



Balanced Nutrition Menu Education During Fasting to Support the Learning Process of Islamic Boarding School Students

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ABSTRACT

The nutritional intake of students in Islamic boarding schools during Ramadan is often dominated by carbohydrates, with limited attention to balanced macro- and micronutrient consumption. This imbalance may affect health and learning concentration. This community engagement program aimed to enhance students' understanding of balanced nutrition during fasting based on physiological principles. The activity was conducted at Pondok Pesantren Assalafi Al Fithrah Surabaya through three phases: initial survey, interactive educational sessions, and follow-up evaluation. Thirty-one students participated in both pretest and posttest assessments. The results showed an increase in the average knowledge score from 54.19 to 66.77 ($p = 0.005$), indicating a statistically significant improvement. The participatory educational approach proved effective in enhancing students' nutritional literacy. The program suggests that physiology-based nutrition education can serve as a strategic approach to improving health awareness in Islamic boarding schools. Integrating nutrition education into institutional food management policies is recommended to promote sustainable healthy eating habits.

Keywords: Adolescent Health; Balanced Nutrition; Boarding School; Fasting; Health Education; Physiology-Based Learning

INTRODUCTION

During the month of Ramadan, students in Islamic boarding schools (*santri*) observe fasting as part of their religious obligations. In most Islamic boarding schools (*pondok pesantren*), the meals served tend to be dominated by carbohydrate-rich foods, with limited attention to the balance of macronutrients and micronutrients. One such institution is Pondok Pesantren Assalafi Al Fithrah, located at Jl. Kedinding Lor No. 99 Kenjeran, Surabaya. Established in 1985 by Hadhrotusy Syeikh KH. Achmad Asrory Al Ishaqy, this pesantren provides formal and non-formal education ranging from kindergarten to higher education at *Sekolah Tinggi Agama Islam* (STAI).

Physiologically, the human body requires a balance between macronutrients—carbohydrates, proteins, and fats—and micronutrients such as vitamins and minerals to maintain optimal body functions. During fasting, unbalanced food intake can lead to decreased energy levels, dehydration, and impaired physiological function (Amelia & Ahri, 2021). Therefore, understanding the principles of medical physiology related to nutritional needs during fasting is essential. Previous studies have shown that a well-balanced nutritional menu helps maintain stable blood glucose levels, improves

metabolism, and accelerates post-fasting recovery. This can be achieved by consuming foods rich in fiber, protein, and healthy fats, along with sufficient fluid intake to prevent dehydration (Norhasanah & Salman, 2021).

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Furthermore, the intake of vitamins and minerals plays an essential role in supporting the immune system, which may experience a decline during fasting. The availability of balanced meals for *suhoor* and *iftar* is vital to maintaining the body's physiological balance and ensuring good health throughout the fasting month. However, in practice, many people have not yet fully understood the importance of consuming a balanced diet during fasting. Common habits include the consumption of high-calorie but low-nutrient foods and insufficient water intake, which can lead to fatigue, headaches, and digestive problems (Haryati et al., 2021). Therefore, education on balanced nutrition aligned with the body's physiological needs is necessary, especially among students in Islamic boarding schools.

This study is important because few educational interventions have directly targeted the *pesantren* community to improve understanding of nutritional needs during fasting based on physiological principles. The gap lies in the limited awareness among *santri* about the relationship between dietary composition and physiological body functions during fasting. Although previous studies have emphasized the importance of balanced nutrition during Ramadan, there is still a lack of research focusing on *santri* as the primary target of physiology-based nutrition education.

Therefore, this community engagement program aims to enhance students' understanding of the importance of balanced nutrition during fasting and to promote the planning of *suhoor* and *iftar* menus according to medical physiology principles. The objective of this manuscript is to disseminate the results of the educational intervention and to analyze its impact on improving the knowledge of *santri* regarding balanced nutrition during Ramadan. It is expected that through this program, students at Pondok Pesantren Assalafi Al Fithrah will be able to maintain good health and optimize their physical and cognitive performance while observing fasting.

LITERATURE OR CONCEPTUAL REVIEW

Balanced nutrition plays a crucial role in maintaining health and cognitive performance, particularly during fasting periods such as Ramadan. The physiological balance between macronutrients (carbohydrates, proteins, and fats) and micronutrients (vitamins and minerals) is essential to sustain energy, hydration, and overall body function during limited meal times (Amelia & Ahri, 2021; Guyton & Hall, 2021). Unbalanced dietary patterns—especially those dominated by carbohydrates—can lead to fatigue, headaches, and reduced concentration, which may affect learning productivity among students in Islamic boarding schools (*santri*) (Putri et al., 2023).

Previous studies have highlighted that educational interventions on nutrition significantly improve knowledge and dietary behavior among adolescents. For instance, Nadliroh et al. (2021) demonstrated that structured nutrition education increased awareness of healthy eating habits in *pesantren* communities. Similarly, Haryati et al. (2021) found that participatory health education sessions during fasting effectively improved students' understanding of balanced nutrition concepts.

In a broader physiological context, Salamy (2025) explained that fasting induces metabolic adaptations that require optimal nutrient composition to maintain homeostasis. Consuming balanced meals rich in fiber, protein, and healthy fats helps stabilize blood glucose and enhances recovery after fasting hours. This perspective aligns with findings by Kusumawati et al. (2019) and Parewasi et al. (2021), who emphasized that adequate intake of macronutrients directly influences adolescent nutritional status and endurance.

Educational approaches within the *pesantren* context must also consider the social and cultural environment. Mulyadi (2021) highlighted that participatory and contextual education—especially through interactive workshops—was effective in improving knowledge retention and behavior change among educators and students in *Pondok Pesantren Assalafi Al Fithrah*. The integration of such community-based models aligns with health promotion principles proposed by Hutajulu et al. (2022), which emphasize active engagement of beneficiaries to ensure sustainable outcomes.

Based on these studies, the literature supports the hypothesis that physiology-based nutrition education can bridge the knowledge gap among *santri*, improve dietary behavior during Ramadan,

and enhance both physical well-being and academic focus. However, the existing literature shows a limited number of interventions specifically targeting the *pesantren* environment, thus highlighting the novelty and necessity of this study.

MATERIALS AND METHODS

This community engagement study was conducted at *Pondok Pesantren Assalafi Al Fithrah*, located at Jl. Kedinding Lor No. 99, Kenjeran, Surabaya, Indonesia. The pesantren serves as both an Islamic educational institution and a boarding facility that accommodates students (*santri*) from various regions across Indonesia. As part of its religious curriculum, the institution regularly conducts fasting activities during the month of Ramadan. The program was designed to assess and improve the nutritional literacy of santri during fasting through a participatory educational approach grounded in medical physiology principles.

The research employed a pre-experimental one-group pretest–posttest design, combining both quantitative and qualitative methods. The study consisted of three main stages: initial survey, educational intervention, and evaluation. Prior to implementation, an initial coordination meeting was held with pesantren administrators and kitchen staff to obtain informed consent and ensure logistical readiness.

In the initial survey stage, participants completed a structured questionnaire to identify their existing knowledge, attitudes, and dietary habits during fasting. The survey instrument was validated by two nutrition experts and pilot-tested for clarity. A total of 31 santri were selected purposively based on inclusion criteria: aged 15–19 years, actively residing in the pesantren, and participating in Ramadan fasting. Data collection was conducted using paper-based questionnaires administered in a classroom setting, with responses subsequently coded and analyzed using descriptive statistics to determine baseline understanding.

The educational intervention stage consisted of interactive seminars and workshops designed to improve students' understanding of balanced nutrition, the composition of macronutrients and micronutrients, and practical dietary planning during fasting. The sessions were delivered using a participatory learning model involving group discussions, visual demonstrations, and nutrition games. Educational materials were adapted from the Indonesian Ministry of Health's balanced nutrition guidelines (*Pedoman Gizi Seimbang*, 2020) and presented using PowerPoint slides and printed handouts. Each educational session lasted approximately 90 min and was facilitated by two nutrition educators from the research team.

The evaluation stage was conducted through pretest–posttest assessments to measure changes in knowledge and behavioral indicators. The same questionnaire used in the initial survey was re-administered after the educational sessions. Data were analyzed using the paired *t*-test to evaluate the significance of differences between pretest and posttest mean scores. A significance level of $p < 0.05$ was considered statistically significant. In addition, a follow-up survey was conducted two weeks after the intervention to assess changes in eating habits and to document feedback from santri and kitchen staff.

Throughout the program, active participation from students, teachers, and kitchen staff was strongly encouraged. Approximately 50 participants were directly involved, including 31 santri, 10 kitchen staff members, and 9 educators or supervisors. Their involvement included attending educational sessions, participating in discussions, and applying newly acquired nutritional knowledge in daily meal planning and preparation.

The program's success indicators were defined as follows: (1) at least 80% of santri completing the initial survey, (2) a minimum of 75% demonstrating improved understanding based on pretest–posttest comparison, and (3) at least 60% reporting positive changes in dietary habits following the intervention. The findings were later used to propose recommendations for integrating balanced

nutrition principles into the pesantren's kitchen policy, ensuring sustainable dietary improvements aligned with physiological and health standards.

RESULTS AND DISCUSSION

The community health education program on balanced nutrition was implemented for *santri* at *Pondok Pesantren Assalaḥi Al Fithrah* in Surabaya. To evaluate the impact of the intervention, pretest and posttest knowledge assessments were conducted with 31 participants. The descriptive statistics of the scores are presented in Table 1.

Table 1. Descriptive statistics of pretest and posttest scores of santri participants

Statistic	Pretest	Posttest
Number of data	31	31
Mean	54.19	66.77
Standard deviation	24.33	25.87
Minimum	10	0
Quartile 1 (Q1)	35	55
Median (Q2)	50	80
Quartile 3 (Q3)	75	80
Maximum	100	100

The analysis revealed an average increase of 12.58 points following the educational intervention, from 54.19 (pretest) to 66.77 (posttest). A paired *t*-test showed a statistically significant difference between the two measures ($t = -3.015$; $p = 0.005$), indicating that the intervention effectively improved participants' knowledge.

Figure 1 illustrates the comparison of pretest and posttest scores using boxplots. The median score in the posttest is higher, and the distribution is more concentrated toward the upper range, indicating enhanced understanding among participants.

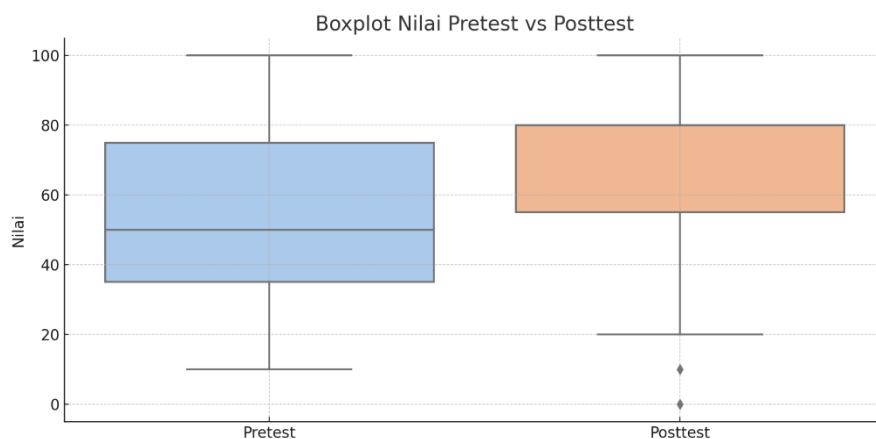


Figure 1. Boxplot of pretest and posttest scores of *santri* participants

The significant increase in mean posttest scores demonstrates that the balanced-nutrition education program had a measurable and positive impact on students' understanding of nutritional principles during fasting. These findings are consistent with Nadliroh et al. (2021), who reported that *santri* receiving structured educational interventions displayed superior comprehension of macro- and micronutrient needs during Ramadan.



Figure 2. Documentation of community engagement activities at *Pondok Pesantren Assalaifi Al Fithrah*

DISCUSSION

Students in Islamic boarding schools typically live within highly structured and religiously intensive environments. Limited nutritional awareness and restricted access to diverse food sources often lead to diets dominated by carbohydrates, with insufficient intake of protein, vitamins, and minerals (Putri et al., 2023). Educational interventions such as this one serve as bridges to close the knowledge gap and foster behavioral changes—specifically in menu planning and proportional energy intake.

These results are supported by Rinawati et al. (2019), who highlighted the importance of food management education in pesantren settings for improving balanced dietary intake during *suhoor* and *iftar*. Likewise, Febrianty (2023) found a positive correlation between nutrition knowledge, macronutrient adequacy, and the nutritional status of adolescent *santri*.

The participatory approach implemented in this program, involving *santri*, educators, and kitchen staff, aligns with the model of community-based health promotion that emphasizes active engagement of beneficiaries to increase program effectiveness (Hutajulu et al., 2022). This finding resonates with Mulyadi (2021), who previously conducted a *Training for Trainer* program at *Pondok Pesantren Assalaifi Al Fithrah* focusing on COVID-19 prevention. Their study showed that participatory training using pretest–posttest evaluation significantly improved health literacy among educators, supporting the importance of contextual, experience-based health education in pesantren communities.

From a physiological perspective, the educational content of this program is consistent with the findings of Salamy (2025), who reviewed the impact of intermittent fasting on women’s hormonal and metabolic regulation. Their work emphasized that fasting affects hormonal balance, energy metabolism, and overall physiological stability—scientific evidence that strengthens the relevance of integrating physiology-based nutrition education for *santri* during Ramadan. By connecting physiological theory with practical dietary guidance, this program successfully translated scientific concepts into actionable habits within a pesantren setting.

Additional supporting evidence comes from Hariati (2021), who reported that nutritional education in *Pesantren Tebuireng* reduced the incidence of anemia and underweight conditions among adolescent girls. Similarly, Cahyani (2022) found that balanced meal plans during fasting help maintain energy and concentration among *santri*. Adequate hydration, as emphasized by Kusumawati et al. (2019), also plays a key role in preventing dehydration-related fatigue during fasting. Parewasi et al. (2021) demonstrated that structured *suhoor* and *iftar* scheduling contributes to maintaining physical and cognitive performance in pesantren environments.

Taken together, these findings indicate that physiology-based and participatory education programs are effective in enhancing both understanding and behavioral outcomes related to nutrition

during fasting. Integrating such programs into institutional food management policies is recommended to ensure sustainable improvements in students' health and dietary practices. Future initiatives can replicate this model in other pesantren with contextual adjustments to local resources and community needs.

CONCLUSIONS

The educational program on balanced nutrition during fasting, implemented at *Pondok Pesantren Assalaft Al Fithrah*, proved effective in enhancing the *santri*'s knowledge regarding the importance of adequate macro- and micronutrient intake based on physiological principles during Ramadan. A statistically significant increase in knowledge scores after the intervention confirmed the success of the participatory educational approach in delivering health-related content to adolescents within the pesantren environment.

This activity made a valuable contribution in addressing the existing nutritional knowledge gap among *santri*, who traditionally tend to focus on carbohydrate-dominant meals with less attention to nutrient balance. Through a physiology-based and collaborative educational strategy between the implementation team and the pesantren administration, the program successfully influenced the development of more balanced and healthier *suhoor* and *iftar* meal planning.

Looking forward, similar initiatives can be replicated in other Islamic boarding schools as a model of community-based education aimed at fostering sustainable healthy behavior change. Integrating such programs into pesantren kitchen policies, coupled with long-term monitoring, is essential to ensure that nutritional education translates not only into improved knowledge but also into consistent healthy eating practices within the pesantren community.

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Conflict of Interests

The authors declared that no potential conflicts of interest with respect to the authorship and publication of this article.

REFERENCES

- Amelia, A. P., & Ahri, R. A. (2021). Gizi seimbang pada saat puasa untuk meningkatkan imunitas di masa pandemi COVID-19 pada ibu di Desa Tonasa Kabupaten Gowa. *Idea Pengabdian Masyarakat*, 1(2), 94–99. <https://doi.org/10.53690/ipm.v1i01.67>

- Cahyani, D. E. R. N. (2022). *Hubungan pola makan, tingkat kecukupan protein, dan tingkat stres dengan status gizi pada remaja putri Pondok Pesantren Nurul Burhany 2 Mranggen, Demak* [Undergraduate thesis, UIN Walisongo Semarang].
- Febrianty, H. (2023). *Hubungan kejadian diare, pengetahuan gizi seimbang dan tingkat kecukupan zat gizi makro terhadap status gizi pada remaja putri di Pondok Pesantren Darud Da'wah Wal Irsyad Mangkoso Kabupaten Barru Sulawesi Selatan* [Undergraduate thesis, UIN Walisongo Semarang].
- Guyton, A. C., & Hall, J. E. (2021). *Textbook of medical physiology* (14th ed.). Elsevier.
- Hariati, N. W. (2021). Determinan masalah gizi remaja di Pondok Pesantren Tebuireng (studi kualitatif). *Jurnal Ilmiah Kesehatan (JIKa)*, 3(2), 86–98. <https://doi.org/10.36590/jika.v3i2.152>
- Haryati, A., Purba, A., & Putra, T. (2021). Penyuluhan gizi seimbang saat puasa di SMK Al Maksum Langkat. *Jurnal Pengabdian Kepada Masyarakat (JPKM)*, 2(2), 23–29.
- Hutajulu, L. M. V., Dieny, F. F., Probosari, E., & Tsani, A. F. A. (2022). Status gizi dan anemia kaitannya dengan kebugaran tubuh santriwati di Pondok Pesantren Askhabul Kahfi Kota Semarang. *Gizi Indonesia*, 45(1), 23–34. <https://doi.org/10.36457/gizindo.v45i1.568>
- Kusumawati, D., Rimbawan, R., & Ekayanti, I. (2019). Pengaruh program makan siang terhadap asupan makanan, status anemia dan perilaku gizi santri perempuan. *Media Kesehatan Masyarakat Indonesia*, 15(1), 7–13. <https://doi.org/10.30597/mkmi.v15i1.5769>
- Matin, N. S., & Mulyadi. (2021). *Training for Trainer: Meningkatkan kesiapan dan pemahaman edukator di Pondok Pesantren Assalafi Al Fithrah Surabaya terhadap COVID-19*. Fakultas Kedokteran, Universitas Nahdlatul Ulama Surabaya. <https://snpm.unusa.ac.id>
- Murray, R. K., Bender, D. A., Botham, K. M., Kennelly, P. J., Rodwell, V. W., & Weil, P. A. (2018). *Harper's illustrated biochemistry* (31st ed.). McGraw-Hill Education.
- Nadliroh, K. A., Susanti, N., & Indrawan, H. D. G. D. (2021). *Pesantren Sehat* (Issue October).
- Norhasanah, N., & Salman, Y. (2021). Penyuluhan gizi online dengan media video audio visual “Tetap Fit Saat Puasa dan Pasca Puasa dengan Gizi Seimbang.” *Jurnal Abdimas Kesehatan (JAK)*, 3(1), 33–38. <https://doi.org/10.36565/jak.v3i1.147>
- Parewasi, D. F. R., Indriasari, R., Hidayanty, H., Hadju, V., & Battung, S. M. (2021). Hubungan asupan energi dan zat gizi makro dengan status gizi remaja putri pesantren Darul Aman Gombara. *The Journal of Indonesian Community Nutrition*, 10(1), 1–23.
- Putri, N. I. W. B., Hakimah, N., & Cerdasari, C. (2023). Pola menu, kesesuaian besar porsi, serta ketersediaan energi dan zat gizi makro di Pondok Pesantren Kanjeng Sunan Kalijogo. *Jurnal Nutriture*, 2(1), 60–66.
- Rinawati, W., Marwanti, M., Nugraheni, M., Auliana, R., Yuriani, Y., & Anggraeni, A. A. (2019). Pelatihan pengelolaan makanan bagi penyelenggara makanan di Pondok Pesantren Rumah Tahfidzqu Deresan Yogyakarta. *Proceeding Teknik Pendidikan Boga Busana*.
- Sediaoetama, A. D. (2020). *Ilmu gizi untuk mahasiswa dan profesi di Indonesia* (Edisi revisi). Dian Rakyat.
- Soekirman. (2019). *Ilmu gizi dan aplikasinya untuk mahasiswa dan profesi di Indonesia* (2nd ed.). Direktorat Jenderal Pendidikan Tinggi, Kementerian Pendidikan dan Kebudayaan.
- Witris Salamy, N. F., & Matin, N. S. (2025). The effect of intermittent fasting on women's hormonal and reproductive health: A literature review. *Jurnal Pendidikan Kedokteran dan Kesehatan*, 10(1), 1–12.

World Health Organization. (2021). *Guideline: Balanced and healthy diet to prevent noncommunicable diseases*. WHO Press.