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NUTRITION SECURITY AMONG UNIVERSITY STUDENTS DURING COVID-19 COMMUNITY ACTIVITY RESTRICTION: A CROSS-SECTIONAL STUDY IN SEMARANG, INDONESIA

Ketahanan Gizi Mahasiswa Selama Pembatasan Aktivitas Masyarakat COVID-19: Studi Cross-Sectional di Semarang, Indonesia

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ABSTRACT

The COVID-19 pandemic has had a significant impact on various aspects of human life, including health. In Indonesia, many students in Semarang have had to adapt to online learning and make significant changes to their lifestyles due to community activity restrictions. This adjustment to their lifestyle may have affected their nutritional adequacy and jeopardized their nutrition security. This study aims to determine the nutrition security status of university students during the COVID-19 pandemic's community activity restriction. The research employs a cross-sectional design, and the Modified Semi-Food Frequency Questionnaire (Semi-FFQ) is used as the research tool. Data analysis was conducted using univariate analysis (frequency distribution) and bivariate analysis (Spearman's rank correlation test). The study found that 81.12 percent of respondents had adequate food supplies during community activity restriction, and 39.2 percent of students relied on contemporary or traditional markets as their primary food source. Furthermore, 76 percent of students preferred consuming fried foods. The data analysis showed a weak negative correlation between community activity restriction and nutrition security proxies such as food storage availability (p=-0.071), appetite (p=-0.026), and food hygiene adherence (p=-0.018). However, all p-values were greater than 0.05, indicating no statistically significant link. The study concluded that there was no significant association between community activity restriction and nutrition security among university students in Semarang. Interventions are needed to enhance university students' nutrition and food choices, even amid community activity restrictions. This study's implications could be far-reaching in enhancing nutrition security among university students.

Keywords: nutrition security, university students, community activity restriction, COVID-19

ABSTRAK

Pandemi COVID-19 telah memberikan dampak yang signifikan terhadap berbagai aspek kehidupan manusia, termasuk kesehatan. Situasi pandemi memaksa banyak pelajar di Indonesia, termasuk di kota Semarang, untuk melakukan kegiatan belajar daring dan mengubah gaya hidup secara signifikan, Perubahan gaya hidup ini dapat mempengaruhi kecukupan asupan gizi siswa dan menurunkan ketahanan gizinya. Penelitian ini bertujuan untuk untuk mengetahui pola konsumsi makanan mahasiswa pada masa pandemi COVID-19. Metode penelitian ini menggunakan desain penelitian cross sectional. Instrumen penelitian yang digunakan yaitu Modified Semi *Food Frequency Questionnaire* (Semi-FFQ). Analisis data menggunakan analisis univariat (distribusi frekuensi), dan analisis bivariat (uji korelasi rank Spearman).Hasil penelitian ini diketahui bahwa selama pembatasan aktivitas masyarakat: 81,12 persen responden memiliki persediaan makanan yang cukup, 39,2 persen mahasiswa mengandalkan pasar modern atau tradisional sebagai sumber makanan utama, 76 persen mahasiswa menyukai pemanfaatan makanan dengan metode pengolahan digoreng. Keanekaragaman pola konsumsi mahasiswa mayoritas mengonsumsi daging ayam (74%), telur ayam (73%), wortel (70%), tempe (67%), dan tahu (66%). Hasil analisis data dihasilkan pembatasan aktivitas masyarakat memiliki korelasi negatif yang lemah dengan ketersediaan penyimpanan makanan (p=-0,071), nafsu makan (p=-0,026), dan kepatuhan terhadap kebersihan makanan (p=0,018). Namun, tidak ada korelasi yang signifikan secara statistik, karena semua nilai p lebih besar dari 0,05. Kesimpulan penelitian ini tidak terdapat hubungan yang siginifikan antara pembatasan aktivitas masyarakat dengan ketersediaan penyimpanan makanan, nafsu makan, dan kepatuhan terhadap kebersihan makanan. Dalam penelitian ini berpotensi memiliki implikasi yang signifikan untuk mempromosikan ketahanan gizi di kalangan mahasiswa.

Kata kunci: ketahanan gizi, mahasiswa, pembatasan aktivitas masyarakat, COVID-19

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INTRODUCTION

University students are a prone to malnutrition due to their transitional period from adolescence to adulthood and their need for high mental activity, such as pursuing higher education. They require a sufficient amount of nutrients to meet the demands of their academic and personal lives. Therefore, it is crucial to evaluate their food intake to identify any potential nutrient deficiencies or imbalances. This condition makes students more susceptible to various health problems, including malnutrition. Malnutrition in students can affect their health, including decreasing their immune system and increasing the risk of various infectious diseases, including COVID-19.[1]

The COVID-19 pandemic has had a significant impact on various aspects of human life, including health. The pandemic situation has forced many students in Indonesia, including in the city of Semarang, to engage in online learning activities and significantly alter their lifestyles. The government's implementation of community activity restrictions to slow down the spread of the virus has made life for students even more challenging.[2] Most students have returned to their hometown, but some students have been unable to return home due to government restrictions and are trapped in their boarding houses. Additionally, the closure of some food stalls has made it difficult for these students to access food, which is affecting their nutrition security.[3,4]

The Semarang City Government has enacted Mayor Regulation No. 28 of 2020 concerning Guidelines for Implementing Community Activity Restrictions in the Acceleration of Handling Corona Virus Disease 2019 (COVID-19) in Semarang City on April 24, 2020. This policy has forced many students to change their lifestyles and engage in online learning activities. This change in lifestyle can affect students' adequate intake of nutrients and decrease their nutritional resilience. Therefore, research is needed to determine the extent to which community activity restrictions affect students' nutrient intake adequacy in Semarang City.

This study can provide better insights into the nutritional status of students during the COVID-19 pandemic and the impact of community activity restrictions on their nutrient intake adequacy. Furthermore, the results of this study can serve as a basis for relevant parties, such as universities and the government, in designing appropriate and effective nutritional intervention programs to address malnutrition problems in students post-COVID-19. Thus, this research can provide significant benefits for the health and well-being of students and the general public by understanding the effect of pandemic on nutrition security.

Food Security during the COVID-19 Pandemic

In an effort to develop quality human resources, one of the basic components that must be fulfilled is food. Food is the most basic human need, and its fulfillment is regulated by law. Based on Law Number 18 of 2012, "food" is defined as something that originates from sources of agricultural products, plantations, fisheries, animal husbandry, forestry, and waters that can be processed or cannot be processed and used as food or drinks for human consumption, including food additives, food raw materials, and other materials used in the process of preparation for food and beverage processing.

Food security is the condition of sufficient food availability for every individual at any time. Based on Government Regulation Number 17 of 2015, food security is the condition of fulfilling the availability of food in sufficient quantities that is of good quality, safe, nutritious, equitable, and affordable and does not conflict with people's beliefs and culture to live a healthy, active, and productive life in a sustainable manner. [5]

The existence of the COVID-19 pandemic has had a large-scale impact on food security and individual food crises, one of which is in Indonesia. Especially when the PSBB (Large-Scale Social Restrictions) policy was implemented in several areas, people were asked to reduce physical contact and carry out all activities mostly online and in limited ways. In this condition, food security will be stable when food availability is adequate (quantity, quality, safety, and socio-cultural acceptability) and can be used and accessed by everyone to live a healthy and happy life.[6]

Food security during COVID-19 Pandemics play an important role in promoting public health. In achieving food security, there are three important aspects with indicators in them that need to be considered in order to achieve more stable food security, including: [7]

1. Aspects of Food Availability by considering the indicator of the ratio of normative consumption per capita to food production
2. Access to Food Accessibility by considering indicators of the percentage of people living below the poverty line who have access to food, the percentage of households with a proportion of food expenditure >65 percent of total expenditure, and the percentage of households without access to electricity.
3. Utilization and consumption of food, taking into account the indicators of the average length of schooling for girls >15 years; the percentage of households without access to clean water; the ratio of population per health worker to the density level; the percentage of toddlers with below-standard height (stunting); and the sickness rate.

The aspect of food availability in food security is directed at increasing domestic products with commodities such as rice, corn, meat, and soybeans. Food utilization can be seen in the quantity and quality that must be met in order for each individual to live a healthier and more productive life[8]. According to Suryana, the aspect of food utilization is a subsystem of food security that is influenced by purchasing power, tastes, knowledge and awareness of community nutrition, and the availability of food itself. so that in this case, the aspect of food utilization is no less important than the two previous aspects.[9]

In their research entitled "Impact of COVID-19 on Food Security in the Caribbean," they explained that the COVID-19 pandemic had an impact on food availability in the Caribbean, such as decreased purchases of meat, fish, fruit, chicken, and vegetables, while consumption of rice and eggs increased. Although many of these dietary changes have been driven by changes in price and availability, the nutritional implications are still important. Reducing food intake from animals is a concern for the body's intake of animal protein. In addition, a decrease in consumption of vegetables and fruit, if prolonged, will cause a source of supplying antioxidants from food in the effort to recover from COVID-19 to be hampered.[10]

There are several proposed strategies and resolutions related to food security during the COVID-19 pandemic to fulfill nutrition in the community so that it can increase, which are detailed as follows:[11]

1. Availability of food: construction of food barns to be used as reserves for food stocks; diversification of food within the scope of fulfilling carbohydrates; increasing the quantity of food through imported and domestic supplies.
2. Access to food: massively increasing the food supply chain and reducing food prices so that they are affordable for people with middle-to-lower incomes.
3. Utilization of food: increasing the utilization of agricultural land in supporting food availability and guaranteeing the quality of food circulating in the community, including aspects of safety, hygiene, and nutritional content.

The Interrelationship between Nutrition security and Food Security

Nutrition security and food security are two distinct but interconnected concepts. In this case, nutrition security is a condition in which everyone can consume food in sufficient quantity and quality at any time, with a variety, taking into account the nutritional content and safety of adequate environmental sanitation to meet food needs in support of an active and healthy life, as well as adequate nutritional status.[12]

According to the Food Agricultural Organization (FAO) there has been a refinement of the concept of food security into food security and nutrition. The definition of food security and nutrition is an embodiment of food security that is not only oriented towards providing food in sufficient quantity and quality for the community but also accompanied by the effectiveness of food utilization to create a good nutritional status for each individual. This scope also pays attention to optimizing the use of food supported by environmental sanitation and good hygiene so that people are protected from infectious diseases that can interfere with growth, development, and health.[13]

When talking about nutrition, the quantity and quality of food consumed determine a

person's nutrition security, while the absorption of nutrients in each person's body is different and is influenced by a person's physical condition.

Therefore, in order to achieve optimal nutrition security while supporting a healthy, active, and productive life, it is necessary to fulfill a variety of food consumption patterns that are nutritionally balanced and safe (B2SA).[14]

The Impact of a Pandemic on Student Food Consumption

Students are one of the groups affected by COVID-19 since the rules for studying from home were enforced following the work-from-home rules, or, in other words, the learning system is implemented online. Sociologically, psychologically, and physiologically, this change in the learning system is prone to stressing students and can change their eating behavior. This is similar to the decrease in consumption due to the habit of buying food, drinks, and snacks outside the home directly due to limited access to food during the COVID-19 period, so that new habits make cooking at home more frequent.[15]

Based on research conducted by Ashari, there were significant differences in student food security during the CO-19 pandemic. This was explained by saying that in the consumption of vegetables and fruit during the pandemic, students had sufficient or good availability of vegetables and fruit, so that this affected the consumption of vegetables and fruit every day. The availability of vegetables and fruit at home has a major influence on student vegetable and fruit consumption because many students say that if vegetables and fruit are not available at home, they do not consume them.[16]

METHODS

The study was conducted in May 2020, during the period of social distancing in Semarang City, with a sample size of 197 university students who resided in the city. The purpose of this study was to determine the food consumption patterns of university students during the COVID-19 pandemic using a Modified Semi Food Frequency Questionnaire (Semi-FFQ) administered through Google Form. A cross-sectional food consumption survey method was employed to assess the adequacy of food intake and nutrient intake at the group, household, and individual levels.

The Semi-FFQ is a qualitative online method of measuring food frequency that describes the frequency of consumption per day, week, or month[17]. The questionnaire included aspects of food availability, food accessibility, and food utilization[18]. The food availability questions were designed to determine changes in the students' food storage. The food intake questions asked the students to choose among the types of carbohydrates, animal protein, plant protein, vegetables, and fruits, and their respective eating frequencies (daily, weekly, monthly, and yearly/ never). The food utilization questions were used to determine how the students mostly prepared their food (e.g., fried, boiled, baked, grilled, and steamed), any changes in their appetite, and their adherence to food hygiene practices. The questionnaire comprised a total of 38 items. The researchers also inquired about changes in food availability that occurred during the COVID-19 pandemic.

In this research, the data analysis involved two types of statistical analysis: univariate analysis and bivariate analysis. Univariate analysis is a statistical method used to describe the characteristics of the variables included in the study, such as frequency, mean, standard deviation, and minimum and maximum values. Bivariate analysis, on the other hand, is a statistical method that examines the relationship between two variables. In this study, the bivariate analysis was conducted using the Spearman rank correlation test.[19]

The Spearman rank correlation test is a non-parametric statistical method used to measure the strength and direction of the relationship between two variables. It is used to determine whether there is a significant association between two variables that are not normally distributed or where the relationship is not linear. The Spearman rank correlation test involves assigning ranks to the variables and then calculating the correlation coefficient based on the ranks. The resulting coefficient ranges from -1 to +1, where a coefficient of -1 indicates a perfect negative correlation, a coefficient of +1 indicates a perfect positive correlation, and a coefficient of 0 indicates no correlation between the variables. The significance of the correlation

coefficient is tested using a p-value, where a p-than 0.05 indicates a significant correlation between the variables.[19,20]

The results of the food consumption survey using Semi-FFQ provided preliminary information regarding the possibility of nutritional deficiencies among students and the factors influencing food consumption during the early phase of social distancing measures.[21] Specifically, the researcher assessed three aspects of food security: food availability, food accessibility, and food utilization.[22] The findings of this study can serve as a basis for future research on food security among university students during the COVID-19 pandemic.

RESULT

Demographic Characteristic

Table 1 presents the demographic characteristics of the university students who participated in this study. The majority of the participants were female, accounting for 87.82 percent (n=173) of the total sample, while male students only accounted for 11.73 percent (n=23). All participants were enrolled in undergraduate programs, and no students from vocational programs were included. Among the universities, 65.31 percent (n=129) of the students came from Islamic universities, while 34.69 percent (n=68) came from regular universities. Regarding the stage of studies, most of the participants were sophomores (39.80%, n=78) and juniors (29.08%, n=57), while the remaining participants were freshmen (26.53%, n=52) and seniors (4.59%, n=9). The majority of the participants, accounting for 91.84 percent (n=180) of the total sample, were staying in their hometowns during the restriction. Only a small number of participants, 8.16 percent (n=16), were staying in boarding houses.

Food Availability of The University Students

In this study, food storage availability is used as a proxy for food availability. Food storage availability is defined as the availability of a variety of foods stored at home or in other places that are easily accessible for consumption. The importance of Table 4 is that it provides information on the change in food storage availability during the community activity restrictions.The table shows that 81.12 percent value of less of the participants reported that they had enough food stored during the restrictions, indicating a high level of food storage availability.

Food Accessibility of The University Students

Table 3 presents the daily food acquisition methods used by university students during the community activity restriction period. The most of the students, 39.29 percent (n=77) obtained their food from the modern or traditional market. The second most popular method was buying from mobile vendors, accounting for 32.65 percent (n=64) of the total sample. Homegrown produce, such as vegetables grown in the students' own gardens, accounted for 15.31 percent (n=30) of food acquisition methods, while only 6.63 percent (n=13) of students purchased food from small food stalls around their homes. Additionally, only 5.61 percent (n=11) of students acquired their food from online marketplaces. It is indicating that many of the students relied on modern or traditional market as their primary source of food during the community activity restriction. This suggests that students had relatively good access to food in terms of food accessibility.

Food Utilization of The University Students

Table 4 provides information on the favorite food processing methods utilized by university students during community activity restrictions, categorized by food type. The table displays the percentage of students who preferred different food processing methods such as frying, boiling, baking, grilling, steaming, stir-frying, eating raw, and other methods.

The food categories are divided into carbohydrates, animal protein, plant protein, vegetables, and fruits. For each food category, the table shows the percentage of students who preferred each food processing method. For carbohydrates, the most preferred food processing method was frying (41%), followed by steaming (28%), boiling (20%), baking (8%), and others (0%). For animal protein, most students preferred fried food (76%), while a small percentage preferred other method such as boiled, baked, grilled, or steamed. Similarly, for plant protein, the most preferred method was

frying (74%), followed by stir-frying (6%), and other methods. For vegetables, the most preferred food processing method was boiling (41%), followed by stir-frying (39%), and other methods. For fruits, the most popular food processing method was eating raw (77%), followed by other methods (15%), while only a small percentage of students preferred fried or boiled fruits.

Table 1

Demographic Characteristic of The University Students

	n (196)	%
Sex		
Male	23	11.73%
Female	173	88.27%
Study Levels		
Vocational Program	0	0%
Undergraduate Program	196	100%
University Type		
Islamic Universities	128	65.31%
Regular Universities	68	34.69%
Stages of the Studies		
Freshman	52	26.53%
Sophomores	78	39.80%
Juniors	57	29.08%
Seniors	9	4.59%
Location during Community Activity Restriction		
Hometown	180	91,84%
Boarding Houses	16	8,16%

Credits: Research Data

Table 2

Food storage availability of the university students during community activity restrictions

	n	%
Adequate	159	81,12%
Inadequate	35	17,86%
Excessive	2	1,02%
Total	196	100%

Credits: Research Data

Table 3

Daily food acquisition methods of the university students during community activity restrictions

	n (196)	%
Homegrown produce	30	15.31
Buying from mobile carts	64	32.65
Given by Neighbor	1	0.51
Buying from modern or traditional market	77	39.29
Buying from online marketplace	11	5.61
Buying from small food stall around the house	13	6.63

Credits: Research Data

Table 4

Favorite food processing methods of the university students during community activity restriction

	Fried	Boiled	Baked	Grilled	Steamed	Stir Fried	Raw	Other
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Carbohydrates	80 (41%)	39 (20%)	16 (8%)	6 (3%)	55 (28%)	0 (0%)	0 (0%)	0 (0%)
Animal Protein	148 (76%)	7 (4%)	8 (4%)	4 (2%)	18 (9%)	11 (6%)	0 (0%)	0 (0%)
Plant Protein	146 (74%)	12 (6%)	9 (5%)	5 (3%)	12 (6%)	12 (6%)	0 (0%)	0 (0%)
Vegetable	17 (9%)	81 (41%)	0 (0%)	0 (0%)	6 (3%)	77 (39%)	4 (2%)	11 (6%)
Fruit	11 (6%)	2 (1%)	0 (0%)	0 (0%)	3 (2%)	0 (0%)	150 (77%)	30 (15%)

Credits: Research Data

Dietary Diversity of The University Students

Table 5 shows the frequency of food intake among university students categorized into daily, weekly, monthly, and yearly/never consumed. The table presents ten of the most frequently consumed food items among university students, consisting of only ten top choices for each category out of a total of 107 food options. The most frequently consumed food on a daily basis was rice (89%), followed by tempeh (28%), tea (24%), tofu (21%), and chicken eggs (17%). On a weekly basis, the most consumed foods are chicken meat (74%), chicken eggs (73%), carrot (70%), tempeh (67%), and tofu (66%). On a monthly basis, the most consumed foods were instant noodles (42%), beans (42%), beef (41%), squid (41%), and potato (39%). The foods that were rarely consumed or never consumed are pork (99%), beef kidney (97%), ham (96%), brain (94%), cow intestines (94%), beef liver (90%), cassava leaves (89%), eel (87%), brown rice (87%), and dried fruits (85%).

Correlation of the Community Activity Restriction and Nutrition Security

Table 6 presents the results of Spearman's correlation coefficient analysis to assess the relationship between community activity restriction and food storage availability, appetite, and adherence to food hygiene among university students. The table shows the correlation coefficients for each pair of variables, where a negative correlation indicates an inverse relationship between the variables. The findings indicate that community activity restriction has a weak negative correlation with food storage availability (-0.071), appetite (-0.026), and adherence to food hygiene (-0.018). However, none of the correlations are statistically significant, as all of the p-values are greater than 0.05.

Table 5

The frequency of food intake among university students categorized as daily, weekly, monthly, yearlyor never consumed.

Daily		Weekly		Monthly		Yearly/ Never	
	n (%)		n (%)		n (%)		n (%)
Rice	175 (89%)	Chicken meat	145 (74%)	Instant noodles	83 (42%)	Pork	194 (99%)
Tempeh	54 (28%)	Chicken eggs	144 (73%)	Beans	82 (42%)	Beef Kidney	190 (97%)
Tea	48 (24%)	Carrot	137 (70%)	Beef	80 (41%)	Ham	189 (96%)
Tofu	41 (21%)	Tempeh	131 (67%)	Squid	80 (41%)	Brain	185 (94%)
Chicken eggs	33 (17%)	Tofu	129 (66%)	Potato	76 (39%)	Cow intestines	184 (94%)
Dates	28 (14%)	Banana	125 (64%)	Apple	76 (39%)	Beef liver	177 (90%)
Chicken meat	25 (13%)	Spinach	120 (61%)	Corn	74 (38%)	Cassava leaves	174 (89%)
Tomato	19 (10%)	Chicken skin	113 (58%)	Rice noodles	73 (37%)	Eel	170 (87%)
Carrot	18 (9%)	Meatball	110 (56%)	Dry salted fish	72 (37%)	Brown rice	170 (87%)
Chicken egg Yolk	16 (8%)	Tomato	109 (56%)	Peanuts	71 (36%)	Dried fruits	166 (85%)

n = number of university students
%= percentage of university students
Credits: Research Data

Table 6

Spearman's correlation coefficient for assessing relation between community activity restriction and food storage availability, appetite, and adherence to food hygiene

	Food Storage Availability	Appetite	Adherence to Food Hygiene
Community Activity Restriction	-0.071 (p = 0.807)	-0.026 (p = 0.716)	-0.018 (p = 0.322)

Statistically significant if $p < 0.05$
Credits: Research Data

DISCUSSION

Demographic Characteristic

The demographic characteristics of the university students in this study were collected to provide a comprehensive overview of the sample. The participants in this study consisted of both male and female students, who were all enrolled in undergraduate programs at universities in Semarang City. The sample included students from both Islamic universities and regular universities. In terms of academic year, the sample was composed of students from different stages of their undergraduate studies, including freshmen, sophomores, juniors, and seniors. This information provides insight into the living arrangements of participants and can aid in understanding the potential impact of the community activity restriction on their access to food and nutrition security. Overall, these demographic characteristics are essential to understanding the study sample and evaluating nutrition security among university students. In this study, there is information provides insight into the living arrangements of participants and can aid in understanding the potential impact of the community activity restriction on their access to food and nutrition security. Overall, these demographic characteristics are essential to understanding the study sample and evaluating nutrition security among university students.[23]

Food Availability of The University Students

Food availability is an essential component of nutrition security. It refers to the sufficient supply and access to various types of foods that meet the dietary needs of individuals or households. Food availability is an important indicator of nutrition security as it directly affects the ability of individuals or households to obtain and consume adequate and nutritious food [(24)]. The table 2 shows that 81.12% of the participants reported that they had enough food stored during the restrictions, indicating a high level of food storage availability**.** This information is crucial in understanding the food availability situation during the community activity restrictions and the potential impact on nutrition security. A high level of food storage availability suggests that participants were able to access and store enough food to meet their dietary needs during the restrictions. On the other hand, a low level of food storage availability could indicate a potential food shortage or difficulty in accessing food, which may negatively affect nutrition security.[25]

Food Accessibility of The University Students

Food accessibility refers to the physical and economic access that people have to sufficient, safe, and nutritious food to meet their dietary needs and preferences for an active and healthy life. It is a component of nutrition security, which also includes food availability, food utilization, and dietary variability. Food accessibility is influenced by various factors such as geographic location, income, transportation, market availability, and food prices. People with limited access to food may experience food insecurity, which can lead to malnutrition and negative health outcomes.[26] Food acquisition, which refers to the means by which individuals or households obtain their food, is often used as a proxy measure of food accessibility.[27] Understanding food acquisition patterns and sources can provide insights into the availability and accessibility of food, as well as potential barriers to access that may affect food security.[28]

Food acquisition can be influenced by various factors such as income, food prices, and accessibility of food outlets. In some cases, individuals or households may have limited access to food due to factors such as geographic isolation or lack of transportation. This can result in inadequate food acquisition and, ultimately, food insecurity. Table 3 explains on how university students obtain their food. This information can be used to identify gaps in food access and inform policies and programs aimed at improving food availability and access for communities and populations at risk of food insecurity.

Food Utilization of The University Students

Food utilization is a crucial aspect of nutrition security as it impacts the accessibility, availability, and quality of food. Adequate food utilization involves the consumption of safe, nutritious, and culturally appropriate foods that meet the dietary requirements of individuals.[28] However, during community activity restrictions, individuals may face challenges in accessing diverse and fresh foods, leading to a reliance on processed and convenience foods. To gain insights into the food utilization practices of university students during those times, this study explored their favorite food processing methods. By examining the methods used to prepare food such as frying, boiling, baking, grilling, or steaming, the study aimed to understand how students were utilizing the available food.

The results from Table 4 provide insights into the food utilization practices of university students during community activity restrictions. The preference for fried food among the students is concerning as excessive consumption of fried food can lead to health problems such as obesity, high blood pressure, and heart disease.[29] It is encouraging, however, to see that a considerable percentage of students preferred steaming and boiling methods for carbohydrates. These methods are known to retain the nutritional value of the food and can contribute to a healthy and balanced diet.

The high preference for fried food among students is consistent across animal and plant protein categories, highlighting the need for interventions aimed at promoting healthier food choices. The low percentage of students who preferred grilling or baking as food processing methods for animal and plant protein is concerning as these methods are generally healthier compared to frying. In contrast, the preference for stir-frying and boiling methods among students for vegetables is encouraging, as they are known to retain the nutritional value of vegetables. The preference for eating raw fruits among students is also positive, as this

method can help retain the nutritional value of fruits.

Overall, the results from Table 4 underscore the importance of promoting healthier food processing methods among university students. Interventions that encourage the use of healthy food processing methods such as steaming, boiling, and grilling, along with education on the health benefits of a balanced diet, could be helpful in promoting healthier food choices and improving the nutrition security of students.

Dietary Diversity of The University Students

Dietary diversity is an important aspect of nutrition security as it ensures that an individual is consuming a wide range of foods from different food groups to meet their daily nutrient requirements. It is a well-known fact that a balanced and varied diet is essential for maintaining good health and preventing the risk of chronic diseases. Table 5 shows the frequency of food eaten by university students.

Using food frequency as a proxy to assess dietary diversity is an efficient and practical method as it enables the collection of dietary information from a large number of participants in a short period. By assessing dietary diversity, the researcher can identify any gaps in the participants' diets and design appropriate interventions to improve their nutrition security.[18]

Dietary diversity plays a significant role in ensuring adequate nutrition security, which is essential for maintaining good health and preventing the risk of chronic diseases. As university students are at a critical stage of their lives, it is crucial to assess their dietary habits and food intake to identify any potential nutrient deficiencies or imbalances. By using food frequency as a proxy to evaluate dietary diversity, researchers can obtain a comprehensive understanding of the types and amounts of foods consumed by university students. This information can be used to develop targeted interventions to promote healthy eating habits and improve nutrition security among this population.

Furthermore, the importance of dietary diversity goes beyond just meeting daily nutrient requirements. It also provides benefits such as improving gut microbiota diversity, reducing the risk of food intolerances and allergies, and enhancing overall well-being. Therefore, assessing the dietary diversity of university students is crucial for promoting their health and preventing the onset of chronic diseases. Evaluating the dietary diversity of university students using food frequency as a proxy is essential for assessing nutrition security and promoting healthy eating habits. The results of such assessments can inform the development of targeted interventions to address potential nutrient deficiencies and imbalances and enhance overall well-being.

Correlation of the Community Activity Restriction and Nutrition Security

In assessing the impact of community activity restrictions on nutrition security among university students, it is essential to investigate various aspects of food security. This study explored the relationship between community activity restrictions and food storage availability, appetite, and adherence to food hygiene among university students. Spearman's correlation coefficient was used to analyze the relationship between these variables. This statistical method measures the strength and direction of the association between two variables. The results of this analysis can provide insights into the potential impact of community activity restrictions on food security among university students. Table 6 shows the Spearman's correlation coefficients between community activity restrictions and food storage availability, appetite, and adherence to food hygiene. In this study, The findings indicate that community activity restriction has a weak negative correlation with food storage availability (-0.071), appetite (-0.026), and adherence to food hygiene (-0.018). However, none of the correlations are statistically significant, as all of the p-values are greater than 0.05.

This finding implies that as the level of community activity restriction increased, the food storage availability, appetite, and adherence to food hygiene decreased slightly, but not to a statistically significant extent. These findings are important as they provide insight into the potential impact of community activity restrictions on the food security and nutrition of university students. The weak negative correlation between community activity restriction and food storage availability suggests that as restrictions increase, students may have more difficulty storing food, potentially resulting in food waste or reduced access to food.[30,31] The weak negative

correlation between community activity restriction and appetite suggests that as restrictions increase, students may experience decreased appetite, which could lead to reduced food intake and potential malnutrition.[32] Lastly, the weak negative correlation between community activity restriction and adherence to food hygiene suggests that as restrictions increase, students may have more difficulty maintaining proper food hygiene practices, potentially resulting in increased risk of foodborne illness.[33] Overall, these findings highlight the importance of considering the potential impact of community activity restrictions on the food security and nutrition of university students.

CONCLUSION AND RECOMMENDATION

Conclusion

This research findings could potentially have significant implications for promoting nutrition security among university students. The COVID-19 pandemic has brought about significant changes in the learning system, with university students being among the groups affected. The shift to online learning has led to stress among students, potentially affecting their eating behavior. This study highlights the need for interventions to encourage healthy food choices and improve food utilization among university students. Understanding the challenges faced by students in accessing nutritious and culturally appropriate foods could also inform the development of policies and strategies to enhance the food security of university communities.

Recommendation

This research underscores the importance of promoting nutrition security among university students and calls for further studies to inform effective policy and intervention development.

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