Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 25s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Effect Of Multifaceted Intervention On Knowledge, Attitude, Iron Intake, Hemoglobin (Hb) Levels In Adolescent Women With Mild To Moderate Anemia At Senior High School 2 Tomia Of Wakatobi Regency

May Sri Unjar Zakiyah[1], Sudirman Nasir[2], Muhammad Syafar[3], Yudhira Azzahra[4]

[1,2,3]Department of Health Promotion, Faculty of Public Health, Hasanuddin University, Indonesia

[4]Departement of Epidemiology, Faculty of Public Health, Hasanuddin University, Indonesia

Cite this paper as: May Sri Unjar Zakiyah, Sudirman Nasir, Muhammad Syafar, Yudhira Azzahra, (2025) Effect Of Multifaceted Intervention On Knowledge, Attitude, Iron Intake, Hemoglobin (Hb) Levels In Adolescent Women With Mild To Moderate Anemia At Senior High School 2 Tomia Of Wakatobi Regency. *Journal of Neonatal Surgery*, 14 (25s), 257-267.

ABSTRACT

Background. According to WHO in 2021, the prevalence of anemia in the world was around 29.9%, there were 46 cases of mild to moderate anemia or 21.8% in adolescent girls at Senior High School 2 Tomia, this figure is quite high considering that the provision of Iron Tablet supplementation is carried out routinely. This program has not achieved the target of reducing anemia in adolescents because there is no evaluation and follow-up after the Iron Tablet supplementation has given, lack of knowledge of students and no school and parental control are the contributing factors.

Aims. to analyze the effect of multifaceted intervention on knowledge, attitudes, iron intake and hemoglobin (Hb) levels in adolescent girls with mild to moderate anemia.

Method. The type of *quasi-experimental study* with a design *one group pretest and posttest design* with a sample of 43 respondents. This study was conducted at SMAN 2 Tomia. from September to November 2024.

Results. This study shows that multifaceted intervention has a significant effect on knowledge about anemia and nutrition of young women with mild to moderate anemia (p value = 0.000), attitudes about anemia and nutrition teenager daughter mild anemia moderate (p value=0.000), intake substance iron teenager daughter mild anemia moderate (p value=0.000), hemoglobin (Hb) levels in adolescents daughter mild anemia moderate (p value=0.000).

Conclusion: The multifaceted intervention statistical test have an effect real to hemoglobin (Hb) levels in adolescents daughter mild anemia is at SMAN 2 Tomia with a p value = 0.000 ($p < 0.05$).

Keywords: *iron supplements, adolescent girls, multifaceted intervention, anemia*

1. INTRODUCTION

According to the World Health Organization (WHO) in the 2021 world health statistics, the prevalence of anemia in the world ranges from 29.9% in women of reproductive age 15 to 49 years and the prevalence of anemia in non-pregnant women, one of which is the category of adolescents aged 15 to 49 years, is 29.6% (Yenny et al. 2022)

In Indonesia, the prevalence of anemia in adolescents was 22.7% in 2021 (Ministry of Health. 2021), while in Southeast Sulawesi, the prevalence of anemia was 33.2% in 2018 and increased to 42.1% in 2019. This figure is quite high so that the government implemented an anemia screening policy in junior high and high schools, and then provided blood tablets to adolescents (Riani et al., 2022).

Southeast Sulawesi Province has several island regions, one of which is Wakatobi Regency. Based on data from the Wakatobi Regency Health Office, the program of providing iron tablets to young women has been implemented in 2015.

In 2019, the provision of iron tablets to adolescent girls was 52.6% and in 2020 it decreased by 47.4% (Wakatobi District Health Office, 2021). One of the health centers in the Wakatobi Regency working area that implemented the program of providing iron tablets to adolescent girls is the Usuku Health Center, which has been implemented since 2019. From the results of the initial data collection survey, the program has not reached its target, this is because students' knowledge about anemia is still lacking, and there is no follow-up in its implementation (Wa Ode Nurcahyanti. 2021).

The increased risk of bleeding before and during childbirth is one of the impacts of ongoing anemia that occurs from adolescence to becoming pregnant women, this can be seen from the high Maternal Mortality Rate (MMR). Based on the

data from the Indonesian demographic and health survey, the Maternal Perinatal Death Notification (MPDN) recording system and maternal deaths of the Ministry of Health in 2022 reached 4,005 and increased to 4,129 cases in 2023 when compared to the MMR target of the Sustainable Development Goals (SDGs) of 70 per 100,000 live births in 2030 (Ministry of Health. 2023).

State Senior High School (SMAN) 2 Tomia is one of the one high school located in the working area of the Usuku Health Center, Wakatobi Regency. Based on the data from the Health Plan Work Term Intermediate (RKJM) Year 2022-2023, amount participant educate on Senior High School 2 Tomia has reached 367 students with a percentage of female students/teenage girls of 47.9% (176 female students) (SMAN 2 Tomia, 2023). Based on According to the data, Senior High School 2 Tomia is one of the senior high schools/equivalent schools with the largest number of female students/teenage girls in the work area. Usuku Health Center Technical Implementation Unit.

Based on the report of the Usuku Health Center nutrition program screening carried out in October 2023, there were 46 cases of mild to moderate anemia or 21.8% in adolescent girls at Senior High School 2 Tomia, this figure is quite high considering that the provision of Iron Tablet supplementation is carried out routinely. This program has not achieved the target of reducing anemia in adolescents because there is no evaluation and follow-up after the Iron Tablet supplementation has given, lack of knowledge of students and no school and parental control are the contributing factors (Usuku Nutrition Officer, 2023).

2. THEORETICAL REVIEW

Anemia

Anemia is a condition in which the number of red blood cells or hemoglobin is less than normal (normal hemoglobin (Hb) levels in men) man is 13 gr/dL and Woman is 12 gr/dL) (Grace) et al. 2019). Hemoglobin is formed from a combination of protein and iron and forms red blood cells/ *erythrocytes* which later function to bind oxygen And deliver it to all over cell network body (Ministry of Health RI. 2018).

Signs anemia started with dwindling reserves substance iron (*ferritin*) And increase absorption substance iron Which depicted with increased iron binding capacity which will result in finished savings substance iron, decrease saturation *transferrin* , the reduction in the amount of *protoporphyrin* converted into blood and will followed by decreased *serum ferritin levels* or low Hb levels (Rahayu et al. 2019).

Anemia condition causes health problems Because lack of hemoglobin on blood will cause the disturbance *supply* oxygen to the body. This has implications on symptom Which arise on sufferer anemia that is sluggish, tired, exhausted, weak And limp (Ministry of Health of the Republic of Indonesia. 2020).

Adolescents and Anemia in Adolescent Girls

Deep Teenagers Language the original called *adolescent* comes from from Language Latin *adolescere* which means grow or grow For to reach maturity (Rahayu et al . 2019). According to the World Health Organization (WHO), adolescents is If child aged 12 to 24 years .

Teenager daughter is group risk high anemia compared to with teenager son Because need absorption substance iron peaks at the age of 14-15 years in adolescents daughter (Rahayu et al . 2019). The impact of nutritional anemia iron in adolescents daughter is the decline productivity Work or ability academic at school , disturbing growth and decrease Power stand body so that easy attacked disease (Rahayu et al . 2019). Nutritional anemia iron in adolescents Princess will also influential big at the moment pregnancy and childbirth , namely abortion , giving birth baby with birth weight low , experiencing complicator birth baby Because uterus No capable contract with Good as well as risk the occurrence bleeding post childbirth that causes maternal death (Rahayu et al . 2019).

Global recommendations in granting of signature for area with prevalence of anemia ≥ 40%, administration of TTD to adolescents daughter consists of from 30-60 mg elemental iron and given every day for 3 months consecutive in 1 year (WHO. 2016). The Indonesian government has set policy of program providing TTD to teenagers daughter and WUS with dose prevention and providing one tablet added blood every Sunday for 52 (fifty two) weeks (Ministry of Health of the Republic of Indonesia. 2020).

Nutrition Education

Nutrition education is a combination of educational strategies supported by the environment and designed so that target audiences can adopt food choices and behaviors related to health and well-being through various media and involving activities at the individual, institutional, community and policy levels. Nutrition education is very important in efforts to improve eating habits and proper food choices (Ningsih. 2018).

The goal of nutrition education is to encourage positive behavioral changes related to improving eating patterns in accordance with balanced nutrition, secondly improving nutrition-conscious behavior, physical activity and health, thirdly improving access and quality of nutrition services in accordance with advances in science and technology, fourthly improving the food

and nutrition alert system (Sukraniti et al. 2018).

Concept of Behavior and Behavior Change

According to Skinner, behavior is a person's response or reaction to a stimulus (external stimulus), in other words, the process of a stimulus to an organism, and then the organism responds (Adventus et al. 2019). According to Skinner, the response is divided into two (2), namely:

a. *Respondent response* or *reflexive* is the response that is caused by stimuli (stimulus) certain as example hear news sorrow become sad or cry;

b. *Operant response* or *instrumental response* namely response Which arise And develop Then followed by stimulus or stimulant certain (reinforcing stimulation or reinforcer) Which serves to strengthen the initial response for example if someone officer health carry out his job with Good Then to obtain award from his boss so officer health the will more Good Again in carry out his task (Adventus et al., 2019).

Balanced Nutrition for Adolescent Girls

In in Guidelines Nutrition The balance of the Indonesian Ministry of Health in 2014 was message special For teenager daughter And candidate bride that is :

a) Get used to it consume various Variety

Food various Variety used in frame fulfillment need energy, protein And substance nutrition micro (vitamin And mineral) For rapid growth, increased blood volume and increased hemoglobin. Need substance iron required For to form hemoglobin And prevent anemia Which due to Because lost iron during menstruation. Folic acid is used for the formation of cell And system nerve including red blood cells. Deficiency of folic acid folate can cause anemia due to disturbances in the formation of DNA (*Deoxyribo Nucleic Acid*) which results in red blood cell division disorders so that blood cell count red become not enough.

b) Lots Eat vegetable And fruit colored

vegetables such as spinach and nuts contain lots of it sour folate which is indispensable on time pregnancy. For fruit- fruits colored on generally Lots contain vitamin, especially vitamin A and antioxidants and these are needed by the body to help process metabolism in in body. The Adequate Nutritional Intake (AKG) for a person varies depending on age, type sex or condition certain, so Also with teenagers. Based on the Adequate Nutritional Intake (AKG) for teenage girls age 16-18 year Which issued by Ministry Health Republic of Indonesia (Ministry of Health RI) can seen in the Table 2.

Table 2. Nutritional Adequacy Intake (AKG) for Adolescent Girls Aged 16-18 Years

Age (year)	BB (kg)	TB (cm)	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Fe (mg)	Vitamin C (mg)
16-18	52	159	2100	65	70	300	15	75

(Source: Ministry of Health Republic of Indonesia, 2019)

My Health Care Promotion

The purpose of promotion is to influence consumers in making decisions to make purchases. Promotion is not only communicating or conveying information, but also wants communication to be able to create an atmosphere or situation where customers are willing to choose and have products. According to WHO, health promotion is the process of trying individuals and communities to improve their ability to rely on factors that affect health so that they can improve their health status.

Health promotion activities according to Lawrence Green (1980) must be adjusted to the factors that influence the behavior itself, namely (Notoatmodjo, 2010); 1) predisposing factors, are factors that can facilitate or predispose the emergence of behavior in an individual or society. Factors included in the predisposing factor group include individual knowledge, attitudes, beliefs, traditions, and social norms, 2) behavioral supporting factors are factors that enable or facilitate the occurrence of individual or community behavior or actions. These factors include the availability of health service facilities and ease of reaching them. 3) reinforcing factors, factors that strengthen the occurrence of an action to behave healthily are needed, namely the behavior of health workers and from community leaders such as village heads and religious leaders. In addition to this, the availability of regulations and legislation that strengthen it is also needed.

3. METHODOLOGY

The type of research used is quasi-experimental with one group pretest and posttest design. In this research design, respondents were given a pretest first, after which they were given treatment in this case a multifaceted intervention of a nutrition program in the form of nutrition education, promotion of health behavior and supplementation of iron tablets for its effect on knowledge, attitudes, iron intake and hemoglobin levels (Hb) in Adolescent Girls, and after treatment a posttest was given (Notoadmojo, 2005). This study analyzes the effect of multifaceted intervention in the form of a nutrition program intervention on knowledge, attitudes, iron intake and hemoglobin levels (Hb) in adolescent girls with mild to moderate anemia at SMAN 2 Tomia.

This research was conducted at SMAN 2 Tomia. from September to November 2024. The population in this study were all female adolescents in grade XI. SMAN 2 Tomia. Sampling in this study used consecutive sampling technique where all subjects who came and met the selection criteria were included in the study until the required number of subjects was met. In this study, the sample was female adolescents in grade XI of SMAN 2 Tomia who had mild to moderate anemia. The sample size used was 43 people.

Type data on study is data primary Which obtained from interviews, filling out questionnaires and measuring hemoglobin levels (Hb) from teenager daughter in PUBLIC HIGH SCHOOL 2 Tomiya.

Data collection using pretest-posttest questionnaires to measure the level of knowledge, and questionnaires to assess students' attitudes about anemia. Conducting screening of students' Hb examinations before and after the intervention. The pretest questionnaire was given before the intervention was carried out, then the posttest questionnaire would be given 4 weeks after the intervention activity was carried out, then the researcher replicated the multifaceted intervention activity in the following month in order to obtain more accurate results.

The instruments used in this study were questionnaires and blood hemoglobin measuring devices. The questionnaire instrument in this study contained 24 questions to assess knowledge about anemia and nutrition with a score of 0 if wrong and 1 if right.

Variables in this research namely variables *independent* (free) that is *multifaceted intervention* in the form of nutritional program interventions , namely education nutrition, health behavior promotion as well as supplementation Signature. *Dependent variables* (bound) are knowledge, attitude, iron intake and level hemoglobin (Hb) teenage girl anemia sufferer light currently.

4. RESULTS AND DISCUSSION

SMAN 2 Tomia is one of the state high schools located in the Tomia Timur District. SMAN 2 Tomia was established on January 1, 2007 with the Decree of Establishment Number 48.b/2007 which is under the auspices of the Ministry of Education and Culture. SMAN 2 Tomia is located on the Usuku-Kulati crossroad, Tongano Timur Village, Tomia Timur District. With the existence of SMAN 2 Tomia, it is hoped that it can contribute to educating the nation's children in the Tomia Timur District, Wakatobi Regency (SMAN 2 Tomia. 2024).

Based on **Table 3.1,** it can be seen that the number of students at SMAN 2 Tomia is 367, consisting of 191 male students (52.04%) and 176 female students (47.95%).

Table 3.1 Distribution of the number of students at SMAN 2 Tomia

No.	Gender	Class X	Grade XI	Grade XII
1	Man	55	69	66
2	Woman	58	67	52
	Total	113	136	118

(Source: SMAN 2 Tomia. 2024)

The subjects in this study were all female adolescents in grade XI at SMAN 2 Tomia in the 2024/2025 academic year who suffered from mild to moderate anemia with a total of 43 research subjects. At the beginning of the research sampling, researchers assisted by analysts from the Usuku Health Center conducted screening to identify symptoms and physical examinations on all female adolescents in grade XI who were at risk of anemia. In the initial examination, 60 female adolescents (34.1%) were found to have anemia. After identification was carried out based on the inclusion and exclusion criteria, 43 research subjects were obtained. This was because 7 students were unwilling to participate in the research.

Table **3.2** shows the distribution of research subjects based on anemia category.

Table 3.2 Distribution of Anemia in research subjects at the beginning of the study (n=43)

Class	Distribution of Anemia	Amount	
		Number of people (n)	Percentage (%)
XI	Mild Anemia	28	61.5%
	Moderate Anemia	15	34.9%

The results of the initial examination of hemoglobin (Hb) levels in the research subjects showed that there were 60 cases of anemia 34.1% in female adolescents at SMAN 2 Tomia. Which shows that anemia is still common among female adolescents in Indonesia, especially at SMAN 2 Tomia. The results of the study at SMKN Tanjungsari, South Lampung Regency stated that cases of anemia that occurred among female adolescents were 58.5% (Catur Ariwibowo. 2022).

One of the programs of the Usuku Health Center, namely the integrated coaching post tenager, which is the initial step for hemoglobin (Hb) screening in adolescents, has not yet reached all female adolescents in East Tomia District, which is the scope of the Usuku Health Center's target work area, and the Youth Information and Counseling Center (PIK-R) program, which should be a forum for activities in the Family Life Preparation for Adolescents (PKBR) program, has not been actively implemented so that information and counseling services are thought not to be obtained by students at school, which is one of the reasons why anemia cases still occur among female adolescents.

Nutritional Status and General Characteristics of Research Subjects

In table 3.3. distribution of anemia based on nutritional status in research this is obtained subject study with a thin nutritional status that is experiencing lack energy chronic (KEK) 3 people (6.9%) and experienced anemia category currently Then as many as 27 people 62.8% have the status normal nutrition who experience anemia category light and 10 people with moderate anemia category (23.3%) and 6 of them experience lack energy chronic (CED), while the nutritional status is at risk of overweight in mild anemia category as many as 1 person (2.3%) and the category of moderate anemia as many as 2 people (4.7%).

Table 3.3 Distribution of Nutritional Status with Anemia (n=43)

Nutritional status	Count	KEK	No KEK	Mild Anemia	Moderate Anemia
Thin	(n)	3	0	0	3
	(%)	6.9%	0.0%	0.0%	6.9%
Normal	(n)	6	31	27	10
	(%)	14.0%	72.1%	62.8%	23.3%
Risk Overweight	(n)	0	3	1	2
	(%)	0.00%	6.9%	2.3%	4.7%
Total	(n)	9	34	28	15
	(%)	20.9%	79.1%	65.1%	34.9%

Based on **table 3.3.** on can seen that 9 people or as much as 20.9% of the total sample experiencing KEK and suffering from anemia category moderate . Condition This If left alone happen in term long time can cause impact negative for teenager Princess , worried teenager daughter will suffer from anemia category weight and time coming soon will become Mother high risk pregnancy experience Chronic Energy Deficiency (CED) then become Mother pregnant women who suffer from anemia. This is in line with research conducted on mothers pregnant who checks her pregnancy at the health center plate Kendal district shows that the KEK status is related with maternal anemia incidence pregnant (Sandi and Wijayanti . 2021).

Knowledge, Attitude, Iron Intake, and Hemoglobin (Hb) Levels of Research Subjects Before and After Intervention

Knowledge

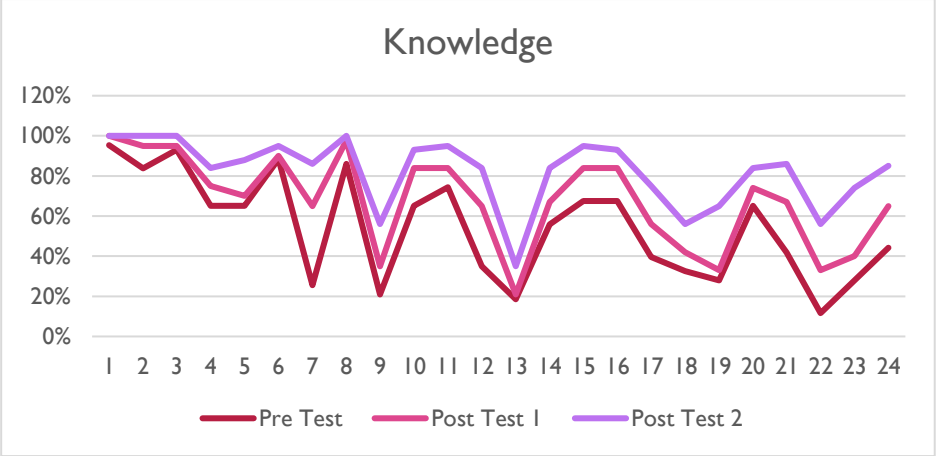

Figure 3.1 Graph of the percentage of correct answers to knowledge about anemia and nutrition of research subjects before and after the intervention.

It can be seen in **table 3.5.** below regarding the categorization of knowledge anemia and nutrition of the research subjects, it was found that 19 people (44.2%) had good knowledge before the intervention was carried out and increase to 25 people (%*.1%) after the intervention and replication/repetition were carried out. This study conducted a replication of activities so that it conducted two post-tests.

Table 3.5 Categories of knowledge about anemia and nutrition before and after intervention

Intervention	Knowledge Category	n	%
Before	Less (< 9.37)	24	55.8
	Good (≥ 9.37)	19	44.2
After	Less (< 9.37)	20	46.5
	Good (≥ 9.37)	23	53.5
After (Replication)	Less (< 9.37)	18	41.9
	Good (≥ 9.37)	25	58.1

In **table 3.6.** below the mean score, maximum score and minimum score are presented. It can be seen that the average mean score of knowledge about anemia and nutrition before and after the intervention and replication were carried out increased, it can be seen in the initial knowledge score of 9.37 points then became 16.33 points after replication.

Bivariate Analysis of Knowledge

Table 3.14. Friedman test of knowledge variables

	Average (point)	Difference (point)	IK 95%	p-value
Initial Knowledge	9.37	6.01	8.8 - 9.94	0,000
Posttest Knowledge 1	15.38	0.97	13.32 – 13.84	
Posttest Knowledge 2	16.35		15.79 – 16.87	

Based on **table 3.14.** after conducting the Friedman test on the initial and final knowledge variables and after replication, the p value was obtained = 0.000 (p <0.05) with a difference of 6.01 and 0.97 and the 95% IK value at the beginning of the study was 8.8-9.94 points, the 95% IK value of knowledge in the first post-test was 13.32-13.84 points and the 95% IK value of knowledge in the second post-test after replication was 15.79-16.87 points, because the p value <0.05 and the 95% IK value increased, statistically there was a significant difference in knowledge about anemia and nutrition before and after the intervention and replication.

Attitude

Figure 3.2 Graph of percentage of statements of attitudes towards anemia and nutrition of research subjects before and after the intervention.

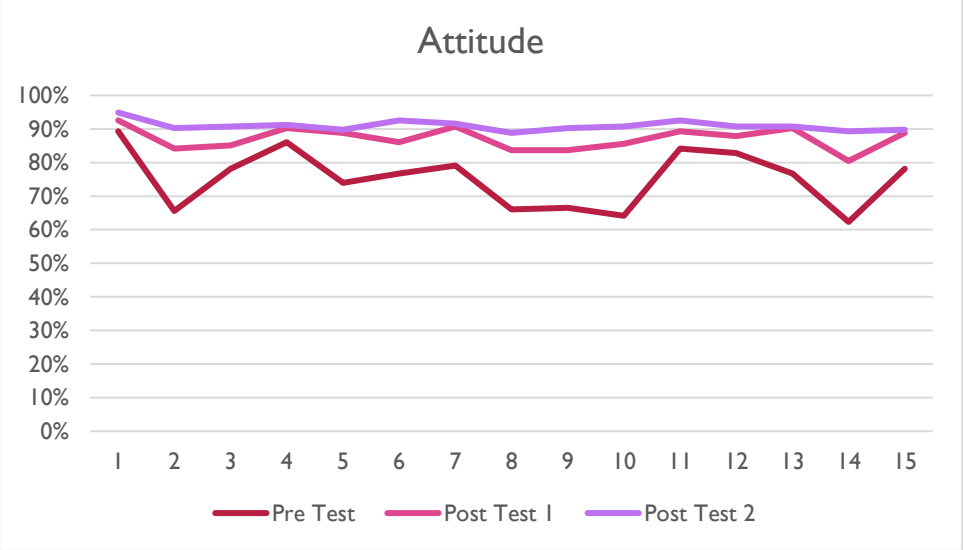

Figure 3.2 . shows the results of the analysis of the questionnaire of attitude statements about anemia and nutrition, it can be seen that the research subjects showed an increase in positive attitudes after the intervention was carried out on most of the attitude statements. While in **table 3.7.** below in the category of attitudes about anemia and nutrition before the intervention was carried out, it was found that the research subjects who had a good attitude were 20 people or 48.8% and after replication/repetition the category of adolescent girls with good attitudes increased to 51.2%.

Table 3.7 Attitude categories before and after intervention (n=43)

Intervention	**Attitude Criteria**	**n**	**%**
Before	Less (< 56.49)	23	53.5
	Good (≥ 56.49)	20	46.5
After	Less (< 56.49)	22	51.2
	Good (≥ 56.49)	21	48.8
After (Replication)	Less (< 56.49)	21	48.2
	Good (≥ 56.49)	22	51.2

Table 3.8 Mean score, maximum score and minimum score of attitudes about anemia and nutrition before and after intervention

Variables	Mean			Maximum			Minimum		
	Pre	Post1	Post2	Pre	Post1	Post2	Pre	Post1	Post2
Attitude	56.49	65.37	68.19	73	75	75	40	58	61

Based on table 3.8, it can be seen that the mean score, maximum score and minimum score of attitudes about anemia and nutrition before and after the intervention were carried out. The mean score showed an increase in initial attitudes of 56.49 points in the pretest and increased to 68.19 points in the second posttest after replication.

Bivariate Analysis of Attitudes

Table 3.15. Friedman test of attitude variables

	Average (point)	Difference (point)	IK 95%	p-value
Initial Attitude	56.49	8.88	53.92-59.06	0,000
Post test attitude 1	65.37	2.82	63.95-66.70	
Post test attitude 2	68.19		66.64-69.73	

In table 3.15 after statistical testing using the Friedman test on the initial and final attitude variables after replication, a p value of 0.000 (p <0.05) was obtained with a difference of 8.88 points in the post-test and 2.82 points in the second post-test and the 95% IK value of the initial attitude was 53.92-59.06 points, the 95% IK value of the attitude in the first post-test was 63.95-66.70 points and the 95% IK value in the second post-test was 66.64-69.73 points because the p value <0.05 and the 95% IK value increased, then statistically there was a significant difference in attitudes about anemia and nutrition before and after the intervention and replication were carried out.

Iron Intake

Table 3.9 Iron intake and nutrient intake before and at the end of the intervention

No	Nutrients	AKG Recommendations	Before		After (Replication)	
			Average Intake	% RDA	Average Intake	% RDA
1	Energy	2,100kcal	1727.5kkla	82	1991.7kkla	95
2	Carbohydrates at	300 g	264.3 g	88	279.2 g	93
3	Fat	70 g	48.6 g	70	62.7 g	90
4	Protein	65 g	57.1 g	88	59.8 g	92
5	Iron	15 mg	6.36 mg	42	11.5 mg	88

Based on the results of the analysis of the Semi Quantitative Food Frequency Questionnaires (SQ-FFQ) questionnaire presented in **table 3.9.** Data on iron intake and other nutrient intake can be seen that there was an increase in nutrient intake before and after the intervention and replication, an increase in nutrients in the form of initial energy intake of 1727.5 kcal increased to 1991.1 kcal, initial carbohydrate intake of 264.3 g increased to 279.2 g, then initial fat intake of 48.6 g increased to 62.7 g, and especially in initial iron intake of 6.36 mg increased to 11.5 mg and initial protein intake of 57.1 g increased to 59.8 g.

Table 3.10 Categories of iron intake before and after intervention (n=43)

Intervention	Criteria	Characteristics	N	%
Before	Less (<15 mg)	< RDA value for iron	22	51.2
	Good (≥15 mg)	≥ RDA value for iron	21	48.8
After	Less (<15 mg)	< RDA value for iron	17	39.5
	Good (≥15 mg)	≥ RDA value for iron	26	60.5
After (Replication)	Less (<15 mg)	< RDA value for iron	16	37.2
	Good (≥15 mg)	≥ RDA value for iron	27	62.8

In **table 3.10.** it can be seen that before the intervention, the research subjects with a good iron intake category or above the AKG iron value were 21 people (48.8%), after the intervention and the first post-test, the average iron intake of the research subjects increased with a good category of 26 people (60.5%), after the researcher replicated the activity and conducted the second post-test, the category of iron intake of the research subjects increased to 27 people (62.8%), an increase of 14% from the first post-test.

Based on **table 3.11.** below shows the mean, maximum, and minimum score values of daily iron intake before and after the

intervention was carried out, there was an increase in initial intake of 5.78 mg/day to 9.8 mg/day after the first post-test then in the second post-test or after replication it increased to 11.5 mg/day. The average iron intake was calculated based on food intake in the questionnaire excluding the provision of iron tablets.

Table 3.11 Mean score, maximum score and minimum score of iron intake before and after intervention

Variables	Mean (mg/day)			Maximum (mg/day)			Minimum (mg/day)		
	Pre	Post1	Post2	Pre	Post1	Post2	Pre	Post1	Post2
Iron Intake	5.78	9.17	11.5	10.1	13.3	16.7	2.3	4.0	5.8

Bivariate Analysis of Iron Intake

Table 3.16. ANOVA test for the same subject on the iron intake variable

	Average (point)	Difference (point)	IK 95%	p-value
Initial iron intake	5.78	3.39	5.12-6.44	0,000
Iron intake Posttest 1	9.17	2.41	8.56-9.79	
Iron intake Posttest 2	11.58		10.91-12.25	

In **table 3.16.** after statistical testing using the same subject anova test, a p value of 0.000 (p <0.05) was obtained for the initial, final and post-replication iron intake variables with a difference of 3.39 points and 2.41 points, then the 95% IK value of the initial iron intake was 5.12-6.44 points, the 95% IK value of the iron intake in the first post-test was 8.56-9.79 points and the 95% IK value of the final iron intake in the second post-test was 10.91-12.25 points, because the p value <0.05 and the 95% IK value increased, statistically there was a significant difference in iron intake before and after the intervention and replication.

Hemoglobin (Hb)

Table 3.12 Distribution of anemia before and after intervention (n=43)

Distribution of Anemia	**Before**		**After**		**Replication**	
	n	**%**	**N**	**%**	**N**	**%**
No Anemia	0	0.0	25	58.1	41	95.3
Mild Anemia	28	65.1	18	41.9	2	4.7
Moderate Anemia	15	34.9	0	0.0	0	0.0

Table 3.13 Mean score, maximum value and minimum value of hemoglobin (Hb) levels before and after intervention

Variables	Mean (g/dL)			Maximum (g/dL)			Minimum (g/dL)		
	Pre	Post1	Post2	Pre	Post1	Post2	Pre	Post1	Post2
Hemoglobin Level	10.9	11.9	12.4	11.9	12.8	13.1	8.3	11.0	11.7

In table 3.12 distribution of anemia before and after the intervention, it can be seen that there was an improvement in anemia status in the research subjects from anemia to non-anemia, namely 41 people (95.3%) of female adolescents. While in **table 3.13** it can be seen in the mean, maximum and minimum scores indicating an increase in hemoglobin (Hb) levels before and after the intervention, the initial hemoglobin (Hb) examination of 10.9 g/dL increased to 12.4 g/dL after the final examination after replication/repetition of the intervention.

Bivariate Analysis of Hemoglobin (Hb)

Based on **Table 3.17.** Normality test using the Sahapiro Wilk test because amount sample <50 obtained that the data is not normally distributed with p value =0.000 (p<0.05) so using the friedman test as a bivariate test . Before intervention mean initial hemoglobin level which is 10.9 g/dL and after done intervention and examination both average hemoglobin levels of the subjects study increase to 11.9 g/dL next increase to 12.4 g/dL after replication / repetition intervention .

Table 3.17. Friedman test of hemoglobin (Hb) level variables

	Average (point)	Difference (point)	IK 95%	p-value
Initial Hemoglobin Level	10.9	1	10.7-11.2	0,000
Final Hemoglobin Level 1	11.9	0.5	11.8-12.0	
Final Hemoglobin Level 2	12.4		12.3-12.5	

Statistical test results using the friedman test on variables hemoglobin (Hb) levels can seen in **table 3.17** . shows initial , final and post- hemoglobin (Hb) levels done replication obtained p value = 0.000 (<0.05) with the difference between 1 and 0.5 points and the 95% IK value of the initial hemoglobin level is 10.7-11.2 points, the 95% IK value of the hemoglobin (Hb) level in the first post-test is 11.8-12.0 points and the 95% IK value of the final hemoglobin (Hb) level in the second post-test is 12.3-12.5 points, because p value <0.05 and 95% IK value experienced increase , then in a way stratistic there is difference significant hemoglobin (Hb) levels before and after intervention and replication / repetition done .

5. CONCLUSIONS AND RECOMMENDATIONS

Based on results research , then obtained conclusion as following :

1. Happen improvement mean knowledge score about anemia and nutrition teenager daughter mild anemia was at SMAN 2 Tomia before done intervention 9.37 to 16.33 after multifaceted intervention was carried out (increased by 6.96 points)
2. Happen improvement mean attitude score about anemia and nutrition teenager daughter mild anemia was at SMAN 2 Tomia before done intervention 56.49 to 68.19 after multifaceted intervention was carried out (increased by 11.7 points)
3. Happen improvement mean intake score substance iron teenager daughter mild anemia was at SMAN 2 Tomia before done intervention 5.78 mg/ day to 11.5 mg/ day after multifaceted intervention was performed (increased by 5.72 mg/ day)
4. Happen improvement mean score of adolescent hemoglobin levels daughter mild anemia was at SMAN 2 Tomia before done intervention 10.9 g/dL to 12.4 d/dL after multifaceted intervention was performed (increased by 1.5 g/dL)
5. Based on the results of the multifaceted intervention statistical test have an effect real to knowledge about anemia and nutrition teenager daughter mild anemia is at SMAN 2 Tomia with a p value = 0.000 (p < 0.05)
6. Based on the results of the multifaceted intervention statistical test have an effect real to attitude about anemia and nutrition teenager daughter mild anemia is at SMAN 2 Tomia with a p value = 0.000 (p < 0.05)
7. Based on the results of the multifaceted intervention statistical test have an effect real to intake substance iron teenager daughter mild anemia is at SMAN 2 Tomia with a p value = 0.000 (p < 0.05)
8. Based on the results of the multifaceted intervention statistical test have an effect real to hemoglobin (Hb) levels in adolescents daughter mild anemia is at SMAN 2 Tomia with a p value = 0.000 (p < 0.05)

6. CONFLICT OF INTEREST

We have no competing interests.

REFERENCES

[1] Adventus, Jaya, IMM and Mahendra, D. 2019. *Health Promotion Textbook , University Christian Indonesia* . Faculty Vocation University Christian Indonesia. Available at: http://repository.uki.ac.id/2759/. 107 pp. accessed on date June 12 202 4 hours 20.30

[2] Wakatobi District

[3] Ministry of Health RI. 2018. Guidelines Prevention And Countermeasures Anemia OnAdolescent Girls and Women of Reproductive Age (WUS). Availableat: anemia-control-in-adolescent-girls-and-women-of-

reproductive-age. 92 p. https://promkes.kemkes.go.id/buku-pedoman-pencegahan-dan- accessed on 19th June 2024 at 12.00.

[4] Ministry of Health RI. 2020. Guidelines Giving Tablet Plus Blood (Signed) for Teenager Daughter on Time Pandemic COVID-19. Available at: http://appx.alus.co/direktoratgiziweb/katalog/ttd-rematri-ok2.pdf. 26 p. accessed on date 19 June 2024 o'clock 12.00

[5] Ministry of Health RI. 2020. Guidelines Giving Tablet Plus Blood (Signed) for Teenager Daughter on Time Pandemic COVID-19. Available at: http://appx.alus.co/direktoratgiziweb/katalog/ttd-rematri-ok2.pdf. 26 page accessed on date May 15 2024 o'clock 12.00

[6] of Indonesia. 2023. Indonesian Health Profile 2023. Jakarta.

[7] Ningsih, THS 2018. The Influence of Balanced Nutrition Guidelines Education on Knowledge Nutrition Balanced To Knowledge And Attitude Teenager DaughterThin. *Journal Of Midwifery Science* . Vol. 2. No. 2. Available at: http://ojsbimtek. univrab.ac.id/index.php/jomis/article/view/517. pp. 90-99.accessed on date 17 May 2024 o'clock 21.30

[8] Notoatmodjo, S. (2014). Health Promotion and Behavioral Science (first edition). Rineka Cipta.

[9] Rahayu Indriasari et al. (2022). Knowledge, Attitudes, and Practices related to Anemia Prevention in Middle to Lower Socio-Economic Adolescents in Makassar: Department of Nutrition, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia.

[10] Rianti, Farmawati, S. (2022). Level of Knowledge, Compliance of Consumption of Iron Supplement Tablets and Iron (Fe) Intake with Anemia Status in Adolescent Girls at SMKN 1 Molawe, Molawe District, North Konawe Regency. Journal of Scientific Nutrition, 9(2). Budiyono, A., and Faishol, L. (2020). The Role of the Adolescent Counseling Information Center (PIK-R) in Improving the Ability to Control Deviant Behavior in Adolescents. *Journal of Islamic Education Guidance and Counseling Coution: Journal of Counseling and Education* , *1* (2), 50–59.

[11] SMAN 02 Tomia. 2023. Medium Term Work Plan (RKJM) of High School Country 02 Tomia Year 2020-2023. 70 p. (No published).

[12] Sukraniti et al., 2018. Nutrition Teaching Materials NUTRITION COUNSELING. P2M2. Ministry of Health of the Republic of Indonesia.

[13] Wa Ode Nurcahyanti, Lisnawaty. 2021. Analysis of the Implementation of the Iron Supplement Program for Adolescent Girls in the Usuku Health Center Work Area, Wakatobi Regency in 2021. Indonesian Journal of Nutrition and Health. Faculty of Public Health, Halu Oleo University, Kendari.

[14] WHO. 2017. Global Accelerated Action for the Health of Adolescents (AA-HA!) Guidance to Support Country Implementation Annexes 1–6 and AppendicesI–IV Global Accelerated Action for the Health of Adolescents (AA-HA!) Guidance to Support Country Implementation, Geneva: World Health Organization. Available at: http://www.who.int/maternal_ child_ adolescent/documents/global-aa-ha-annexes.pdfua=1.pp.

[15] WHO. 2019b.Prevalence of anemia in women of reproductive age(age15 49)(%).Available at https:/ /www . who.int/data/gho/data/indicators /indicator-details /GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(-) accessed on date 20 April 2024 o'clock 11.00.

[16] Yenny Aulya, Jenny Anna Siauta, YN (2022). Analysis of Anemia in Adolescent Girls. Journal of Professional Nursing Research, 4 (Anemia in Adolescent Girls),1377–1386. http://jurnal.globalhealthsciencegroup.com/index.php/JPPP .