

Change in Behavioral Intention Toward Anemia and Reproductive Health Screening Following a School-Based Sari Mentari Intervention Among Adolescent Girls

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ABSTRACT

Background: At the Public Junior High School 9 of Jember, West Java, Indonesia, anemia prevalence in adolescents remains high at 53.01%, which is presumably associated with low adherence to iron and folic acid supplement tablet (IFAT) among adolescent girls. To address this issue, the *Sumbersari Mentoring Adolescent Girls Toward Independence* (SARI MENTARI) program was developed as a school-based intervention. This study aimed to measure the change in students' behavioral intention to participate in anemia and reproductive health screening before and after the SARI MENTARI intervention.

Subjects and Method: This study used quasi experimental pretest and post-test one group design. The study was conducted at the Public Junior High School 9 of Jember in July 2026. A total of 94 adolescent girls were recruited using purposive sampling. Behavioral intention was assessed using the BI-ARSHQ. Data were analysed using a Wilcoxon Matched Pairs Signed Rank Test.

Results: Among 94 adolescent girls with complete pretest and post-test data, the median behavioral intention score increased from 3.00 (IQR 1.00) before the intervention to 4.00 (IQR 1.00) after the intervention (Mean= 3.22; SD= 0.64 vs. Mean= 3.61; SD= 0.49). Post-test scores were higher than pretest scores in 40 participants, lower in 10, and unchanged in 44. The Wilcoxon signed-rank test showed a statistically significant increase with a large effect size (rank-biserial correlation $r_{rb} = 0.65$). The program outputs included a school-based Girls Health Class, a digital educational platform, student-generated health promotion materials, and collaboration between the school and the primary healthcare center.

Conclusion: Behavioral intention toward anemia and reproductive health screening increased after the SARI MENTARI program among female adolescent. Controlled studies with longer follow-up and behavioral outcomes are needed to determine whether this change translates into health behavior.

Keywords: Adolescent girls; anemia screening; reproductive health screening; school-based health promotion; behavioral intention.

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BACKGROUND

Anemia remains one of the major global public health problems, occurring frequently among women and adolescent girls. The latest WHO data show that in 2023, 30.7% of women aged 15–49 years worldwide had anemia, with a prevalence of 30.5% among non-pregnant women and 35.5% among pregnant women (WHO, 2025).

In Indonesia, anemia among adolescent girls remains a public health concern. The 2023 Indonesian Health Survey reported an anemia prevalence of 15.5% among adolescents and young adults aged 15–24 years. The survey also indicated that 54.8% of adolescent girls had never received Iron-Folic Acid Tablet (IFAT) supplementation, highlighting challenges in the coverage and uptake of anemia prevention interventions (Ministry of Health of the Republic of Indonesia, 2023). These findings indicate that anemia control requires more than the provision of IFAT and should be supported by health education, early detection, and continuous monitoring in schools (Gosdin et al., 2021).

Anemia and reproductive health are closely interlinked among adolescent girls, primarily through menstruation. Heavy or prolonged menstrual bleeding is an important yet frequently overlooked risk factor for iron deficiency anemia among adolescent girls, as excessive menstrual blood loss increases iron requirements and may progressively deplete iron stores (Pandey et al., 2026). Menstrual disorders and abnormalities have similarly been identified as key predictors of anemia among adolescent girls, alongside limited reproductive health knowledge and hygiene practices, which further compound their vulnerability to both problems simultaneously (Endale et al.,

2022). This physiological and behavioral overlap underscores the importance of an integrated health care approach that addresses nutrition, menstrual health, and reproductive health together, rather than treating anemia and reproductive health as separate issues (Sari et al., 2022).

A similar concern has been identified in the Summersari Health Center work area in Jember, East Java, Indonesia. Data from the Maternal and Child Health Monitoring System of Summersari Health Center (2025) showed that although anemia screening coverage among adolescent girls reached 92.5% during the 2024/2025 academic year, anemia prevalence remained high at 35%. According to the WHO classification, this prevalence represents a moderate public health problem, as it falls within the 20.0–39.9% range. These findings suggest that high screening coverage alone may not be sufficient to address the persistent burden of anemia among adolescent girls (WHO, 2024). Based on data from the local area monitoring of maternal and child health at the State Junior High School 9 of Jember, the prevalence of anemia even reached 53.01%, even though screening coverage has reached 94.32% (Summersari Health Center work area, 2025).

In response to these challenges, the Indonesian Ministry of Health has strengthened adolescent health services through school-based health screening to prevent and control anemia in adolescent girls, the Indonesian Ministry of Health is implementing anemia screening through the Free Health Check-Up (CKG) in schools which is integrated with health education and the provision of IFAT supplementation (Ministry of Health of the Republic of Indonesia, 2025). This program is part of

the promotive and preventive strategy to improve women's health from adolescence and reduce the risk of intergenerational nutritional problems (Young et al., 2023).

Despite high screening coverage in Summersari and at State Junior High School 9 Jember, anemia prevalence remains relatively high, suggesting that screening alone may be insufficient to address the problem. However, this interpretation represents an observational inference based on local programmatic data rather than evidence of causality. Even when IFAT is distributed at school, actual consumption stays low only 47% of girls take it regularly, mainly due to taste, parental prohibition, fear of side effects, and forgetfulness (Hidayanty et al., 2025) while knowledge, attitude, and program implementation at the school level also remain weak (Silitonga et al., 2023). Adherence is instead driven more by teacher supervision and monitoring than by tablet availability (Daba et al., 2024), and a systematic review confirms that improved coverage has not consistently improved hemoglobin outcomes (Duggirala et al., 2026). Taken together, these findings suggest that weak follow-up and compliance monitoring may be one contributing factor to persistent anemia, alongside other determinants such as inadequate iron intake, menstrual blood loss, infection, overall nutritional status, treatment adherence, diagnostic thresholds, and the effectiveness of follow-up and treatment protocols.

Existing school-based anemia programs in Indonesia are largely single component IFAT distribution, one off education, or screening alone rather than integrated and continuously monitored, even though digital tools have shown promise in isolation, such as an app that cut anemia prevalence from 35% to 17.5% in four weeks (Pasamba et al., 2025) and

WhatsApp reminders that improved adherence in a rural setting (Laurence et al., 2025). A Bali based study explicitly called for integrated, digital, school-based models that remain untested in Indonesia (Prima-dewi et al., 2026), and while reproductive health education has separately been shown to shift behavioral intention (Alekhya et al., 2023; Hinson et al., 2023), it has rarely been combined with anemia prevention, and teacher mentoring or school health center monitoring remain understudied as active program components. This leaves a clear gap: evidence is lacking on integrated, digitally monitored school programs combining anemia and reproductive health education, teacher mentoring, and IFAT/IFAT compliance monitoring, and their effect on adolescent girls' behavioral intention to participate in screening.

Therefore, an integrated school-based intervention is needed to address anemia and reproductive health simultaneously; the SARI MENTARI (Summersari Mentoring Adolescent Girls Toward Independence) program was developed as a school-based health promotion innovation. This program integrates education on anemia and reproductive health, mentoring by teachers, and the use of a website for education, screening, and monitoring adherence to IFAT. These three components were selected based on the Theory of Planned Behavior (TPB) framework. Education was directed at strengthening adolescent girls' attitude and perceived behavioral control toward anemia prevention, as better attitude and behavioral control among adolescent girls have been shown to be associated with better anemia prevention behavior (Ajzen, 1991).

Teacher mentoring functions to shape subjective norms through social support and supervision within the school environment, consistent with findings that classroom-based health promotion interventions can

enhance the subjective norm construct and adolescents' behavioral intention, as evaluated through a school-based health promotion intervention on behavioral intention among urban adolescents (Jha et al., 2024). The monitoring feature on the website was designed to strengthen adolescent girls' perceived behavioral control and self-efficacy in independently monitoring their adherence to iron supplementation, given that the use of digital applications for self-monitoring has been shown to play a role in enhancing self-efficacy in adolescents' management of health behaviors (Hood et al., 2021). This theory-based approach is expected to improve adolescent girls' understanding and participation in anemia prevention, as well as strengthen coordination and monitoring between schools and community health centers.

Improving screening participation requires first targeting behavioral intention, the most proximal and consistent predictor of health behavior. According to the Theory of Planned Behavior (Ajzen, 1991), intention is shaped by attitude, subjective norms, and perceived behavioral control all of which can be deliberately targeted through structured education, peer/teacher reinforcement, and improved access to health information, as demonstrated by a TPB based school intervention in Iran that significantly improved adolescent girls' intention toward anemia prevention (Rakhshani et al., 2025). This raises the question of whether an integrated, TPB informed school intervention combining anemia and reproductive health education, teacher mentoring, and digital monitoring can improve adolescent girls' behavioral intention to participate in screening.

Based on this background, this study aimed to measure the difference in behavioral intention scores of female students to participate in anemia and reproductive

health screening, as assessed using a behavioral intention questionnaire before (pre-test) and after (post-test) the intervention among female students at the State Junior High School 9 of Jember.

SUBJECTS AND METHOD

1. Study Design

This study used one group pretest-posttest quasi experimental study.. The research location was at the State Junior High School 9 of Jember. Participant recruitment, pre-test and the SARI MENTARI intervention were conducted on the same day, 15 July 2026, with the pretest administered shortly before the intervention began, while the posttest was administered on 22 July 2026, resulting in a one-week interval between the pretest and posttest. The absence of a concurrent control group represents one of the main limitations of this study design, meaning that the observed changes in behavioral intention cannot be fully attributed to the intervention alone. Key threats to internal validity that should be considered include maturation (natural changes in students' knowledge or attitudes occurring over time), testing effects (potential improvement in posttest scores due to students' prior exposure to the instrument during the pretest), history effects (external events occurring during the study period that may have influenced outcomes), and possible regression to the mean among students with extremely low or high pretest scores.

2. Population and Sample

The target population comprised female students in Grade 7 at State Junior High School 9 of Jember, Indonesia. A total sampling (census) approach was used, whereby all eligible Grade 7 female students were invited to participate in the SARI MENTARI program. The inclusion criteria were female students enrolled in Grade 7,

willing to participate in the program, and able to complete both the pretest and posttest assessments. Students who were absent during either the pretest or posttest, or who did not complete the questionnaire, were excluded from the final analysis. Of the 94 students in Grade 7 female students assessed for eligibility, 94 met the inclusion criteria and were invited to participate. A total of 94 students enrolled in the program, and all 94 completed both the pretest and posttest assessments and were therefore included in the final analysis. Thus, no sample-size calculation was performed because the study used a census of all eligible Grade 7 female students available at the study site during the implementation period.

3. Study Variables

The study variables consisted of one intervention variable and one primary outcome variable. The Sari Mentari Program was the intervention, while the primary outcome was the composite behavioral intention score related to anemia screening and reproductive health screening. No secondary outcomes were assessed in this study.

4. Operational Definition of Variables

The Sari Mentari Program was defined as the independent variable in this study. It refers to an educational and monitoring intervention designed to improve adolescent girls' awareness of anemia and reproductive health and to support their intentions to participate in relevant screening activities.

The composite behavioral intention score was defined as the primary outcome (dependent variable) and represented adolescent girls' intention to undergo anemia screening and reproductive health screening. The composite score incorporated behavioral intention items related to both screening domains, with higher scores indicating a stronger intention to participate in anemia and reproductive health screen-

ing. No secondary outcomes were assessed in this study.

5. Study Procedures

The Sari Mentari Program was designed as a two session, TPB informed intervention combining education, teacher mentoring, and website-based monitoring. Session 1 was planned to include pretest administration, education on anemia and reproductive health delivered by the researcher, introduction of the sarimentari.com website, and explanation of an individual poster competition judged on aesthetics, message content, and presentation. Two trained teachers and students participating in the School Health Unit (UKS) extracurricular were assigned as mentors to assist students with questionnaire completion and website use throughout the intervention period. Session 2 was planned to consist of poster presentations, judging, and post-test completion for remaining students. All students were to receive identical content with no individual tailoring, and adherence to this protocol was to be monitored through activity logbooks.

6. Study Instruments

Behavioral intention was measured using the Behavioral Intention toward Anemia and Reproductive Health Screening Questionnaire (BI_ARHSQ). The instrument was based on the Theory of Planned Behavior (Ajzen, 1991). The questionnaire consists of 26 items across four constructs: attitude (8 items; four on anemia and four on reproductive health), subjective norm (4 items), perceived behavioral control (6 items), and behavioral intention (8 items; four on anemia and four on reproductive health). The items refer to screening activities in the free health check-up program and at the community health centers. Responses are rated on a four-point Likert scale (1= strongly disagree to 4= strongly agree). Item validity was evaluated using

Pearson product-moment correlations between each item and the total score. All 26 items correlated positively and significantly with the total score ($r = 0.51\text{--}0.86$, $p < 0.01$), above the critical value for $n = 30$ ($r = 0.36$, $df = 28$, $\alpha = 0.05$) with the Cronbach's $\alpha = 0.97$.

7. Data Analysis

Behavioral intention was measured with the BI-ARHSQ and scored on a 1–4 scale, with higher scores indicating stronger intention. Because the score is bounded, has only four response categories, and contains many tied values, it was treated as ordinal data. In addition, Shapiro-Wilk tests showed that both pretest ($W = 0.77$, $p < 0.001$) and posttest scores ($W = 0.62$, $p < 0.001$) deviated from normality. The Wilcoxon signed-rank test was therefore used to compare pretest and posttest scores.

Analysis was restricted to complete pairs. One of 95 participants (1.1%) had missing data and was excluded, leaving 94 pairs for analysis. Zero differences ($n = 44$) were excluded from the test according to the standard Wilcoxon procedure, and tied absolute differences received average ranks. Results are reported as median (IQR), Wilcoxon Z, and two-sided asymptotic p value. Effect size was calculated as the rank-biserial correlation, $r_{rb} = (W^+ - W^-)/(W^+ + W^-)$, where W^+ and W^- are the sums of positive and negative ranks. Confidence intervals for effect size were not estimated because they are not provided by SPSS. Statistical significance was set at $p < 0.05$. Analyses were performed using IBM SPSS Statistics version 26.0.

8. Research Ethics

Research ethical issues including informed consent, anonymity, and confidentiality, were addressed carefully during the study process. The research ethical clearance approval letter was obtained from the Research Ethics Committee of the Brawijaya

University, Malang, Indonesia, with number 086/EC/KERIS/01/VII/2026, on July 22, 2026.

RESULTS

1. Implementation of The Program

This program was designed based on a needs assessment using the Hanlon Method, Fishbone Diagram, and Five Why's analysis. These three methods were conducted by the researcher over a one-week period (1–7 July 2026) prior to participant recruitment, involving staff from the Summersari Health Center and using data from the Local Area Monitoring of Maternal and Child Health of the Summersari Health Center work area. The Hanlon Method was used to prioritize health problems within the Summersari Health Center work area based on four criteria: Size (magnitude of the problem), Seriousness (severity), Effectiveness (feasibility of resolution), and PEARL (a screening criterion for program feasibility and appropriateness), the results of which underpinned the selection of anemia and adolescent reproductive health as the program's priority topic. Subsequently, the Fishbone Diagram was used to identify possible root causes of the problem across multiple domains, while the Five Why's analysis was used to further trace the causal pathway until the underlying root cause was identified. Both methods informed the design of the website-based SARI MENTARI program, which is equipped with an e-book as an educational medium, an anemia screening questionnaire, and a monthly checklist for iron supplement tablet consumption, supervised and monitored by teachers at school.

The SARI MENTARI an intervention combining education, teacher mentoring, and website-based monitoring designed to strengthen adolescent girls' attitude, subjective norm, and perceived behavioral

control. The intervention was delivered face to face in a group format to all 94 seventh-grade female students at State Junior High School 9 of Jember, across two 1.5-hour sessions.

Session 1 (15 July 2026) included pretest administration, education on anemia and reproductive health delivered by the researcher using an evidence-based slide presentation covering hemoglobin screening and iron-folic acid supplementation, supervised by Summersari Health Center staff, along with introduction of the sarimentari.com website and explanation of an individual poster competition ("Anemia Prevention" theme, one-week completion, judged by five researchers on a 1–10 scale for aesthetics, message content, and presentation). Two teachers the school health (UKS) and Student Affairs PICs served as mentors after completing a two day website training, assisting students with pretest/posttest completion, website use, and monthly screening/weekly IFAT checklist monitoring.

Session 2 (22 July 2026) comprised poster presentations, judging, winner

announcement, and posttest completion for remaining students. All students received identical, non-tailored content. Two deviations from the Plan of Action occurred: the pretest was administered orally with paper-based responses instead of via mobile phones, due to restrictions during the School Environment Orientation Period (MPLS); similarly, 77 students completed the posttest online while the remaining 17 completed a paper-based version during Session 2 due to the same restriction. Implementation fidelity, monitored through activity logbooks and reports, confirmed the intervention was delivered consistently with the planned protocol despite these adaptations. All 94 students completed the posttest, and 10 students joined the poster competition, with 9 posters submitted.

2. Characteristics of Respondents

Table 1. shows the characteristics of the respondents, respondents characteristics included age, history of iron supplementation, previous hemoglobin screening and participation in anemia screening during the program.

Table 1. Characteristics of Respondents

Characteristics	Frequency	Percentage
Age (years)		
12	32	34.0%
13	60	63.8%
14	2	2.0%
Iron and Folic Acid Tablet (IFAT) consumption		
Ever consumed	4	4.25%
Never consumed	90	95.75%
History of hemoglobin test		
Previously screened	5	5.3%
Never screened	89	94.7%
Participation in Anemia Screening		
Screened	0	0%
Not Screened	94	100.0%

3. Implementation Outcomes

The intervention consisted of two educational sessions. The first session included

education regarding anemia, adolescent reproductive health, the importance of hemoglobin screening, iron and folic acid

supplementation, and an introduction to the sarimentari.com website. The first session was attended by 94 students. Out of them, 90 students were able to access the Sarimentari website, fill out the pre-test, and access the educational materials, while the other 4 students couldn't access it due to issues with account registration. Out of them, 90 students were able to access the Sarimentari website, fill out the pre-test, and access the educational materials, while the other 4 students couldn't access it due to issues with account registration. The second session involved 10 student presentations of educational posters developed during the intervention as a strategy to reinforce knowledge and communication skills. In the second session, 94 students were able to access the Sarimentari website to take the post-test and fill out a questionnaire about

anemia screening as well as a checklist for iron tablet consumption.

Throughout the implementation, participants actively engaged in discussions, question-and-answer sessions, and poster presentations. The educational website was also utilized by participants as an independent learning resource to review educational materials outside classroom sessions.

4. The result of multilevel analysis

Table 2 shows changes in behavioral intention toward Anemia and Reproductive Health Screening after implementation of the Sari Mentari Program. Of the 94 complete pairs, 40 participants (42.6%) had a higher posttest score, 10 (10.6%) had a lower score, and 44 (46.8%) showed no change. The mean behavioral intention score increased from 3.22 at pretest to 3.61 at posttest.

Table 2. Comparison of behavioral intention scores before and after intervention

Behavioral Intention	Mean	SD	p
Pretest	3.22	0.642	0.001
Post test	3.61	0.491	

DISCUSSION

The results showed that the implementation of the SARI MENTARI program increased adolescent girls' behavioral intention toward anemia screening and reproductive health. This finding suggests that the education provided not only increased individuals' inclination to undergo screening but also fostered more consistent perceptions and motivations among participants.

This increase in behavioral intention is consistent with the TPB, which positions behavioral intention as the most proximal predictor of behavior and posits that intention is shaped by attitude, subjective norms, and perceived behavioral control. The SARI MENTARI program was designed to address all three determinants simultaneously: education on the impact of anemia,

the benefits IFAT, and reproductive health fostered a more positive attitude; group discussion sessions and poster presentations created supportive subjective norms through reinforcement from peers and facilitators; while access to the educational website enhanced perceived behavioral control regarding anemia and reproductive health, as participants felt more capable of seeking information and taking preventive action whenever needed. This finding is consistent with a school-based quasi-experimental study by Rakhshani et al. (2025) involving 160 high school girls in Iran, which reported that six TPB based educational sessions (lectures, question and answer sessions, and group discussions) significantly improved all TPB constructs, including behavioral intention to prevent

iron deficiency anemia. The consistency in direction of findings across two different populations and intervention designs strengthens the argument that structured, TPB based education can consistently shift adolescent girls' behavioral intention toward the prevention and early detection of anemia.

The Health Belief Model (HBM) may offer an alternative, post-hoc interpretive lens for these findings. HBM was not part of the intervention design or the analytic framework of this study, which was guided by the TPB. Some educational content, such as the signs, symptoms, and consequences of anemia and reproductive health problems and the benefits of hemoglobin screening and IFAT consumption, overlaps conceptually with HBM constructs (perceived susceptibility, severity, and benefits), and the website may have reduced barriers to accessing health information. However, none of these constructs was measured, so we cannot conclude that they changed or mediated the observed increase in behavioral intention. Future studies could measure HBM and TPB constructs together to test these pathways.

The sarimentari.com website also included an IFAT checklist intended as a reminder and self-monitoring tool. IFAT in the Jaga Diri quasi-experimental study among 82 adolescent girls in Maluku, an Android application delivering weekly reminders and brief educational messages was associated with better knowledge and adherence to iron-folic acid tablets than routine school services (Pasamba et al., 2025). Regarding sustainability, a systematic review of school-based public health interventions found that maintaining them after initial resources end depends largely on continued commitment from school leaders, staff skills and motivation, ongoing training, and adequate resources (Herlitz et

al., 2020). The collaboration among Summersari Community Health Center, schools, and students could provide a structure for such support, but the sustainability of the program was not evaluated in this study.

SARI MENTARI combined face-to-face classes, digital media, and poster creation and presentation. A comprehensive review suggests that combining digital tools with interactive learning approaches is a promising strategy for improving adolescent health literacy (Mancone et al., 2024). In line with this approach, participants did not only receive information but also produced and presented posters, which may have encouraged peer discussion of health messages. However, engagement, learning processes, knowledge retention, and social norms were not measured in this study. These mechanisms therefore remain hypothetical and were not demonstrated in this sample.

In a randomized controlled trial among 138 anemic adolescent girls in rural Bangladesh, mHealth-based nutrition education improved knowledge, attitude, and practice scores, while the increase in hemoglobin was not statistically significant (Rahman et al., 2025). A scoping review likewise reported positive outcomes of mHealth interventions in delivering sexual and reproductive health information to adolescents (Isaacs et al., 2024). Those studies measured knowledge, attitude, practice, or information delivery rather than behavioral intention, and the Bangladesh trial included a control group, unlike our single-group pretest and post-test design. Our findings may therefore be consistent with the idea that cognitive and motivational outcomes change earlier than biological indicators, but our design cannot establish that the intervention caused the change, and hemoglobin was not measured.

Anemia among adolescent girls remains an important public health concern in Indonesia and provides an important context for interpreting the findings of the present study. The 2018 National Basic Health Survey reported an anemia prevalence of 32% among individuals aged 15–24 years (Ministry of Health of the Republic of Indonesia, 2019). More recently, the 2023 Indonesian Health Survey reported a prevalence of 15.5% in the same age group, including 18.0% among females (Ministry of Health of the Republic of Indonesia, 2023). Although these estimates indicate a decline compared with 2018, anemia continues to affect a substantial proportion of young people, particularly adolescent girls. This ongoing burden highlights the importance of preventive strategies that can identify anemia early and strengthen adolescents' willingness and ability to engage in screening and other preventive behaviors.

Evidence from the local context further supports the relevance of school-based approaches to adolescent anemia prevention. In a validation study of the Adolescent Anemia Screening Form (FORSA) involving 228 girls from two senior high schools in Malang City, 29.8% of participants were identified as anemic based on hemoglobin measurement, while FORSA demonstrated a sensitivity and specificity of 82% compared with hemoglobin testing (Wahyuningtyas et al., 2025). These findings indicate both the continuing burden of anemia among Indonesian schoolgirls and the potential value of approaches that facilitate early identification. Similarly, the community service program Holistic Strategy for Managing Adolescent Girls' Anemia at Junior High School 2 Singosari, Malang, incorporated hemoglobin screening, reproductive health education, IFAT education, and nutrition training to improve knowledge, attitudes, and anemia-preven-

tion behaviors while also addressing the risk of intergenerational stunting (Wardani et al., 2025). The use of multiple complementary components in this program is broadly consistent with the multicomponent structure of SARI MENTARI and supports the relevance of combining education, screening-related activities, and ongoing monitoring within the school setting. However, differences in study design and outcomes mean that these findings should be viewed as contextual support rather than direct evidence of the effectiveness of SARI MENTARI.

Several limitations should be considered when interpreting the findings of this study. First, the intervention was implemented in a single primary healthcare working area and one junior high school, which limits the generalizability of the findings to other schools and settings. Second, the one-group pretest–posttest design did not include a concurrent control group. Therefore, the observed change in behavioral intention cannot be attributed to the intervention with certainty and may partly reflect maturation, testing effects, regression to the mean, or Hawthorne effects. The follow-up period was also short, at only one week after the intervention. Consequently, longer-term outcomes, including sustained participation in anemia and reproductive health screening, IFAT adherence, changes in hemoglobin levels, and continued use of the sarimentari.com monitoring feature, could not be assessed. In addition, posttest scores were concentrated toward the upper end of the response scale (range 3–4), suggesting a potential ceiling effect that may have limited the ability to detect further improvements in behavioral intention.

There were also limitations related to measurement. Behavioral intention was assessed using self-reported responses and

may therefore have been influenced by social desirability bias. This potential bias may have been heightened because questionnaire items were read aloud by the researchers rather than completed independently and anonymously. Participants and investigators were not blinded, which may also have introduced expectancy or observer bias. Furthermore, although the BI-ARHSQ had been pilot tested among 30 adolescents and demonstrated high internal consistency (Cronbach's $\alpha = 0.966$), its factor structure, test-retest reliability, and construct validity have not yet been established among Indonesian adolescents. Finally, education, teacher mentoring, and website-based monitoring were delivered as an integrated package; therefore, the individual contribution of each component could not be determined. Future studies should employ controlled and preferably multi-site designs, include longer follow-up periods, evaluate individual intervention components, and incorporate objective measures of behavior and health outcomes.

Overall, behavioral intention to participate in anemia and reproductive health screening increased significantly among adolescent girls at State Junior High School 9 Jember (SMPN 9 Jember) following implementation of the SARI MENTARI program, which combined anemia and reproductive health education, teacher mentoring, and website-based learning (median 3.00 to 4.00; Wilcoxon $Z = -4.36$, $p < 0.001$, $r_{rb} = 0.65$; $n = 94$ pairs). Although the single-group pretest-posttest design prevents causal attribution and the study did not assess actual screening uptake, IFAT adherence, or hemoglobin outcomes, the findings provide preliminary evidence that a multicomponent, school-based approach may strengthen adolescents' intention to engage in anemia and reproductive health screening. Integrating such

an approach with existing school-based health initiatives, including the Free Health Check-Up (CKG) program, may therefore warrant further investigation. Future controlled, multi-site studies with longer follow-up should determine whether improvements in behavioral intention are sustained and translate into actual screening participation, IFAT adherence, and improved hemoglobin outcomes.

AUTHOR CONTRIBUTION

In preparing this manuscript, Winny, Nabila, Britania, Salsabila, Eri, Ary, Diadjeng, Adinda, and Tyas contributed to the development and preparation of the manuscript. Winny was responsible for preparing the research administrative documents, including research permits. Winny, Nabila, Britania, Salsabila, Eri, Ary, Diadjeng, Adinda, and Tyas contributed to data collection, data analysis, interpretation of the findings, and preparation of the manuscript for publication. All authors reviewed and approved the final version of the manuscript.

CONFLICT OF INTEREST

There is no conflict of interest.

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