
**NUTRITIONAL STATUS OF KINDERGARTEN STUDENTS AT LABSCHOOL
LIDAH WETAN AND KETINTANG SURABAYA**

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ABSTRACT

There is insufficient information on the nutritional status of kindergarteners, especially in Surabaya. This study's primary goal is to present information on the nutritional status of kindergarten children enrolled at Labschool Lidah Wetan and Ketintang, Surabaya. Cross-sectional descriptive study of students aged 4-7 years (n = 56), with anthropometric measurements for weight and height of the students using a digital weight and height scale. After obtaining the students' weight and height data, Z-score measurements were conducted according to the WHO curve for height-for-age (H/A), weight-for-age (W/A), and body mass index-for-age (BMI/A). The findings showed that three students (5.4%) were classified as stunted, fifty-two students (92.9%) as normal, and one student (1.8%) as tall for H/A measurement. According to the W/A measurement results, one student (1.8%) was classified as severely underweight, two (3.6%) as underweight, forty-eight (85.7%) as normal, and five (8.5%) as overweight. Nine students (16.1%) were classified as wasted, forty students (71.4%) as normal, three students (5.4%) as overweight, and four students (7.1%) as obese based on the BMI/age measurement. Overall, kindergarten students at Labschool Lidah Wetan and Ketintang Surabaya had generally good nutritional status.

Keywords: *anthropometry; nutritional status; z-score*

ABSTRAK

Data mengenai status gizi anak TK, khususnya di Surabaya, masih terbatas. Tujuan utama penelitian ini adalah menyajikan informasi mengenai status gizi anak TK Labschool Lidah Wetan dan Ketintang, Surabaya. Penelitian ini merupakan penelitian deskriptif cross-sectional terhadap siswa usia 4-7 tahun (n=56), dengan pengukuran antropometri berat badan dan tinggi badan siswa menggunakan timbangan digital berat dan tinggi badan. Setelah data berat dan tinggi badan siswa diperoleh, pengukuran Z-score dilakukan plotting berdasarkan kurva WHO tinggi badan menurut usia (TB/U), berat badan menurut usia (BB/U), dan indeks massa tubuh menurut usia (IMT/U). Hasil penelitian menunjukkan bahwa tiga siswa (5,4%) tergolong pendek, lima puluh dua siswa (92,9%) tergolong normal, dan satu siswa (1,8%) tergolong tinggi berdasarkan pengukuran TB/U. Berdasarkan hasil pengukuran BB/U, satu siswa (1,8%) tergolong sangat kurus, dua siswa (3,6%) tergolong kurus, empat puluh delapan siswa (85,7%) tergolong normal, dan lima siswa (8,5%) tergolong kelebihan berat badan. Sembilan siswa (16,1%) tergolong kurus, empat puluh siswa (71,4%) tergolong normal, tiga siswa (5,4%) tergolong kelebihan berat badan, dan empat siswa (7,1%) tergolong obesitas berdasarkan pengukuran IMT/usia. Secara keseluruhan, siswa TK di Labschool Lidah Wetan dan Ketintang Surabaya umumnya memiliki status gizi baik.

Kata Kunci: *antropometri; status nutrisi; z-score*

INTRODUCTION

An inadequate or imbalanced intake of essential nutrients is referred to as malnutrition, which includes undernutrition and overnutrition. Stunting, wasting, and micronutrient deficiencies are manifestations of undernutrition, while overnutrition manifests in overweight or obesity (Elia, 2017; Ernawati et al., 2023). The Indonesian Ministry of Health's 2022 Nutritional Status Survey found that from 2021 to 2022, the country's stunting rate decreased by 2.8%. This achievement is in line with the Indonesian Ministry of Health's annual target of approximately 2.7%. In 2023, the East Java Health Office's monthly district/city weighing data showed that 6.8% of children were underweight, 5.1% were stunted, 4.8% were malnutrition, and 0.7% were severely malnutrition. In general, Surabaya has the lowest rate of undernutrition in East Java, suggesting that children in the urban area have a decent nutritional state (Dinkes Jatim, 2024).

In underdeveloped countries, school-age children's malnutrition is a complex issue that has an impact on their academic performance and general well-being. It is influenced by socioeconomic, environmental, and health-related factors. In many places, undernutrition, which is characterized by a lack of nutrients and restricted access to nutritional foods remains a serious problem (Amoadu et al., 2024). This silent catastrophe is increasing the risk of illness and mortality while also affecting children's physical and cognitive development and susceptibility to diseases. Chronic undernutrition causes stunting, which impairs not just physical development but also cognitive function, academic performance, and future economic productivity (Jumilia et al., 2023). An individual who consumes more calories than their body needs for energy expenditure and metabolic processes is considered to be overnutritious. This can lead to several health problems, including obesity, diabetes, metabolic disorders, and cardiovascular illnesses, and it frequently results in weight increase. Overnutrition in school-age children in developing countries shows up as conditions like overweight and obesity, often caused by sedentary behavior, unbalanced dietary patterns, and excessive calorie consumption (Safaei et al., 2021; Amoadu et al., 2024).

Children should have nutritional assessments to ascertain their nutritional status and any issues with their eating habits. If issues are found, they must be treated to keep them from getting worse and endangering the health of the children. Anthropometry is a useful and

instantly applicable method for evaluating the growth patterns of children. A more thorough analysis utilizing different methods can be conducted when anthropometric indicators are used as a screening tool to identify those who may be at risk of under or over nutrition (Rysha et al., 2017). The World Health Organization (WHO) has developed WHO Child Growth Standards using the following indicators: weight-for-age, length/height-for-age, weight-for-length/height, and BMI-for-age. The Republic of Indonesia's Regulation Number 2 of 2020 concerning Child Anthropometry Standards outlines the process for assessing a child's nutritional status. The four standard indices are weight-for-age, height/length-for-age, weight-for-height/length (ages 0–60 months), and BMI-for-age (ages 0–60 months and 5–18 years) (Permatasari & Chadirin, 2022).

Surabaya is an urban region with complex socioeconomic characteristics and consumption patterns. Data on children's nutritional status are essential because the preschool period is a critical stage of growth and development, which can affect long-term health, learning capacity, and future productivity. In addition, these data may inform decision-making by the Surabaya city government in planning and establishing health, education, and school-based nutrition interventions, such as balanced-nutrition education programs and routine growth monitoring. A lot of research about nutritional status is being done, but there is insufficient information on the nutritional status of kindergarteners in Surabaya, especially those in this age group. Thus, providing data on the nutritional status of kindergarteners at Labschool Surabaya is the main objective of this study.

METHOD

Design, place and time

This cross-sectional descriptive study was conducted at Labschool Kindergarten in Lidah Wetan and Ketintang, Surabaya. The population was all students in grades A and B. The study was conducted in October 2024.

Number and method of taking the research subject

Researchers interviewed kindergarten teachers to obtain information about the names, ages, dates of birth, and genders of students. The anthropometric measures based on the body

mass index-for-age (BMI/A), weight-for-age (W/A), and height-for-age (H/A) indices according to the WHO growth curve were used to gather nutritional status data. Anthropometric measurements were performed using a digital weight and height scale.

Types and methods of data collection

To evaluate the children's nutritional status, anthropometric measurements were conducted. A digital scale was used to measure each child's height and weight to the closest 0.1 cm and 0.1 kg, respectively. Height and body weight for each age group were used to standardize the WHO's height-for-age (HAZ), weight-for-age (WAZ), and BMI-for-age (BAZ) Z-scores (Galgamuwa et al., 2017). If HAZ was less than -2.0, the participants' nutritional state was classified as stunting. Conversely, $BAZ > 2.0$ was used to identify children who were overweight or obese (Insani et al., 2018).

Data analysis

Anthropometric measurements, such as W/A, H/A, and BMI/A, as well as three indicators utilizing the Z-score calculation, were used to gather nutritional status data. After that, these were shown in tabular form along with narrative justifications.

RESULT AND DISCUSSION

The study involved 56 kindergarten children Labschool Lidah Wetan and Ketintang Surabaya, consisting of 26 males and 30 females. Their ages ranged from 4 to 7 years. The distribution of subjects is presented in Table 1.

Table 1. Distribution of Respondent Characteristics by Age and Gender

Sample Characteristics	TK	
	Count (n)	Percentage (%)
Age (years)		
4	29	51,8
5	16	28,6
6	10	17,9
7	1	1,8
Gender		
Male (M)	26	46,4
Female (F)	30	53,6

Source: research data, 2024

Z-score measurements were carried out using the WHO curve following the acquisition

of the children's height and weight data. Table 2 presents the findings from the height-for-age (H/A), weight-for-age (W/A), and body mass index-for-age (BMI/A) assessments. Three students were classified as stunted (5.4%), fifty-two as normal (92.9%), and one as tall (1.8%), according to the Z-score assessment for H/A. According to the W/A measurement results, one student (1.8%) was classified as severely underweight, two (3.6%) as underweight, forty-eight (85.7%) as normal, and five (8.5%) as overweight. Nine students (16.1%) were classified as wasted, forty students (71.4%) as normal, three students (5.4%) as overweight, and four students (7.1%) as obese based on the BMI/age measurement.

Table 2. Determinants of child nutritional status

Interpretation	M	F	n	%
Height for Age (H/A)				
Severely stunted	0	0	0	0
Stunted	2	1	3	5,4
Normal	23	29	52	92,9
Tall	1	0	1	1,8
Weight for Age (W/A)				
Severely underweight	0	1	1	1,8
Underweight	1	1	2	3,6
Normal	22	26	48	85,7
Overweight	3	2	5	8,9
Body Mass Index for Age (BMI/A)				
Severe wasted	0	0	0	0
Wasted	6	3	9	16,1
Normal	17	23	40	71,4
Overweight	2	1	3	5,4
Obese	1	3	4	7,1
Total	26	30	56	100

M: male, F: female

Source: research data, 2024

The nutritional status of Labschool Kindergarten students was mostly normal, although some students were stunted, underweight, overweight, and obese. There are 3 students who are categorized as stunted, but there is no student who is categorized as severely stunted and severely wasted. This means that the nutritional status of these students was good. This study aligns with Agustin et al. (2023), which found that the nutritional status of preschool children aged 4-6 years at Dharma Wanita Kloposepuluh Kindergarten was mostly good. Another study also found that 90% of children examined had good nutritional status, with 2% being

overweight and 8% being underweight (Hartian et al., 2022).

Based on gender, stunted and wasted students dominated among males, with a 2:1 ratio. Study by Thurstans et al. (2022) showed that in children, boys are more likely to be wasted, stunted, and underweight. Boys are more active and have more muscle tissue than girls, requiring more energy and nutrients to support their activities. This result is similar to previous studies, which found that stunted students are mostly male rather than female (Agustin et al., 2023; Fithria et al., 2024).

The nutritional status among children can be affected by several factors, such as dominant democratic maternal parenting style, adequate nutrition, personal and environmental hygiene, and good basic healthcare (Marpaung et al., 2021). Another study found that children's nutritional status is influenced by parental parenting styles (Tahapary et al., 2023). The mother's level of education is element that influences the nutritional status. Undernutrition was more common in children whose mothers had less education than in children whose mothers had more education. Mothers who receive education are better able to grasp the physical and mental development of their children and the nutritional values of food. The majority of young, poorly educated married females are neither psychologically nor physically prepared to become mothers, and underage marriages are nevertheless prevalent in the plantation industry (Galgamuwa et al., 2017). Mothers' nutritional education and knowledge significantly improved maternal attitudes, practices, and in turn children's nutritional outcomes, for example, improved birth weight compared to controls (Prasetyo et al., 2023). In another study, the Chi-Square analysis revealed that the child's nutritional quality was strongly correlated with the mother's employment position, family income, and nutritional awareness ($p < 0.05$). This suggests that children with better nutritional outcomes are more likely to come from families with steady work and income (Rahayuwati et al., 2019).

Adequate nutrition, personal and environmental hygiene, and access to good basic healthcare are interrelated determinants of children's nutritional status. Adequate nutrient intake ensures sufficient energy and micronutrients to support growth, cognitive development, and immune function, as shown by school-based interventions that improved children's diet quality and reduced unhealthy eating behaviors (Collado-Soler et al., 2023).

Poor water, sanitation, and hygiene (WASH) conditions can offset these benefits, as repeated exposure to contaminated environments leads to infections and environmental enteric dysfunction that impair nutrient absorption and contribute to stunting (Batool et al., 2023). Having access to comprehensive primary healthcare improves nutritional outcomes by facilitating illness prevention, growth monitoring, and the integration of nutrition-sensitive and nutrition-specific interventions such as maternal counseling, supplementation, and vaccination (Hasan et al., 2023). Together, these factors act synergistically to ensure optimal growth and reduce both undernutrition and overnutrition in children.

Overnutrition, such as overweight or obesity, can be caused by various factors, including an unbalanced diet, lack of physical activity, and the habit of consuming fast food or snacks that are high in calories but low in nutrition. In addition, low-energy-use hobbies like playing computer games or watching television for extended periods of time. This is a serious challenge because obesity can trigger various long-term health problems, such as diabetes, hypertension, and metabolic disorders. In addition, street food available in school environments often does not meet health requirements and contains dangerous ingredients. Around 40% of street food in schools does not meet the required nutritional standards, so children are more vulnerable to consuming unhealthy foods. This nutritional deficiency not only impacts physical health but can also affect children's cognitive and emotional development. Children who are obese tend to have problems with self-confidence and can experience social stigma, which can affect their interactions with peers (Fithria et al., 2024; Insani et al., 2018).

Children in rural areas had a greater possibility of being stunted, whereas children in urban areas were more likely to be overweight. Children in urban areas had healthier eating habits, as evidenced by the higher percentage of kids who regularly ate breakfast, meat, dairy, and fruits (Insani et al., 2018). Compared to their rural counterparts, urban students were much taller and heavier (Tang et al., 2024). The easier access to fast food, higher dietary intake, and lower levels of physical activity among urban school children relative to those from rural regions may all contribute to the increased prevalence of obesity in urban settings (Crouch et al., 2025). This study has several limitations, including the lack of information on the child's dietary intake history, parental involvement, and possible medical

history. Consequently, the causes of nutritional disorders in children cannot be identified. Furthermore, the study subjects were limited to a specific school. Future research is expected to include more schools with diverse backgrounds.

CONCLUSION

One important factor that impacts a child's health, academic achievement, and mental health is their nutritional status. Optimal growth and development can be supported by a healthy nutritional status. Parents, in particular, play the main role in efforts to maintain children's nutritional needs and avoid undernutrition and overnutrition. Additionally, the government and the school must also provide support. We recommend that children's nutritional status be monitored regularly and continuously.

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REFERENCES

- Agustin, S. P., Maemonah, S., & Widarti, L. (2023). Gambaran Status Gizi Pada Anak Prasekolah di TK Dharma Wanita Persatuan Klopolepuluh. *Jurnal Keperawatan*, 17(2): 93–98. <https://nersbaya.poltekkes-surabaya.ac.id/index.php/nersbaya/article/view/87/125>
- Amoadu, M., Abraham, S. A., Adams, A. K., Akoto-Buabeng, W., Obeng, P., & Hagan, J. E. (2024). Risk Factors of Malnutrition among In-School Children and Adolescents in Developing Countries: A Scoping Review. *Children*, 11(4): 476.
- Batool, M., Saleem, J., Zakar, R., Butt, M. S., Iqbal, S., Haider, S., & Fischer, F. (2023). Relationship of stunting with water, sanitation, and hygiene (WASH) practices among children under the age of five: a cross-sectional study in Southern Punjab, Pakistan. *BMC Public Health*, 23(1): 1–7.

- Collado-Soler, R., Alférez-Pastor, M., Torres, F. L., Trigueros, R., Aguilar-Parra, J. M., & Navarro, N. (2023). A Systematic Review of Healthy Nutrition Intervention Programs in Kindergarten and Primary Education. *Nutrients* 2023, 15(3): 541.
- Crouch, E., Abshire, D. A., Wirth, M. D., Hung, P., & Benavidez, G. A. (2025). Rural–Urban Differences in Overweight and Obesity, Physical Activity, and Food Security Among Children and Adolescents. *Preventing Chronic Disease*, 20: 1–10.
- Dinkes Jatim. (2024). *Profil Kesehatan Provinsi Jawa Timur Tahun 2023*.
- Elia, M. (2017). Defining, Recognizing, and Reporting Malnutrition. *International Journal of Lower Extremity Wounds*, 16(4): 230–237.
- Ernawati, F., Efriwati, Nurjanah, N., Aji, G. K., Hapsari Tjandrarini, D., Widodo, Y., Retiaty, F., Prihatini, M., Arifin, A. Y., Sundari, D., Rachmalina, R., Salimar, Julianti, E. D., Aidi, M. N., & Syauqy, A. (2023). Micronutrients and Nutrition Status of School-Aged Children in Indonesia. *Journal of Nutrition and Metabolism*, 2023(1).
- Fithria, F., Ramadani, A., Dirahayu, W. O. H., Pini, C. N., Mahmud, I., Kalisi, H., & Andani, N. S. (2024). Gambaran Status Gizi Anak di SD Negeri 1 Poasia Kendari. *Jurnal Kendari Kesehatan Masyarakat*, 4(1): 26–33.
- Galgamuwa, L. S., Iddawela, D., Dharmaratne, S. D., & Galgamuwa, G. L. S. (2017). Nutritional status and correlated socio-economic factors among preschool and school children in plantation communities, Sri Lanka. *BMC Public Health*, 17(1): 1–11.
- Hartian, T. S., Mulyani, S., Hana Harahap, M., & Sari Batu Bara, H. (2022). Pengukuran Status Gizi Pada Anak Pra Sekolah Di TK Asisyah VII Kota Pekanbaru. *Journal of Character Education Society*, 5(1): 198–208.
- Hasan, A. M. R., Selim, M. A., Anne, F. I., Escobar-DeMarco, J., Ireen, S., Kappos, K., Ash, D., & Rasheed, S. (2023). Opportunities and challenges in delivering maternal and child nutrition services through public primary health care facilities in urban Bangladesh: a qualitative inquiry. *BMC Health Services Research*, 23(1): 1–12.
- Insani, P. N. C., Rimbawan, R., & Palupi, E. (2018). Dietary habits and nutritional status among school children in rural and urban areas: A comparative study from Bogor, Indonesia. *Future of Food: Journal on Food, Agriculture and Society*, 6(2): 55–66.
- Jumilia, J., Cleodora, C., & Widyastuti, M. (2023). Analysis of the Impact of Stunting on Psychosocial Development in Pre-School Children in the Working Area Seberang

- Padang Community Health Center. *Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)*, 9(3).
- Marpaung, R. V., Samodra, Y. L., & Harjosuwarno, S. S. (2021). Hubungan Pola Asuh Terhadap Status Gizi Pada Anak Tk Di Kota Yogyakarta. *Jurnal Ilmiah Media Husada*, 10(1): 1–9.
- Permatasari, T. A. E., & Chadirin, Y. (2022). Assessment of undernutrition using the composite index of anthropometric failure (CIAF) and its determinants: A cross-sectional study in the rural area of the Bogor District in Indonesia. *BMC Nutrition*, 8(1): 133.
- Prasetyo, Y. B., Permatasari, P., & Susanti, H. D. (2023). The effect of mothers' nutritional education and knowledge on children's nutritional status: a systematic review. *International Journal of Child Care and Education Policy*, 17(1): 1–16.
- Rahayuwati, L., Nurhidayah, I., Hidayati, N. O., Hendrawati, S., Agustina, H. S., & Ekawati, R. (2019). Analysis of Factor Affecting Nutrition Status on Children. *Jurnal Keperawatan Padjadjaran*, 7(2): 119–133.
- Rysha, A., Gjergji, T. M., & Ploeger, A. (2017). Nutritional status of preschool children attending kindergartens in Kosovo. *Journal of Health, Population and Nutrition*, 36(1), 1–8.
- Safaei, M., Sundararajan, E. A., Driss, M., Boulila, W., & Shapi'i, A. (2021). A systematic literature review on obesity: Understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity. *Computers in Biology and Medicine*, 136.
- Tahapary, P. A., Chodidjah, S., & Rachmawati, I. N. (2023). Peran Ayah terhadap Status Gizi Anak Balita. *Journal of Telenursing (JOTING)*, 5(1): 1205–1214.
- Tang, F., Zhou, M., & Li, B. (2024). Regional and urban–rural differences in childhood growth trajectories and the role of family in China. *Scientific Reports*, 14(1): 1–10.
- Thurstans, S., Opondo, C., Seal, A., Wells, J. C., Khara, T., Dolan, C., Briend, A., Myatt, M., Garenne, M., Mertens, A., Sear, R., & Kerac, M. (2022). Understanding Sex Differences in Childhood Undernutrition: A Narrative Review. *Nutrients* 2022, 14(5): 948.