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Individual Dietary Diversity Score and Nutritional Status Differences between Students Living in Dormitory and Home during COVID-19 Pandemic

Perbedaan Keragaman Pangan dan Status Gizi Santri di Asrama dan Rumah selama Pandemi COVID-19

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ABSTRACT

Background: High school students at Islamic Boarding Schools (IBS) are continuing their learning activities at school during the COVID-19 pandemic, with the option to live either at home or in the dormitory. These differing living conditions may have an impact on individual dietary diversity scores (IDDS) and nutritional status.
Objectives: To compare the IDDS and nutritional status of IBS students between dormitory living and home living during the COVID-19 pandemic.
Methods: This study was conducted using a cross-sectional design involving 232 boys and girls (116 residing in the dormitory and 116 residing at home) aged 16-18 years, from 8 IBS located in Mranggen District, Demak Regency. The subjects were selected through systematic random sampling, adhering to specific inclusion and exclusion criteria. Data was collected using structured questionnaires that included IDDS, weight, and height measurements to calculate BMI Z-scores. Data were analyzed using Independent T, Mann Whitney U, Chi-Square, Rank Spearman Tests, and General Linear Models.
Results: The subjects living at home consume a higher number (≥ 6) of food groups compared to those living in the dormitory. The malnutrition rates in dormitories are higher (40.5%). There were no significant differences in age and the number of confirmed COVID-19 cases between the two groups. The mean IDDS (5.4, p<0.001) and BMI Z-scores (0.26, p<0.001) of subjects living at home were higher than those living in the dormitory (3.7 and -0.73, respectively). The mean allowance for subjects living at home (Rp 325,948.3, p<0.001) was also higher than for those living in the dormitory (Rp. 224,913.8). Even after controlling for IDDS and allowance, the BMI Z-scores of subjects living at home remained higher than those in the dormitory.
Conclusions: During the COVID-19 pandemic, IBS students who lived at home had higher food diversity and BMI Z-scores compared to those who lived in the dormitory. acceptability value and increased nutritional content compared to the control formula.

INTRODUCTION

According to the Basic Health Research Indonesia 2018, a significant number of Indonesian youths still experience malnutrition, with 8.1% classified as severely thin or thin, and 13.5% as obese[1]. If this issue persists into adulthood, it can lead to various health problems, including chronic energy deficiency, metabolic diseases, and eating disorders[2]. The nutritional status of individuals also influences immunity and the healing process of diseases. Additionally, it is essential for adolescents to consume a diverse range of foods, including grains, nuts, fruits, vegetables, and animal sources, as this is vital for improving their nutritional status[3].

Research conducted at Maroes Islamic Boarding School (IBS) reveals that teenage students have a preference for foods that are high in fat and sodium but lacking in essential vitamins and minerals. Moreover, these young students tend to rely heavily on ready-to-eat meals and rarely include vegetables, fruits, or animal products in their diet. Insufficient daily food diversity can lead to inadequate nutrient intake, resulting in malnutrition[4].

The COVID-19 pandemic has had a profound impact on families across Indonesia. Approximately three million people have lost their jobs, leading to a decline in their purchasing power, particularly concerning everyday food expenses. The implementation of Large-Scale Social Restrictions has also brought about changes in people's consumption habits. This includes a decrease in food diversity, a rise in the consumption of ready-to-eat meals,

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and a reduction in the intake of nutritious foods like fresh fruits and vegetables. It is crucial to ensure a balanced and safe nutrition in order to enhance the immune system, improve nutritional status, and mitigate the risk of chronic and infectious diseases[3].

The findings from the Basic Health Research conducted in Central Java Province in 2018 reveal that in Demak district, the percentage of adolescents aged 16-18 years classified as thin is 7.68%, while the percentage of obese adolescents is 12.49%[5]. Demak itself is renowned for its strong religious values and is often referred to as the "Demak City of Guardians," attracting many parents who choose to send their children to modern Islamic Boarding Schools (IBS) in Demak. The district boasts numerous IBS, with Mranggen sub-district standing out for having a higher number of senior high schools (SMA) compared to other sub-districts. Additionally, *Madrasah Aliah* (equivalent to high school) in the Mranggen sub-district is also more prevalent than traditional high schools, making IBS the most abundant educational institutions in this area. It is worth noting that the Mranggen sub-district is located in one of the highest COVID-19 red zones within Demak district, particularly because of its proximity to the city of Semarang (as of July 8, 2021)[6].

Modern Islamic Boarding Schools are educational institutions that offer formal education following the national curriculum. These IBS can be categorized into two types: those that solely focus on religious *madrasah* (schools) and those that combine religious schools with public schools. Among the educational components within the IBS system is the presence of *madrasah aliyah*, which serves as the equivalent of a high school. The key figures within *pesantren* (boarding school) environment are the leaders, commonly known as *kyai*, along with the teachers and students[7].

Santri is a term used to refer to students who seek knowledge at formal educational institutions, specifically Islamic Boarding Schools. In the context of modern IBS, the term "santri" can be further divided into two categories: those who reside in the dormitories, known as "santri mukim," and those who live at home, referred to as "santri non-mukim." *Santri mukim* are students who live in the IBS premises after completing their madrasah activities, while *santri non-mukim* are students who return to their respective homes immediately after completing their madrasah activities. In this study, the researchers aim to compare the dietary diversity and nutritional status of Mranggen Demak students living in dormitories versus those living at home during the COVID-19 pandemic.

METHODS

This observational study employed a cross-sectional design to investigate the population of teenage students aged 16-18 years from 8 Madrasah Aliah at Modern IBS in Mranggen District, Demak Regency, Central Java Province. The study included students who lived in dormitories and those who lived at home, totaling 1350 participants. Among them, 526 students resided in dormitories, while 824 students lived at home. To be eligible for inclusion in the study, students had to meet certain criteria. These criteria included being registered as private madrasah students at modern IBS, having the freedom to choose between living in a dormitory or at home, not having been exposed to COVID-19, and being in good health. In the context of modern IBS, students are classified into two groups: those living in dormitories (referred to as "santri mukim") and those living at home (referred to as "santri non-mukim"). *Santri mukim* are students who reside in the IBS premises after completing their madrasah activities, while *santri non-mukim* are students who immediately return to their respective homes after finishing their madrasah activities. Exclusion criteria were applied to exclude schools that mandated all students to live in the dormitory, students who were absent during the research period, and those with incomplete data. The selection of research subjects was performed using systematic random sampling.[8].

Data collection in the field was conducted between January and February 2022. To gather information about the subjects, structured questionnaires were used during interviews. Food diversity data was collected through the use of a 2x24-hour food recall form. The food items consumed were then categorized using the Individual Dietary Diversity Score (IDDS) form, which comprises nine food groups: starchy staples, dark green leafy vegetables, other vitamin A-rich fruits and vegetables, other fruits and vegetables, organ meat, meat and fish, eggs, legumes, nuts and seeds, and milk and milk products[9,10]. The dietary diversity score was calculated based on the number of food groups consumed, with a scoring range of 0 to 9. Foods that were consumed in quantities less than one tablespoon (<10g) were not included in the scoring[9].

The nutritional status of the subjects was evaluated using the BMI Z-score, according to the WHO Anthro-Plus standard. To measure the weight, a digital scale (Kova) with a range of 0.1-180 kg and an accuracy of 0.01 kg was used. The subjects were wearing school uniforms and had their shoes removed during the weight measurement. For measuring body height, a digital wireless body height meter (onemed HT701) with a range of 0.01-200 cm and an accuracy of 0.01 cm was utilized. When measuring height, shoes and headgear were taken off. Additionally, the subjects receive an allowance, which represents the amount of money they receive daily to purchase food and drinks at school.

The sample size was determined using a formula to compare the means of two separate population groups with numerical data. Considering a 5% error rate, 80% power, a standard deviation of 1.09, and a difference in BMI Z-score of 0.4, the minimum sample size for each group was calculated to be 116[11,12].Therefore, the total sample consisted of 232 individuals, with 116 students residing in dormitories (58 boys and 58 girls) and 116 students living at home (58 boys and 58 girls), ensuring that each group had the same gender composition.

Before commencing data collection, approval was obtained from the Medical/Health Research Bioethics Commission at the Faculty of Medicine, Sultan Agung Islamic University Semarang (Approval Number: 425/XII/2021/Bioethics Commission). Additionally, written consent was obtained from all research

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participants after providing them with relevant information.

The normality of the data was assessed using the Kolmogorov-Smirnov test. Data analysis involved conducting various statistical tests, including the Independent T-test, Mann Whitney U-test, Chi-Square test, and Rank Spearman test. Multivariate analysis was performed using the General Linear Model. The data analysis was conducted using IBM-SPSS Statistics 21 software, licensed by Diponegoro University. A significance level of P<0.05 was considered statistically significant for all the conducted statistical tests.

RESULTS AND DISCUSSION

Table 1 presents the age distribution of the subjects in both the home and dormitory groups, indicating that some individuals were 16 years old. There were no significant differences observed between the two groups concerning age, gender, or the number of subjects who tested positive for COVID-19. Among the participants, 6% of those in the dormitory group and 6.9% of those in the home group had experienced COVID-19 within the past six months. During their COVID-19 diagnosis, all students were still engaged in online learning from their respective homes or dormitories. In the event of a confirmed COVID-19 case in the dormitory, the school collaborated with the dormitory to suspend all on-site activities. The affected student was granted permission to return to their home for a period of 2 weeks to 1 month, and they would only return to the dormitory once the environment was considered safe again. Regarding the nutritional status, as categorized by BMI according to WHO Anthro-Plus13, the subjects in the home group exhibited significantly better nutritional status compared to those in the dormitory group. The prevalence of obesity among adolescents aged 15 years or older, according to the 2018 Basic Health Research data in Semarang, was 31%. Similarly, in Central Java, it was 29.5%. Interestingly, the research subjects in Demak had a lower prevalence of obesity, which stood at 8.6%, in comparison to Central Java and Semarang.

Table 1. Differences in Subject Characteristics in Dormitory and Home Groups

Variable	Residence		p-value
	Dormitory n (%)	Home n (%)	
Age			
16 years	92 (79.3%)	79 (68.1%)	
17 years	22 (18.9%)	32 (27.5%)	0.127
18 years	2 (1.7%)	5 (4.3%)	
Gender			
Man	58 (50%)	58 (50%)	1.00
Woman	58 (50%)	58 (50%)	
Subjects with confirmed COVID-19			
Yes	7 (6%)	8 (6.9%)	1.00
No	109 (94%)	108 (93.1%)	
BMI nutritional status			
Normal (-2 SD to +1 SD)	69 (59.5%)	87 (75%)	
severe thinness (> -3 SD)	4 (3.4%)	0 (0%)	
Undernutrition/thinness (- 3 SD to <- 2 SD)	29 (25%)	0 (0%)	0.000*
overweight (+ 1 SD to +2 SD)	9 (7.8%)	14 (12.1%)	
Obesity (> + 2 SD)	5 (4.3%)	15 (12.9%)	

*Chi-Square Test, p-value < 0.05

The average BMI Z-scores of the subjects in the home group were found to be significantly higher than those in the dormitory group, as shown in Table 2. These findings are consistent with a study conducted in Ardabil, North Iran, which revealed that students living at home had higher average BMI Z-scores compared to those in the dormitory group.[14]. The subjects residing in the dormitory face a higher risk of consuming unhealthy food, such as snacks available in the dormitory's canteen as well as outside options. Furthermore, there are limitations in their food choices since the dormitory provides their meals[15]. Similar conclusions were drawn from a research study in Lahore, Pakistan, which found that the nutritional status of students in the home group was better than those in the dormitory group. The living environment can significantly influence the type and quantity of food intake. Changes in location and eating habits experienced in the dormitory can greatly impact food consumption[16].

There were differences in the allowance provided to the subjects in the dormitory and home groups. The allowance given to the subjects in the home group was significantly higher compared to those in the dormitory group, as shown in Table 2. In the dormitory group, subjects had to manage their monthly allowance for various necessities, including buying food and drinks at school, fulfilling daily needs (such as shampoo, soap, detergent, etc.), and saving money. One dormitory set a fixed allowance of Rp. 5000 per day for all subjects in the group (29 people). On the other hand, subjects in the home group only had to manage their allowance for buying food and drinks at school and saving money.

The dietary diversity scores of the subjects in the home group were significantly higher than those in the dormitory group, as indicated in Table 2. Eating in the dormitory is more cost-effective (averaging Rp. 150,000

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per month), resulting in limitations in the variety of foods consumed by the subjects in the dormitory group. The dormitory provides food groups such as rice, dark green leafy vegetables like spinach and kale, as well as legumes, nuts, and seeds as side dishes (tofu/tempeh). If the subjects do not receive side dishes from the dormitory, they have to purchase them outside the dormitory's cafeteria. In one dormitory, the subjects have to buy and cook food in groups as the dormitory does not provide meals. However, due to limited cooking time caused by various cottage activities, the subjects often only cook side dishes without including vegetables[17]. On the contrary, subjects in the home group find it easier to consume a variety of foods since their parents directly provide them, although not necessarily covering all food groups.

Table 2. Differences in Allowance, Food Diversity, and Subject BMI Z-Scores in Dormitory and Home

Variable	Residence		p-value
	Dormitory (n=116) (Mean ± SD)	Home (n=116) (Mean ± SD)	
BMI Z-score	-0.7 ± 1.6	0.3 ± 1.4	<0.001*
Allowance (IDR)	224913.8 ± 95839.5	325948.3 ± 118093.4	<0.001**
Dietary diversity score	3.7 ± 1.2	5.4 ± 1.4	<0.001**

*Independent Samples T-Test, p-value < 0.05
**Mann Whitney U-Test, p-value < 0.05
IDR = Indonesian Rupiah

One of the ways to maintain body immunity is by consuming a variety of foods. Immunity plays a crucial role in preventing the transmission of the COVID-19 virus. Food diversity ensures a balance of essential nutrients since no single type of food contains all the necessary nutrients[18]. All participants included starchy staples like rice, noodles, and bread in their diets (Table 3). Additionally, they consumed vitamin A-rich fruits and vegetables such as carrots, mangoes, and papayas. Carrots were typically served in soup dishes. Interestingly, the participants in the home group consumed significantly more vitamin A-rich fruits and vegetables compared to those in the dormitory group. A deficiency in vitamin A can lead to a weakened immune function, making individuals more susceptible to infections. Moreover, when the cell lining covering the trachea and lungs undergoes keratinization and stops producing mucus, it becomes easier for microorganisms, bacteria, or viruses to enter and cause respiratory tract infections[18].

The subjects consumed various fruits and vegetables, including eggplants and tomatoes in the soup. Notably, the home group consumed a higher amount of vegetables and other fruits compared to the dormitory group, as shown in Table 3. The dark green leafy vegetables they consumed included spinach, cassava leaves, and kale. Interestingly, both the dormitory and home groups consumed similar amounts of dark green leafy vegetables, which are readily available at affordable prices.

Furthermore, the study revealed that subjects in the home group (16%) consumed fruits in general more than those in the dormitory group (9%). These findings align with previous research conducted in Medina Munawaroh, Saudi Arabia, and Hamadan, Iran, which indicated that students living at home tended to have higher fruit consumption compared to dormitory residents. Students in the dormitory group often have limited food choices since their meals are provided, and they may also develop altered eating habits due to the adaptation of living away from their parents[19,20].

When it came to organ meat consumption, the subject primarily consumed chicken organ meat in the form of satay, specifically intestinal satay and heart satay. The home group exhibited higher consumption of organ meat compared to the dormitory group, as indicated in Table 3. However, only a small percentage of subjects (<50%) in both groups consumed organ meat. Overall, there was a general dislike for organ meats such as liver and chicken intestines.

The subjects consumed a variety of meat and fish, including fried chicken, chicken cooked in opor, meatballs (beef), and fried fish, as shown in Table 3. The home group had a higher consumption of meat and fish compared to the dormitory group. During holidays, students in the dormitory group were visited by their families who brought chicken or fish. Additionally, some dormitories received assistance from the local community in the form of chicken meat on holidays. However, only a small percentage of subjects consumed fish (9.2%). These findings are consistent with research conducted in Medina Munawaroh, Saudi Arabia, which concluded that students living at home consumed more meat than dormitory students[19].

Table 3 indicates that the subjects in the home group consumed more eggs than those in the dormitory group. The relatively low cost of meals in the dormitory meant that eggs were not included in the menu for students living there. On the other hand, students in the boarding group consumed more legumes, nuts, and seeds compared to those at home. They enjoyed a variety of legumes and grains, such as fried tofu, fried tempeh, and mendoan, either sautéed or mixed with pecel.

The subjects consumed various milk and milk products, including powdered milk, milk in UHT packaging, and yogurt. The home group had a higher consumption of milk and milk products compared to the dormitory group, as shown in Table 3. Limited allowance was one of the reasons why students in the dormitory group purchased less milk as part of their diet. Subjects in the home group either had powdered milk at home or bought UHT milk and yogurt outside. These findings align with research conducted in Medina Munawaroh, Saudi Arabia, which concluded that students living at home consumed more milk and milk products than dormitory students. This can be attributed to dormitory students

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experiencing changes in their dietary habits due to being away from their families and lacking access to healthy food options in the dormitory[19].

Table 3. Nine Food Groups of Food Diversity by Place of Residence

Food Group	Residence		p-value
	Dormitory n (%)	Home n (%)	
Starchy staples	116 (100%)	116 (100%)	
Other vitamin A rich fruits and vegetables	22 (19%)	92 (79.3%)	<0.001*
Dark green leafy vegetables	63 (54.3%)	66 (56.9%)	0.792
Other fruits and vegetables	23 (47.5%)	72 (62.1%)	<0.001*
Organ meat	5 (4.3%)	18 (11.5%)	0.008*
Meat and fish	73 (62.9%)	92 (79.3%)	0.009*
Egg	19 (16.4%)	62 (53.4%)	0.000*
Legumes, nuts, and seeds	100 (86.2%)	82 (70.7%)	0.007*
Milk and milk products	11 (9.5%)	30 (25.9%)	0.002*

*Chi-Square Test, p-value < 0.05

The dormitory group exhibited low consumption (>50%) of various food groups, including other vitamin A-rich fruits and vegetables, other fruits and vegetables, organ meats, eggs, milk, and milk products. In contrast, the home group had only two food groups with low consumption (<50%): organ meats and milk/milk products. Surprisingly, fruit consumption was very low in both the home and dormitory groups. Although fruit consumption is not a basic necessity that must be provided, it is essential during a pandemic. This aligns with the 2013 Basic Health Research, which reported that 93.5% of the population aged over 10 years consumed less than five servings of fruit per day [21].

The results indicated a relationship between the allowance score and the BMI Z-score (p<0.001, R=0.264). A higher allowance score correlated with a higher BMI Z-score. The amount of allowance determined the purchasing power for food and snacks, and a higher allowance meant greater food choices. Subjects could select a variety of foods based on their allowance, which, in turn, influenced nutrient adequacy and nutritional status. Research in Osun, Nigeria, demonstrated that the amount of allowance influenced adolescents' food intake, as a higher allowance provided more food choices, leading to an increased BMI Z-score[22]. Similar findings were observed in Chennai, India, where the allowance received by adolescents was a determining factor for BMI Z-scores [23].This study is consistent with research in China and Pekanbaru, Riau, which concluded that individuals who were overweight/obese had higher allowances compared to thinner and normal-weight teenagers[24,25].

The study revealed a significant relationship between dietary diversity scores and BMI Z-scores (p=0.006, R=0.178). Students in the dormitory group faced limitations in consuming a variety of foods as their meals were provided by the dormitory. Additionally, their food intake was relatively small. They ate together in groups of 6-8 people, and those who ate quickly ended up consuming more than those who ate slowly. Moreover, their transition to independent living in a new environment allowed them to choose unhealthy side dishes like *cilok*.[26,27]. In contrast, students in the home group found it easier to have a diverse diet as their parents provided their meals directly. Consuming a variety of foods is crucial for achieving optimal nutritional status and preventing nutritional deficiencies [9]. These findings are in line with research conducted in Dembia, Ethiopia, which demonstrated a relationship between dietary diversity and BMI Z-scores. Adolescents with a score of 5 or higher had normal nutrition, while those with a low dietary diversity score were more likely to experience malnutrition[28]. Similar consistency was found in research on adolescents in Malang, which indicated that dietary diversity scores were associated with BMI Z-scores. Food diversity plays a vital role in ensuring nutritional adequacy and influencing overall nutritional status[29].

In this study, multivariate analysis was conducted to control for confounding variables (food diversity and allowance), and it showed that the BMI Z-scores of subjects in the home group remained higher than those in the dormitory group (Table 4).

Table 4. The results of the analysis showed differences in BMI Z-scores among different residences after controlling for confounding variables

Parameter	B	Standard Error	p-value	R2
Intercepts	0.539	1.034	0.302	
Food Diversity	-0.126	-1,694	0.092	
Allowance	1.256	1.407	0.161	0.114
Dormitory	-1,091	-4,416	0.000	
Home	0a		0.302	

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However, it is important to note some limitations of this research. The study did not inquire about the duration of the students' stay in the dormitory, and the dietary diversity score was obtained through a 2x24-hour food recall, which relied on the respondents' memory of the previous day's food consumption. This method may lead to inaccuracies, such as overestimation or underestimation of food intake. On the other hand, the strength of this research lies in being the first study to compare food diversity between students living in modern Islamic boarding school dormitories and homes in Indonesia.

CONCLUSIONS

During the COVID-19 pandemic, students living at home had a more varied diet and higher BMI Z-scores compared to those residing in dormitories. Several factors, including financial limitations, food availability, and changes in eating habits, can impact the students' eating patterns and nutritional status. It is recommended that managers of modern Islamic boarding schools increase food diversity for dormitory students. One approach could involve implementing a gardening program to cultivate vegetables and fruits, as well as raising livestock such as fish, chickens, or goats within the school premises, enabling daily consumption of homegrown produce. Moreover, the managers can establish a program to monitor the students' nutritional status through health posts in collaboration with the Community Health Center. This initiative would provide information and take proactive measures to prevent severe thinness, thinness, overweight, and obesity. Future studies could consider larger sample sizes and incorporate food weighing methods to obtain more detailed data.

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REFERENCES

1. Ministry of Health of the Republic of Indonesia.*2018 Basic Health Research Results*. Ministry of Health of the Republic of Indonesia vol. 53 https://kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-riskesdas-2018_1274.pdf (2019).
2. Harrison, JF*et al.*Handbook and Lesson Plan Collection for Junior High School Teachers: TEENAGERS HEALTH AND NUTRITION. ((SEAMEO RECFON) Ministry of Education and Culture, Republic of Indonesia, 2016).
3. United Nations Indonesia.*Joint Statement on Food Security and Nutrition in the Context of the COVID-19 Pandemic in Indonesia*. https://www.unicef.org/indonesia/media/4901/file/Statement%252520Bersama%252520about%252520Resilience%252520Pangan%252520dan%252520Gizi.pdf (2020).
4. Musyayyib, Rudy Hartono, AP Knowledge and Diet with the Nutritional Status of Adolescents at the Nahdlatul Ulum Soreang Maros Islamic Boarding School.*Health Media. Polytechnic. healthy. Macassar*(2017).
5. Basic Health Research.*Central Java Province Report on Basic Health Research 2018*. Ministry of Health of the Republic of Indonesia (2018).
6. Demak Covid-19 Handling Task Force. Table of Covid-19 Distribution in Demak Regency per District. *Demak District Health Office*https://corona.demakkab.go.id/ (2020).
7. Dhofier, Z. *Islamic Boarding School Traditions: A Study of Kyai's View of Life*. (LP3ES, 1984).
8. Notoatmojo, S.*Health Research Methodology*. (PT Rineka Cipta, 2010).
9. Kennedy G., Ballard T., DM*Guidelines for measuring homehold and individual dietary diversity*. Fao (European Union, through the EC-FAO, 2010).
10. Sirajuddin, D. *Food Consumption Survey*. (EGC, 2015).
11. Sastroasmoro, S. *Fundamentals of Clinical Research Methodology 2nd Edition*. (Sagung Seto, 2002).
12. Bano, R.*et al.*A comparative study of Knowledge, Attitude, Practice of nutrition and non-nutrition student towards a balanced diet at Hail University. IOSR J. Nurs. Heal. sci. 2, 29–36 (2013).
13. WHO. BMI for ages (5-19).*World Health Organization*https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age (2022).
14. Tarighat, A., Mahdavi, R., Ghaemmaghami, J. & Saafaian, A. Comparing the nutritional status of college female students living on and off campus in Ardabil, 1999.*J. Ardabil Univ. med. sci.*3, 44–52 (2003).
15. Alghamdi, ES, Farrash, MS, Bakarman, MA & Mukhtar, AM Dietary Habits of University Students Living at Home or at University Dorm: A Cross-Sectional Study in Saudi Arabia.*Glob. J.Health Sci.*10, 50 (2018).
16. Saeed, A., Moazam, M. & Razzaq, S. a Research To Assess the Diet Pattern With Varying Nutrient Intake: Dormitory Versus Non-Dormitory Female Students. *Indo Am. J. Pharm. sci.*6, 7634–7638 (2019).
17. Small, M., Bailey-Davis, L., Morgan, N. & Maggs, J. Changes in Eating and Physical Activity Behaviors Across Seven Semesters of College: Living On or Off Campus Matters. *Heal. Educ. Behav.*40, 435–441 (2013).
18. Almatsier, S. *Basic Principles of Nutrition Science.*(Gramedia, 2010).
19. Eid Aljohani, N. Comparison of Nutritional Status Between University Students Living At Dormitory and Students Living At Home. *int. J. Adv. Res.*7, 905–911 (2019).

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20. Mohamadi, N., Shobeiri, F., Khirolahei, A. & Gh, R. Nutritional patterns in Iranian university students: comparison between dormitory and non-dormitory states.**3**, 1–5 (2014).
21. Health Research and Development Agency, Ministry of Health of the Republic of Indonesia.*Basic Health Research 2013*. (2013).
22. Ikujenlola, AV & Adekoya, TS Nutritional status and feeding habits of females in public and private Universities in Osun state, Southwestern, Nigeria.*Heliyon*6, e05023 (2020).
23. Punitha, VC, Amudhan, A., Sivaprakasam, P. & Rathnaprabhu, V. Pocket Money: Influence on body mass index and dental caries among urban adolescents.*J. Clin. Diagnostic Res.*8, JC10–JC12 (2014).
24. Dong, X. & Chen, L. Effects of pocket money on weight status among junior high school students: a longitudinal study in. 1–18 (2022).
25. Sartika, W., Herlina, S., Qomariah, S. & Juwita, S. The Effect of Allowance on Overnutrition in Adolescents during the Covid-19 Pandemic The Effect of Allowance on The Events of Overnutrition In Youth Times Pandemic Covid 19 *.J. Heal. Technol. med.*8, 400–405 (2022).
26. Parmar, *et al.*Exploring the dietary habit of medical students and their perception about their effect on health. Indian J. Public Heal. Res. Dev. 8, 154–158 (2017).
27. Wilson, Courtney K. Matthews, June l. Seabrook, Jamie A. Dworatzek, PD Self-reported food skills of university students.*Elsevier*(2016) doi:DOI: 10.1016/j.appet.2016.10.011.
28. Gonete, KA, Tariku, A., Wami, SD & Akalu, TY Dietary diversity practice and associated factors among adolescent girls in Dembia district, northwest Ethiopia, 2017.*Public Health Rev.*41, 1–13 (2020).
29. Muslihah, N., Winarsih, S., Soemardini, S., Zakaria, A. & Zainudiin, Z. Diet quality and its relationship with nutritional knowledge, socioeconomic status, and nutritional status.*J. Nutrition and Food*8, 71 (2013).

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