

Improving School Readiness for Weekly Iron Folic Acid Supplementation Program through School Readiness Training and Technical Assistance Intervention

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ABSTRACT

This study examines the impact of enhancing school readiness for the implementation of school-based Weekly Iron-Folic Acid Supplementation (WIFAS) program through training and technical assistance. A quasi-experimental design was used to analyze readiness levels after intervention in six intervention and five control high schools for three months. This study involved 115 teachers in baseline and 124 teachers in endline as subjects. Advisory assistance on educational materials and iron folic acid tablets was delivered to coordinating teachers and anti-anemia squad from six intervention high schools. Two-day consecutive face-to-face training was delivered to 10 coordinating teachers and one full day of anti-anemia squad training was delivered to 24 female student representatives to enhance the school's capacity building in implementing a school-based WIFAS program. By adopting and modifying the community readiness model, data were collected through interviews and using a questionnaire. A preliminary study shows that both high school groups were at the same vague awareness stage (third level) regarding female adolescents' anemia and adherence to the WIFAS program. After the intervention, the intervention and control high schools had different levels of readiness. The intervention high schools' readiness improved to the initiation stage (sixth level), while the control high schools remained at the vague awareness stage (third level). Training and technical assistance improved schools' readiness to implement the WIFAS program.

Keywords: adherence, anemia, female adolescent, iron-folic acid, school readiness

INTRODUCTION

Anemia is a global nutritional problem affecting human health, as well as social and economic development. Basic Health Research (Riskesdas) 2018 showed an increase in anemia prevalence in the 15–24 year- age group, from 18.4 % in 2013 to 32% in 2018. The prevalence was 27.2% in women and 20.3% in men (MoH RI 2019). The screening data for junior high school students in West Java show an anemia prevalence of more than 50% (Roche *et al.* 2018).

The Ministry of Health targets to reduce the prevalence of anemia to below 20% for adolescents and increase the Iron-Folic Acid Supplement (IFAS) consumption rate by 30% (MoH RI 2015). The supplementation program conducted by the government is the Prevention

and Control of Iron Deficiency Anemia, targeting middle school adolescent girls. However, female adolescents' consumption of IFAS is one of the success indicators of the program. Riskesdas 2018 reported that only 1.4% of female adolescents in schools consume 52 or more IFAS tablets (MoH RI 2019).

This program involves schools' support for the success of Weekly Iron- Folic Acid Supplementation (WIFAS) programs. School communities, including principals, teachers, and peers, are determinants of student behavior (Lee *et al.* 2010) . They are agents of change, with critical roles in nourishing a school environment that supports nutrition, health, and learning process. As a result, schools' support often determines the success of interventions (Lewallen *et al.* 2015; Octaria *et al.* 2020).

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Community readiness is the ability of individuals and communities to receive and support new programs or actions (Ehlers *et al.* 2013; Buckner-brown *et al.* 2014; Anderson-Carpenter *et al.* 2017). According to the Community Readiness Model (CRM), there are nine levels of community readiness, and every school is at a different readiness level of program implementation (Ehlers *et al.* 2013; Buckner-brown *et al.* 2014). Therefore, readiness needs to be assessed and improved to increase the school community's motivation and capacity. This study aimed to investigate whether enhancing a school's capacity through school readiness training and technical assistance improved the school's readiness level in implementing a school-based WIFAS program.

METHODS

Design, location, and time

A quasi-experimental design was used to conduct trials on groups of individuals, in which subject selection was not random (Taherdoost 2020). The study population comprised senior teachers and female adolescent students from the high schools with Iron-folate supplementation programs in Kota Depok, West Java, Indonesia. The data were collected from July 2018 to September 2019.

Sampling

Using the Lemeshow formula for the intervention test, at least eight schools were obtained, consisting of four schools in the intervention arm and four in the control arm (Lemeshow *et al.* 1990). A total of 11 out of 18 schools in the pilot study were willing to participate in the study later, while seven other schools refused. Six schools were willing to be trained as intervention schools, while five others became control schools.

The study subjects included 115 teachers from 18 high schools in the pre-intervention study and 124 teachers from 11 schools in the post-intervention study. The number of subjects was sufficient because the minimum number in CRM is around 4–12 people for each community (Jarpe-Ratner *et al.* 2013). Training participants were purposively selected as teachers, including those working as School Health Unit Coordinators, Career and Counseling, or the

vice school principal. Each school assigned 1–2 people as training participants; thus, 10 teachers were involved. Peer representative students were chosen purposively from members of the Intra-School Student Organization, known as OSIS (in Bahasa Indonesia), Youth Red Cross, Scouts, or Teen Health Promoters in their schools. In this category, each school sent four people as face-to-face training participants, making it in total 24 high school female students.

Description of intervention

School readiness training consists of capacity building for teachers and anti-anemia squad training for representative female adolescent students. Two-days consecutive face-to-face training was delivered to 10 coordinating teachers and one full-day anti-anemia squad training was delivered to 24 female student representatives to enhance the school's capacity building in implementing school-based WIFAS program. Training materials were delivered by resource persons from nutrition experts, public health, and stakeholder from Depok City municipal health office.

The training materials and duration were prepared using literature studies, qualitative studies, and quantitative studies conducted in the preliminary research. The literature study used reference sources from the Training Module for Adolescent Girls' Anemia Prevention and Management published by Nutrition International in 2018, Guidelines for the Prevention and Management of Anemia in Adolescent Girls published by the Ministry of Health of the Republic of Indonesia in 2016 (MoH RI 2016), a guideline for implementing the weekly iron-folate supplementation program in India (MoH India 2012) and textbook related to iron nutritional anemia in adolescent girls (Fikawati *et al.* 2017).

The contents of the training materials given to the participants were printed in the form of a training module, namely the coordinator teacher manual book and the anti-anemia team member's pocketbook. The training material content is also written in educational media consisting of posters, flipcharts, and monitoring cards. Before implementing the training, the content and face validity of the training materials was tested in another school other than the subject or control schools. The development of the training materials followed the ADDIE model,

comprising Analysis, Design, Development, Implementation, and Evaluation stages. ADDIE is one of the most frequently used models in the field of instructional design as a guide for producing an effective design (Aldoobie 2015).

Data collection

The school readiness level was assessed using the Tri-ethnic Survey of Community Readiness Model, formerly used to assess community readiness for change (Kelly & Stanley 2014). This study identified five dimensions of community readiness, including school's awareness about anemia and female adolescents' compliance to consuming WIFAS, community climate, community effort, resources, and leadership. Each dimension was classified on a 9-stage scale ranging from 1 (no consciousness) to 9 (community ownership).

The CRM theory consists of nine levels of readiness to accept and run a program in its environment. The levels include no matter, resistance, ambiguous consciousness, pre-planning, preparation, initialization, stabilization, affirmation or expansion, and professionalization. Community readiness represents the ecological context and organizational system involving change efforts (Jarpe-Ratner *et al.* 2013). The community readiness was measured by interviewing key respondents, including the school representative, Health Unit, Career and Counseling, Physical Exercise, and class teachers using a validated instrument.

Data were obtained using a questionnaire and interviews. The questionnaire was translated into Indonesian and tested for its validity and reliability ($\alpha:0.81$; $r=>0.174$). The school readiness score was measured twice. The first measurement was conducted in July 2018 and the second one was conducted in September 2019.

Data analysis

The school readiness score was based on a consensus of three scorers' review and each interview response was classified by dimensions of community readiness. Independent scores were combined for each dimension, and the overall community readiness score was then calculated using the 5-dimensional average scores in Ms. Excel 2010. School readiness scores were assessed as a continuous variable, and descriptive statistics were used to assess variations in school

readiness differences between July 2018 and September 2019. Respectively, the mean score was rounded down to categorizes the overall and dimension-specific community readiness scores into levels. For instance, a community with a continuous readiness score of 3.7 was placed in Stage 3 (Vague Awareness). School characteristics and readiness scores were reported as descriptive statistics displayed as frequency, percentage, average, and standard deviation. Difference analysis was performed using a dependent T-test and independent T-test for normally distributed variables and using Wilcoxon test for abnormally distributed variables using SPSS IBM version 25.

RESULTS AND DISCUSSION

School readiness training consists of School Capacity Building Training for the School-based Weekly Iron Folic Acid Supplementation (WIFAS) Program Implementation and the Anti-Anemia Squad Training. The training participants came from six intervention public and private schools, including High Schools, Vocational High Schools, and Islamic High School (Madrasah Aliyah). Figure 1 presents the intervention flow chart.

As the program spearhead, the teachers need to be trained about the school-based WIFAS program. Teachers failed to resolve this issue of the adolescent and their parents since they were not trained to implement a school-based WIFAS program (Malhotra *et al.* 2015). A total of 10 teachers participated in the Capacity-building Training for the school-based WIFAS Program Implementation. They included vice-principals in student affairs (10%), school health unit teachers (10%), subject teachers (40%), and career and counseling teachers (40%). The mean age of the teachers was 37.5 years; the youngest and oldest ages were 26 and 55 years, respectively. All teachers were female, and they were selected based on their duties and responsibilities, which are related to the school-based WIFAS program. Several studies state that teachers have important roles in supporting school-based WIFAS program (Gupta *et al.* 2014; Dwiriani *et al.* 2011; Bhatt *et al.* 2013; Kheirouri & Alizadeh 2014; Risva & Rahfiludin 2016; Sau 2016; Sethi *et al.* 2017).

Anti-Anemia Squad Training participants comprised 24 students, with an average age of 16.2 years. From these students, 45.8% were

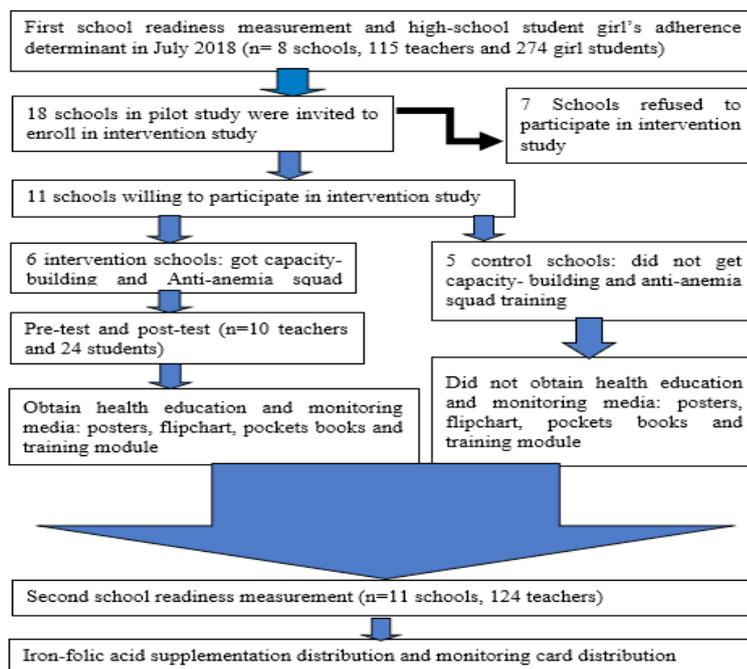


Figure 1. Intervention study flow chart

members of the Youth Red Cross or known as Palang Merah Remaja (PMR), 29.2% belonged to Intra-School Student Organization, while the others were youth health promoters. The main role of the anti-anemia squad members was as a peer educator at school. Shankar *et al.* (2020) state that peer educators positively influence their friends' knowledge, attitude, and behavior.

The participants' knowledge levels and attitudes before and after training

As seen in Table 1, there was a significant difference in the knowledge scores of teachers ($p=0.005$) and Anti-Anemia Squad ($p<0.001$) before and after the training. Accordingly, training increases knowledge about the definition, diagnosis, signs, causes, prevention, and treatment of anemia in female adolescents. This result is in line with Aditianti *et al.* (2015), which focused on anemia and IFAS through counseling to companions (husbands, parents, cadres, and other close relatives) and found different knowledge levels before and after training.

There were significant differences in teacher attitudes before and after training ($p=0.005$). However, there was no significant difference in Anti-Anemia Squad participants' attitude scores towards the prevention of anemia

program in young women before and after training ($p=0.187$).

Teachers' knowledge about and attitudes toward health influence their behavior. They play a role in educating and shaping students' health behavior in schools (Blazar & Kraft 2017). Therefore, knowledge and positive attitudes of the teachers towards improvement programs are important. In this study, the teachers' knowledge and attitudes regarding the school-based WIFAS program are moderate and good.

Impact of the school readiness training on the school readiness level

After the intervention was given in the form of capacity-building training and the formation of an anti-anemia squad, followed by technical assistance accompanied by the provision of educational and monitoring materials to the sample and control school groups, impact measurement was carried out by comparing the value of school readiness before and after the intervention was carried out (see Table 2).

Table 2 compared the school readiness score between the intervention school group or the subject schools and the control school group. There is a significant difference in readiness dimensions in the intervention school group

Table 1. Difference of teachers' and anti-Anemia squad's knowledge and attitude score towards WIFAS program*

Variable	Mean rank	Z	p	n
Teacher's knowledge score				
Post-training	79.2	2.812	0.005	10
Pre-training	42.3			
Anti-anemia squad's knowledge score				
Post-training	60.9	-4.216	0.000	24
Pre-training	37.1			
Teacher's attitude score				
Post-training	86.2	-2.809	0.005	10
Pre-training	72.5			
Anti-anemia squad's attitude score				
Post-training	73.5	-1.319	0.187	24
Pre-training	72.5			

*Wilcoxon statistical test

between baseline and post line measurements. However, there is no significant difference in the control school group. This result is in line with Whelan *et al.* (2019), who found a significant difference in community readiness in a sustainable obesity prevention program in Victoria, Australia.

The dimension of school knowledge about female high school students' adherence to consuming WIFAS had the most significant increase in the intervention school group, from the planning to the confirmation stage. In the confirmation stage, the school community is aware of other efforts to improve its effectiveness. Some intervention school coordinator teachers identified subjects that could address anemia prevention, such as Science, Career and Counseling sessions, Physical Education lessons, and Entrepreneurship. Students are asked to design menus with a sale value in this lesson, containing iron-rich food. Additionally, an increase in the knowledge dimension resulted from the training and technical assistance given to the intervention school. Nikfallah *et al.* (2017) stated that an increase in training sessions has a significant positive relation with the degree of awareness in the iron supplemental aid program. Besides, knowledge has been referred to as an influential factor in function.

The score of the leadership dimension increased from the pre-planning to the stabilization stage. At the stabilization stage, the principal initiates weekly consumption of IFAS and considers the resources available to support anemia prevention programs and increase compliance. An intervention school principal suggested that Anti-Anemia Squad members briefly address the importance of consuming WIFAS after joining gymnastics activities or regular flag ceremony every Monday.

The school climate dimension indicates the school community's attitude towards anemia and female high school students' compliance. There is a post-intervention increase in the climate dimension score from vague awareness to the initiation stage. In this new stage, the school community acknowledged that anemia and female students' compliance to iron-folic acid intake are the school's responsibility and begins to consider supporting the program. School climate, which includes teachers' support and peer relationship, is an important protective factor against many health risk behavior (Nassar *et al.* 2018).

The dimension of the effort to increase female high school students' adherence to consuming WIFAS increased only by two scores. This low increase was attributed to the school's

Table 2. Difference in school readiness score between subject and control school*

School readiness dimension	School readiness score means							
	Intervention school				Control school			
	Baseline	End line	Delta readiness stage	p	Baseline	End line	Delta readiness stage	P
Knowledge of anemia and female adolescent's adherence	4.1	8.0	+3.9	0.000	4.1	4.6	+0.5	0.416
School climate	3.3	6.8	+3.3	0.000	3.3	3.0	-0.3	0.710
School effort	2.9	5.3	+2.4	0.016	1.9	1.4	-0.5	0.179
Resources	2.5	5.5	+3.0	0.016	2.8	2.6	-0.2	0.534
Leadership	4.5	7.9	+3.4	0.008	3.8	4.5	+0.7	0.083
Total score	3.5	6.7	+3.2	0.001	3.2	3.2	+0.0	0.933

*Dependent t-test

failure to conduct regular education on anemia prevention and the importance of consuming WIFAS. Some of the programs proposed by the research team, such as yelling and making the Anti-Anemia menu, did not receive positive responses. The education provided is only intended for students that refuse or experience difficulties in consuming WIFAS. The Teacher Coordinator and Anti-Anemia Squad required technical assistance to propose an anemia education program to be inserted in a subject.

Furthermore, assistance was required to submit contests and provide consultation channels for challenges in conducting a drinking day IFAS program and consultation education. Many schools organized weekly drinking of IFAS together and monitored their female students' compliance. This effort requires a commitment from the schools because others were initially objected to organize weekly drinking of IFAS together.

CONCLUSION

School-based Weekly Iron-Folic Acid Supplementation program places schools as a significant player in the program's success. School readiness needs to be assessed and improved to increase the program's success. Training and technical assistance improve school readiness to implement school-based Weekly Iron-Folic Acid Supplementation program significantly from

vague awareness level to initiation level. This study only analyzed the effectiveness of training for the school readiness stage. Therefore, further research needs to explore the effect of the school readiness stage on other aspects, such as female high school students' adherence to consuming IFAS and their hemoglobin status.

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AUTHOR DISCLOSURES

The authors declared that they do not have conflict of interest with another person or institution.

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