The COVID-19 pandemic has made people care more about a healthy lifestyle and consume more fruit and vegetables. Research in Indonesia shows that Indonesians think about buying fruit from Thailand by looking at the taste, quality, safety, price, and packaging[26].

In research in Denmark and Germany, more than 20% of respondents experienced decreased fruit and vegetable consumption, but this change was insignificant. The study conducted by Izzo (2021) showed an increase in fruit and vegetable consumption, but still below those recommended by dietary guidelines; this study also indicated that limited access to daily grocery shopping provoked a reduction in the consumption of fresh foods, such as fruits and vegetables[27]. The survey by Yilmaz (2020) and Ruiz-Roso (2020) also shows that increased consumption of fruit increased during the COVID-19 pandemic because of the lockdown significant impact on the frequency of accessing supermarkets to buy fresh produce like fruits and vegetables[28,29]. Factors that influence changes in consumption are the frequency of shopping, the risk of being exposed to COVID-19, the distance from their residence to the market, the closing of cafes and restaurants, and decreasing income. Based on Riskesdas in 2018, the fruit and vegetable consumption frequency in Papua was low, but our results indicate a decrease in the variety of fruit and vegetable consumption but an increase in the frequency of fruit and vegetable consumption. It is in line with research in Germany, where the same occurred; people think that fruit and vegetable consumption increases the immune system so that it can reduce the risk of being exposed to Covid -19. The variety of fruit and vegetable consumption in Papua is due to the restrictions on community activities, including shop and market operating hours[19]. Consumption of fruit and vegetables is increasing in Italy; for food safety, they prefer growing fruit and vegetables or buying organic materials to prevent the transmission of COVID-19 (15% of respondents)[7]. Research in Indonesia found that vegetable consumption has increased due to health knowledge about COVID-19, but fruit consumption is still low[9].

The decreasing diversity of fruit and vegetable consumption may be due to the availability and higher prices, especially fruits and vegetables originating outside the region, such as apples, grapes, pears, carrots, and broccoli, due to restrictions on community activities that people switch to local fruits and vegetables. In contrast to research in several developed countries where people turn to ultra-processed and industrial foods, we revealed that most students in Papua land get fresh food to cook themselves. It may also be related to the different status of restrictions; in other countries, a total lockdown is imposed, while in Papua, the restriction of community activities between 06.00-14.00 so that people can still go to traditional markets to buy fresh food ingredients.

CONCLUSIONS

The changes occurred in eating patterns, ways of getting food, frequency of eating, and the variety of fruit and vegetable consumption during the COVID-19

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pandemic. Although there was a decrease in the variety of fruit and vegetable consumption among students, the frequency of consumption increased. Changes in food habits include eating frequency, dish arrangement, and fruit and vegetable consumption. Before covid-19, the highest frequency of eating was 3x a day; after covid-19, the highest frequency was >3x a day. For the diet before covid, most respondents had main dishes (rice), side dishes, and fruit/vegetables; after covid 19, the number decreased. The most significant change occurred in the increased eating patterns with main dishes (rice) and side dishes. The variety of fruit and vegetable consumption dropped, before the pandemic consumption of 3 types of fruit, while after the pandemic <3 Types. Local fruits commonly consumed are papaya, banana, orange, watermelon, and guava. Types of vegetables consumed before the pandemic six types; after the pandemic <6 types, with local vegetables commonly consumed as kale, spinach, cassava leaves, long beans, cabbage, gambas, sweet potato leaves, bitter melon, papaya flowers, and chayote.

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