

The Role of Stakeholders in The Implementation of Anemia Prevention Programs in Schools

Susi Tursilowati*, Oktia Woro Kasmini Handayani, Arief Yulianto, Irwan Budiono,
Suwito Eko Pramono, Inaya Melati

Universitas Negeri Semarang, Semarang, Indonesia

*Corresponding Author: tursilowati2411@students.unnes.ac.id

Abstract. The global prevalence of anemia reaches 29.9%, while in Indonesia it reaches 36.5%. Anemia in adolescent girls can lead to decreased learning ability and concentration, inhibit growth, decrease immunity, and reduce performance in physical activity. Currently, around 23% of adolescent girls in Indonesia experience anemia. As the next generation will give birth to the next generation, it is important to ensure that their nutritional, reproductive health, and hygiene needs are well met. One of the anemia control programs that can be done is through schools. The success of school-based anemia management programs is highly dependent on multisectors, including strengthening internal stakeholders and external involvement in the school environment. This study aims to find out the role of stakeholders in overcoming anemia in schools. This research method uses literature review by searching Indonesian and English articles through the Elviesier, Google Scholar and PubMed databases in the period 2015-2025. The keywords used are "anemia", "adolescents", "health programs", "schools", "stakeholders". From the results of the search and review, a number of articles were obtained used for this research. The results of the study show that stakeholders have an important role in anemia management programs in adolescent girls. Each stakeholder has their own role in supporting each other in the implementation of school-based anemia management programs in adolescents. With cooperation between stakeholders, the anemia management carried out will be more optimal.

Keywords: anemia; adolescents; health programs; schools; stakeholders

INTRODUCTION

Indonesia faces significant nutritional challenges due to the nutrition transition. This change in diet directly triggers a high rate of anemia, especially among adolescent girls (Masitah & Sulistyadewi, 2022). For adolescent girls, this anemia problem is exacerbated by physiological factors such as menstruation, which causes periodic blood loss and inherently increases their iron needs, making them particularly susceptible to deficiency (Vermita w, Widodo, Candra, & Rialita, 2019).

Anemia in adolescent girls is a serious problem that should not be ignored, as it can have serious long-term implications for their health (UNICEF Indonesia, 2021). Global data from 2019 paints a worrying picture: the prevalence of anemia in women of reproductive age stands at 30.7%, representing more than half a billion women aged 15 to 49 worldwide with the condition. This figure becomes more specific when differentiated by pregnancy status: 30,5% in women of reproductive age who are not pregnant, while in pregnant women, the figure jumps significantly to 35,5% (World Health Organization, 2025). This phenomenon is also evident in Indonesia,

especially among young women. The publication of specific intervention data in 2024 revealed that 20.6% of 7th grade girls nationally have anemia, with a slightly higher prevalence in Central Java, which is 22.6%.

Anemia can inhibit normal physical growth, reduce the capacity of the immune system so that it is more susceptible to various disease infections, and significantly affect performance in physical and social activities, making adolescents tend to be lethargic, tired quickly, and less enthusiastic in interacting (Cliffer et al., 2023). In the long term, poorly managed anemia in adolescence can continue into adulthood, increasing the risk of serious reproductive health complications such as maternal death, premature birth, and the birth of babies with low birth weight (Anggreiniboti, 2022).

The school provides easy access to a large population of young women that is relatively homogeneous, allowing for efficient intervention coverage. The existence of an organized organizational structure, a planned learning schedule, and an integrated curriculum, make the school an ideal platform for continuous health education and behavior change intervention (Wisnuwardani, Wulandari, & Kartika, 2023).

The success of anemia control programs is highly dependent on a multi-sectoral approach involving a wide range of stakeholders. Internal stakeholders, such as principals, teachers, and students themselves, have a crucial role in the implementation of health programs in the school environment. Meanwhile, external stakeholders include vital institutions such as public health centers, health offices, education offices, and academic institutions. A study by Azalia et al. (2024) revealed that there is a conflict of interest and a lack of direct involvement from schools and the Education Office in the implementation of school health programs (Xarisa Azalia, Wiraharja, & Hadiyanto, 2024). This condition directly causes the role of actors in health program policies in schools to not run optimally.

The purpose of this study is to analyze the role of stakeholders in the prevention of anemia carried out through schools. This analysis will explore how various actors, both internal and external to schools, contribute to designing, implementing, monitoring, and evaluating anemia prevention initiatives.

METHODS

The research method used in this article is literature review. The article search was conducted through a database of research journals using a search engine by entering special keywords such

"anemia", "stakeholder", and "health program". These keywords were chosen to ensure that the articles obtained focused on the issue of anemia and health education interventions in the school environment, in accordance with the research objectives. The time range for searching for articles is limited to the period 2015 to 2025 to obtain the latest literature that is relevant to current conditions.

The data sources used came from several credible international and national journal databases, namely Google Scholar, PubMed and Elsevier. The process of searching for articles is carried out systematically by entering predetermined keywords into the search engines in each database. After that, an initial selection was made based on titles and abstracts to determine the relevance of the article to the topic of anemia, stakeholders and health programs in schools. After the initial selection, articles that meet the criteria will be read in their entirety to assess the suitability of the content and quality of the reported research methodology.

RESULTS AND DISCUSSION

The results of the article analysis related to data on the role of stakeholders in anemia prevention programs in adolescent girls can be seen in the Figure 1.

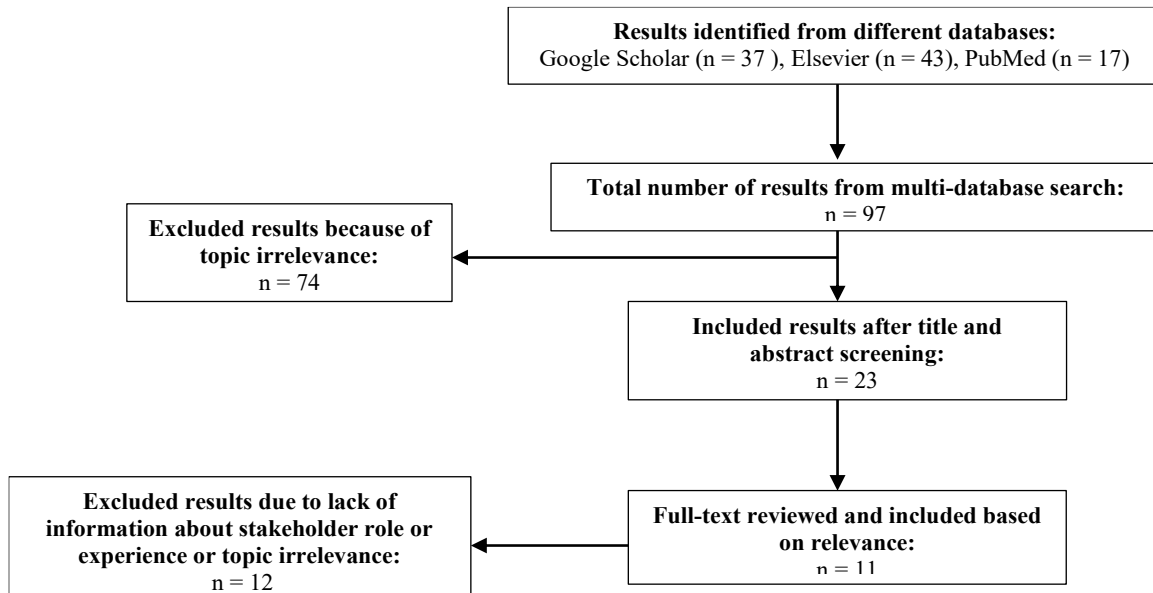


Figure 1. Search Results

Table 1. Result of Literature Review

No	Writer	Heading	Result
1.	Xarisa Azalia, Regina Satya Wiraharja, Hadiyanto	Stakeholder Analysis Of School Health Program At Elementary Schools In North Jakarta, A Case Study	UKS teachers serve as the primary implementers while infrastructure development falls under the education authority, though conflicts of interest arise due to the influence of key stakeholders
2.	Emily Belita, Nancy Carter, Denise Bryant-Lukosius	Stakeholder Engagement in Nursing Curriculum Development and Renewal Initiatives: A Review of the Literature	Four themes emerged from the literature relating to facilitators of positive stakeholder engagement in curriculum projects: (1) positive leadership, (2) empowerment, (3) sense of ownership, and (4) culture of equality.
3.	Emma Soneson, Anne-Marie Burn, Joanna K. Anderson, Ayla Humphrey, Peter B. Jones, Mine Fazel, Tamsin Ford, Emma Howarth	Determining stakeholder priorities and core components for school-based identification of mental health difficulties: A Delphi study	The program focuses on early detection of mental health issues in children, staff training and student education, opt-out parental consent, clear support referral paths, and fostering a school culture that values mental health and wellbeing.
4.	Giuseppe Pellegrin and Chiara Lovati	Stakeholders' engagement for improved health outcomes: a research brief to design a tool for better communication and participation	This research provides key insights into engaging health stakeholders effectively amid rapid AI-driven technological growth
5.	Rita Asriyanti, Azrimaidaliza Azrimaidaliza, Frima Elda, Khiky Dwinatrana	Fe Tablet Provision Program in Schools and Reducing the Incidence of Anemia in Adolescent Girls in Padang City	Factors significantly associated with anemia include iron tablet consumption, amount consumed, paternal education, and nutritional knowledge.
6.	Dinda Indika Putri, Veronica Ishabela Romaulytua Rajagukguk, Aulia Rizky Ramadhania, Raihana Sekar Armila, Iradillah Al Asadi, Delli Yuliana Rahmat	Effectiveness of Health Education about Anemia on Female Students' Knowledge in Stunting Prevention Efforts: A Study at SMP Negeri 2 Rancakalong	Demonstrating that health education programs effectively prevent anemia in adolescents and support better quality of life and reduced future stunting risk.
7.	Vani Sethi, Zivai Murira, Kapil Yadav, Preetu Mishra, Ireen Akhter Chowdhury, Ahmadwali Aminee	Supporting Policy Action To Reduce Adolescent Anaemia In South Asia	Scaling up anemia reduction programs for adolescent girls requires generating and strategically communicating evidence at all levels, building program manager capacity, allocating sufficient resources, and implementing innovative demand generation

No	Writer	Heading	Result
8.	Sandhya NVS Dittakavi, R.S. Savitha, S. Kiran Kumar, Phani Kumari	Assessing the Knowledge, Attitudes, and Practices of Key Stakeholders in Anaemia Management among Adolescent Girls in Social Welfare Schools	The study showed that health supervisors knew a lot about normal hemoglobin levels, slightly less than principals of teachers used volunteers for screenings, and half of the supervisors gave Albendazole twice a year compared to a third of the teachers.
9.	Angeline Jeyakumar, Shraddha Chalwadi, Pooja Madhu and Padmini Ghugre	Sustainability Of Integrated Anaemia Prevention Activities Implemented Through Non-Government Organizations And Schools, And Its Effect On Haemoglobin Status Of Adolescent Girls In Urban Slums Of Pune, In Maharashtra, India	The need to identify and address barriers to sustainable anemia control interventions.
10.	Alison Mildon, Daniel Lopez de Romaña, Maria Elena D Jefferds, Lisa M Rogers, Jenna M Golan, Mandana Arabi	Integrating And Coordinating Programs For The Management Of Anemia Across The Life Course	To build and sustain effective need coordinated delivery mechanisms and optimize existing and promising systems to achieve national and global anemia targets.
11.	Shumona Sharmin Salam, Umesh Ramadurg, Umesh Charantimath, Geetanjali Katageri, Bronwen Gillespie, Jayaraj Mhetri, Shrinivas Patil, Ashalata Mallapur, Chandrashekhar Karadiguddi, Phaniraj Vastrad, Ashwini Dandappanavar, Subarna Roy, Basavaraj Peerapur, Shivaprasad Goudar, Dilly O. C. Anumba	Impact Of A School-Based Nutrition Educational Intervention On Knowledge Related To Iron Deficiency Anaemia In Rural Karnataka, India: A Mixed Methods Pre-Post Interventional Study	Teachers and students reported high acceptance, increased awareness, positive behavior changes, and greater demand for supplements.

Anemia, especially among adolescent girls, remains a serious public health problem in Indonesia. This condition is not just a nutritional deficiency. The impact extends to affect the quality of education, future productivity, and fundamentally hinders efforts to improve the quality of national human resources (Anas, Hidayanty, Nontji, Hadju, & As'ad, 2023). Effectively addressing anemia demands a comprehensive, integrated, and most crucially,

requires active collaboration from various stakeholders. Anemia prevention programs in schools, as a strategic environment to reach the adolescent population, require optimal synergy between actors so that its implementation is effective and sustainable (Khairunnisa, Flora, Idris, Nurlaili, & Ikhsan, 2020).

The impact of anemia on adolescent girls is not only limited to physical symptoms. First, in terms of education, anemia can cause a decrease in

learning ability and concentration, inhibit memory, decrease learning motivation, and ultimately lead to a decrease in academic achievement (Aulya, Siauta, & Nizmadilla, 2022). Second, in terms of physical health, anemia reduces immunity, makes adolescents more susceptible to infections, inhibits physical growth, and reduces performance in physical activity. Furthermore, the high prevalence of anemia in adolescent girls who are not treated properly can continue into adulthood and contribute significantly to the increase in maternal mortality, premature birth, and babies with low birth weight (Rahman & Fajar, 2024).

Schools emerged as the most strategic intervention environment for anemia prevention programs (Putri, Ishabela, Rajagukguk, & Ramadhania, 2025). The role of stakeholders, both in the school environment and outside the school, is very crucial to ensure that the implementation of anemia prevention programs can run effectively and sustainably (Xarisa Azalia et al., 2024). Collaboration between educational institutions, schools, and health institutions is essential to design innovative nutrition programs (Asriyanti, Azrimaidaliza, Elda, & Dwinatrana, 2025). Internal stakeholders such as principals and teachers have the main responsibility for managing and running health programs in schools. Health education can be used as a priority approach in increasing public awareness, especially in vulnerable groups, such as adolescent girls and pregnant women (Putri et al., 2025). School principals as decision-makers at the school level must be able to allocate resources and set policies that support anemia prevention programs, while teachers, especially UKS teachers, play the role of technical implementers who directly interact with students.

Programs that are well planned on paper will not run optimally without strong synergy from various parties involved. Building this collaboration is not just bringing together individuals or institutions, but rather forming a supportive ecosystem. Therefore, it is important to identify and strengthen mechanisms that encourage positive engagement from all parties. Some key themes are often associated with successful effective engagement. The four main themes that emerged are positive leadership, empowerment, sense of ownership and culture of equality (Belita, Carter, & Bryant-Lukosius, 2020).

1) Positive leadership.

Positive leadership in involving stakeholders is the

main foundation of the success of a program (Belita et al., 2020; Xarisa Azalia et al., 2024). This role is clearly demonstrated by those who occupy formal leadership positions, not only through authority, but through the effective use of communication and interpersonal skills. In the context of anemia prevention programs in schools, such leaders actively show sincere support to all parties involved, from teachers, canteen staff, to health workers at the health center (Salam et al., 2023). All of this aims to foster a culture of safety and health in the school environment, a culture that prioritizes the well-being and health of students at the core of every activity, including the prevention of anemia (Soneson et al., 2022). Furthermore, the core of this positive leadership is a commitment to the promotion of continuous learning. This is achieved by providing or facilitating various training and education opportunities for stakeholders.

2) Empowerment.

Empowerment is the second major theme that emerges from the literature, underlining how important it is to create conditions where stakeholders feel empowered and capable of contributing and actively participating (Belita et al., 2020). The strategy to achieve this condition relies heavily on the formation of a culture that encourages authentic engagement. This means that the contribution of each party is appreciated and considered important, not just a formality (Putri et al., 2025). When stakeholders feel that their input has meaning and value, they will be more motivated to engage. This sense of meaningful contribution arises when their feedback is formally recognized and truly integrated into important decisions that affect the change or development of the project (Pellegrini & Lovati, 2025). The key to this empowerment is the recognition of the expertise possessed by each stakeholder (Mildon et al., 2023). In addition, the physical space where stakeholder meetings are held also plays an important role in creating empowering conditions (Jeyakumar, Chalwadi, Madhu, & Ghugre, 2022).

3) Sense of ownership.

A strong sense of ownership among stakeholders throughout the course of a project proves to be crucial to maintaining the continuity of partnerships and commitments (Mildon et al., 2023). Coordination and communication must always be pursued and the involvement of stakeholders, especially field officers, in every activity process, including the growth of commitment in every routine meeting (Sethi et al.,

2025). One of the most effective strategies to foster this sense of shared ownership, while conveying the value of each contribution, is to provide stakeholders with the opportunity to participate early in the development of the program's shared goals and vision (Asriyanti et al., 2025).

4) Culture of equality.

This division of power is facilitated by establishing democratic decision-making processes and principles. Every stakeholder must feel that their voice is heard and considered (Dittakavi, Savitha, Kumar, & Kumari, 2025). In addition, the appreciation of each idea is also very important, even if the idea is not chosen in the end. Building equality also depends on openness and transparency with all members of the group (Jeyakumar et al., 2022; Xarisa Azalia et al., 2024). When everyone has the same understanding and feels that there is nothing to hide, trust is built. This environment encourages everyone to participate without fear or doubt, and to contribute to the success of the anemia prevention program in schools.

Fundamentally, the role of stakeholders is crucial considering that anemia is a multifactorial pathology that cannot be unilaterally overcome by one entity or sector. The etiology of anemia, especially in the adolescent female population, is polyfactorial (Budiarti, Anik, & Wirani, 2021). Addressing this complexity demands coordinated and integrated interventions from different domains: nutrition, environmental health, health education, and medical services. Each of these aspects falls under the specific domains and expertise of different stakeholders. This synergy between parties is an essential prerequisite for holistic treatment of the root of anemia.

In addition, anemia prevention programs are often faced with limited resource allocation, which demands an efficient division of roles and responsibilities (Mildon et al., 2023). Whether it's financial limitations, adequate availability of experts, time constraints, or supporting infrastructure, no one organization or individual has unlimited capacity. By strategically involving various stakeholders, the burden of resources can be distributed more proportionately (Yilma et al., 2020). Each party can contribute according to its core capacity and expertise: primary health facilities are responsible for the provision of Blood Supplement Tablets and trained medical personnel for screening and consultation; educational institutions provide a physical platform and educators as direct facilitators; education

authorities provide policy support and curriculum frameworks (Salam et al., 2023). Meanwhile, the student's guardian provides a supportive environment in the family environment. This synergy optimally improves efficiency and expands the reach of the program substantially.

Another crucial aspect is the achievement of the program's sustainability as a long-term goal. Anemia prevention programs are not ad-hoc or incidental interventions, but rather require an ongoing commitment to induce established behavior and habit change (Puspitasari, Armini, Pradanie, & Triharini, 2022).

Improving the effectiveness of interventions is highly dependent on contextual understanding and adaptability of the program to local conditions (Zuair, 2025). The establishment of an environment conducive to health and nutrition in schools also requires comprehensive multisectoral support. Active stakeholder engagement is also crucial for continuous learning and innovation (Gusti Puspitasari). Through regular forums, experience sharing, and participatory evaluations, stakeholders can identify best practices and areas for improvement. The various perspectives and expertise brought by each party trigger the birth of innovative ideas and creative solutions to emerging challenges. This collective learning process ensures that anemia prevention programs are not static, but continue to evolve and adapt to become more effective over time, responsively addressing the dynamic needs of young women in the school environment.

CONCLUSION

Effective anemia prevention in Indonesian adolescent girls requires a multifaceted approach, with schools serving as a strategic hub for interventions. The success of these programs fundamentally relies on the active and synergistic involvement of all stakeholders, both internal and external, to ensure comprehensive and sustainable impact.

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