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Promoting Menstrual Health Through Nutritional Education and Peer-Based Interventions in Adolescent Girls: A Scoping Review

Putu Ayu Karisma[1)], Apoina Kartini[2)], Siti Fatimah Pradigdo[2)]

[1)]Master's Program of Public Health, Universitas Diponegoro, Indonesia
[2)]Faculty of Public Health, Universitas Diponegoro, Indonesia

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ABSTRACT

Background: Menstruation, a normal part of puberty, is frequently misinterpreted because of societal stigma and limited access to proper education. Educational settings and peer-based programs are key in enhancing both menstrual and nutritional health, which are vital to supporting the overall well-being of adolescent girls. This Study aims to explore the factors influencing the promotion of menstrual health through nutrition education and peer-based interventions for adolescent girls using a scoping review methodology.

Subject and Method: This scoping review was conducted using data obtained from PubMed Central, Science Direct and Google Scholar. The target population includes adolescent girl related to their menstrual health, nutritional education and peer-based intervention. A search was conducted using the keywords "Menstrual health" AND "nutritional education" AND "peer-based interventions" AND ("adolescent girls" OR "teen girls" OR "adolescent health") AND ("menstruation" OR "menstrual hygiene" OR "menstrual health promotion") AND ("nutrition" OR "diet" OR "healthy eating") AND ("peer support" OR "peer education" OR "peer-led programs"), yielding 4.245 articles, which were then filtered down to 7 relevant articles after applying a 10-year time frame.

Results: Several factors influence the promotion of menstrual health through nutrition education and peer-based interventions for adolescent girls. These include social support from peers, skills-based education, family involvement (especially mothers), sufficient nutrition literacy, psychosocial factors such as self-confidence and self-control, the role of schools as a health education platform, and the theoretical models used in the program, such as the Theory of Planned Behavior.

Conclusion: Peer-led and skills-based education improves health outcomes for adolescent girls. Combining peer support, family involvement, and active learning enhances program success. Schools and communities should adopt these models to address adolescent health issues effectively.

Keywords: Menstrual Health, Nutritional Education, Peer-Based Interventions

Correspondence:
Putu Ayu Karisma, Faculty of Public Health, Universitas Diponegoro. Jl. Prof. Jacub Rais, Tembalang, Semarang, Central Java 50275, Indonesia. Email: imakharisma829@gmail.com.

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BACKGROUND

Puberty is a phase of physical and hormonal development that prepares the body for sexual reproduction. The onset of menstruation, known as menarche, signifies the beginning of puberty in girls, usually occurring between the ages of 10 and 16 (Yogesh

et al., 2024). Menstruation is a natural occurrence frequently linked to negative views. How individuals manage it differs, influenced by cultural norms, traditions, and education. Menstrual health represents a state of complete physical, mental, and social wellness, not merely the absence of illness (Shah et al., 2022). Menstruation is a sign of puberty and fertility, not an illness. The absence of accurate information, influenced by cultural factors, can result in unhealthy behaviors among adolescent girls (Darabi and Yaseri, 2022).

As teenagers typically attend school and spend a significant portion of their time there, schools play a crucial role in educating them about sexuality, reproductive health, and positive health behaviors (Nafisah et al., 2023). Schools provide an ideal setting for health education, particularly in terms of achieving maturity and preventing health issues related to sex and puberty. However, these educational programs are often not implemented for various reasons (Eslamimehr et al., 2017). Health and sexual education are essential for teenagers, as knowledge of puberty can assist them in dealing with the various issues they encounter during this stage (Ghasemi et al., 2019). The effectiveness of health education programs relies on the proper use of theory. Ajzen's Theory of Planned Behavior forecasts health behavior based on attitudes, social norms, and perceived control over behavior (Eslamimehr et al., 2017).

The health and well-being of school-aged children is a global priority, with the role of schools increasingly recognized. Peer education interventions have also risen in recent decades (Dodd et al., 2022). The peer education approach aims to improve adolescents knowledge, attitudes, and abilities, helping them take responsibility for managing and promoting their health (Ghasemi et al., 2019). Having adequate knowledge of puberty helps adolescents navigate this phase in a healthier way. The absence of proper education, feelings of embarrassment, and reluctance to discuss genital health hinder adolescent girls from achieving mental and social well-being, leading to various issues (Eghbal et al., 2023). Moreover, knowledge about adolescents' perceptions and understanding of menstruation remains scarce (Nooh, 2015).

Peer education is considered an effective method of health education. It involves individuals who share similar experiences, such as classmates, close friends, or family members, and aims to improve knowledge, foster positive attitudes, and encourage healthy behaviors, even though these individuals are not health professionals (Babapour et al., 2023). The implementation of nutrition education in schools has proven to be effective and serves as a sustainable strategy to promote optimal nutritional health (Abu-Baker et al., 2021)Proper nutrition plays a crucial role in maintaining hormonal balance and metabolism, which in turn affects overall health, including the menstrual cycle (Ariyanty et al., 2024). Research indicates that women with a low percentage of body fat due to insufficient calorie intake are more prone to menstrual irregularities, such as shorter bleeding duration, infrequent cycles, severe menstrual pain, or even the absence of menstruation (Thakur et al., 2020).

Adolescence is a period of rapid growth that increases the demand for essential nutrients, particularly iron. Adolescent girls are at a higher risk of iron deficiency anemia due to blood loss during menstruation (Pulingmuding et al., 2019). Anemia in adolescent girls is associated with menstruation, inadequate protein and iron intake, and unhealthy dietary habits often linked to weight loss efforts (Zuraida et al., 2023). Studies indicate that 27% of girls

aged 11–18 experience iron deficiency, compared to only 4% of boys. Adolescent girls are more vulnerable to nutritional deficiencies as they often restrict food intake to maintain body image. Limited nutrition depletes the body's iron reserves, accelerating the onset of iron deficiency anemia (Wati et al, 2023).

Peer educators contribute to enhancing adolescent health, as peers have a significant impact on their social development. Adolescents tend to seek support from their friends, and peer educators gain benefits such as boosted self-confidence and acknowledgment from schools (Dodd et al., 2022). In this context, promoting menstrual health through nutrition education and peer-based interventions for adolescent girls is essential.

SUBJECT AND METHOD

1. Study Design

This study used a scoping review design based on the methodological framework by Arksey and O'Malley. This approach allows researchers to systematically map existing literature on a topic to identify key concepts, research gaps, and evidence types. The review specifically explored studies that promote menstrual health through nutritional education and peer-based interventions in adolescent girls.

2. Population and Sample

The population of interest in this review was adolescent girls aged 10 to 19 years who had already experienced menstruation. The inclusion criteria were: (1) studies published in English between 2015 and 2025; (2) peer-reviewed and open-access articles; (3) studies focusing on menstrual health, nutritional education, and peer-based interventions. Exclusion criteria included: studies that did not involve adolescents, were not peer-reviewed, or did not address the core themes of this review.

3. Study Variables

The main variables analyzed in the studies included:

Menstrual health promotion measured through improvements in knowledge, attitudes, practices, and menstrual hygiene behaviors.

Nutritional education includes content related to diet, healthy eating habits, nutrient literacy, and its link to menstrual regulation.

Peer-based interventions refers to programs involving peer educators or support groups designed to influence adolescent health behaviors.

4. Study Instruments

Data were collected from PubMed Central, Science Direct and Google Scholar using a keyword search : “Menstrual health" AND "nutritional education" AND "peer-based interventions" AND ("adolescent girls" OR "teen girls" OR "adolescent health") AND ("menstruation" OR "menstrual hygiene" OR "menstrual health promotion") AND ("nutrition" OR "diet" OR "healthy eating") AND ("peer support" OR "peer education" OR "peer-led programs"). Filters were applied to include only articles published between 2015 and 2025. This search strategy was designed to identify relevant literature for the scoping review.

5. Data analysis

A thematic analysis approach was used to synthesize data from the selected studies. Two independent reviewers screened and extracted data to reduce bias and enhance validity. Themes were identified based on repeated concepts and patterns, including the effectiveness of peer support, the role of nutrition education, and the involvement of family and school-based interventions. Discrepancies were resolved through discussion. A PRISMA flowchart was used to illustrate the screening and selection process of articles.

The process of searching for articles to be synthsized and the process of reviewing and selecting articles using the PRISMA Flow Diagram are presented in Figure 1. The included studies varied in methodological quality. Most were quasi-experimental or RCTs with limited follow-up. Only a few assessed long-term behavior change. Peer involvement and family support showed consistent effectiveness, while nutritional outcomes were less commonly evaluated.

1. Study Selection

Based on figure 1 show that the study selection of the scoping review. A total of 4.245 articles were identified from various data bases, and then excluded 1.608 articles were removed. 3 articles were removed due to duplication. Records screened at the year level were 4.242 articles, A total of 2.634 articles were excluded on the grounds that 2.150 articles were not relevant to the keywords and 477 articles were not in accordance with the discussion. The remaining articles were 7 articles.

2. Included Study

Based on Table 1 show that the primary studies included in the scoping review. A total of 7 articles were included. A total of 7 articles came from Indonesia (n= 1), Iran (n= 4), Mashhad (n= 1) and Jamnagar (n=1)

3. Critical Analysis

Following a selection process based on keyword relevance and inclusion criteria, seven articles were identified, representing a variety of research designs such as randomized controlled trials (RCT), semi-experimental interventions, and quasi-experimental studies.

RESULTS

Based on Table 1, various studies have evaluated the effectiveness of peer-based interventions in improving adolescent health behaviors, particularly related to menstrual health and nutritional status. A randomized controlled trial (RCT) by Rezvani et al. (2024) demonstrated high internal validity due to its theory-based design and proper randomization, though it lacked long-term follow-up. Mohamadi et al. (2019) conducted a quasi-experimental study comparing peer and motivational methods, showing positive outcomes, though internal validity was moderate and external validity was culturally specific to Iran.

Jarrahi et al. (2021) also used an RCT involving mothers, resulting in significant behavior improvements despite a small sample size and short follow-up period. In the Islamic boarding school context, Nafisah et al. (2023) found peer counseling effective, although the study lacked randomization and had a limited sample. Babapour et al. (2023) compared peer-led and health worker-led interventions for PMS/PMDD using a quasi-experimental design, but the study's narrow focus and limited geographic scope constrained generalizability.

Damghanian et al. (2019) reported increased physical activity through a school-based RCT using peer-led approaches, although no significant changes were observed in diet or nutritional status. Lastly, Yogesh et al. (2024) found that a skills-based learning approach was more effective and engaging than lectures in rural India, despite the non-randomized design. Internal validity was rated moderate to high, with external validity appropriate for the rural setting.

Table 1. Critical Analysis of Scoping Review Menstrual Health Through Nutritional Education and Peer-Based Interventions in Adolescent Girls

Author (Year)	Study Design	Criteria Study	Strengths	Limi-tations	Internal Validity	External Validity
Rezvani et al. (2024)	RCT (peer-led inter-vention)	Clear objective, strong design, representative sample, control group, randomi-zation, theory-based, valid instru-ments, strong stats, outcome relevance, ethics declared	Large sample size, pre-post analysis, theory used (SCT)	No long-term follow-up	High	Fairly high for public school setting
Mohamadi et al. (2019)	Semi-experi-mental inter-vention	Clear purpose, adequate sample, peer comparison group, valid instrument, sta-tistical analysis	Compared peer and motivational methods, posi-tive outcomes	Lacks full randomiz ation, control partial	Moderate	Culturally specific to Iran
Jarrahi et al. (2021)	RCT with maternal involvement	Controlled trial, clear design, valid tools, behavior-focused outcomes, ethics considered	Combined mother parti-cipation, strong impro-vement in behavior	Small sample, short follow-up	High	Fair for urban adolescents in Iran
Nafisah et al. (2023)	Semi-experimental study	Focused objective, intervention clarity, small but contextual sample, qualita-tive insight	Peer counselor empowerment, good local adaptation	No randomiz ation, small size	Moderate	Good for pesantren/ Islamic school setting
Babapour et al. (2023)	Quasi-experimental	Comparative design, PMS-focused outcomes, pre-post evaluation	Peer vs healthcare provider comparison, relevant outcomes	No randomiz ation, narrow focus	Fair	Limited to small city in Iran
Damghanian et al. (2019)	Randomized field trial	Controlled trial, activity-focused, physical activity evaluation, statistical testing, ethics addressed	Physical activity improved, structured peer model	No sig-nificant change in diet or nutrition al status	High	Urban public school setting in Iran
Yogesh et al. (2024)	Quasi-experimental	Skill-based vs lecture, KAP-based outcomes, qualitative feedback, 2-month follow-up	Skill-based education more effective, engaging method	Not randomiz ed, limited to one rural area	Moderate to High	Fair for rural Indian setting

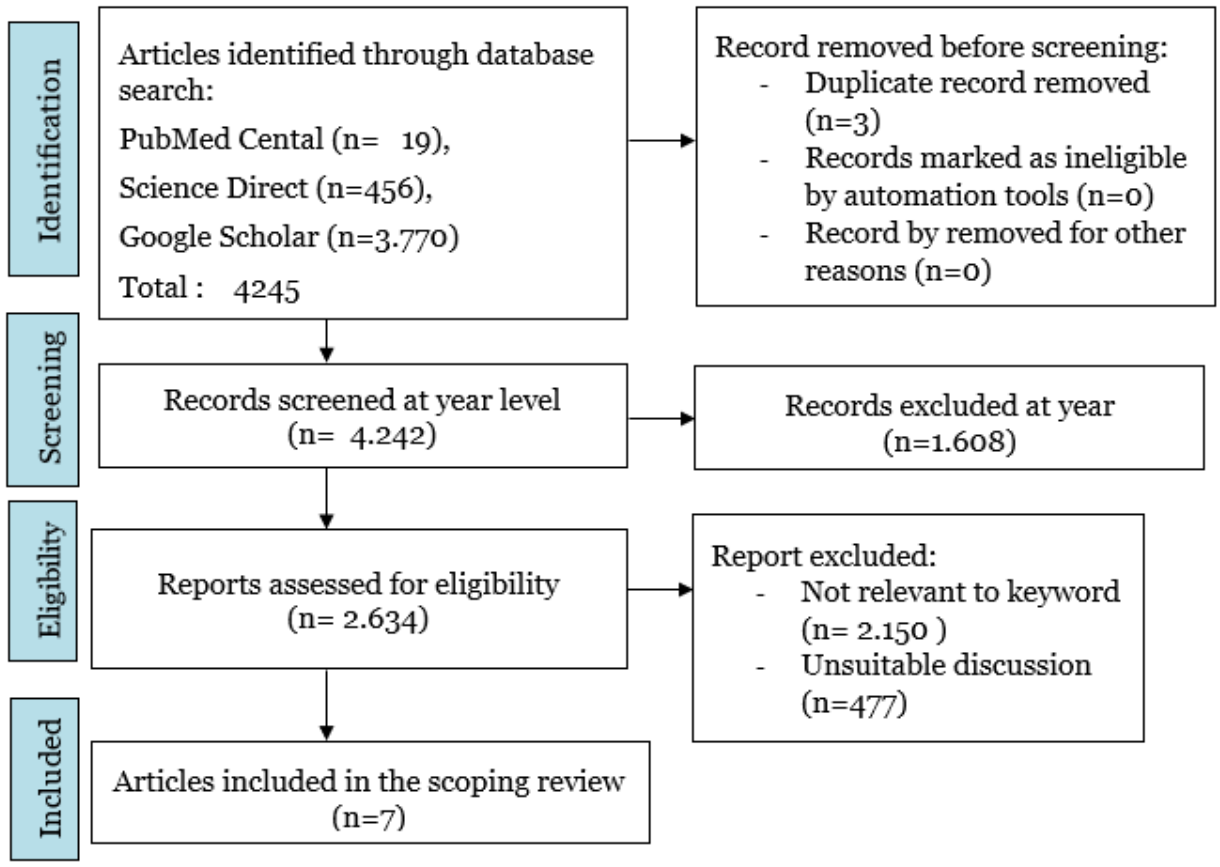

Figure 1. PRISMA Flow Diagram

Table 2. Review research on Promoting Menstrual Health Through Nutritional Education and Peer-Based Interventions in Adolescent Girls

Author (year)	Study Design	Study Location	Subject	Result
Rezvani *et al.*, (2024)	Randomized controlled educational trial	City of Genaveh in southern Iran	245 female students in public high schools	Peer-led training increases knowledge, expectations of results, self-confidence, self-control, social support, and puberty-related behaviors in adolescent girls. The group that received the training demonstrated significant improvements compared to the other group. The primary factors affecting puberty-related behavior are outcome expectations and social support, which explain 46.4% of the behavior changes.
Mohamadi *et al.*, (2019)	Semi-experimental intervention study	High schools of Shahroud-Iran	334 female students (13–15 years old)	The study results indicate that both intervention groups (motivational interview and peer group) showed notable improvements in knowledge, performance, and mental health after the intervention and one month later, compared to the control group. The peer group performed better in all of these areas.
Jarrahi *et al.*, (2021)	Randomized clinical trial	Mashhad	60 high school female students	The results of the study show that the intervention group using peer education with the participation of mothers had a significant improvement in menstrual health behaviors compared to the control group after two menstrual cycles (P<0.001).

Author (year)	Study Design	Study Location	Subject	Result
Nafisah, Rizqi and Aryani, (2023)	Semi-experimental intervention study	Madrasah Aliyah Al-Ikhsan school in Beji Village, Kedung-banteng District, Indonesia	30 young women	This program resulted in notable gains in participants' knowledge regarding adolescent reproductive health (by 8.28 points) and peer education (by 5.17 points). Furthermore, they developed the ability to recognize typical reproductive health issues in adolescents and deliver appropriate health education and counseling.
Babapour *et al.*, (2023)	Quasi-experimental non-randomized controlled trial	Sari, northern Iran	90 students	Peer education and healthcare provider education significantly reduced PMS scores and improved general health scores in adolescents. However, neither approach significantly decreased the frequency of PMDD compared to the control group
Damghanian *et al.*, (2019)	Randomized field trial with control group	Tehran's 17th district, Iran	223 students	The main result of this study shows that peer-based education is effective in increasing physical activity in female students, with the average score rising from 16.19 to 19.74 ($p < 0.001$). However, this intervention did not result in significant changes in the eating patterns or nutritional status of the female students.
Yogesh *et al.*, (2024)	Quasi-experimental study	Local public girls' schools in rural villages surrounding Jamnagar	100 girls aged 12–16 years	Skills-based menstrual health education is more effective than lecture-based education in improving knowledge, attitudes, and practices (KAP) among adolescent girls. The skills-based group showed significant improvements in KAP, which were sustained two months after the intervention. Qualitative feedback indicated increased enjoyment, engagement, and confidence.

Table 2 outlines the findings from seven key studies that examined how nutritional education and peer-based strategies support menstrual health among adolescent girls. Collectively, the evidence indicates that peer-led approaches significantly enhance knowledge, attitudes, and behaviors related to puberty and reproductive health. For example, both Rezvani et al. (2024) and Mohamadi et al. (2019) found that peer education effectively boosts self-esteem, emotional regulation, and social connectedness, leading to better health-related actions during puberty. Jarrahi et al. (2021) emphasized the added benefit of involving mothers, showing that family engagement can strengthen educational outcomes. In the Indonesian context, Nafisah et al. (2023) demonstrated that peer education not only improved health knowledge but also equipped participants to act as peer counselors and educators. Meanwhile, studies by Babapour et al. (2023) and Damghanian et al. (2019) explored broader health aspects, such as physical activity and emotional well-being, although changes in nutrition-related behaviors were not always observed. Yogesh et al. (2024) further supported the value of hands-on, skills-based learning by showing that it leads to more lasting improvements in menstrual health practices compared to traditional lecture formats.

DISCUSSION

This scoping review explores how menstrual health promotion among adolescent girls

can be effectively supported through nutritional education and peer-based interventions. To provide a comprehensive understanding of the findings, this discussion is organized around the three main variables analyzed in this review: menstrual health, nutritional education, and peer-based interventions. Each component plays a critical role in shaping adolescent girls' overall well-being, and their interaction highlights the complexity of health promotion in this demographic.

1. Menstrual Health

Menstrual health is a multifaceted concept that extends beyond the biological process to include physical, psychological, and social well-being. It encompasses hygienic practices, accurate knowledge, emotional readiness, and social support systems. The studies reviewed consistently demonstrate the benefits of educational interventions in improving menstrual health behaviors. For instance, Jarrahi et al. (2021) and Yogesh et al. (2024) found that structured peer education programs significantly improved menstrual hygiene practices, reduced stigma surrounding menstruation, and boosted the self-confidence of adolescent girls. This highlights the critical role of education not only in imparting knowledge but also in fostering a supportive environment where girls feel empowered to manage their menstrual health openly.

Moreover, Damghanian et al. (2019) expanded the scope of menstrual health by showing how peer education can influence related health behaviors such as physical activity, which may indirectly contribute to menstrual cycle regulation. This holistic approach acknowledges the interconnectedness of lifestyle factors in adolescent health.

However, menstrual health challenges are not uniform; Babapour et al. (2023) noted that while peer and healthcare provider education alleviated symptoms of premenstrual syndrome (PMS), neither intervention significantly reduced the prevalence of premenstrual dysphoric disorder (PMDD). This suggests that certain menstrual disorders require individualized medical and psychological interventions beyond educational strategies, emphasizing the need for a continuum of care that integrates education with clinical support.

Collectively, these findings indicate that menstrual health promotion programs must move beyond simple knowledge dissemination to incorporate psychosocial support and targeted management of menstrual disorders, thereby ensuring a comprehensive approach to adolescent well-being.

2. Nutritional Education

Nutritional status is a vital determinant of menstrual health, particularly in the regulation of menstrual cycles and the prevention of iron-deficiency anemia—a common concern among adolescent girls due to increased iron requirements during menstruation. Although this review identified fewer studies focusing exclusively on nutrition education, the evidence underscores its critical importance.

Damghanian et al. (2019) observed significant increases in physical activity following peer education but found no parallel improvements in dietary behaviors or nutritional status. This discrepancy highlights the well-documented challenge in health promotion: converting knowledge into sustained behavior change. Factors such as body image concerns, socioeconomic limitations, and family dietary habits may hinder adolescents' ability to adopt healthier eating patterns despite increased awareness.

Nonetheless, integrating nutrition education into menstrual health interventions remains essential. Ariyanty et al. (2024) and Zuraida et al. (2023) provided compelling evidence linking poor dietary

habits and inadequate iron intake with menstrual irregularities and anemia. Therefore, nutritional education should focus on practical, actionable guidance regarding iron-rich foods, strategies to enhance iron absorption (such as avoiding inhibitors like tea and coffee during meals), and balanced diets that support hormonal health. Delivery methods that engage adolescents in relatable, culturally sensitive ways—such as cooking demonstrations, peer discussions, or interactive digital platforms—could increase effectiveness and adherence.

3. Peer-Based Interventions

Peer-based education emerged as a particularly powerful modality across nearly all studies reviewed. Peers offer unique advantages including relatability, trust, and emotional resonance, which facilitate greater engagement and receptivity to health messages. Rezvani et al. (2024) and Mohamadi et al. (2019) demonstrated that peer-led interventions significantly enhanced adolescents' knowledge, emotional regulation skills, and positive health behaviors, outperforming traditional didactic or even motivational interviewing approaches. These findings align with the Social Cognitive Theory, which stresses the role of social modeling, observational learning, and self-efficacy in behavior change.

Furthermore, peer education programs have shown adaptability to diverse contexts. Nafisah et al. (2023) highlighted the successful implementation of peer education within Islamic boarding schools, where reproductive health literacy improved alongside empowerment of participants to become peer educators themselves—effectively multiplying the program's impact. This model not only fosters knowledge dissemination but also builds leadership and advocacy skills among adolescents.

Family involvement also enhances peer education outcomes, as evidenced by Jarrahi et al. (2021), who found that maternal participation strengthened the effectiveness of menstrual health interventions. This points to the importance of integrating family and community support into peer-led programs to create a more supportive ecosystem for adolescent health.

Lastly, Yogesh et al. (2024) emphasized that skills-based, interactive education methods yield better long-term behavioral outcomes compared to passive lecture formats. Engaging adolescents actively through role-plays, discussions, or problem-solving activities may solidify knowledge and encourage practical application.

In summary, menstrual health promotion among adolescent girls is optimized through a comprehensive approach that combines peer support, nutrition education, active learning techniques, and family involvement. The interplay of these elements addresses the multidimensional nature of menstrual health—spanning biological, psychological, and social domains.

Future programs should prioritize culturally sensitive, skills-based peer interventions supported by schools, families, and communities to create sustainable improvements in reproductive and nutritional health. Additionally, addressing barriers to behavior change, such as socioeconomic constraints and stigma, is critical. Integration of clinical care for menstrual disorders alongside educational strategies will also enhance outcomes.

Continued research is needed to explore innovative methods for nutrition education, evaluate long-term effectiveness of peer-led programs, and tailor interventions to diverse cultural settings, ultimately empowering adolescent girls to achieve holistic menstrual health.

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CONFLICT OF INTEREST

There are no conflicts in this study.

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