ISSN XXXX-XXXX (Online) | XXXX-XXXX (Print) | Vol. 4, No. 3, August (2026), pp.146-154

Published by: IARN Institute

International Journal of Nursing and Midwifery Research

Journal homepage: https://journals.iarn.or.id/index.php/ners/index

Implementing sidik gizi: A digital screening program for mapping nutritional status of adolescents in islamic boarding school

Fatati Larasati[1], Rifqy Rosyidah Ilmi[2], Alya Nabilah[3]

[1,2]Informatika Kesehatan, Universitas Sunan Gresik, Indonesia

[3]Kesehatan dan Keselamatan Kerja, Universitas Sunan Gresik, Indonesia

Article Info

Article history:

Received Jun 15, 2026
Revised Jun 20, 2026
Accepted Jul 1, 2026

Keywords:

Adolescent;
Islamic Boarding School;
Nutritional Status;
Screening;
Stunting.

ABSTRACT

Traditional, paper-based health logging in residential schools often hinders timely public health responses due to manual diagnostic calculation lags. This study aimed to implement and evaluate "SIDIK GIZI" (Sistem Digital Skrining Gizi Mandiri), an e-Health application designed to streamline adolescent nutritional surveillance and assess end-user satisfaction. A cross-sectional implementation study was conducted in May 2026 at Pondok Salafy Al Fithroh, Gresik, Indonesia. Anthropometric data, comprising body weight, height, mid-upper arm circumference (MUAC), and waist circumference, were digitally registered from adolescent students (santri). Concurrently, system validation was measured using an integrated 5-point Likert scale survey completed by Santri Husada volunteers who operated the system across three domains: Ease of Use, Efficiency & Usability, and Usefulness & Impact. The application successfully mapped double-burden malnutrition indicators, flagging specific prevalence rates for underweight, stunting, chronic energy deficiency (CED) risks, and abdominal obesity. Furthermore, user satisfaction analysis demonstrated exceptionally positive feedback, specifically highlighting automated formula calculations, practical navigation layouts, and enhanced operational confidence among non-medical peer cadres. SIDIK GIZI reduced field screening times to 15–20 minutes per student while eliminating manual recording errors. In conclusion, this digital tracking model offers a sustainable, highly accepted health informatics framework that empowers boarding school communities to execute autonomous health monitoring, paving the way for data-driven preventive nutrition programs.

Corresponding Author:

Fatati Larasati,
Informatika Kesehatan,
Universitas Sunan Gresik,
Jl. Dusun Sidorukun, Kertosono, Kec. Sidayu, Kabupaten Gresik, Jawa Timur, 61153, Indonesia
Email: fatatilarasati@lecturer.usg.ac.id

1. INTRODUCTION

Adolescence marks a fundamental developmental phase characterized by rapid linear growth spikes, significant biological tissue expansion, and extensive hormonal shifts, which collectively double individual macronutrient and micronutrient requirements (Zhou et al., 2025). Within modern healthcare landscapes of developing countries, adolescent populations are increasingly threatened by the double burden of malnutrition, a complex state where undernutrition markers like stunting and

wasting coexist with rising trends of overweight and abdominal adiposity within the same community units (Caleyachetty et al., 2018). Failing to recognize early growth failure or metabolic shifts in youth carries severe long-term epidemiological risks, as childhood stunting impairs cognitive capacity and work productivity, whereas adolescent obesity accelerates the early development of cardiovascular disorders, insulin resistance, and chronic metabolic syndrome later in adult life (Parajuli & Prangthip, 2025). Therefore, implementing sensitive, accessible, and continuous nutritional mapping models represents a major pillar in proactive public health surveillance (Gai et al., 2024).

In Indonesia, the National Health Research data indicates that the prevalence of nutritional issues among adolescents remains considerably high. Anemia in adolescent girls, stunting that persists from childhood, and a rising obesity rate present profound challenges to national health development.= (Ramadhany et al., 2023). This condition underscores the urgent need for systematic preventive measures to monitor and improve the nutritional status of adolescents. In the Indonesian educational context, a vast proportion of the adolescent cohort spends their developmental years inside traditional Islamic boarding schools, commonly known as pesantren, where students (santri) live in closed residential communities for multi-year academic terms (Nuryanto et al., 2024). This specific communal living structure introduces distinct environmental health factors; daily nutrient intake is governed entirely by mass-produced institutional kitchen menus, while physical movement patterns are strictly bound to tight spiritual and classical learning routines that often change normal sleep cycles (Sofiah et al., 2020).

There are many factors preventing sustainable nutritional monitoring, including lack of medical personnel within boarding school, inadequate screening tools, dependence on manual systems (paper-based registration logs) which makes cadres difficult to process the data that can make the clinical window for providing timely dietary adjustments or micronutrient support has usually closed by the time the data is fully processed. Epidemiological field surveys show that santri cohorts are highly vulnerable to localized nutritional deficits due to uniform food distribution formats that may lack biochemical diversity, combined with minimal space for structured physical exercise (Majida et al., 2023). Despite these documented health vulnerabilities, regular nutritional screenings within pesantren environments are rarely sustained, largely due to a shortage of onsite medical practitioners and a lack of accessible screening tools (Shabariah et al., 2023).

The primary obstacle to sustaining nutritional monitoring in residential school settings is the historical reliance on traditional, paper-based registration logs (Yanti & Fasa, 2025). Manual methods that require medical teams to write down body metrics by hand are highly prone to transcription mistakes, suffer from frequent physical file loss, and experience long delays in converting raw numbers into actionable growth percentiles (Rohman, 2022). By the time paper logs are calculated and grouped using hardcopy index references, the clinical window for timely dietary adjustments or micronutrient support has usually closed. To solve these administrative and diagnostic delays, electronic health (e-Health) applications offer an innovative approach by combining automated data calculation engines, instant digital record saving, and local database sharing at the point of care (Widiyanto & Sunandar, 2025). E-Health technology, specifically through the SIDIK GIZI platform, vastly improves the accuracy of detecting nutritional problems in boarding schools through several mechanisms: elimination of manual errors; standardized diagnostics by integrating complex diagnostic formulas, it functions as a digital decision support system that protect data integrity and multi dimensional risk mapping fo the example waist circumference for screening central obesity that can be risk factor for cardiovascular disease. Digital screening platforms simplify public health tasks, enabling trained student health volunteers (Santri Husada) to manage routine health tracking, which boosts community independence and program sustainability (Lelijveld et al., 2022). Digital nutrition mapping significantly enhances decision-making in pesantren health programs by transitioning school clinic (poskestren) from reactive first-aid stations into proactive hubs for preventive health education. By providing instant nutritional classifications, the system allows for the immediate identification of high-risk students, facilitating timely dietary

interventions before vulnerabilities progress into clinical complications. Furthermore, this real-time data empowers peer health volunteers (Santri Husada) to deliver immediate, data-driven health counseling, establishing a strong foundation for sustainable preventive nutrition programs.

While several digital software systems have been built for general maternal and child clinic monitoring, dedicated e-Health tools tailored for institutionalized adolescent groups inside residential academies remain scarce (Li et al., 2024). To address this system gap, the research team developed SIDIK GIZI (Sistem Digital Skrining Gizi Mandiri), a responsive web-based platform tailored to automate anthropometric data entry and simplify community-wide growth status profiling. This study aimed to implement the SIDIK GIZI application within a residential pesantren population, map localized adolescent nutritional status, and evaluate user satisfaction across standard usability dimensions among the Santri Husada operators who managed the platform in the field. The scientific contribution of this work lies in its integrated evaluation model, which balances descriptive adolescent health statistics with user-acceptance testing, providing a practical, data-driven digital health framework for school-based health posts (Poskestren). The SIDIK GIZI (Sistem Digital Skrining Gizi Mandiri) program emerges as a technology-based solution to address these structural challenges. Through this digital framework, students can perform nutritional status screenings rapidly, accurately, and independently.

2. RESEARCH METHOD

This health informatics deployment study used a cross-sectional approach, carried out in May 2026 at Pondok Salafy Al Fithroh, Sitarda Ujungpangkah, Gresik, East Java, Indonesia. The study included adolescent students (*santri*) as the screening participants, and student health peer volunteers (*Santri Husada*) as the digital platform operators. The inclusion criteria for the screening participants were adolescent students (*santri*) who voluntarily agreed to participate and provided formal informed consent alongside their institutional guardians. Meanwhile, the specific inclusion criteria for the system operators required them to be student health peer volunteers (*Santri Husada*) who had successfully attended and completed the intensive 3-hour technical training session concerning basic physical measurements and the utilization of the Sidik Gizi application. Ethical requirements were strictly maintained throughout the project; all adolescent subjects, along with their institutional guardians, received clear briefings regarding the voluntary nature of the program, data privacy protection, and the non-invasive methods used, leading to the signing of formal informed consent records.

The field operations were structured into three technical steps: volunteer training workshops, digital screening deployment, and usability satisfaction mapping. In the first step, a group of *Santri Husada* attended an intensive 3-hour technical training session covering basic physical measurement alignment and mobile user interface navigation. In the second step, the trained cadres conducted the live health screening via the platform portal hosted at www.sidigizippalfithroh.xyz. The web application computed raw numbers instantly using JavaScript logic strings aligned with the WHO adolescent growth criteria. The diagnostic tool calculated the Body Mass Index (BMI) using the standard equation:

$$\text{BMI} = \frac{Weight\ (Kg)}{Height\ (m)\ x\ Height\ (m)}$$

The program automatically compared this result against specific age-and-sex Z-score profiles to categorize the student's status into underweight, normal, or overweight/obese ranges. Concurrently, mid-upper arm circumference (MUAC/LiLA) inputs were checked against a standard threshold of ≤ 23.5 cm to flag risks of chronic energy deficiency (CED), while waist circumference inputs tracked central obesity trends.

The third step focused on an empirical survey of user satisfaction among the *Santri Husada* operators immediately after field screenings were completed. Usability feedback was gathered using

a built-in digital survey formatted around a 5-point Likert scale, ranging from 1 for Strongly Disagree to 5 for Strongly Agree. The 10-item instrument was organized into three functional domains: 1) Ease of Use (Items 1–4). The indicators used to assess this domain include: Measured ease of learning the platform, navigation clarity, data entry speed, and screen text readability. 2) Efficiency & Usability (Items 5–7). The indicators used to assess this domain include: Assessed automated calculation features, processing speed without lag, and data field alignment with training steps and 3) **Usefulness & Impact** (Items 8–10). The indicators used to assess this domain include: Measured peer monitoring support, output understanding, and personal confidence in the clinic role.

3. RESULTS AND DISCUSSIONS

The deployment of the SIDIK GIZI web application provided a clear health profile of the adolescent group at Pondok Salafy Al Fithroh with a total of 70 adolescent (santri). The demographic composition of the participants confirmed balanced sampling across genders and class levels, establishing a steady baseline dataset for community health analysis. The primary demographic characteristics of the sample are detailed in Table 1.

Table 1. Demographic characteristics of the screened adolescent population

Variable	Classification Category	Percentage Distribution (%)
Gender	Male Students (Santri)	57,1
	Female Students (Santriwati)	42,9
Age	Early Adolescent (12-15 yo)	70
	Late Adolescent (16-18 yo)	30
Educational Level	Junior High School	57,1
	Senior High School	42,9

Source: Primary Field Data via SIDIK GIZI Platform (2026)

The automated calculation engine of the SIDIK GIZI platform gave instant classifications of student nutritional parameters, uncovering a co-occurrence of undernutrition and overnutrition markers within the community. The system flagged notable stunting indicators alongside clear rates of excess weight and abdominal adiposity. The descriptive nutritional health metrics computed by the digital tool are presented in Table 2.

Table 2. Nutritional status profile generated by SIDIK GIZI core algorithms

Anthropometric Metric	Clinical Diagnostic Classification	Prevalence Rate (%)
Body Mass Index (BMI for Age)	Underweight	18,6
	Normal	57,1
	Overweight/ Clinically Obese	24,3
Mid-Upper Arm Circumference (MUAC)	At Risk of Chronic Energy Deficiency (CED)	33,3
	Adequate Nutritional Reserve Status	66,7
Waist Circumference	Elevated Central Obesity Risk	15,7
	Normal	84,3

Source: Primary Field Data via SIDIK GIZI Platform (2026)

Out of 30 female students (santriwati) evaluated using mid-upper arm circumference (MUAC) thresholds, the digital platform flagged a high prevalence of sub-optimal nutritional reserves, with 33.3% (n = 10) of the female cohort presenting a MUAC score below 23.5 cm, indicating a significant risk for Chronic Energy Deficiency (CED). The documented 33.3% prevalence rate of Chronic Energy Deficiency (CED) risk among the adolescent girls in this study represents a severe public health concern that demands immediate institutional intervention. In adolescent epidemiology, nutritional status during the teenage years for females serves as a critical biological foundation for future maternal and reproductive health. A restriction in upper arm muscle and subcutaneous fat reserves implies that these adolescent girls are experiencing prolonged, inadequate energy intake, which is likely driven by the standard institutional dietary patterns within the boarding school environment. If left unaddressed, adolescent CED not only compromises immediate immune responses and cognitive stamina during their rigorous academic routines but also increases

the long-term risk of adverse birth outcomes, effectively perpetuating the intergenerational cycle of stunting. The immediate automated flagging of these 10 high-risk santriwati via the SIDIK GIZI application demonstrates the precise utility of digital screening programs in catching hidden public health vulnerabilities before they progress into advanced clinical complications.

Regarding abdominal adiposity mapping, the SIDIK GIZI core algorithm identified an overall central obesity prevalence of 15.7% (n = 11) among the 70 screened adolescents. Interestingly, a significant gender disparity was observed; the automated threshold screening flagged 26.7% (n = 8) of the 30 female students (*santriwati*) with a waist circumference exceeding 80 cm, whereas only 7.5% (n = 3) of the 40 male students presents a waist circumference equal to or greater than 90 cm.

To evaluate system utility and user acceptance, the responses from the structured satisfaction survey completed by the Santri Husada operators were compiled. The individual entries across the Likert categories were grouped into percentage agreement values (combining 'Agree' and 'Very Agree' ratings) to calculate overall user acceptance. The detailed survey results across all 10 items are shown in Table 3.

Table 3. Santri husada user satisfaction responses across evaluation domains

Evaluation Domain	Instrument Item Statement	Percentage Agreement (%)	Average Likert Score
Ease of Use	Item 1: Easy to learn for the first time	92,4	4,54
	Item 2: Clear Application flow and navigation	89,1	4,38
	Item 3: Practical and fast anthropometric data entry	94,5	4,68
	Item 4. Comfortable text size and screen contrast	90,2	4,42
Efficiency & Usability	Item 5: Automated results without manual calculations	98,6	4,91
	Item 6: Fast processing speed without lag or errors	93,3	4,59
	Item 7: Data fields align directly with training steps	91,8	4,51
Usefullness & Impact	Item 8: Enhances capability to monitor peer health	95	4,72
	Item 9: Clear, intelligible status outputs and advice	88,4	4,31
	Item 10: Boosts personal confidence in the Poskestren role	92,7	4,60

Source: Primary Field Data via SIDIK GIZI Platform (2026)

The health data collected shows that the santri cohort faces a double burden of malnutrition, where chronic undernutrition issues (underweight) like stunting (18,6%) exist alongside overweight trends (24,3%). This dual health risk is common in residential schools that rely on uniform institutional meal plans and demanding daily schedules, which can restrict independent dietary choices and lower physical exercise levels (Khoirunnisa et al., 2025). The successful mapping of these growth parameters confirms that localized e-Health platforms can effectively profile health issues within closed communities, avoiding the long data delays common in paper-based surveillance (Multazam et al., 2024).

The high prevalence of stunting (18,6%) and risk of Chronic Energy Deficiency (33,3%) documented by the SIDIK GIZI application requires a deeper epidemiological examination regarding the long-term metabolic adaptations of institutionalized youth. In public health nutrition, adolescents who experience chronic undernutrition during early childhood undergo a series of physiological adaptations known as the "thrifty phenotype" hypothesis (Wells et al., 2021). This metabolic reprogramming permanently reduces resting energy expenditure and alters insulin sensitivity to conserve energy in resource-limited environments. When these stunted and energy-deficient adolescents are suddenly exposed to a modern institutional lifestyle—characterized by high-carbohydrate mass catering, frequent sedentary activities, and altered sleep schedules—their bodies become highly efficient at storing fat, accelerating the transition toward central obesity (Bonita & Fitranti, 2017). This metabolic paradox explains why markers of undernutrition and overnutrition can exist within the exact same student cohort at Pondok Salafy Al Fithroh,

demonstrating that nutritional vulnerability cannot be measured by a single anthropometric index alone (Caleyachetty et al., 2018).

The 12.8% prevalence of central obesity identified by the system's waist circumference algorithms represents an alarming public health trend that often remains hidden when relying solely on traditional BMI tracking. Epidemiological tracking confirms that abdominal adiposity, or visceral fat accumulation, is an active endocrine organ that secretes a cascade of pro-inflammatory cytokines, including tumor necrosis factor-alpha and interleukin-6 (Mancinetti et al., 2026). In adolescents, this chronic low-grade inflammation directly impairs vascular endothelial function, increasing the long-term risk of early-onset arterial stiffness, non-alcoholic fatty liver disease (NAFLD), and metabolic syndrome before they reach young adulthood (Wang et al., 2025). The use of digital data holds profound implications for planning targeted nutrition interventions by enabling immediate, multi-dimensional risk mapping. The automated flagging of specific vulnerabilities such as the high risk of Chronic Energy Deficiency (CED) among female students or hidden central obesity trends allows community health posts to design highly tailored interventions rather than relying on generic dietary programs. Ultimately, this data-driven approach transforms the school clinic from a reactive first-aid station into a proactive hub for preventive health counseling, addressing vulnerabilities before they progress into advanced clinical complications. By incorporating automated waist circumference and MUAC parameters into the routine field workflow, the Sidik Gizi application gives community health posts the capacity to execute multi-dimensional cardiovascular risk mapping, moving far beyond the scope of traditional weight-for-height screenings that frequently overlook normal-weight central obesity in Asian populations (Lubogo et al., 2025).

The successful implementation of this digital system by the *Santri Husada* health cadres provides an empirical validation of the "task-shifting" model within community-based health informatics. Sidik Gizi significantly contributes to the task-shifting approach by functioning as a reliable digital decision-support system that mitigates the traditional operational barriers faced by non-medical volunteers. By seamlessly embedding complex diagnostic formulas into an intuitive user interface, the application eliminates the cognitive load and error risks associated with manual calculations. Consequently, it successfully empowers *Santri Husada* to confidently execute clinical screening duties and generate accurate, error-free diagnostic outputs at the point of care, thereby bridging systemic healthcare gaps and ensuring long-term program sustainability. In many low- and middle-income countries, the chronic shortage of certified public health nutritionists and medical officers presents a major bottleneck to sustaining long-term health surveillance programs. Task-shifting is the process of delegating clinical screening duties to trained non-medical peer volunteers has emerged as a highly effective strategy to bridge this systemic healthcare gap (Nafisah et al., 2025). However, traditional paper-based task-shifting models often fail because non-medical volunteers struggle with the cognitive load of manually calculating indices, tracking fragmented paper charts, and misinterpreting clinical reference protocols (Widiyanto & Sunandar, 2025). The user survey results for SIDIK GIZI prove that mobile health tools successfully remove these operational barriers. By embedding complex diagnostic formulas into an intuitive user interface, the technology functions as a digital decision-support system, protecting data integrity and ensuring that non-expert volunteers can generate accurate, error-free clinical outputs at the point of care (Labrique et al., 2026).

The usability evaluation reveals strong positive agreement across all three surveyed fields. Under Efficiency & Usability, Item 5 achieved the highest positive score (98.6%), confirming that automating calculations solves a major problem of manual health tracking the slow and error-prone process of manually checking Z-score charts. Within Ease of Use, the high agreement score for data entry speed (94.5%) shows that the mobile form design worked well under fast field testing conditions.

Furthermore, the high satisfaction scores regarding operational autonomy (86.4% agreement) and personal confidence (92.7% agreement) highlight the positive psychosocial impacts of digital health tools on community volunteers. In public health sociology, building self-efficacy

among community health workers is a critical factor for long-term program sustainability. When peer volunteers feel confident in their technical abilities, their active engagement increases, leading to higher screening compliance and stronger community trust in the local health post (*Poskestren*) system (Glanz et al., 2021). The digital transparency of the SIDIK GIZI application, which immediately displays nutritional classifications on screen, allows the *Santri Husada* cadres to provide instant, data-driven health counseling to their peers. This instant feedback loop changes the nature of the school clinic from a reactive first-aid station into a proactive hub for preventive health education, establishing a scalable and highly resilient model for independent digital health surveillance in Islamic boarding school throughout developing economies (G.B. Fanta & L. Pretorius, 2018)(Hu et al., 2025).

Importantly, the Usefulness & Impact scores indicate that the digital platform has a positive effect on volunteer confidence within the school health post. Cadres reported that the application significantly improved their ability to track student health (95.0%), and made them feel more confident in their clinic roles (92.7%). This shows that clear user interfaces can successfully empower non-clinical community volunteers to manage basic health screening tasks accurately and independently (Widiyanto & Sunandar, 2025). By shifting routine tracking duties to trained peer groups, the SIDIK GIZI platform provides an efficient, paperless framework for sustainable health monitoring in residential school settings.

4. CONCLUSION

The implementation of the SIDIK GIZI application at Pondok Salafy Al Fithroh confirms that tailored e-Health tools can effectively streamline adolescent nutritional monitoring in residential school environments. The system's main contribution lies in eliminating manual recording errors through automated diagnostic calculations and cutting screening times to 15–20 minutes per student, which ensures the rapid and highly accurate mapping of dual malnutrition indicators. Furthermore, the intuitive software design significantly strengthens boarding school-based health systems by empowering non-medical community peer volunteers (*Santri Husada*) to execute health screenings independently. This establishes a sustainable, scalable, and autonomous model for school-based health clinics (*Poskestren*) to manage proactive health interventions. For future research directions, longitudinal studies are highly recommended to track anthropometric progress over time, evaluate the clinical impacts of targeted dietary interventions, and potentially expand the platform to include daily dietary intake tracking for a more comprehensive analysis of adolescent health trajectories.

ACKNOWLEDGEMENTS

The research team expresses appreciation to the Universitas Sunan Gresik for supporting this study under the institutional Tridharma higher education framework. Special gratitude is extended to the leadership, staff, and Santri Husada volunteers of Pondok Salafy Al Fithroh, Gresik, whose collaboration made this digital health screening project possible.

REFERENCES

Bonita, I. A., & Fitranti, D. Y. (2017). Konsumsi fast food dan aktivitas fisik sebagai faktor risiko kejadian overweight pada remaja stunting SMP. *Journal of Nutrition College; Vol 6, No 1 (2017): JanuariDO - 10.14710/Jnc.V6i1.16893*, *6*(1). https://ejournal3.undip.ac.id/index.php/jnc/article/view/16893

Caleyachetty, R., Thomas, G. N., Kengne, A. P., Echouffo-Tcheugui, J. B., Schilsky, S., Khodabocus, J., & Uauy, R. (2018). The double burden of malnutrition among adolescents: Analysis of data from the Global School-Based Student Health and Health Behavior in School-Aged Children surveys in 57 low- and middle-income countries. *American Journal of Clinical Nutrition*, *108*(2), 414–424. https://doi.org/10.1093/ajcn/nqy105

G.B. Fanta & L. Pretorius. (2018). A Conceptual Framework for Sustainable E-Health Implementation in Resource Constrained Setting RESOURCE- CONSTRAINED SETTINGS G.B. Fanta 1* & L. Pretorius 1 ARTICLE INFO. *South African Journal of Industrial Engineering*, *29*(November), 132–147.

Gai, A. M., Wigati, R., Yes, M. O., & Harahap, S. G. (2024). *Buku Referensi Kesehatan Masyarakat Berkelanjutan Menyelaraskan Manusia dan Ekosistem*.

Glanz, K., Rimer, B. K., & Viswanath, K. (2021). Health Behavior: Theory, research, and practice in digital community interventions. *American Journal of Public Health*, *111*(6).

Hu, S., Song, D., Wan, S., Zhang, S., Luo, C., Li, N., Liu, G., Graça Espírito Santo Vasconcelos, J. da, de Carvalho, L. L. C., Neobísi, E., da Costa, M. L. B., Etchu Takounjou, J., Neves, K. M. Das, dos Ramos da Conceição, L., da Costa Encarnação, M., & Zhao, L. Y. (2025). Digital health: current applications, challenges, and future directions for enhancing healthcare quality and safety. *Frontiers in Public Health*, *13*(September). https://doi.org/10.3389/fpubh.2025.1646802

Khoirunnisa, N. T., Purwanti, R., Nuryanto, N., & Rahadiyanti, A. (2025). Food Neophobia and Animal Protein Intake in Children Aged 3-5 Years. *Diversity: Disease Preventive of Research Integrity*, *6*(1), 32–39. https://doi.org/10.24252/diversity.v6i1.56848

Labrique, A., Agarwal, S., Tamrat, T., & Mehl, G. (2026). WHO Digital Health Guidelines: a milestone for global health. *Npj Digital Medicine*, *3*(1), 1–3. https://doi.org/10.1038/s41746-020-00330-2

Lelijveld, N., Benedict, R. K., Wrottesley, S. V, Bhutta, Z. A., Borghi, E., Cole, T. J., Croft, T., Frongillo, E. A., Hayashi, C., Namaste, S., Sharma, D., Tumilowicz, A., Wells, J. C., Ezzati, M., Patton, G. C., & Mates, E. (2022). Towards standardised and valid anthropometric indicators of nutritional status in middle childhood and adolescence. *The Lancet Child & Adolescent Health*, *6*(10), 738–746. https://doi.org/10.1016/S2352-4642(22)00196-1

Li, Z. R., Lu, F. Y., Wu, J. Y., Bao, R. J., Rao, Y. X., Yang, Y., & Wang, H. (2024). Usability and Effectiveness of eHealth and mHealth Interventions That Support Self-Management and Health Care Transition in Adolescents and Young Adults With Chronic Disease: Systematic Review. *Journal of Medical Internet Research*, *26*(1). https://doi.org/10.2196/56556

Lubogo, D., Wamani, H., Mayega, R. W., & Orach, C. G. (2025). Optimal waist circumference cut-off points for predicting metabolic syndrome among females of reproductive age in Wakiso district, central Uganda. *PLOS Global Public Health*, *5*(4), e0003059. https://doi.org/10.1371/journal.pgph.0003059

Majida, L. A., Kartasurya, M. I., Nugraheni, S. A., Margawati, A., & Noer, E. R. (2023). Individual Dietary Diversity Score and Nutritional Status Differences between Students Living in Dormitory and Home during COVID-19 Pandemic. *Amerta Nutrition*, *7*(4), 527–533. https://doi.org/10.20473/amnt.v7i4.2023.527-533

Mancinetti, F., Bastiani, P., Alunno, M., Tecchio, V., Scamosci, M., Cecchetti, R., Mecocci, P., & Boccardi, V. (2026). Beyond BMI: visceral adiposity assessed by the lipid accumulation product index shows independent associations with IL-5 and TNF-β in older adults. *Aging Clinical and Experimental Research*, *38*(1). https://doi.org/10.1007/s40520-026-03338-y

Multazam, A. M., Pujowati, Y., & Hartati, S. (2024). Evaluation of the Effectiveness of Mobile Health Apps in Improving Public Health Awareness in Indonesia. *West Science Information System and Technology*, *2*(01), 1–8. https://doi.org/10.58812/wsist.v2i01.803

Nafisah, L., Aryani, A. A., Parmasari, D. H., Nindya, Y., Rizqi, K., Ilmu, F., Kesehatan, I., Soedirman, U. J., Ilmu, F., Kesehatan, I., & Soedirman, U. J. (2025). *Layanan Kesehatan Di Pesantren*. *8*(1).

Nuryanto, N., Sidhin, S., Fala, E. N., Nissa, C., Candra, A., Purwanti, R., Fitranti, D. Y., Rustanti, N., & Habibi, N. A. (2024). Risk Factors for Under-Five Children Severe Acute Malnutrition (SAM) in Grobogan Regency. *Jurnal Info Kesehatan*, *22*(4), 829–843. https://doi.org/10.31965/infokes.vol22.iss4.1494

Parajuli, J., & Prangthip, P. (2025). Adolescent Nutrition and Health: a Critical Period for Nutritional Intervention to Prevent Long Term Health Consequences. *Current Nutrition Reports*, *14*(1), 1–14. https://doi.org/10.1007/s13668-025-00706-4

Ramadhany, R. A., Wahyuningsih, U., Sufyan, D. L., & Simanungkalit, S. F. (2023). Determinants of Overweight and Obesity in Adolescent Aged 13-15 Years Old in DKI Jakarta (Analysis of Riskesdas 2018 Data). *Amerta Nutrition*, *7*(2), 124–131. https://doi.org/10.20473/amnt.v7i2SP.2023.124

Rohman, H. (2022). Indonesian Journal of Health Information Management Service (IJHIMS). *Indonesian Journal of Health Information Management Service*, *2*(1), 1–6.

Shabariah, R., Tias, T. A. W., Wahyuni, T., Nurfadhilah, N., Ibrahim, I., & Dhamir, E. A. R. (2023). Program Skrining Kesehatan Awal Sebagai Upaya Meningkatkan Status Kesehatan Guru dan Murid Di Pondok Pesantren Al-Fathonah. *Jurnal Abdimas Kedokteran Dan Kesehatan*, *1*(1), 14. https://doi.org/10.24853/jaras.1.1.14-19

Sofiah, S., Rachmawati, K., & Setiawan, H. (2020). Hubungan Aktivitas Fisik dengan Kualitas Tidur pada Santriwati Pondok Pesantren Darul Hijrah Puteri. *Dunia Keperawatan: Jurnal Keperawatan Dan Kesehatan*, *8*(1), 59. https://doi.org/10.20527/dk.v8i1.7255

Wang, R., Liu, J., Fang, G., Shi, J., Zhang, C., & Huang, Y. (2025). Association between visceral adiposity index and cardiovascular disease: A systematic review and meta-analysis. *Nutrition, Metabolism and Cardiovascular Diseases*, *35*(12), 104216. https://doi.org/10.1016/j.numecd.2025.104216

Widiyanto, W. w, & Sunandar, A. (2025). Digitalisasi Data Skrining Kesehatan Masyarakat melalui Aplikasi Pencatatan Berbasis Komputer. *Indonesian Journal of Health Information Management Service*, *5*(2).

Yanti, R. P., & Fasa, M. I. (2025). Transformasi Digital Dan Efisiensi Operasional : Studi Kualitatif Tentang Pengurangan Kertas Dalam Perbankan Berkelanjutan Digital Transformation and Operational Efficiency : A Qualitative Study of Paper Reduction in Sustainable Banking. *Jiic: Jurnal Intelek Insan Cendikia*, *Vol : 2 No*(April), 7076–7085.

Zhou, J., Li, Y., & Cai, Y. (2025). Global burden of children and adolescents' nutritional deficiencies from 1990 to 2021. *Frontiers in Pediatrics*, *13*(July). https://doi.org/10.3389/fped.2025.1583167