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Evaluating the implementation of iron supplementation to prevent stunting and anemia: A qualitative case study at the Benu-Benua Community Health Center, Kendari, Indonesia

Evaluasi implementasi suplementasi zat besi untuk pencegahan stunting dan anemia: Studi kasus kualitatif di Puskesmas Benu-Benua, Kendari, Indonesia

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Abstract

Previous studies on iron supplementation programs have largely focused on policy outcomes and national strategies, often overlooking the implementation dynamics at the primary healthcare level. This study addresses this gap by evaluating the implementation of the Iron Supplement Tablets (TTD) program at the Benu-Benua Health Center in Kendari City, Indonesia. Using a qualitative case study design, data were collected through in-depth interviews, observation, recordings, and documentation involving nine purposively selected informants, including health center staff and beneficiaries. Thematic content analysis was applied through stages of data reduction, presentation, and conclusion drawing. The findings show that although inputs such as human resources, funding from the Health Operational Assistance (BOK), and educational media are available, no specific training was provided to program implementers. SOPs exist but are not visibly posted, and coordination between stakeholders remains suboptimal. The process revealed that TTD planning and implementation were based on standard targets, but monitoring and recording were weak, leading to challenges in tracking outcomes. Output analysis showed that while pregnant women generally received TTD, distribution among adolescents was inconsistent, and consumption compliance was low. These results underscore the need for improved training, monitoring mechanisms, and cross-sectoral collaboration. Strengthening these areas is crucial for enhancing the impact of iron supplementation programs and supporting public health efforts to reduce stunting and anemia.

Abstrak

Penelitian sebelumnya mengenai program suplementasi zat besi umumnya berfokus pada hasil kebijakan dan strategi nasional, namun masih kurang mengeksplorasi dinamika implementasi di tingkat layanan kesehatan primer. Studi ini bertujuan mengisi kesenjangan tersebut dengan mengevaluasi pelaksanaan program Tablet Tambah Darah (TTD) di Puskesmas Benu-Benua, Kota Kendari, Indonesia. Menggunakan desain studi kualitatif dengan pendekatan studi kasus, data dikumpulkan melalui wawancara mendalam, observasi, rekaman, dan dokumentasi terhadap sembilan informan yang dipilih secara purposive, terdiri dari petugas puskesmas dan penerima manfaat. Analisis data dilakukan melalui reduksi data, penyajian data, dan penarikan kesimpulan. Hasil menunjukkan bahwa meskipun input seperti sumber daya manusia, dana dari BOK, dan media edukasi tersedia, pelaksana program tidak menerima pelatihan khusus. SOP tersedia namun tidak ditempel secara terbuka, dan koordinasi antar pemangku kepentingan belum optimal. Proses pelaksanaan menunjukkan bahwa perencanaan dan implementasi didasarkan pada target standar, namun pencatatan dan pemantauan masih lemah, sehingga sulit menilai keberhasilan program secara akurat. Dari sisi output, ibu hamil umumnya menerima TTD, namun distribusi untuk remaja putri tidak merata dan tingkat konsumsi masih rendah. Temuan ini menekankan perlunya peningkatan pelatihan, mekanisme pemantauan, dan kolaborasi lintas sektor. Penguatan aspek-aspek ini penting untuk meningkatkan efektivitas program TTD dan mendukung upaya kesehatan masyarakat dalam menurunkan angka stunting dan anemia.

Keywords :

adolescent; dietary supplements; female; growth disorders; iron

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INTRODUCTION

Stunting, defined as low height-for-age due to chronic undernutrition, remains a significant public health issue with implications for individual health and broader socio-economic conditions globally. The prevalence of stunting affects over one-third of children under five in some regions, such as Sub-Saharan Africa and South Asia (Phad et al., 2024; Abu-Fatima et al., 2020). Despite a general decline in stunting rates worldwide, regions like Africa have seen increases in prevalence (Imam et al., 2020).

The complexity of stunting arises from various contributing factors, including poverty, maternal nutrition, and access to healthcare. For instance, improved household wealth correlates with lower stunting rates; a $1000 increase in per-capita GDP is associated with a 23% reduction in stunting odds (Kishore et al., 2022). Interventions targeting the first 1,000 days of life are crucial, as early-life undernutrition has significant long-term health effects (Blankenship et al., 2020). Geographical disparities in stunting rates further emphasize the need for tailored interventions that account for regional contexts (Tamir et al., 2024; Bhadra, 2024).

Efforts to mitigate stunting, particularly in high-burden countries, should thus focus on comprehensive nutritional strategies and socioeconomic improvements (Noori et al., 2025; Montenegro et al., 2022; Astatkie, 2020). These strategies align with Sustainable Development Goals (SDGs) and World Health Organization (WHO) guidelines. SDG 2 seeks to end all forms of malnutrition by 2030, including stunting among children under five (Deda et al., 2024). WHO emphasizes comprehensive maternal and child health interventions, including breastfeeding promotion and nutritional education to prevent stunting (Wali et al., 2023).

Various national initiatives provide examples of practical implementation. In Indonesia, programs involve intersectoral collaborations among health staff, NGOs, and community leaders to enact nutrition policies effectively (Arieffiani & Ekowanti, 2024; Daniel et al., 2023). The "1,000 days" framework underpins interventions like pregnancy monitoring and nutritional counseling (Mairo & Jenjawaty, 2022). Similarly, Brazil employs multilevel cooperation to promote food security and adolescent health in vulnerable contexts (Vale et al., 2022).

A critical factor in stunting and anemia is iron deficiency, especially among infants and young children. Iron is vital for hemoglobin production and its deficiency causes iron deficiency anemia (IDA), which impairs oxygen transport and linear growth (Gupta et al., 2025; Rivera et al., 2024). Studies reveal that stunted children are nearly twice as likely to develop IDA (Flora et al., 2022), and that stunting may reduce erythropoietin production, worsening anemia. Moreover, iron deficiency compromises immunity, increasing susceptibility to infection and perpetuating malnutrition (Dewi et al., 2022).

Government strategies emphasize nutritional supplementation and comprehensive health programs. Policies provide iron supplements, micronutrient powders, and lipid nutrient supplements (LNS) to address stunting and associated deficiencies (Marni et al., 2022). In Indonesia, the National Strategy for the Acceleration of Stunting Prevention (2018-2024) targets 100 high-prevalence districts through direct interventions and community engagement (Azzahra & Ismail, 2023; Waterpauw, 2024). Maternal iron and folic acid supplementation has shown efficacy in reducing stunting risk (Traore et al., 2023), and improving adolescent girls' adherence to iron intake is crucial (Feriyanti et al., 2022).

However, community-level implementation remains fraught with challenges. Limited program coverage and short durations often hinder measurable impacts (Elisaria et al., 2021). In Ethiopia and Mozambique, despite planning and resources, stunting reductions were not realized. A lack of awareness regarding stunting's causes impairs community participation, underscoring the need for education in parenting, nutrition, and hygiene (Aprilia et al., 2023).

Decision-making and resource control also present barriers. Village funding is frequently dominated by local leaders, restricting community involvement and leading to ineffective interventions (Prabasari et al., 2021; 2022). Environmental factors, such as sanitation and clean water access, further complicate efforts. Addressing these multidimensional issues requires empowering communities to participate in program design and execution (Danapriatna et al., 2023; Soviyati et al., 2023).

Recent studies have assessed the effectiveness of iron supplementation programs in combating stunting, yet many of these focus on large-scale or national-level interventions without thoroughly evaluating implementation at the primary healthcare level. Previous research tends to highlight policy frameworks and outcomes but provides limited insight into the operational barriers and real-world challenges faced by local health centers (e.g., Avula et al., 2022; Omer et al., 2023; Paulino et al., 2021). This leaves a critical gap in understanding how frontline services function and what factors influence program effectiveness at the

grassroots. Therefore, this study contributes by evaluating the implementation of the Iron Supplement Tablets (TTD) provision program at the Benu-Benua Community Health Center in Kendari City, Indonesia. The findings aim to bridge the knowledge gap by offering context-specific insights into program inputs, processes, and outcomes. The objective of this study is to assess the effectiveness of the TTD program in addressing stunting at the Benu-Benua Health Center through a qualitative evaluation approach.

METHODS

This study employed a qualitative research design with a case study approach to evaluate the implementation of the Iron Supplement Tablets (TTD) program at the Benu-Benua Community Health Center, Kendari City, Southeast Sulawesi. The case study approach was selected to enable an in-depth understanding of the program implementation in a real-life context. Benu-Benua Health Center was purposively chosen due to its strategic role as a frontline public health facility serving a high number of maternal and adolescent populations, making it a representative case for evaluating nutritional intervention programs such as TTD. The study was conducted from November to December 2024.

The population in this study consisted of individuals directly involved in the planning, implementation, and reception of the TTD program. Informants were selected through purposive sampling based on their roles, experience, and involvement in the TTD distribution process. A total of nine informants were involved, including the Head of the Health Center, Nutrition Coordinator, Midwife Coordinator, three community health cadres, and three mothers of children under five. Inclusion criteria for informants included having been actively involved in the TTD program for at least six months and being willing to participate. Informants were selected to ensure data richness and variation of perspectives across policy implementers, field executors, and beneficiaries. Data collection was conducted using semi-structured in-depth interviews guided by an interview protocol, observation of TTD-related activities, documentation of program reports and posters, and audio recording using smartphones.

The interview instrument explored themes including planning and stakeholder involvement, dosage and administration procedures, educational outreach, availability of facilities and infrastructure, challenges and barriers, and program achievements. Sample questions included: “How is the target population for TTD identified?”, “What challenges are faced in distributing and monitoring TTD?”, and “How do you educate beneficiaries about TTD consumption?”. Data were analyzed using content analysis through systematic steps of data reduction, data display, and conclusion drawing. Triangulation was conducted through multiple sources—interviews, observations, and documentation—to validate findings and ensure credibility. Ethical considerations were upheld by obtaining informed consent from all participants before interviews, assuring them of confidentiality and voluntary participation. The research adhered to ethical research principles as approved by the appropriate institutional review board.

RESULTS

In-depth interviews about who are the actors involved in the TTD program at the Benu-Benua Health Center and training, socialization, technical guidance, and so on that the informants have received. Here are some of the informant's statements:

> *“.....For the provision of TTD, it is nutrition, but for the health screening, we are a team. So there are from health programs, there are from midwives, usually doctors also come down. For the provision of TTD, only nutritionists and midwives are involved. There are 4 nutritional workers, one person holds 2 villages. The most socialized.”* (Informant K, 49 years old)

Based on the results of the interviews, informants reported that they had not received any specific training related to the implementation of the Iron Supplement Tablets (TTD) program. Their understanding of the program was primarily based on socialization materials derived from the Ministry of Health's regulations, which were read and interpreted independently. The implementation of the TTD program at the Benu-Benua Health Center involves multiple actors, including four nutrition workers responsible for distributing and managing TTD supplies, six midwives who assist in administering TTD to pregnant women, health promotion officers who contribute to awareness and education efforts, and a doctor who provides clinical support. Oversight of the program is led by the Head of the Health Center, who coordinates and ensures program execution. In addition, community health cadres are actively involved in distributing TTD to adolescent girls, particularly within school settings, highlighting the multi-stakeholder nature of the intervention.

In-depth interviews about where the funding sources are used and the obstacles related to funding the PMT program. Here is the informant's statement:

> *".....It's same with BOK, but because it is in the form of drug drops, most of the funds that come out for distribution are distributed to predetermined places. So far it is still sufficient."* (Informant MJ, 49 years old)

Based on the results of the informant's interview, it was stated that the TTD program funds came from the government, namely the BOK (Health Operational Assistance) fund. So far, there have never been any obstacles regarding funding for the program.

In-depth interviews regarding the dosage or amount of TTD given, and the availability of educational media related to TTD consumption for the target. The following is the informant's statement:

> *".....If teenagers have 1 pill per week, unless they menstruate every day, including the bride-to-be. But if the mother is breastfeeding, the mother gives birth, and the pregnant woman every day 1 pill. Monitoring using KIA books."* (Informant R, 43 years old)

Based on the results of the informant's interview, the target of adolescents or school children is to get a dose of 4 tablets per month or 1 tablet per week, while pregnant women get a dose of 1 tablet per day for 9 months of pregnancy. Counseling and socialization media for TTD consumption education include PowerPoint, leaflets, and KIA Books.

In-depth interviews about what facilities and infrastructure must be available related to the TTD program. For example, record books, reporting forms, storage warehouses, and the availability of technical instructions/SOPs in the puskesmas room. Here is the informant's statement:

> "*.....Yes, there is a reporting form in the same program as a file. The entry and exit of the drug is one door, so maybe the recording of the drugs that come out will be in the pharmacy. Yes, we follow from the Ministry of Health*." (Informant MJ, 49 years old)

Based on the results of the informant's interview, it was stated that the reporting facility for pregnant women was through the KIA Book, while school children used the form given to the school. The health center reports data to the center via the EPPGBM application, which can be accessed by the health office and the Ministry of Health. The pharmacy warehouse of the health center stores medicines, with the recording of expenses and income managed by the pharmacy. The SOP used comes from the Ministry of Health, in the form of a map and is not pasted in the room.

In-depth interviews on how to set goals, how to set a schedule:

> *".....We already have the target from the health office anyway, in the form of SPM (Minimum Service Standards). If the TTD is based on the target of pregnant women, maternity mothers/postpartum mothers throughout the work area of the health center, then the target of adolescent girls is taken from school. If the pregnant woman is suitable for where she comes to visit, if today is the first time she comes to visit, we will give it on that day. In the form of counseling."* (Informant R, 43 years old)

Based on in-depth interviews, the determination of targets was carried out by screening schools to collect data on adolescent girls in grades 1–3 of junior high and high school. In addition, targets are also set by the health office, such as pregnant women and maternity/postpartum mothers who are in the work area of the Benu-Benua Health Center. The TTD distribution schedule is for school children and distribution is carried out every month, but nutrition officers usually drop TTD stock for 3 months at UKS. Pregnant women receive TTD every time they are examined at the posyandu, while the bride-to-be is given a TTD for every examination, generally per month. The method to educate targets related to TTD consumption is the extension method.

Process

In-depth interviews regarding who are the actors involved in program planning, and the goals set for the delivery of TTD. Here is the informant's statement:

> *".....As the head of the health center, yes, I do have to accompany them, then there are nutrition workers, KIA (midwives), where they already have their own responsibilities. Adolescent girls, catin, then pregnant women, breastfeeding mothers, with maternity mothers."* (Informant MJ, 49 years old)

Based on the results of the interviews, the actors involved in planning the TTD program include nutrition officers, midwives, and the head of the health center who act as leaders. The target recipients of TTD include school children or young women, brides-to-be, pregnant women,

breastfeeding mothers, and maternity mothers. Women of childbearing age who are not school children or mothers are not targeted for TTD because they are no longer targeted for it.

In-depth interviews discuss the division of responsibility in the TTD program, including those in charge of organizing, distributing, and educating the target.

> *".....The UKS coach who gives it to students, health workers only deliver it at school. Officers who are doing the service are also educating."* (Informant R, 43 years old)

Based on interviews, the division of responsibility in the TTD program is that nutrition officers give TTD to school children, midwives give TTD to pregnant women, provide counseling, and monitoring through the KIA book, and pharmacy officers are responsible for the procurement and storage of medicines. TTD for school children is distributed by UKS coaches or teachers, while pregnant women receive TTD from midwives at health centers or posyandu. The officer who distributes the TTD is also in charge of educating the target.

The in-depth interview discussed the TTD administration procedure, frequency of administration, assistance to prevent side effects, education carried out, obstacles faced, and efforts to overcome them.

> *".....If the school children are once a week, but usually we immediately drop the stock for 3 months at school. It is distributed because sometimes if it is drunk in the place, there is no breakfast, at the beginning of the year we educate. In ordinary schools, the stock expires because it is not distributed. Whether we want to drink or not, the important thing is that we have give."* (Informant K, 49 years old)

Based on the interviews, the TTD was given as follows: For students, TTD was distributed by officers at the beginning, then handed over to teachers for distribution every week, with 3 months' stock given to schools. For pregnant women, a minimum of 90 tablets is given, but if stock is limited, 10 tablets are given first. There is no direct assistance to ensure the goal of consuming TTD. For school students, they are only educated at the beginning of the year. Obstacles in the implementation of the TTD program include: Only nutrition officers give TTD to school children, even though midwives should also be involved. Schools only provide TTDs when students faint, and are often not distributed until they expire. Some pregnant women are reluctant to take TTD and some do not come to the posyandu. The efforts made are that health workers are trying to provide TTD to the school.

In-depth interviews about how the target monitoring process is, whether HB checks have been carried out on each target, and obstacles faced in the monitoring process. The following is the statement of the informant:

> *".....Most children don't drink. He threw it away. Yes, the sample was in class 1. A lot of expired."* (Informant K, 49 years old)

Based on the results of the interviews, the process of monitoring the target is school students by screening. However, most school students do not drink TTD, but instead throw away the TTD. As for pregnant women, the monitoring is through their husbands. Midwives also use the TTD control table in the KIA book. There have been HB tests for school children and pregnant women. The obstacle faced in the monitoring process is that many TTDs are expired.

Output

In-depth interviews about the achievements of the TTD program that has been implemented, and the amount of TTD that has been distributed. The following is the statement of the informant:

> "It is in line with the visits of pregnant women who come, for example, 10 people who visit, the 10 people are sure to get 90 tablets. I don't know if I can get any TTD.." (Informant R, 43 years old)

Based on interviews, the number of TTDs is sufficient for the target of school children, although sometimes students do not consume or the school does not distribute the TTD that has been received. Meanwhile, all pregnant women who come for health services receive TTD. And the exact amount of TTD distributed is unknown. Because health workers adjust to existing targets.

Based on the results of the in-depth interviews conducted, several concepts were found as follows: the administration of blood supplement tablets already includes the number of pregnant women registered in the register book, the number of blood supplement tablets is sufficient for school children, it's just that the obstacles found by health workers found that TTD was not consumed by the target and TTD tablets could not be known for their distribution properly.

DISCUSSION

The findings of this study at the Benu-Benua Health Center highlighted several key aspects affecting the implementation of the Iron Supplement Tablets (TTD) program. Notably, although the allocation of resources such as TTD supplies and personnel was generally sufficient, gaps in program delivery were evident—particularly in the monitoring process, training for implementers, and the actual consumption compliance among target groups. Despite adequate funding from the Health Operational Assistance (BOK), issues such as expired tablets and inconsistent distribution to adolescents reveal operational weaknesses. Additionally, the lack of direct assistance or follow-up to ensure TTD consumption, especially among school-aged girls, underscores the importance of strengthening educational outreach and monitoring systems.

The effectiveness of health programs, particularly those targeting issues like stunting and anemia, is significantly influenced by the components of input, process, and output. Input factors, such as resources allocated (financial, human, and material), directly affect the program's capacity to initiate and sustain interventions. For instance, a study indicated that well-resourced schools adopting the Health Promoting School (HPS) framework showed improved health outcomes, emphasizing the importance of proper funding and resource allocation in enhancing program success (Jamaluddin et al., 2021).

The process component, which encompasses the execution of program activities, is also crucial. Effective communication among stakeholders—including health officials, educators, and community leaders—can facilitate smoother implementation. Research highlights that community outreach within school health activities significantly impacts the success of interventions, particularly showing that when teachers are trained and involved, there are positive outcomes in health behaviors (Naing et al., 2022). Training and capacity-building for teachers have been shown to equip educators with the necessary skills to engage with health programs effectively, which plays a vital role in the process component of program implementation (Naing et al., 2022).

Finally, output factors are related to the results of the interventions, such as changes in health behaviors, knowledge, or actual health outcomes. For programs to be deemed effective, measurable outcomes—like decreased stunting rates or improved nutritional knowledge—must align with stated objectives (Jamaluddin et al., 2021). The interconnectedness of these components cannot be understated; the success or failure of health programs often hinges on their ability to integrate strong inputs with effective processes to achieve desired outputs (Ajemu & Desta, 2020).

School-level barriers and facilitators significantly affect the implementation of health interventions aimed at reducing issues such as stunting and mental health challenges. One prominent barrier is the competing priorities within the school system, primarily academic pressures that often overshadow health initiatives. Teachers reportedly prioritize exam preparation and standardized assessments over health programs, which diminishes the likelihood of robust participation in interventions (Carlson et al., 2021). This reflects a broader challenge in aligning educational objectives with health promotion activities, where academic curriculums often do not accommodate time for such initiatives.

Facilitators of successful program implementation include teacher awareness and engagement, which are crucial for fostering a supportive environment. Teachers who are well-informed about the importance of health interventions tend to endorse them, thereby increasing student participation (Shinde et al., 2023; Kusumawardani et al., 2023). For example, in schools where staff received training on mental health programming, both teachers and students reported heightened awareness and receptiveness to related initiatives (Cuccaro et al., 2023).

Additionally, student behavior plays a pivotal role in participation rates. Students who are actively engaged and supportive of health programs can serve as catalysts for broader acceptance and success within their peer groups. Programs like SEHER have demonstrated that a nurturing school environment enhances student involvement, which correlates with lower rates of depressive symptoms and other health issues (Shinde et al., 2023). Thus, cultivating a culture of health within schools, backed by teacher advocacy and proactive student engagement, is fundamental to overcoming barriers and ensuring the sustainability of health interventions.

Community and cultural attitudes toward iron supplementation significantly influence its acceptance and adherence, particularly among vulnerable populations such as pregnant women and adolescents. Various social and cultural factors shape these attitudes. For instance, in some cultures, misconceptions exist regarding the implications of iron supplementation during pregnancy, including fears that it may lead to complications during labor or affect the size of

the newborn (Sedlander et al., 2020). These perceptions can deter women from adhering to iron folic acid (IFA) supplementation guidelines, which are crucial for preventing anemia and supporting maternal health.

Moreover, communication gaps between healthcare providers and community members can hinder the effectiveness of iron supplementation initiatives. Research indicates that cultural and linguistic differences may lead to misunderstandings about the importance of iron supplements, thereby reducing community trust and acceptance (Mabetha et al., 2025). Effective distribution of IFA by health workers is critical, as their role is often viewed positively, making them key facilitators in promoting the importance of iron supplements (Sedlander et al., 2020).

Additionally, women's knowledge about iron requirements and anemia impacts their willingness to comply. Studies have shown that increased knowledge correlates with a more positive attitude toward iron supplementation, emphasizing the need for targeted educational programs (Al-Marzouqi et al., 2024). However, despite awareness of health benefits, many still hesitate to consume iron supplements due to prevailing cultural beliefs and misinformation (Al-Marzouqi et al., 2024). Therefore, addressing these cultural barriers through tailored educational initiatives and fostering strong community engagement is essential for enhancing the uptake of iron supplementation.

Inter-sectoral coordination among health centers, schools, and local government is critical for the success of community health initiatives, particularly in addressing public health concerns such as stunting and anemia. Effective collaboration fosters a holistic approach that integrates multiple perspectives and resources, enhancing the reach and impact of health programs (Kalantari et al., 2023; Kriegner et al., 2020).

Health centers and schools both play pivotal roles in delivering health education and services, making their collaboration essential. For instance, programs that engage teachers in health training can significantly enhance students' awareness and participation in health initiatives (Scholtes et al., 2023). However, challenges persist when local government officials lack awareness of their responsibilities in public health, which can limit effective inter-sectoral collaboration (Scholtes et al., 2023). The development of multi-disciplinary teams that include leaders from each sector is crucial for achieving shared goals and addressing complex health issues (Kriegner et al., 2020).

Moreover, the alignment of policies between sectors is vital for operationalizing inter-sectoral strategies. Local governments must facilitate communication and partnerships among health institutions and educational entities to streamline efforts and share information effectively. Programs promoting a unified vision and mutual understanding of objectives tend to flourish under such coordinated efforts (Partovi et al., 2022).

Sustained engagement across these sectors, particularly by fostering trust and shared accountability among stakeholders, can lead to more comprehensive and effective health interventions. Encouraging this cooperation is not just beneficial but necessary for the long-term success of community health programs (Liu & Tsasis, 2024; Omidvar et al., 2021).

To improve health programs aimed at addressing issues like stunting and anemia, several recommendations can be made based on current evidence and best practices. These include strengthening standard operating procedures (SOP) dissemination, enhancing monitoring systems, and elevating educational efforts within communities. Ensuring that all stakeholders, including health workers, educators, and community leaders, are well-acquainted with the standard operating procedures is crucial for program consistency and adherence. Regular training sessions and workshops should be implemented to disseminate these SOPs effectively. Utilizing various communication channels, including digital platforms, can enhance accessibility and reach.

Robust monitoring and evaluation systems are essential to assess program effectiveness and inform necessary adjustments. Establishing clear indicators for success, along with regular data collection and analysis, will enable stakeholders to track progress effectively. Additionally, integrating feedback mechanisms for community members can foster greater involvement and accountability, allowing for real-time adjustments to program delivery. Community education initiatives should be prioritized to raise awareness about the importance of nutrition and health interventions. Tailored educational programs targeting different demographics—such as pregnant women, adolescents, and parents—can help to dispel myths and foster positive health behaviors. Collaborating with local leaders and utilizing culturally appropriate materials can further strengthen the outreach and impact of educational campaigns.

Strengthening partnerships between health systems, educational institutions, and local governments can enhance resource sharing and planning synergies.

Cross-sectoral initiatives can lead to more comprehensive approaches to tackling malnutrition and health issues by leveraging strengths from various sectors. Engaging community members in the planning and implementation of programs ensures that initiatives are tailored to local needs. Encouraging local ownership can enhance program buy-in and sustainability, leading to improved health outcomes.

The strength of this study lies in its qualitative approach, which allowed for an in-depth exploration of contextual factors influencing the TTD program at the grassroots level. The selection of diverse informants—from program managers to community members—ensured the inclusion of multiple perspectives and a richer understanding of the implementation dynamics. Additionally, data triangulation through interviews, observations, and documentation enhanced the credibility of the findings.

However, the study is not without limitations. It focused on a single community health center, which may limit the generalizability of the findings to other settings. The absence of male perspectives, such as husbands or school administrators, may also narrow the understanding of household and institutional dynamics affecting TTD compliance. Furthermore, the study did not employ longitudinal methods to assess long-term program outcomes. Future research is encouraged to adopt a mixed-methods design across multiple sites to provide a more comprehensive evaluation of TTD program effectiveness.

CONCLUSION

This study concludes that while the Iron Supplement Tablets (TTD) program at the Benu-Benua Health Center has benefitted from adequate resource allocation and stakeholder involvement, its overall effectiveness remains limited due to gaps in program implementation and monitoring. Key findings revealed that although TTD tablets are generally available and distributed to target groups—namely, adolescent girls and pregnant women—there is low adherence to consumption, especially among adolescents. Inadequate education efforts, limited training for implementers, and lack of consistent monitoring mechanisms contribute to suboptimal program outcomes. The findings underscore the importance of strengthening health education, enhancing inter-sectoral coordination, and ensuring continuous monitoring to improve adherence and program impact. This study contributes to public health by emphasizing the need for localized program evaluation and implementation adjustments to optimize iron supplementation efforts, thereby helping reduce stunting and anemia in vulnerable populations.

It is recommended that health center staff increase direct education and supervision, particularly in school settings, and engage school personnel more actively in TTD distribution and monitoring. For community members, especially adolescents and pregnant women, awareness campaigns using culturally appropriate materials are essential to improve knowledge and change attitudes toward iron supplementation. Stakeholders, including local governments and educational authorities, must enhance their support and coordination to integrate health objectives within school systems. Future research should expand on this study by incorporating quantitative measures and broader geographic coverage to evaluate long-term program effectiveness and inform national-scale policy improvements.

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AUTHORS' CONTRIBUTIONS

Hartati Bahar designed the study, formulated the concept, and revised the manuscript. Febri Karisma Dewi, Hariati Lestari, and Lade Albar Kalza, wrote the manuscript, analyzed the data, performed the field work. All Authors read and approved the final.

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COMPETING INTERESTS

The authors affirm that there are no conflicts of interest related to the research, writing, or publication of this article.

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