



## Nutritional Status and Clean Healthy Lifestyle Behavior of *Santri* in Islamic Boarding Schools in West Sulawesi

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### Abstract

**Introduction:** Islamic boarding schools, as residential educational institutions, face challenges in maintaining the health and nutritional status of students (*santri*), particularly concerning Clean and Healthy Living Behavior (CHLB). *Santri* living in densely populated environments with limited sanitation facilities are vulnerable to health issues. This study aimed to provide an overview of the nutritional status and CHLB implementation in Islamic boarding schools in West Sulawesi.

**Methods:** This descriptive cross-sectional study was conducted from July to October 2024 among 260 *santri* from three Islamic boarding schools in West Sulawesi, Indonesia. The sample size was determined using the Lemeshow formula and randomly selected from the population. Data were collected through structured interviews and analyzed using descriptive statistical tests.

**Results:** The results showed that 81.2% of the *santri* had a normal nutritional status, while 6.5% were undernourished, 8.8% were overweight, and 3.5% were obese. Bathing twice a day had the highest compliance rate (mean 4.75), while not sharing personal items had the lowest compliance rate (mean 2.96).

**Conclusion:** Although most *santri* have a normal nutritional status, some groups still experience undernutrition, obesity, and risky health behaviors. Continuous interventions in the form of nutrition education and CHLB improvement programs are necessary to raise awareness and promote healthy behaviors in Islamic boarding schools.

**Keywords:** Nutritional status, Clean and Healthy Lifestyle Behavior, *santri*, adolescents, Islamic boarding schools.

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### Introduction

Islamic boarding schools (*pondok pesantren*) are community-based Islamic educational institutions that function as centers for religious education and serve as living spaces where thousands of adolescents reside in close quarters. <sup>1</sup>

Adolescents living in pesantren are in a critical phase of growth and development, making them particularly vulnerable to nutrition-related problems such as undernutrition and anemia, especially among female students. <sup>2,3</sup> Nutritional intake of students is often a problem in

Islamic boarding schools. One of them is the lack of a varied balanced nutritional menu, which has an impact on the nutritional status of the students. Furthermore, the fiber intake of Islamic boarding school students remains low, below the recommended nutritional level. Research on Islamic boarding school students in Jakarta has shown a relationship between energy, protein, and fat intake and nutritional status.<sup>4</sup>

The communal lifestyle, characterized by shared dormitories and high-density living conditions, further increases the risk of communicable diseases, including tuberculosis (TB). For example, dormitory rooms often house 10–15 students with a bed distance of less than 90 cm, which greatly facilitates TB transmission of TB through airborne droplets. Such conditions create a double burden: students must cope with both communicable diseases and nutritional challenges in their lives.<sup>5</sup> Clean and Healthy Lifestyle Behavior (CHLB) in *pesantren* is intended to address these dual health risks by integrating health promotion and daily hygiene practices into the school environment. However, previous studies suggest that the implementation of the CHLB in *pesantren* remains suboptimal. Previous studies reported that more than half of the students (54.7%) had not adopted CHLB adequately, knowledge levels were low (47.8%), and although attitudes were relatively positive (75%), the role of teachers in health promotion was limited (56.3%).<sup>6,7</sup> Similarly, other studies have highlighted gaps in health education and promotion, suggesting that existing health interventions have not been sufficiently effective or comprehensive.<sup>8</sup>

Despite the recognition of *pesantren* as high-risk environments for both infectious diseases and nutritional issues<sup>7</sup>, limited research has simultaneously examined the intersection of CHLB practices and nutritional status in this setting, particularly in remote provinces such as West Sulawesi. Most studies on *pesantren* health have focused on hygiene behavior or communicable diseases in Java and other densely populated regions, leaving a gap in understanding how CHLB

correlates with nutritional outcomes among *pesantren* students outside Java.<sup>9,10</sup> This study addresses this gap by exploring not only the behavioral aspects of CHLB but also their potential association with students' nutritional status, providing a more holistic view of adolescent health in *pesantren*.

Therefore, this study aimed to provide an overview of CHLB practices and nutritional status among students in selected Islamic boarding schools in West Sulawesi. By highlighting both the behavioral and nutritional dimensions, this study seeks to generate evidence that can inform context-specific health promotion strategies in *pesantren*. The findings are expected to contribute to the design of integrated interventions that address hygiene, nutrition, and overall adolescent health, thus supporting the improvement of health outcomes in Islamic boarding school communities.

## Methods

This study employed a cross-sectional design to provide an overview of the nutritional status and Clean and Healthy Living Behavior (CHLB) among students (*santri*) in Islamic boarding schools in West Sulawesi. The research was conducted in three randomly selected Islamic boarding schools within the region to ensure data representativeness. The study population comprised all students enrolled in three selected Islamic boarding schools, totaling 591 students. A sample of 260 students was determined using the Lemeshow formula and randomly selected for the study. The inclusion criteria were senior high school students residing in boarding schools and willing to participate, while those who were ill or had incomplete data were excluded.

Data were collected using structured questionnaires to assess Clean and Healthy Living Behavior (CHLB) practices, including bathing habits, tooth brushing, washing clothes, handwashing, breakfast habits, consumption of nutritious and diverse foods, and physical activity. Anthropometric measurements of the respondents were conducted by measuring body weight using a digital scale with an accuracy of 0.1 kg. Height was measured

using a stadiometer with an accuracy of 0.1 cm. Nutritional status was measured using Body Mass Index-for-Age (BMI/A) and classified according to the WHO criteria into four groups: underweight, normal, overweight, and obese.<sup>11,12</sup> Statistical analysis was performed to examine the relationship between students' health behaviors and nutritional status. The study was conducted from July to October 2024.

## Results

Table 1 shows the distribution of respondent characteristics based on gender, age, length of stay in the boarding school, and grade level of the 260 respondents. Based on the length of stay at the Islamic boarding schools, the distribution is relatively even, with 48.5% staying for 0-3 years and 51.5% staying for 4-6 years. The majority of respondents were female, aged 16 and 17 years (34.2% and 34.6%), had stayed at the Islamic boarding schools for 4-6 years, and were in grade XI.

Table 2 shows that most mothers of the 260 respondents had a high school education (38.7%), followed by those with higher education (30.1%), junior high school education (18.1%), and elementary school education (13.1%). On the other hand, the majority of respondents' fathers had a high school education (38.5%) and higher education (31.9%), while others completed junior high school (16.9%), elementary school (11.9%), and only 0.8% did not attend school.

In terms of occupation, the majority of mothers were housewives (62.7%), while others worked as civil servants/military/police (21.5%), entrepreneurs (10.7%), farmers/fishers/breeders (3.5%), contract workers (1.2%), and in the private sector (0.4%). The occupations of fathers are more diverse, with the majority working as farmers/fishers/breeders (41.2%), followed by civil servants/military/police (28.5%), entrepreneurs (22.7%), private sector workers (5.8%), laborers (1.4%), and contract workers (0.4%). These data reflect that the occupations and education levels of parents vary, with most mothers being homemakers and fathers tending to work in the agricultural or formal sectors.

Table 3 presents data on the implementation of Clean and Healthy Living Behavior (CHLB) and nutrition among 260 respondents. The survey results showed that the habit of bathing at least twice a day had the highest compliance rate, with an average of 4.75 and a standard deviation of 0.677, indicating that this behavior had become a consistent routine among the students.

Washing hands after using the toilet also showed a high rate (mean 4.55), indicating students' awareness of the importance of hygiene after using the toilet. However, the behavior of not sharing personal items had the lowest average (2.96) with a standard deviation of 1.356. This suggests that many students still exchange items such as towels or toothbrushes, with considerable variation in this practice among respondents. This indicates the need for further education on the health risks associated with these habits.

In terms of nutrition, the habit of consuming vegetables had a fairly good average (3.98), but fruit consumption showed a lower figure (3.07), indicating that students may still fall short of meeting their daily fruit intake needs. Meanwhile, the consumption of fried foods had an average of 3.40, suggesting that fried foods are consumed quite frequently among students.

Overall, the results indicate that personal hygiene habits, such as bathing, handwashing, and maintaining clean clothing, are fairly well implemented. However, aspects related to balanced nutrition and cleanliness of personal items still need improvement.

Table 4 shows that the majority of respondents (81.2%) had normal nutritional status, while 6.5% were classified as undernourished, 8.8% had excess nutrition, and 3.5% were obese. In terms of health, the most common illness experienced by students in boarding schools was fever, reported by 73.5% of respondents. Additionally, 8.1% of respondents experienced diarrhea, 7.3% had skin diseases such as itching or rashes, 4.2% suffered from headaches and gastritis, and 2.7% experienced toothaches. These data show that although

the majority of students have a normal nutritional status, certain health issues, such as fever, still pose a significant

challenge in the boarding school environment.

Table 1. Respondent Characteristics

Characteristic	n (260)	%
Gender		
Male	110	42.3
Female	150	57.7
Age (year)		
15	14	5.4
16	89	34.2
17	90	34.6
18	67	26.8
Length of Stay in <i>pesantren</i>		
0 - 3 years	126	48.5
4 - 6 years	134	51.5
Grade		
X	59	22.7
XI	121	46.5
XII	80	30.8

Table 2. Socioeconomic Characteristics of Respondents' Parents

Parent Characteristics	n (260)	%
Mother's Education		
Elementary School	34	13.1
Junior High School	47	18.1
High School	101	38.7
Higher Education	78	30.1
Father's Education		
No Schooling	2	0.8
Elementary School	31	11.9
Junior High School	44	16.9
High School	100	38.5
Higher Education	83	31.9
Mother's Occupation		
Civil Servant/Military/Police	56	21.5
Entrepreneur	28	10.7
Farmer/Fisherman/Breeder	9	3.5
Contract Worker	3	1.2
Private Sector	1	0.4
Housewife	163	62.7
Father's Occupation		
Civil Servant/Military/Police	74	28.5
Entrepreneur	59	22.7
Farmer/Fisherman/Breeder	107	41.2
Contract Worker	1	0.4
Private Sector	15	5.8
Laborer	4	1.4

Table 3. Clean and Healthy Living Behavior (CHLB) and Nutrition of Students in Islamic Boarding Schools

No	Clean and Healthy Behavior Item	N	Mean
1	Bathe at least twice a day	260	4.75
2	Brush teeth at least twice a day	260	4.29
3	Do not share personal items	260	2.96
4	Wash clothes worn a maximum of twice	260	4.35
5	Wash hands with soap before eating	260	3.97
6	Wash hands with soap after using the toilet	260	4.55
7	Have breakfast	260	4.23
8	Eat a variety of foods	260	4.02
9	Do physical activities (exercise)	260	3.88
10	Consume vegetables	260	3.98
11	Consume fruits	260	3.07
12	Consume fried foods	260	3.40

Table 4. Nutritional Status and Most Common Diseases Experienced in the Islamic Boarding School

Characteristic	n (260)	%
<b>Nutritional Status</b>		
Underweight	17	6.5
Normal	211	81.2
Overweight	23	8.8
Obesity	9	3.5
<b>Most Common Diseases Experienced</b>		
Fever	191	73.5
Diarrhea	21	8.1
Skin diseases/Itching/Rashes	19	7.3
Toothache	7	2.7
Headache	11	4.2
Gastritis	11	4.2

## Discussion

The measurement of students' nutritional status in the Islamic boarding school, based on Body Mass Index-for-Age (BMI/A), revealed that the majority of respondents (81.2%) were within the normal range. According to the WHO growth reference standards and the Indonesian Ministry of Health, this indicates that most students maintained a healthy weight relative to their age and height. A normal BMI/A reflects adequate energy and nutrient intake, supporting optimal physical growth, immune system development, and cognitive performance in adolescents.<sup>12</sup> This is encouraging, as adolescents with normal nutritional status

are better positioned for academic achievement and long-term health resilience.

However, the presence of 6.5% undernourished students highlights the persistence of nutritional vulnerability in this population. According to the WHO standards, a BMI/A below -2 SD indicates undernutrition, which can impair growth, weaken the immune system, and increase susceptibility to infections such as respiratory illnesses or tuberculosis, conditions already of concern in the communal living environment of *pesantren*.<sup>13,14</sup> This aligns with previous findings showing that adolescent undernutrition is closely linked to inadequate dietary intake,

poor meal frequency, and limited dietary diversity. Adolescents with poor nutrition are more vulnerable to health problems, such as anemia, immune system disorders, and delays in physical development.<sup>15</sup> Conversely, 8.8% of students were classified as overweight and 3.5% as obese (BMI/A > +1 SD and > +2 SD, respectively). This finding is consistent with global and national concerns regarding the “double burden of malnutrition,” wherein undernutrition and overnutrition coexist within the same population. Overnutrition in adolescents can increase the risk of non-communicable diseases (NCDs), including type 2 diabetes, hypertension, and metabolic syndrome, which are increasingly reported among young Indonesian populations.<sup>16</sup> The communal dietary practices in *pesantren*, reliance on canteen food, and availability of calorie-dense, low-nutrient snacks may contribute to this trend.

Nutritional issues are among the primary challenges faced by adolescents. One recurring problem is inadequate nutritional intake, which can lead to malnutrition, chronic energy deficiency, protein deficiency, and anemia<sup>16</sup>. These conditions not only affect individual health but also impact public health. A common consequence is reduced concentration and learning ability among adolescents, which can ultimately affect the quality of education and productivity of younger generations.<sup>11,17</sup>

This study revealed that adolescents' vegetable consumption had a relatively high mean score (3.98), while their fruit consumption had a lower mean score (3.07), and their consumption of fried foods had an average score of 3.40. This indicates that fiber intake from fruits is relatively low and that fried foods are frequently consumed by students. This research aligns with research conducted on Islamic boarding school students in Jakarta, which found a relatively low daily fiber intake due to insufficient consumption of fiber from vegetables and fruit. One reason is the low consumption of vegetables and fruits among students, as well as a tendency for students to prefer snacks from the canteen, which tend to be high in calories, fat, sugar, and salt.<sup>4</sup> Fruit

and vegetable intake is not only beneficial for adolescents' physical health but also for their mental health. A systematic review of 17 observational studies showed a positive association between fruit and vegetable intake and mental health in adolescents, such as increased happiness and self-esteem<sup>18</sup>. In addition, teenagers who frequently consume junk food and high-fat foods are at risk of obesity.

The study also found that the most common illnesses experienced by students included scabies (itching), digestive disorders such as diarrhea and gastritis, and shortness of breath and colds. Skin diseases, particularly scabies, are the most common conditions among boarding school students. Scabies is caused by the microscopic parasite *Sarcoptes scabiei*, commonly known as mite, which infects the skin and causes severe itching, especially at night<sup>19</sup>. This condition tends to worsen in humid weather, which creates an ideal environment for mite development. In boarding school environments, such as Islamic boarding schools, the high density of residents and limited sanitation facilities accelerate the spread of scabies, as the disease can easily be transmitted through direct contact or by sharing personal items, such as towels and clothing.<sup>20,21</sup>

The study highlighted that *santri* showed very good compliance in personal hygiene behaviors, particularly bathing at least twice a day (mean 4.75) and washing hands after defecation or urination (mean 4.55). These habits reflect a strong awareness of basic hygiene, which is essential in a communal environment such as a *pesantren*, where overcrowding can increase the risk of disease transmission. Regular bathing helps maintain personal hygiene and reduces skin infections, whereas proper handwashing prevents fecal-oral diseases, such as diarrhea, and reduces respiratory tract infections.<sup>20,22</sup>

However, low compliance was found for the habit of not sharing personal items (mean 2.96). This indicates that while students maintain some hygiene practices, they are still vulnerable to behaviors that could facilitate disease transmission, particularly scabies and respiratory infections, which are frequently reported in *pesantren* environments.<sup>23</sup> This gap

highlights the need for targeted health education focusing on hygiene risks associated with sharing personal items.

The *pesantren* context poses unique challenges in terms of environmental sanitation. Dormitory rooms housing 10–15 students in small spaces often lack proper ventilation and sanitation facilities, increasing the risk of tuberculosis and other communicable diseases.<sup>24</sup> Dietary habits were not directly measured in this study, but *pesantren* students typically rely on communal canteens, which may contribute to both undernutrition (6.5%) and overnutrition (8.8%) observed in this study. Physical activity was also not directly assessed, but limited recreational space in *pesantren* environments has been cited in other research as contributing to sedentary lifestyles among *the santri*.<sup>25</sup>

### Conclusion

The study highlights that while the majority of students in Islamic boarding schools in West Sulawesi demonstrate good personal hygiene practices, such as bathing twice a day with the highest compliance (mean 4.75), and 81.2% of students having normal nutritional status, there are areas that require attention, particularly in terms of balanced nutrition and avoiding the sharing of personal items. To address the issues of undernutrition, overnutrition, and the spread of infectious diseases, it is essential to strengthen nutrition education, enforce stricter hygiene policies, and provide ongoing health promotion programs in the workplace.

### Ethics approval

This research was reviewed and approved by the Bioethics Commission for Medical/Health Research, Faculty of Medicine, Sultan Agung Islamic University Semarang, and cleared with letter No.94/III/2024/Komisi Bioetik.

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