



Food Consumption Patterns of Male and Female Undergraduate Students in Indonesia During New Normal Implementation of Pandemic Covid-19 Era

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Abstract

AIM: This study aimed to analyze the description of Indonesian undergraduate students' food consumption patterns during the COVID-19 period.

METHODS: The design used was cross-sectional with random sampling technique. The correlation test was Chi-Square and analyzed using univariate. The respondents involved were 17–24 years old with 5924 persons; active undergraduate students. Questionnaires were distributed using Google form.

RESULTS: The results indicated a relationship between gender and major, education level, social status, and funds source ($p = 0.000$). However, sex and residence did not correlate ($p = 0.16$). The same was revealed between gender with consumption patterns, carbohydrates, animal protein, vegetable protein, vegetables, fruit, snacks, water, and supplements.

CONCLUSION: Overall, during the new normal period of pandemic COVID-19 era, student food consumption patterns could be categorized as healthier lifestyle changes. Thus, the undergraduate students are suggested to maintain a diverse and balanced diet to boost their immunity optimally.

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Introduction

Food consumption is a basic human need that can affect a person's nutritional status. Undergraduate students are vulnerable to nutrition since their growth and development period and require sufficient energy to support activities [1]. If the consumption received does not follow the needs, it will disrupt the growth and development that cannot be optimal [2]. The need for suitable food consumption is guided by balanced nutrition [3].

Consumption of proper food can help maintain physical health and support learning abilities and daily activities [4]. During the COVID-19 pandemic, it was necessary to balance food consumption to maintain body immunity [5]. Along with proper and varied food consumption, immunity will be maintained so that students can ward off diseases and other types of infections [6]. However, if already infected, the healing will be quicker [7].

Facing the spread of COVID-19 pandemic and the level of student activity is dense, it is necessary to support suitable food consumption to maintain the endurance and support regular exercise [8]. Suggested that apart from providing healthy food, supplements, and vitamins also recommended maintaining cleanliness by washing hands with soap, wearing masks, and maintaining distance [9].

Covid-19 has caused many changes in various sectors and made restrictions on a large scale so that changes in daily patterns must adjust to the COVID-19 period [9]. The condition in COVID-19 era changed all orders, and all patterns must undergo adjustments, including the world of higher education. Indonesian higher education currently requires students to study at home and stop student activities related to direct physical contact. This situation lets the researchers who observe the food consumption patterns of Indonesian undergraduate students during the COVID-19 period. This study aimed to determine the food consumption

patterns of Indonesian undergraduate students during the COVID-19 era.

Methods

Design, time, and location

This research was conducted in June 2020 with a cross-sectional design. The respondents involved in the study were Indonesian undergraduate students, selected by random sampling technique. They were 17–23 years old, hold an active student status, and willing to fill out a questionnaire by signed out the informed consent available on the Google form. This study was involving 5924 respondents. The data retrieval was carried out by questionnaires distributed through WhatsApp media.

Data processing and analysis

The data processing in this study included coding, entry, cleaning, and analysis. The data collected was processed and analyzed using the Microsoft Excel 2013 computer program. These variables include gender, major, education level, food expenditure, non-food expenditure, social status, source of funds, residence, food frequency, carbohydrates, animal protein, vegetable protein, vegetable, fruit, snacks, water, and supplements. The statistical analysis applied in this study was univariate using SPSS version 21 through Chi-square test.

Results

Characteristic of samples

The sample involved in this study was 5924 people. Characteristically, the sample represented in Table 1 was dominated by women and most of from health major study program (3982 samples). Based on the education level, there were 2529 samples from bachelor degree level, 2169 samples from Diploma 3 (D3) level, and 1226 samples from Diploma 4 (D4) education level. According to social status, mostly sample was in the middle category (4180 people). The source of funds received by the sample during education was from families (5287 people). About 5287 samples during education in the COVID-19 period stayed with their family. It indicated that all Indonesia education during the pandemic underwent a learning process from their respective homes and supported to prevent coronavirus infections.

Table 1: Sample characteristics

Characteristic	Male		Female		Total		p-value
	n	%	n	%	n	%	
Major							
Health	300	7.5	3682	92.5	3982	100	0.000
Non-health	545	28.0	1397	72.0	1942	100	
Education level							
Diploma 3 (D3)	210	9.7	1959	90.3	2169	100	0.000
Diploma 4 (D4)	138	11.2	1088	88.8	1226	100	
Bachelor degree	497	19.7	2032	80.3	2529	100	
Social status							
Lower class	120	19.0	511	81.0	631	100	0.000
Middle class	588	14.1	3592	85.9	4180	100	
Upper class	137	12.0	976	88.0	1113	100	
Source of funds							
Family	678	13.0	4609	87.0	5287	100	0.000
Working	76	35.3	139	64.7	215	100	
Scholarship	73	21.6	266	78.4	339	100	
Loan	2	14.3	12	85.7	14	100	
Personal savings	15	28.8	37	71.2	52	100	
Social assistance	1	5.8	16	94.2	17	100	
Residence							
Boarding house	344	13.8	2147	86.2	2491	100	0.16
Family	406	14.9	2309	85.1	2715	100	
Dormitory	92	13.0	617	87.0	709	100	
others	3	33.3	6	66.7	9	100	

Food consumption pattern

According to Table 2, regarding the food consumption pattern during the COVID-19 pandemic, the frequency of eating among undergraduate students was 2–3 time meals with a sample size of 5364 respondents. It was mostly found in female respondents.

Table 2 shows that the undergraduate students' food consumption patterns for the carbohydrate group frequency were 2–3 times, dominated by 4706 female respondents and 4033 male respondents. The frequency of food consumption by Indonesian undergraduate students originated from animal food was 2–3 times with a total sample of 3872 people and the dominant by the female (3380 respondents). Table 2 shows that the frequency of Indonesian undergraduate students in the vegetable protein food consumption was 2–3 times, 3451 samples. Vegetable protein intake had a significant relationship and was correlated with gender ($p = 0.000$). High consumption of vegetable protein brings various health benefits and is one solution for avoiding animal protein consumption. The advantages of vegetable protein are maintaining body, supporting heart health, maintaining concentration, and other advantages. Based on the data shown in Table 2, the total sample was 3555 people with the frequency of vegetable consumption about 2–3 times and dominated by female respondents (3077 persons).

Table 2 shows that data for the snack consumption pattern of Indonesian undergraduate students were 1 time. It was different with several previous studies; the contribution of snacking one's nutritional fulfillment during adolescence tends to be higher than that of staple foods. Meanwhile, students' most commonly consumed supplements were vitamins with a total sample of 2898 persons, and 1855 samples did not consume any supplement. It indicated that it had become necessary for students to maintain health and keep the body healthy. Some samples that did not take supplements (1855 respondents) could be due to the

Table 2: Food consumption patterns of Indonesian students during the COVID-19 pandemic

Food frequency	Male		Female		Total		p-value
	n	%	n	%	n	%	
Food consumption							
1 time	34	14.2	205	85.8	239	100	0.044
2-3 time	750	14.0	4614	86.0	5364	100	
>3 time	61	19.0	260	81.0	321	100	
Carbohydrate							
1 time	65	11.4	507	88.6	572	100	0.035
2-3 time	673	14.3	4033	85.7	4706	100	
>3 time	107	16.6	539	83.4	646	100	
Animal protein							
0 time	15	28.8	37	71.2	52	100	0.000
1 time	226	18.0	1031	82.0	1257	100	
2-3 time	492	12.7	3380	87.3	3872	100	
>3 time	112	15.1	631	84.9	743	100	
Vegetable protein							
0 time	50	26.5	139	73.5	189	100	0.000
1 time	223	13.7	1404	86.3	1627	100	
2-3 time	469	13.6	2982	86.4	3451	100	
>3 time	103	15.7	554	84.3	657	100	
Vegetables							
0 time	43	23.8	138	76.2	181	100	0.000
1 time	206	16.0	1079	84.0	1285	100	
2-3 time	478	13.4	3077	86.6	3555	100	
>3 time	118	13.1	785	86.9	903	100	
Fruit							
0 time	152	21.2	566	78.8	718	100	0.000
1 time	394	14.1	2395	85.9	2789	100	
2-3 time	243	13.1	1618	86.9	1861	100	
>3 time	56	10.1	500	89.9	556	100	
Snacks							
0 time	181	21.7	655	78.3	836	100	0.000
1 time	356	13.3	2314	86.7	2670	100	
2-3 time	209	13.0	1397	87.0	1606	100	
>3 time	99	12.2	713	87.8	812	100	
Water							
<8 glasses	358	11.8	2676	88.2	3034	100	0.000
>8 glasses	487	16.9	2403	83.1	2890	100	
Supplement							
Vitamins	398	13.7	2500	86.3	2898	100	0.000
Minerals	36	16.4	184	83.6	220	100	
Spice stew	37	8.6	394	91.4	431	100	
Herbs	31	8.8	323	91.2	354	100	
Black seed	3	9.7	28	90.3	31	100	
Infused water	4	4.4	87	95.6	91	100	
No supplement	326	17.6	1529	82.4	1855	100	
Others	10	22.7	34	77.3	44	100	

lack of knowledge about the benefits of supplements and how to use supplements properly.

Discussion

Mokoginta *et al.* explain that a person's health behavior is influenced by the level of education, the better the behavior related to health and well-being [11]. Higher education can help a person make a change in healthy living behavior and regulate consumption patterns. Higher education can achieve a healthy life and plan for a healthy life in the short and long term [11], [12], [13]. Stated that higher education aims to encourage life change by implementing a healthy lifestyle and having a positive attitude toward eating and nutritional intake [9].

The Ministry of Education and Culture of Indonesia issued a letter listed in Number 15 of 2020 and strengthened by Indonesian Minister of Education and Culture's circular, Number 4 of 2020; concerning guidelines for organizing learning from home during the COVID-19 pandemic. Hence, breaking the Covid-19 chain by not

doing direct learning. The appeal made by the minister is also responded directly by all universities throughout Indonesia by instructing all learning process activities to be carried out at home. However, the relearning process can be carried out if the higher education area zone is included in the green zone category by establishing a right and correct health protocol.

Food consumption patterns are usually carried out in fulfilling needs, including attitudes, beliefs, and food choices [10]. The factors influencing food consumption are gender, age, education, occupation, knowledge, and taboos [14]. When viewed from the guidelines for balanced dietary nutrition, the recommended frequency of meals is appropriate. It is also supported by Supariasa [15], who explained that the frequency of main meals could affect the total intake of daily energy and nutrients.

Recommends that proper food includes balanced nutrition such as carbohydrates, protein, fat, vitamins, and minerals [9]. Hence, a balanced nutritional pattern can create a robust immune foundation. Rhaisa *et al.* [16] revealed that staple foods containing carbohydrates are often consumed and have been part of Indonesia's culture for a long time. Carbohydrates are one of the primary sources of energy for the body. Carbohydrate is also part of the fulfillment of balanced nutrition and physical movement and for concentrating while studying [11].

Bogor states that Indonesian people have experienced an increase in animal food consumption of 32.11% [17]. The importance of animal food as a source of increasing body immunity [12]. Animal food is a food source that contains protein and function as a building block and is needed during growth. Besides, protein can help maintain body tissues and replace damaged cells [6].

Protein is a macronutrient needed by the body in large quantities [10], [13]. Protein intake in an inappropriate amount will have detrimental effects on the body's health [14]. The frequency level of student food consumption is categorized well [9]. The large number of samples consumes vegetables about 2-3 times. The importance of the level of student knowledge about health during the Covid-19 pandemic, a global problem and included non-natural disasters. By consuming enough vegetables to help and maintain normal health in the body because vegetables are one of the intakes that can maintain the balance of the body and complement and prevent the risk of other non-communicable diseases [15]. For fruit food consumption, the frequency of consumption was 1 time. Musyabiq *et al.* [18] and Viau [19] showed the same data; Indonesian people's fruit consumption is still low, with an average of 83.64%. Based on Llanaj *et al.* [20], the level of fruit availability is sufficient after rice and grain. Another thing that makes people who lack consumption of fruit is that fruit is not compulsory food for consumption.

Aulia et al. [21] in her research explained that >10% of energy is from snacks and >5 times a week and it is $\times 7$ the risk of obesity. Factors affecting the frequency of snacks made by undergraduate students in this study were due to the limited availability and access to snacks since the pandemic COVID-19. Besides, students also had an adequate level of knowledge of the information received.

Furthermore, students' frequency of drinking during the COVID-19 pandemic is <8 glasses (3034). Briawan et al. [22] explained in their research that most adolescents 15–24 years had not met their fluid needs according to the recommendation to drink eight glasses of water per day. Students' lack of drinking water frequency is because teenagers currently only consume water when thirsty [16]. The impact of lack of fluids on the body is fatigue and makes the body weak and loses focus and lowers the body's metabolic conditions [22]. However, consuming nutritious food with proper handling will provide more health benefits for the body [17]. Another consideration for many who do not take supplements is knowing the supplement's benefits [18].

Conclusion

Undergraduate students' consumption pattern during the COVID-19 pandemic was categorized as sufficient and close to the general guidelines for balanced nutrition. The level of undergraduate student awareness of health during the COVID-19 pandemic was excellent. The frequency of eating is in the good category because it is done 2-3 times (Table 2). Food consumption frequency was the same for macronutrient food source groups such as carbohydrates, animal and vegetable protein, and several other food groups. However, still many students did not take any supplement.

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