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A Descriptive Study of Balanced Nutrition Knowledge, Eating Patterns, and Nutritional Status Among Grade X Students at State Senior High School 22 Surabaya

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ABSTRACT

Adolescents are an age group that is prone to experiencing nutritional problems due to low knowledge about balanced nutrition and unhealthy diets. This study aims to find out the overview of balanced nutritional knowledge, diet, and nutritional status of grade X students at SMA Negeri 22 Surabaya as the basis for promotive and preventive efforts.

This descriptive study involved 79 Grade X students at SMA Negeri 22 Surabaya, selected through proportional simple random sampling. Data were collected using a validated nutrition knowledge questionnaire, SQ-FFQ, and anthropometric measurements, then analyzed using univariate analysis.

Of the 79 Grade X students, the majority were female (70.9%) and predominantly aged 16 years (68.4%). A total of 67.1% demonstrated good knowledge of balanced nutrition; however, only 43% had normal energy intake. Dietary diversity was found to be good in 35.4% of respondents, while 54.4% had good meal frequency. Despite this, 57% exhibited poor overall eating patterns. In terms of nutritional status, 65.8% had normal status, while 13.9% were undernourished and 20.3% were categorized as overweight or obese.

The study found that although most students possessed good knowledge of balanced nutrition, many still exhibited poor dietary patterns. Despite this, the majority maintained a normal nutritional status. These findings highlight the discrepancy between nutritional knowledge and actual behavior, emphasizing the need for targeted interventions to improve adolescents' eating habits and nutritional outcomes.

INTRODUCTION

Adolescence is a golden age as well as a vulnerable time in a person's life. In this phase, there is an acceleration of physical growth, psychological development, and cognitive maturity that requires optimal nutritional support. Unfortunately, not a few adolescents experience nutritional problems due to various basic factors, such as low knowledge about nutrition, unbalanced diet, the influence of the social environment, the habit of skipping meals, to the consumption of ready-to-eat foods that are high in calories but low in nutrients. This condition not only threatens health today, but also has a long-term impact on learning achievement and quality of life in the future[1–6].

In Indonesia, children aged 5–12 years experience multiple nutritional problems, with 11.2% classified as underweight (4.0% very thin and 7.2% thin), and 18.8% overweight (10.8% obese and 8.8% overweight). In adolescents aged 13–15 years, 11.1% were classified as thin (3.3% very thin and 7.8% were thin), while 10.8% were overweight (8.3% were obese and 2.5% were severely obese). For adolescents aged 16–18 years, 9.4% were malnourished (1.9% very thin and 7.5% were underweight), and 7.3% were overweight (5.7% obese and 1.6% overweight)[7]. In East Java, the prevalence of malnutrition in children aged 5–12 years is 7.6%, with 10.9% being overweight. In adolescents aged 13–15 years, 7.9% were classified as thin and 8.9% were overweight. Meanwhile, adolescents aged 16–18 years showed 8.2% were thin and 6.2% were overweight. In general, adolescent girls have lower undernutrition rates and a higher proportion of normal nutritional status compared to adolescent boys. In general, adolescent girls have lower rates of malnutrition and better nutritional status than adolescent boys. These data suggest the need for more targeted and gender-sensitive nutrition interventions, especially for adolescent boys who tend to have higher susceptibility to nutritional problems (Agency for Research and Development of Sahatan, 2013).

Adolescents with low balanced nutritional knowledge are at high risk of having unhealthy diets, such as consuming foods high in calories and fat, low in fiber, and the habit of skipping meals. This improper diet can have an impact on imbalances in nutrient intake, leading to various health problems such as anemia, decreased immunity, reproductive disorders (especially in adolescent girls), to decreased learning achievement and productivity. In addition, the lack of nutritional knowledge causes adolescents to have difficulty in choosing foods according to the body's needs, thereby increasing the risk of growth and developmental disorders. In the long run, this can contribute to the incidence of stunting, obesity, and susceptibility to chronic diseases in adulthood. Low nutritional status is also closely related to stunted physical and cognitive growth and decreased physical fitness, which is especially important in adolescence as a transition period to adulthood. Thus, improving nutrition knowledge is critical for fostering healthier dietary behaviors.

Based on a preliminary study conducted on 17 students at SMA Negeri 22 Surabaya, it was found that 6 students (16.6%) were underweight, 1 student (2.7%) was obese, and only 10 students (27.7%) had normal nutritional status. These findings show that there are significant nutritional problems among school adolescents. Considering that adolescents are an age group that is experiencing rapid growth and needs optimal nutritional intake, a good understanding of balanced nutrition and the application of a healthy diet is very important to prevent various health risks in the present and future. Therefore, this study aims to see an overview of the level of knowledge about balanced nutrition, diet, and nutritional status of grade X students at SMA Negeri 22 Surabaya, as a basis for promotive and preventive efforts to improve the overall health and quality of life of

adolescents. The findings are expected to serve as a foundation for future health promotion and prevention strategies.

MATERIALS AND METHODS

This study utilized a descriptive research design and was conducted from November 2023 to June 2024 at State Senior High School 22 Surabaya. The study population consisted of 360 Grade X students, from which 79 participants were selected using proportional simple random sampling to ensure representativeness across subgroups.

The inclusion criteria for participants were as follows: active enrollment as Grade X students, being in good physical health at the time of data collection, absence of chronic diseases or serious infections, no known mental or cognitive impairments, willingness to participate by providing informed consent, and the ability to complete both the questionnaire and anthropometric measurements in full.

Data collection was carried out through structured interviews using a validated questionnaire on balanced nutrition knowledge, dietary intake assessment through the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ), and anthropometric measurements including body weight and height. Prior to data collection, informed consent was obtained from all participants in accordance with ethical research practices.

Data were analyzed using univariate analysis to describe the frequency distributions of the main variables. Although the study was primarily descriptive, it also provided preliminary observations regarding the potential relationships between nutrition knowledge and nutritional status, as well as between dietary patterns and nutritional status, without performing advanced inferential statistical tests with SPSS.

RESULTS

Table 1. Gender, Age, Balanced Nutrition Knowledge, Total Consumption, Type of Consumption, Frequency of Consumption, Respondents' Diet, and Nutritional Status

Variabel	n	%
Gender		
Man	23	29,1
Woman	56	70,9
Age		
15 years	20	25,3
16 years	54	68,4
17 years	5	6,3
Balanced Nutrition Knowledge		
Less	7	8,9
Enough	19	24
Good	53	67,1
Amount of Consumption		
Severe Deficit	4	5,1
Moderate Deficit	14	17,7
Mild Deficit	19	24,1
Normal	34	43
More	8	10,1
Type of consumption		
Diverse	28	35,4
Quite Diverse	28	35,4
Less Diverse	23	29,1
Frequency of Consumption		
Good	43	54,4
Not Good	36	45,6
Diet		
Good	34	43
Not Good	45	57
Nutritional Status		
Less	11	13,9
Good	52	65,8
More	12	15,2
Obesity	4	5,1

Source: Primary Data, 2024

The majority of respondents in this study were female (70.9%) and aged 16 years (68.4%). Most students (67.1%) had good knowledge of balanced nutrition, while 24% had sufficient knowledge and 8.9% had poor knowledge. However, nutritional intake showed varied results: only 43% of students had normal consumption levels, while 47% experienced varying degrees of intake deficits, and 10.1% consumed more than required. In terms of dietary diversity, only 35.4% had diverse food consumption,

another 35.4% had moderately diverse intake, and 29.1% had poor dietary diversity. Meanwhile, 54.4% of respondents had a good frequency of consumption, but 45.6% still had poor frequency.

Despite the majority having good nutrition knowledge, only 43% of students demonstrated good eating patterns, while 57% had poor eating habits. Regarding nutritional status, most students (65.8%) had normal nutritional status; however, 13.9% were undernourished and 5,1 % were classified as obese, indicating the presence of a double burden of malnutrition. These findings may indicate that, although the level of nutritional knowledge among respondents is relatively high, it does not necessarily correspond with the adoption of healthy dietary practices or the attainment of optimal nutritional status. This highlights the potential need for more comprehensive nutrition education strategies and behavior-focused interventions to bridge the gap between knowledge and practice.

Table 2. Cross tabulation of balanced nutrition knowledge with nutritional status of class X students at SMAN 22 Surabaya

Balanced Nutrition Knowledge	Nutritional Status							
	Less		Good		More		Obesity	
	n	%	n	%	n	%	n	%
Less	2	28,6	4	57,1	1	14,3	0	0
Enough	4	21,1	10	52,6	3	15,8	2	10,5
Good	5	9,4	38	71,7	8	15,1	2	3,8

Source: Primary Data, 2024

Based on Table 2, there is a tendency that the better the balanced nutrition knowledge that students have, the greater the proportion of students with good nutritional status. Of the group with poor nutrition knowledge, 57.1% had good nutritional status, but there were still 28.6% who experienced malnutrition. In the group with adequate nutritional knowledge, 52.6% were in good nutritional status, but 21.1% were also found to be undernourished and 10.5% were obese. Meanwhile, in the group with good nutrition knowledge, 71.7% showed good nutritional status, and only 9.4% experienced malnutrition These findings show a tendency for a proportion of better nutritional status in students with good nutrition knowledge, but because this study is descriptive, the relationship cannot be statistically inferred.

Table 3.Cross tabulation of dietary patterns with nutritional status of class X students at SMAN 22 Surabaya

Diet	Nutritional Status							
	Less		Good		More		Obesity	
	n	%	n	%	n	%	n	%
Good	4	11,8	22	64,7	7	20,6	1	2,9
Not Good	7	15,6	30	66,7	5	11,1	3	6,7

Source: Primary Data, 2024

Based on Table 3, it appears that students with a good diet tend to have a more optimal nutritional status compared to those with a poor diet. As many as 64.7% of students with a good diet were in the category of good nutritional status, and only 11.8% were undernourished and 2.9% were obese. On the other hand, although 66.7% of students with poor diets were also in good nutrition status, the proportion of students with poor nutrition (15.6%) and obesity (6.7%) was higher than the group with good diet. These findings suggest a tendency that a better diet may contribute to a more balanced nutritional status, although it is possible that other factors also play a role in determining nutritional status.

DISCUSSION

The results of the study showed that the majority of class X students at SMAN 22 Surabaya had balanced nutritional knowledge in the good category (67.1%). These findings illustrate that in general, students have an adequate understanding of the basic principles of balanced nutrition, including the importance of varied food consumption, regular eating frequency, and macro and micronutrient needs. This finding is in line with Amira (2022) research at SMA Muhammadiyah 2 Surabaya which shows that more than 70% of students have a good level of nutritional knowledge. This is allegedly related to adequate access to information, both through school lessons, digital literacy, and social media, which is one of the main sources of health information among adolescents.

However, good knowledge is not yet fully reflected in healthy eating behaviors. This study shows that as many as 57% of students have a poor diet, which is characterized by energy consumption below the nutritional adequacy (AKG), lack of diversity of food consumed, and frequency of meals that are not in accordance with the recommendations of the Balanced Nutrition Guidelines. This indicates a gap between knowledge and practice, which is a common phenomenon in health behavior change[8]. Based on research conducted by Noviyanti & Marfuah (2017), it is also reported that there is a weak correlation between nutritional knowledge and eating practices, showing that behavior is not only determined by cognition, but also by other factors such as motivation, habits, environmental influences, and economic constraints[9].

This gap between knowledge and eating practices can be explained by behavioral theories such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB). Both theories state that healthy behavior is determined not only by knowledge, but also by risk perception, benefit value, social influence, and self-efficacy[10–12]. In this context, even if students are aware of the benefits of nutritious foods, they may feel not motivated enough to change their eating habits due to a low perception of risk to the long-term consequences of poor diet. In addition, peer influence, fast food consumption trends, and lack of parental supervision can also reinforce unhealthy diets[13].

The high consumption patterns of fast food and sugary drinks among teenagers are also an important concern. A study by Ramadhan & Puspowati (2018) shows that the frequency of consumption of instant foods, fried foods, and sweetened beverages is closely related to an increased risk of overweight and obesity in adolescents[14]. In this study, although 65.8% of students had normal nutritional status, there were still 13.9% of students who were malnourished and 20.3% were overnourished (overweight and obese). This imbalance shows that adolescents face a double burden of malnutrition, namely malnutrition and overnutrition in one age group[15].

The factors that cause abnormal nutritional status in students can come from various aspects. Students who are malnourished may be caused by eating disorders, low energy intake, or impaired nutrient absorption due to the habit of skipping breakfast or consuming foods that are low in protein and healthy fats[16–18]. On the other hand, overnutrition and obesity can be caused by excessive calorie consumption without adequate physical activity, as well as sedentary habits such as excessive use of gadgets and lack of exercise[19].

The results of this study also show that students with good nutritional knowledge can still have an excess or undernutrition status. This shows that knowledge does not directly guarantee optimal nutritional status. A more comprehensive approach is needed that includes behavioral interventions, school environments, family roles, and community empowerment to form healthy eating habits[20].

In general, these results are consistent with national data from Riskesdas (2018) which shows that the prevalence of undernutrition in adolescents continues to increase. In the East Java region itself, the proportion of adolescents with abnormal nutritional status is quite high and is a concern in the adolescent health intervention program launched by the Ministry of Health[7]. Within the framework of the "Healthy Adolescents Full of Nutrition" program, increasing nutritional literacy must be accompanied by strengthening environmental support and school policies such as the provision of healthy canteens, prohibiting ultra-processed foods, and hands-on learning nutrition education activities[21].

Parental involvement is also an important factor in shaping adolescents' diets. A study by Willy (2011) confirms that parenting by parents has a great influence on children's eating habits, including breakfast habits, consumption of vegetables and fruits, and restrictions on foods high in sugar and fat[22]. Lack of nutrition education in the family can make adolescents rely only on personal preferences or environmental influences in choosing food[23].

In addition, physical activity is also an important variable that has not been analyzed in this study. Research by Ramadhan (2018) states that students with low levels of physical activity have a higher risk of becoming overweight, even though their food consumption is not excessive[24]. Therefore, interventions to improve adolescent nutritional status can not only be focused on nutrition,

but also on improving physical fitness through regular exercise, physical extracurricular activities, and reducing screen time.

The psychosocial aspect should also not be ignored. Social stress and body image among teens can negatively affect their diet, including strict dietary habits without guidance, emotional eating, or eating disorders such as anorexia and bulimia that generally begin to appear at high school age[25].

This study has some limitations. First, the approach used is descriptive, so it cannot reveal the causal relationship between the variables studied. Second, the data obtained through interviews using SQ-FFQ is recalled, so it is prone to memory bias. Third, external variables such as physical activity, family income, parental support, and the quality of the school canteen are not used as controlling variables, even though they have the potential to affect diet and nutritional status.

In the future, it is recommended to conduct research with quantitative and qualitative analytical approaches to explore the determinants of adolescent nutritional behavior more comprehensively. Interventions also need to be cross-sectoral, involving schools, health centers, parents, and communities to form a healthy eating environment for adolescents.

CONCLUSION

The study found that although most students possessed good knowledge of balanced nutrition, many still exhibited poor dietary patterns. Despite this, the majority maintained a normal nutritional status. These findings highlight the discrepancy between nutritional knowledge and actual behavior, emphasizing the need for targeted interventions to improve adolescents' eating habits and nutritional outcomes.

SUGGESTION

Schools need to develop nutrition education programs that not only emphasize improving knowledge, but also encourage changes in students' eating behavior. One of the steps that can be taken is to form a nutrition support group between students who are trained as peer nutrition ambassadors to convey information and provide examples of healthy eating behaviors. In addition, the implementation of routine nutrition counseling every semester in collaboration with UKS and Puskesmas is very important to assist students in an ongoing manner. The topic of balanced nutrition should also be included in Biology or Physical Education lessons to strengthen conceptual understanding. Schools are expected to provide healthy meals in the canteen and control student snacks, as well as involve parents through periodic meeting forums to support healthy eating habits at home. Media literacy campaigns are also needed so that students are more critical of unhealthy food advertisements. All of these strategies require support from the health and education offices so that implementation is effective and sustainable.

REFERENCES

1. Boncyk M, Leroy JL, Brander RL, Larson LM, Ruel MT, Frongillo EA. Accuracy of Using Weight and Length in Children under 24 mo to Screen for Early Childhood Obesity: A Systematic Review. Adv Nutr [Internet]. 2025;16(7):100452. Available from: https://doi.org/10.1016/j.advnut.2025.100452
2. Smith ER, Gomes F, Adu-afarwuah S, Aguayo VM, Arifeen S El, Bhutta A, et al. Contribution of Maternal Adherence to the Effect of Multiple Micronutrient Supplementation During Pregnancy : A Systematic Review and Individual Participant Data Meta-analysis. 2025;16(May).
3. Coomson JB, Smith NW, Mcnabb W. Impacts of Food Forti fi cation on Micronutrient Intake and Nutritional Status of Women of Reproductive Age in Africa — A Narrative Review. Adv Nutr [Internet]. 2025;16(7):100463. Available from: https://doi.org/10.1016/j.advnut.2025.100463
4. Boxall LR, Eskandari F, Wallis J, Bielat AD, Appleton KM. The Effects of Aspartame on Glucose, Insulin, and Appetite-Regulating Hormone Responses in Humans: Systematic Review and Meta-Analyses. Adv Nutr [Internet]. 2025;16(7):100449. Available from: https://doi.org/10.1016/j.advnut.2025.100449
5. Li ZH, Wang XX, Du HY, Liu WB, Zhang CJ, Talifu Z, et al. Unraveling Spinal Cord Injury Nutrition: Effects of Diet on the Host and Microbiome. Adv Nutr [Internet]. 2025;16(7):100448. Available from: https://doi.org/10.1016/j.advnut.2025.100448
6. Birch DA. Addressing Social Justice Through School Health Education: Thoughts on an Expanded Focus. J Sch Health [Internet]. 2021 Jun 30;91(6):439–42. Available from: https://onlinelibrary.wiley.com/doi/10.1111/josh.13017
7. Badan Penelitian Dan Pengembangan Kesehatan Republik Indonesia. Laporan Riskesdas 2018 Nasional. Lembaga Penerbit Balitbangkes. 2018. p. hal 156.
8. Dwi Jayanti Y, Elsa Novananda N. Hubungan Pengetahuan Tentang Gizi Seimbang dengan Status Gizi Pada Remaja Putri Kelas XI Akuntansi 2 (di SMK PGRI 2 Kota Kediri). J KEBIDANAN [Internet]. 2019 Mar 25;6(2):100–8. Available from: https://akbid-dharmahusada-kediri.e-journal.id/JKDH/article/view/38
9. Noviyanti RD, Marfuah D. Hubungan Pengetahuan Gizi, Aktivitas Fisk, dan Pola Makan terhadap Status Gizi Remaja. Univ Res Colloq. 2017;421–6.
10. Irwan. Etika dan Perilaku Kesehatan. 2017. I.
11. Cindrawati N. Penyebab Kesenjangan Antara Pengetahuan dan Perilaku Terkait Diabetes Modifiable Risk Factors Pada Mahasiswa Fakultas Farmasi Universitas Surabaya. Calyptra J Ilm Mhs Univ Surabaya. 2013;2(1):1–18.
12. Notoadmodjo S. Promosi Kesehatan & Prilaku Kesehatan. Jakarta: EGC. 2012.
13. Nurjannah AS, Dalimunthe NK, Kustiani A, Gizi PS, Kesehatan F, Indonesia UM, et al. Hubungan Pembelian Makanan Online dan Kebiasaan Makan Dengan Status Gizi Mahasiswa Indekos di Kota Bandar Lampung. 2024;2(2):903–10.
14. Siti Qomariah, Sara Herlina, Wiwi Sartika, Sellia Juwita. Pengaruh Peran Orang Tua Terhadap Kejadian Gizi Lebih Pada Remaja Di Era Pandemi Covid 19 Di Pekanbaru.

Jakiyah J Ilm Umum dan Kesehat Aisyiyah. 2021;6(2):76–82.

15. Peng H, Pan S, Yan Y, Brand RE, Petersen GM, Chari ST, et al. Systemic Proteome Alterations Linked to Early Stage Pancreatic Cancer in Diabetic Patients. Cancers (Basel). 2020;12(6):1–14.
16. Penelitian A. Analisis Pola Makan dan Status Gizi Kurang (Thinness) Pada Siswa SDN Cikupa 4 Kabupaten Tangerang. 2024;1(2):49–56.
17. Aulia JN. Masalah Gizi Pada Anak Usia Sekolah. J Ilm Kesehat Media Husada. 2022;11(1):22–5.
18. Wagustina S, Fitriyaningsih E, Novita R. Nutrition Awareness Students Guidance in an Efforts To Prevent Malnutrition in School Children at MIN 8 Aceh Besar. 2024;2024(6):54–62.
19. Wahyuningsih R, Pratiwi IG. Hubungan Aktifitas Fisik dengan Kejadian Kegemukan Pada Remaja di Jurusan Gizi Politeknik Kesehatan Mataram. AcTion Aceh Nutr J. 2019;4(2):163.
20. Fitria F, Musniati N, Mulyawati DA. Gambaran Tingkat Pengetahuan tentang Gizi Seimbang Pada Siswa SMA Muhammadiyah 13 Jakarta. Muhammadiyah J Nutr Food Sci [Internet]. 2022 Jul 1;3(1):11. Available from: https://jurnal.umj.ac.id/index.php/MJNF/article/view/12136
21. Kementerian Kesehatan Republik Indonesia. Remaja Sehat Penuh Gizi [Internet]. Jakarta; 2019. Available from: http://scioteca.caf.com/bitstream/handle/123456789/1091/RED2017-Eng-8ene.pdf?sequence=12&isAllowed=y%0Ahttp://dx.doi.org/10.1016/j.regsciurbeco.2008.06.005%0Ahttps://www.researchgate.net/publication/305320484_SISTEM_PEMBETUNGAN_TERPUSAT_STRATEGI_MELESTARI
22. Savage JS, Fisher JO, Birch LL. Parental Influence on Eating Behavior. J Law, Med Ethics. 2007;35(1):22–34.
23. Jimima Ramadhani C, Tuhfatul Fadilah L, Ratu Zahira M, Salsa Az-Zahra Riyanto matul, Lutfiatun N, Yuna Carisa N, et al. Analisis Faktor yang Mempengaruhi Keputusan dalam Memilih Menu Makanan pada Mahasiswa program Studi Gizi Universitas Negeri Semarang 2023. J Anal [Internet]. 2024;3(2):177–94. Available from: http://jurnalilmiah.org/journal/index.php/Analis
24. Hidayah KA, Sholichah F, Widiastuti W. Differences in Energy Adequacy Levels, Physical Activity, and Nutritional Status among Female Santri Groups who Fasting and Not Fasting Monday Thursday (Case Study at Askhabul Kahfi Islamic Boarding School , Semarang City). 2024;6(2):59–65. Available from: http://jurnalilmiah.org/journal/index.php/Analis
25. Suhag K, Rauniyar S. Social Media Effects Regarding Eating Disorders and Body Image in Young Adolescents. Cureus. 2024;16(July 2014).