# Food Variety And Nutritional Status Among Adolescents in MAN Bangkalan

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Abstract: Food variety was one of the methods to improve nutritional status. Maintaining nutritional status is important to improve their productivity. This study aimed to determine the impact of food variety on the nutritional status of MAN Bangkalan students. The population of this research was students from MAN Bangkalan. This study used a cross-sectional design with a binary logistic regression analysis test, using simple random sampling with a total of 55 participants, consisting of 24 males and 31 females. The result was statistically significant p-value 0.009 < 0.05 with an OR of 1,645. The students who had a better variety of foods were more likely to have better nutritional status 1,6 times higher than students who did not do the same. Students needed to improve their food variety to maintain their nutritional status. Student could improve food variety by consuming foods from different sources. They could also increase food variety by choosing a more diverse range of snacks

## 1 INTRODUCTION

Adolescence was a stage of human life that lay between childhood and adulthood. According to WHO, adolescents were those who aged between 10 to 20 years old; however, this could be classified again into early adolescence (10–14 years old) and late adolescence (15 – 20 years old) (Hayati, Yusrawati and Dewi, 2023). This period of transition was characterized by fast psychological and physical development. (Jaleel et al., 2024) Adolescents were commonly left unnoticed in terms of nutritional status compared to children or infants. In spite of that, the nutritional status of adolescents needed to be taken seriously, because at that period of time, there was rapid growth and reproductive development towards adulthood. That was why it was important to maintain the nutritional status of adolescents. In Indonesia, according to BPS (Badan Pusat Statistik), there were 44,294,146 adolescents in 2024. That number made up 30% of the entire population. Based on that, it meant Indonesia had a large number of young productive people. The productivity level of the young population had to be maintained to ensure the progress and sustainability of the nation. One of the methods to keep that level was by increasing food variety.

Food variety referred to the practice of consuming a wide range of food, rather than relying on a single type or one single product. Food variety was a key to maintaining optimal nutritional intake and health. (Nair, Augustine and Konapur, 2015). Lots of people mistakenly thought that increasing food variety meant eating a large amount of food, but

in reality, it meant eating many variations of food. Numerous studies found that increasing food variety could lead to better nutritional status. The better the nutritional status of an individual, the better the ability of that individual to maintain a healthy life.

Nutritional status was a state of balance between nutrient intake from food and the body's nutritional needs for optimal metabolic status. (Cahyanto et al., 2021). Every individual had different needs for nutrient intake. Some of them needed less, while others needed more. If the nutrient intake was less than the body's needs, it could lead to deficiency, but if it was more than the body needed, it could lead to overnutrition. Indonesia suffered from both deficiency and overnutrition diseases. One of the diseases caused by deficiency was stunting..

Stunting, according to WHO, referred to a condition of chronic malnutrition in young children, characterized by low height-for-age due to prolonged inadequate nutrition. (Dadang et al., 2023). nadequate nutrition could result from many factors such as infectious diseases, poor variation of foods, poverty, malnutrition in pregnant women, and improper feeding practices and care during early infancy. (Agustian et al., 2023). People with stunting typically had both low height-for-age and low weight-for-age. This was because people with stunting suffered from prolonged inadequate nutrition, so they could not maintain their ideal weight. (Agustian et al., 2023). n Southeast Asia, the prevalence of stunting was quite high. The highest prevalence of stunting in Southeast Asia was in Timor-Leste at 48.8%, followed by Indonesia (31.8%), Laos (30.2%), Cambodia (29.9%), the Philippines (28.7%), Myanmar (25.2%), and Vietnam (22.3%).(Azriani et al., 2024). This rate had declined every year until 2024. According to SSGI, the prevalence reached 15.6%. In East Java Province, the prevalence of stunting reached 12.1%, the lowest in the island of Java. Unfortunately, the highest prevalence of stunting was concentrated in rural regions in Madura Island such as Bangkalan, Sampang, Pamekasan, and Sumenep, with the highest number found in Bangkalan Regency (16%). This was quite disheartening, considering that Bangkalan Regency was directly located next to the metropolitan city of Surabaya.

Eradicating stunting in Bangkalan Regency was a must. Stunting not only caused the victims to stop growing, but also inhibited their cognitive development. Studies in Indonesia found a significant relationship between stunting and cognitive development. (Maulina et al., 2023). This condition was serious because it could inhibit the victims in school or work. It could also lead to setbacks for a region, especially Bangkalan Regency. This was because progress in a region was influenced by the quality of human resources. If the human resources were poor, this could inhibit the regency from moving forward. That was why it was necessary to find a way to reduce the number of stunting cases. One of the methods was by increasing food variety.

Research in rural areas in Ghana found that food variety was related to nutritional status among adolescents. The study found that teenagers who did not eat various kinds of food were significantly underweight and suffered from micronutrient deficiencies. (Wiafe, Apprey and Annan, 2023). On the other hand, studies in Demak Regency found that the higher the food variety score, the better the individual nutritional status was (Hastuti et al., 2024). Moreover, studies in Ivory Coast showed that the lower the dietary scores, the higher the chance of

having poor health status (Traoré et al., 2022). Based on previous research data, it could be concluded that there was an influence between food variety and nutritional status.

## 2 METHOD

The design of this research was cross-sectional. The purpose of this design was to investigate the impact of food variety on the nutritional status of MAN Bangkalan students. The population of this research consisted of officially registered students at MAN Bangkalan. To obtain the sample, simple random sampling was used, and 55 tenth-grade students were selected who were willing to participate by filling out the Food Frequency Questionnaire (FFQ) form and having their height and weight measured. Once the height and weight data had been collected, the BMI of all participants was calculated. The FFQ questionnaire was then scored in accordance with the scoring system, 50 for "More than once a day", 25 for "Once a day", 15 for "4–6 times a week", 10 for "1–3 times a week", 5 for "1–3 times a month", and 0 for "Never". After scoring, the dietary score data were averaged to obtain a mean value. A score below the average was categorized as "Not Diverse", while a score above the average was categorized as "Diverse". The data were then analyzed using binary logistic regression.

## 3 RESULT

• **Participant Characteristic**

| Variable | Mean (+- SD) |
|---|---|
| Age | 16 (±0.0) |
| Height | 159,17 (±6.84) |
| Weight | 53,82 (±12,48) |
| Food Variety Score | 629,63 (±280.90) |
| BMI | 21.24 (±4.56) |

All participant was aged 16 when the research intended. The average of weight all 55 participants was 53.82 kg and height 159,17 cm. It shows that most of the participants had a normal height. However, their weight is 25% below the standard weight for children in the same age according to CDC. The average food variety score for 55 participants was 629,63.

• **The Impact between Food Variety and BMI**

| BMI | FFQ Score | |
|---|---|---|
| | Below Average | Above Average |
| Normal | 22 | 18 |
| Low | 7 | 8 |
| N (%) | 29 (52,7%) | 26 (47,3%) |
| p-value | 0.009 | |
| OR | 1,645 | |

Based on Table 2, it was found that 26 (47.3%) participants had food variety scores above the average, while 29 (52.7%) participants had scores below the average. The participant with normal BMI but had FFQ score below the average were 22, while the normal BMI and FFQ score above the average were 18. The participants who had low BMI and have lower FFQ score were 7 participants. Meanwhile participants who had low BMI but had FFQ score above the average were 8 persons. The p-value and OR were obtained using a binary logistic regression test. The p-value was 0.009, which meant there was an effect between food variety and nutritional status,

with an OR value of 1.64. This meant that individuals with various food variety were 1.64 times more likely to have good nutritional status.

## 4 DISCUSSION

This study found a significant influence between food variety and the nutritional status of adolescents. The OR value showed that adolescents with good food variety were 1.16 times more likely to have good nutritional status. This supported the hypothesis that the more diverse the diet, the higher the chance of having normal nutritional status. Conversely, the lower the food variety, the lower the likelihood of having a normal nutritional status. These findings were in line with previous studies that explicitly stated that food variety was key to meeting daily nutritional needs, especially in adolescents, who were in a crucial period of growth and development before adulthood.

Food variety was defined as the effort to consume various types of food sources to meet daily nutritional requirements**.** Methods for measuring food variety were varied, but the method used to measure dietary variation in this study was the Food Frequency Questionnaire (FFQ). The FFQ measured dietary variation scores based on how often and how varied the foods were eaten by clients. It was considered varied if the food variety score was above the average of the entire sample, and it was considered not varied if the score was still below average. Based on the FFQ scores, many adolescents still had monotonous eating patterns, often limited to staple foods such as rice, animal protein sources, and fast food. The causes were varied, such as economic limitations, minimal nutrition education, and social environmental influences. Not a few adolescents prioritised taste, easy access, or social media trends without considering nutritional content. This could affect their nutritional status, especially their BMI.

The nutritional status of adolescents was generally measured using BMI-for-age. This measurement method was considered quick and easy to determine an individual's nutritional status. An individual was classified as having a normal BMI if the value ranged from 18.5 to 25.0 (Mulyasari *et al.*, 2023). In Table 1, the average BMI of the 55 participants was 24.14. This meant that the majority of participants had a normal BMI for their age group. A normal BMI was one of the indicators of good nutritional status. This was because BMI could provide an overview of the proportion between body weight and height. A poor body weight proportion could serve as an indicator of nutritional problems, either underweight or overweight. The impact of being underweight was an increased risk of stunting. A study conducted by (Verma and Prasad, 2021) showed that stunting conditions were often found together with low body weight. Stunting could inhibit the cognitive development of adolescents. This, of course, could also hinder their academic achievement at school. A study conducted by (Lestari *et al.*, 2024) showed that stunting conditions were often found together with low body weight. Stunting could inhibit the cognitive development of adolescents. This, of course, could also hinder their academic achievement at school.

Based on this, food variety played an important role in maintaining the nutritional status of adolescents through the mechanism of fulfilling daily nutritional needs. A single type of food could not possibly contain all the nutrients required by the

body. For example, it was not possible to meet protein needs only by eating rice. Although rice contained a certain amount of protein, the quantity was too small. Therefore, to meet protein requirements, it was necessary to consume protein sources such as chicken, fish, tofu, and others. Based on the results of this study, individuals with good food variety had 1.16 times the likelihood of having a normal BMI. This meant that individuals with greater food variety tended to have a normal BMI as their nutritional status. Thus, food variety was highly necessary to maintain the nutritional status of adolescents. Poor food variety led to a low BMI, which was not beneficial for the sustainability of adolescent health. Similar results were shown by (Golpour-Hamedani *et al.*, 2020) shows that Iranian adolescents with high food variety tended to have higher body weight, height, and BMI. Another study conducted by (Nithya and Bhavani, 2018) found that low FFQ scores were associated with low BMI and a higher risk of malnutrition. This showed that food variety played an important role in maintaining the nutritional status of adolescents.

In conclusion, this study showed that food variety is an essential part of the diet and plays a crucial role in maintaining adolescents' nutritional health. In other words, children should be equipped from an early age with the knowledge and skills to choose diverse foods, whether through the role of families at home or education at school. The government can support this by improving the availability of nutritious foods, especially fresh foods and protein sources, while schools can contribute by providing canteens that offer healthy and varied food options. By following these simple steps, children are expected not only to avoid nutritional problems but also to develop more balanced eating habits that support their optimal growth and development.

# 5 CONCLUSIONS

The results of the study confirmed that food variety was positively associated with the nutritional status of adolescents. Adolescents with more varied eating patterns tended to have a body mass index in the normal category. These findings emphasized the importance of the role of families, schools, and the government in providing healthy and diverse food options to prevent nutritional problems during adolescence.

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