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THE EFFECT OF LOCAL FOOD-BASED HEALTH LITERACY ON THE NUTRITIONAL STATUS OF PROSPECTIVE BRIDES IN PULAU TALIABU REGENCY

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ABSTRACT

Anaemia is a health problem commonly experienced by brides-to-be (catin) and has an impact on the health of mothers and children. Efforts to improve health literacy based on local foods through mentoring and pocket books are an important strategy in preventing anaemia and improving the nutritional status of catin. This study aims to analyse the effect of mentoring and pocketbook interventions on health literacy (knowledge, attitudes, behaviour, skills) and nutritional status (haemoglobin and body weight) among catin in Taliabu Island Regency. The research method used a quasi-experiment with a repeated pre-test and post-test design, involving catin in four sub-districts (Bobong, Lede, Nggele, Samuya) divided into four groups: no intervention, mentoring, pocket books, and a combination of both. Measurements were taken up to three post-tests. The analysis included multiple linear regression, repeated measures ANOVA, and Tukey's test. The results showed a significant increase in all aspects of health literacy after the intervention, especially in the group that received both mentoring and pocket books. Haemoglobin levels increased consistently in all subdistricts, with the highest achievement in Bobong (from 10.9 g/dL to 14.8 g/dL in the third month). Regression analysis showed that behavioural changes, initial skills, mentoring, and pocket books contributed significantly to the increase in Hb ($p < 0.05$). Repeated measures ANOVA confirmed the effect of time, the effect of intervention, and a significant interaction between mentoring and pocket books on nutritional status. It was concluded that the local food-based health literacy intervention was effective in improving the knowledge, attitudes, behaviours, skills, and Hb levels of brides-to-be. The combination of interventions was the most optimal approach and was recommended for integration into premarital education at the KUA and health services.

KEYWORDS: Health Literacy, Local Food, Anaemia, Haemoglobin, Prospective Brides, Assistance, Pocket Book.

1. INTRODUCTION

Anaemia in women of childbearing age remains one of the major public health problems both globally and nationally. The WHO (2023) reports that approximately 571 million women aged 15–49 years worldwide suffer from anaemia, with a global prevalence of 30.2%. In Southeast Asia, the prevalence is even higher at 36.5%, and this condition directly impacts the increased risk of pregnancy complications, low birth weight babies, and the quality of the next generation's health. In Indonesia, based on Basic Health Research, the prevalence of anaemia among women of childbearing age is recorded at 48.9%, indicating that nearly half of women in the reproductive age group are at risk of adverse effects on reproductive health and pregnancy.

Prospective brides and grooms (*catin*) are couples who are planning to marry and are not yet legally bound by religious or state law. According to the Great Dictionary of the Indonesian Language, *catin* is a term for women of childbearing age who are in good health before pregnancy to give birth to normal and healthy children. The increase in the number of marriages must be accompanied by thorough preparation in terms of age, physical, financial, mental, emotional, social, moral, interpersonal, intellectual, and life skills. Marriages that are not well prepared can have negative consequences, including domestic violence and divorce. The minimum age for marriage is in line with the government's efforts to promote responsible pregnancy planning to avoid unplanned pregnancies, especially in the context of the 4Ts (unplanned, too young, too many, too old).

Pre-marital counselling or courses for prospective brides and grooms (*Suscatin*) are important programmes that help prospective brides and grooms understand and respond to the concepts of marriage and family life based on developmental tasks and religious values. Readiness for marriage has an impact on their ability to maintain their children's health in the future. Research shows a significant relationship between readiness for marriage and pregnancy planning. The nutritional status of prospective brides and grooms, especially premarital women, plays an important role in the preconception period.

Preventive measures for anaemia have thus far focused primarily on iron and folic acid supplementation. However, this single strategy often faces challenges, particularly low compliance with iron tablet consumption due to insufficient education, side effects, and limited support from healthcare workers. Saville *et al.* (2024) emphasise

that interventions based on local foods combined with nutrition education and support are more sustainable in increasing haemoglobin levels compared to single supplementation. Ali *et al.* (2025) found that adolescent girls and brides-to-be in several island regions tend to prefer consuming low-nutrient instant foods rather than utilising locally available foods, which are actually abundant.

In island regions such as Taliabu Island, North Maluku, these challenges are even more complex. Limited infrastructure and food distribution restrict access to nutritious food, while local food sources such as sweet potatoes, sago, fish, shrimp, shellfish, moringa leaves, ganemo, fiddlehead ferns, bananas and lobi/tomi-tomi are abundant. Unfortunately, the utilisation of local food is still low due to limited nutritional literacy, more practical consumption habits, and a lack of innovation in food processing. Cultural factors also play an important role. On Taliabu Island, most prospective brides and grooms registered at the KUA (Office of Religious Affairs) have been married according to custom or religion, but have not been registered with the civil registry (), thus narrowing the scope of premarital anaemia prevention. Strong traditional customs influence food consumption patterns and household decisions. Traditional leaders, religious leaders, and community leaders have a major influence on premarital health practices.

Health literacy plays an important role in encouraging changes in consumption behaviour. Wakwoya *et al.* (2023) reported that women with low health literacy tend to have lower compliance with iron tablet consumption and rarely apply a balanced nutritional diet. Interventions that improve health literacy, such as pocket book-based educational media, have been proven effective in improving nutritional understanding and healthy consumption practices. Research in Padang shows that nutrition education through pocket book media increases adolescent girls' nutrition knowledge scores and significantly raises haemoglobin levels. A systematic review by Febrianti *et al.* (2023) found that nutrition education can improve knowledge of anaemia and adherence to iron tablet consumption among adolescents. However, pocket books alone are sometimes insufficient without accompanying guidance.

The study by Nahrisah *et al.* (2020) demonstrated that the use of culturally customised illustrated handbooks combined with intensive counselling can increase Hb levels, haematocrit, and compliance with iron and folic acid intake in pregnant women. Conversely, Silalahi, Aritonang, and Ashar (2015)

reported that education using booklets did increase adolescent girls' nutritional knowledge, but was not followed by a significant increase in nutritional intake. A combination of interventions in the form of pocket books based on local foods, supplemented with a continuous mentoring method, is a promising approach to preventing premarital anaemia. The pocketbook serves as a practical and contextual educational medium, while mentoring plays a role in strengthening motivation, providing cultural and social support, and helping prospective brides and grooms apply the material to their daily food consumption practices. In the context of Taliabu Island, this strategy is expected to improve health literacy, encourage the use of local foods, and directly contribute to increased haemoglobin levels and nutritional status among prospective brides and grooms.

2. RESEARCH METHOD

This study utilised a mixed methods approach, focusing on quantitative data collection and analysis. The method employed was an exploratory mixed method with a sequential model, namely the stage of using quantitative methods.

2.1. Type and Design of Research

This study uses a quasi-experimental design with a repeated measures design. Each respondent is measured at several time points (pretest, posttest 1, posttest 2, posttest 3) for variables related to local food-based health literacy (knowledge, attitudes, behaviour, and skills), as well as nutritional status (Hb levels). This design was chosen to assess the effectiveness of interventions in the form of mentoring and the provision of pocket books on changes in health literacy and nutritional status among prospective brides and grooms.

2.2. Time and Place of Research

The research was conducted from 24 September 2024 to 24 September 2025 in Taliabu Island Regency, North Maluku, covering four sub-districts: Bobong, Lede, Nggele, and Samuya.

2.3. Population and Sample

The population in this study consisted of prospective brides and young women in Taliabu Island Regency, North Maluku. The sample size was calculated using the Slovin formula: $n = N / (1 + N(e)^2)$, with $N = 291$ and $e = 0.1$ (10%), resulting in a sample of 74 respondents divided into four intervention groups. The characteristics of the respondents are as follows:

- a) Lede Subdistrict: 37 female students aged 12-15 years old, all of whom are Muslim, from various villages in Lede Subdistrict, such as Lede Village, Balohang, Langganu, Permata, Haliba, Kampung 8, and Lese.
- b) Bobong Subdistrict: 37 female students aged 14-18 from various villages such as Bobong, Talo, Kilong, Ratahaya, Penu, Kilo, Meranti, and Langkuba. Most of them are Muslim, but there are also Christians and Catholics.
- c) Nggele District: 38 women aged 13-35 from Nggele Village and Onemay Village, all of whom are Muslim, living in various hamlets such as Rambutan, Kelapa Pendek, Permay, Kembang, Mangga Dua, and Dermaga.
- d) Samyua Subdistrict: 36 women aged 14-38 years from Samuya Village and its surroundings, with Islamic, Christian, and Catholic backgrounds, living side by side in a harmonious community.
- e) 4. Validation Test, Discrimination Power, and Reliability Test

a. Content Validity

Content validity analysed using Aiken's V shows that the pocket book on anaemia prevention based on local wisdom has a very high validity value, ranging from 0.97 to 1, which means that its content is highly relevant and appropriate to the construct being measured. In the knowledge questionnaire, Aiken's V values ranged from 0.067 to 0.967, and from these results, nine items were discarded, namely items 5, 9, 11, 13, 14, 20, 22, 24, and 28 because they did not meet the eligibility criteria. In contrast, the attitude questionnaire had an Aiken's V value between 0.850 and 1, and the action questionnaire ranged from 0.917 to 1; both showed that all items were valid and none were discarded. For the local wisdom-based food module and menu, the validity value ranged from 0.821 to 1, with no items discarded. Meanwhile, the validity of the menu, which was assessed by seven experts using the method, showed an Aiken's V value between 0.821 and 0.928, which means it is very good and suitable for use.

b. Construct Validity

Construct validity was assessed using Pearson's product moment correlation with a table r of 0.3061, indicating that of the 41 items on the knowledge questionnaire, 11 items were invalid, namely items 5, 9, 13, 14, 19, 20, 21, 24, 27, 28, and 36, because the calculated r value was lower than the table r . In the attitude questionnaire, only one item was invalid, namely item 18. Similarly, in the action

questionnaire, only one item was invalid, namely item 10. This indicates that most items have good construct validity.

c. Item Discrimination Power

The Corrected Item-Total Correlation results show that the eleven items that were discarded from the knowledge questionnaire had values of less than 0.20, meaning that they were unable to distinguish between respondents' ability levels. In the attitude questionnaire, only item number 18 had low discriminatory power, while all items in the action questionnaire had good discriminatory power with values above 0.30.

d. Reliability

The reliability test results using Cronbach's Alpha reinforce the quality of the instrument. The knowledge questionnaire had a reliability value of 0.816, indicating good reliability. The attitude questionnaire had a very high reliability value of 0.990, and the action questionnaire also showed very high reliability with a value of 0.975. All three instruments were reliable and consistent in measuring the variables under study.

3. DATA ANALYSIS

Descriptive analysis was used to describe the characteristics of respondents, means, and standard deviations of each variable. Multiple linear regression tests were applied to determine the effect of health literacy (knowledge, attitudes, behaviours, skills) on haemoglobin (Hb) levels. Repeated Measures ANOVA was used to analyse differences in Hb levels between time points (pre-test, post-test 1, post-test 2, post-test 3), as well as interactions with intervention variables (counselling and pocket books). Tukey's post-hoc test was performed to identify which intervention groups had significant differences between measurement times. The significance level was set at $p < 0.05$.

In the initial stage of the research, several preliminary tests were conducted to ensure that the instruments and interventions used were standardised, valid, and appropriate to the field context, namely:

a. Questionnaire Test

The questionnaire test was conducted on 30 respondents who had similar characteristics to the prospective research participants. This test was conducted twice to assess the consistency of answers, language comprehension (), and clarity of questions. The test results were used to improve and refine the

instruments so that they were suitable for use in measuring the level of health literacy based on local food. The feasibility indicators included readability $\geq 85\%$ of respondents rated it as clear, consistency of answers (test-retest) ≥ 0.70 , and item-total correlation ≥ 0.30 .

b. Local Food Menu Test

The local food menu to be used in the intervention was tested to assess its nutritional composition, acceptability, and suitability to the consumption habits of the local community. A small panel of participants provided feedback on the taste, appearance, presentation, and affordability of the menu. Feasibility indicators included an average acceptance score of $\geq 3.5/5$, ingredient availability of $\geq 75\%$, and nutritional composition that met the iron and vitamin C requirements for anaemia prevention.

c. Pocket Book Test

The local food-based pocket book was tested on prospective users to ensure readability, comprehension, and visual appeal. This test formed the basis for improvements to the language, illustrations, and content to make it easier to understand and more relevant to the needs of prospective brides and grooms. Feasibility indicators include readability $\geq 85\%$ of respondents rating it as clear, content comprehension $\geq 70\%$ correct answers in a short test, and user satisfaction $\geq 4/5$.

d. Companion Partner Feasibility Test

Prospective mentors from health workers, posyandu cadres, and community leaders were involved in a short training course. This test assessed their understanding of the material, communication skills, and commitment to mentoring adolescent girls or prospective brides during the intervention. Eligibility indicators included an increase in *pre-post* training knowledge scores of $\geq 20\%$, communication skills and protocol fidelity of $\geq 75\%$, and attendance and commitment of $\geq 90\%$.

3.1. Quality Control

This study needs to maintain research quality, so the following quality controls were implemented:

a. Standardisation of Measurement Tools

Standardisation of measuring instruments is carried out by adjusting them to their normal position before use. The measuring instrument that is standardised is the questionnaire. Standardisation is carried out by testing the questionnaire before it is used in the study.

b. Standardisation of Intervention Tools

Standardisation of *tools* (intervention tools) was also carried out in this study through interventions and control groups taken from reliable sources by adjusting to the needs of the community in the form of *leaflets*.

c. Standardisation of Enumerators (Field Assistants)

Field assistants (enumerators) were given training in advance to provide a basic understanding of the social community in the research area, to unify perceptions about the instruments to be used, to provide educational materials to be delivered to the community, and to explain the efforts to be made in this study while in the field. After the training, enumerators were given an Integrity Pact to ensure the quality of assistants relevant to the research.

3.2. Data Processing and Presentation

a. Research Instruments

The instruments used in this study included a health literacy questionnaire measuring knowledge (41 items), attitudes (57 items), behaviour (50 items), and skills (50 items) based on local foods for the prevention of anaemia.

b. Observation Sheet

Observation sheets were used to document the intervention implementation process and respondent compliance.

c. Haemoglobin Measuring Device

A digital haemoglobinometer to measure Hb levels with an accuracy standard of ± 0.1 g/dL.

d. Local Food Pocket Book

An educational medium containing information about the nutritional content of local foods, processing methods, and validated anaemia prevention menus (Aiken's $V = 0.97-1$).

3.3. Data Analysis

Quantitative data were analysed using SPSS version 26 and JASP. The analysis included descriptive analysis to describe the characteristics of the respondents, the mean, and the standard deviation of each variable. Descriptive analysis was used to describe the characteristics of the respondents and the descriptive statistics of the variables. Multiple linear regression tests were used to determine the effect of health literacy on Hb changes. Repeated Measures ANOVA was used to

analyse differences in Hb levels over time and interactions with intervention variables. Tukey's post-hoc test was used to identify groups with significant differences. The significance level was set at $p < 0.05$. Statistical assumptions, including normality, homogeneity of variance, and sphericity, were tested before inferential analysis. Data were presented in the form of descriptive and inferential statistical tables, accompanied by graphs comparing groups and measurement times. Each table and figure was accompanied by explanatory narration to facilitate interpretation of the research results.

3.4. Research Ethics

Research is conducted in accordance with ethical principles to protect research subjects. Respondents' rights are protected by the following considerations:

1. *Right to Self-Determination*: Respondents have the right to decide whether or not to participate in the research.
2. *Right to Privacy and Dignity*: researchers protect the privacy and dignity of respondents. Confidentiality is maintained throughout the research.
3. *Right to Anonymity and Confidentiality*: research data is not accompanied by the respondent's identity but only by a respondent code.
4. *Right to Fair Treatment*: all respondents receive the same intervention during the collection of research data.
5. *Right to Protection from Discomfort and Harm*: The physical, psychological, and social comfort of respondents was maintained throughout the study.

4. RESEARCH RESULTS

4.1. Health Literacy based on Local Food for Prospective Brides

a. Knowledge

The results in Table 1 show a substantial increase from the pretest to posttest 1 in all sub-districts. In Bobong, average knowledge increased from 44.60% (SD = 3.17) to 89.40% (SD = 2.60), then peaked at post-test 2 at 96.10% (SD = 6.21) before declining slightly at post-test 3 (87.70%, SD = 1.96). A similar pattern occurred in Lede, from 51.20% (SD = 3.81) to 79.70% (SD = 2.33), peaking at 82.70% (SD = 1.63), then declining to 75.00% (SD = 2.19). Nggele also showed an increasing pattern from 48.70% (SD = 3.18) to 85.40% (SD = 2.11), then rose to 87.90% (SD = 2.03), and decreased slightly to 83.00% (SD = 2.07). Unlike the other three, Samuya, despite experiencing an increase from 40.40% (SD = 3.37) to 51.20% (SD =

3.01) and 51.60% (SD = 2.49), it declined again to 49.00% (SD = 2.40), showing the lowest achievement

among all sub-districts.

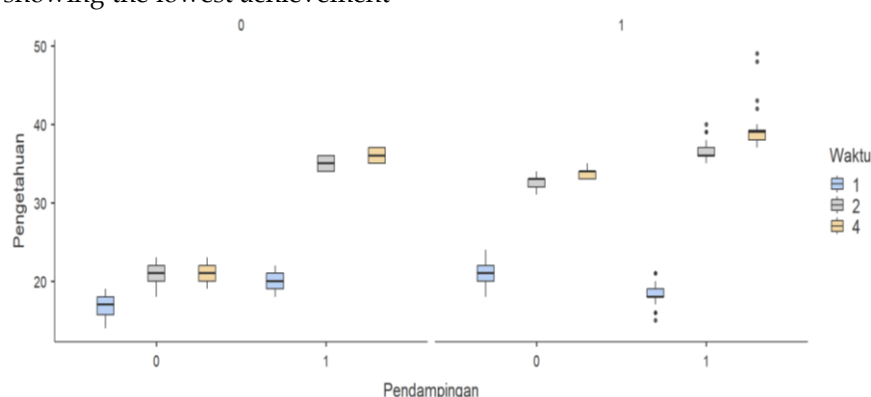


Figure 1: Changes in Knowledge of the 4 Groups in Months 1-3.

b. Attitude

An increase in attitude was also seen consistently in almost all subdistricts. In Bobong, the score increased from 2.01 (SD = 0.052) to 4.26 (SD = 0.063)

in posttest 1, rose again to 4.47 (SD = 0.043), then remained stable at 4.26 (SD = 0.056). Lede showed an increase from 2.24 (SD = 0.041) to 3.61 (SD = 0.032), a slight increase to 3.63 (SD = 0.033), then a decline to 3.33 (SD = 0.038).

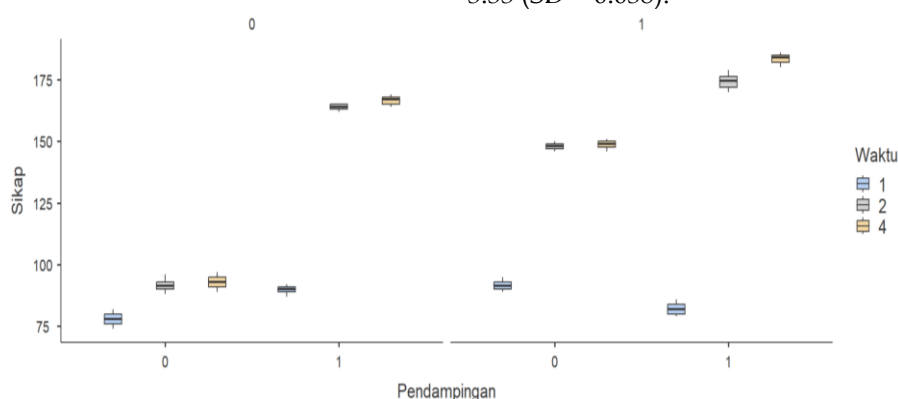


Figure 2: Attitude Changes of the 4 Groups in Months 1-3.

Nggele showed a similar pattern, from 2.19 (SD = 0.033) to 3.99 (SD = 0.024), reaching 4.06 (SD = 0.043), then decreasing to 3.87 (SD = 0.036). Samuya showed

a slower upward trend, from 1.89 (SD = 0.057) to 2.24 (SD = 0.048), then rose slightly to 2.28 (SD = 0.052), and declined again to 2.10 (SD = 0.049).

Table 1: Descriptive Statistics of Local Food-Based Health Literacy.

Variable	Bobong		Lede		Nggele		Samuya	
	M	Primary School	M	Primary	M	Primary	M	Primary
Knowledge (pre-test)	44.60	3.17	51.20	3.81	48.70	3.18%	40.40%	3.37%
Knowledge (post 1)	89.40	2.60	79.70	2.33	85.40	2.11%	51.20%	3.01%
Knowledge (postes 2)	96.10%	6.21	82.70	1.63	87.90	2.03%	51.60%	2.49%
Knowledge (postes 3)	87.70%	1.96	75.00	2.19	83.00	2.07%	49.00%	2.40%
Attitude (pre-test)	2.010	0.052	2.240	0.041	2.190	0.033	1,890	0.057
Attitude (post 1)	4,260	0.063	3,610	0.032	3,990	0.024	2,240	0.048
Attitude_Post2	4,470	0.043	3,630	0.033	4,060	0.043	2,280	0.052
Attitude_Post3	4,260	0.056	3,330	0.038	3,870	0.036	2,100	0.049
Behaviour (pre-test)	1,780	0.055	1,990	0.043	1,890	0.027	1,610	0.036
Behaviour (post 1)	4,100	0.041	3,400	0.021	3,850	0.019	2,010	0.045

Behaviour_Post2	4,340	0.041	3,350	0.021	4,000	0.016	2,050	0.044
Behaviour_Post3	4,100	0.078	3,100	0.025	3,800	0.024	1,840	0.040
Skills (pre-test)	1,530	0.060	1,760	0.033	1,710	0.033	1,390	0.035
Skills (post 1)	4,210	0.045	3,010	0.023	4,000	0.017	1,760	0.046
Skills (postes 2)	4,490	0.065	3,100	0.022	4,150	0.021	1,720	0.042
Skills (post 3)	4,250	0.077	2,860	0.023	4,000	0.017	1,560	0.040

c. Behaviour

Behavioural patterns also indicated a strong improvement at the beginning, followed by a decline at the end of the post-test. In Bobong, the score increased from 1.78 (SD = 0.055) to 4.10 (SD = 0.041), then rose to 4.34 (SD = 0.041), and declined to 4.10 (SD = 0.078). Lede showed a similar trend, from 1.99

(SD = 0.043) to 3.40 (SD = 0.021), then slightly decreased to 3.35 (SD = 0.021) and declined further to 3.10 (SD = 0.025). Nggele showed a relatively stable pattern, from 1.89 (SD = 0.027) to 3.85 (SD = 0.019), rising to 4.00 (SD = 0.016), then decreasing slightly to 3.80 (SD = 0.024). Samuya experienced a small increase from 1.61 (SD = 0.036) to 2.01 (SD = 0.045) and 2.05 (SD = 0.044), then declined again to 1.84 (SD = 0.040).

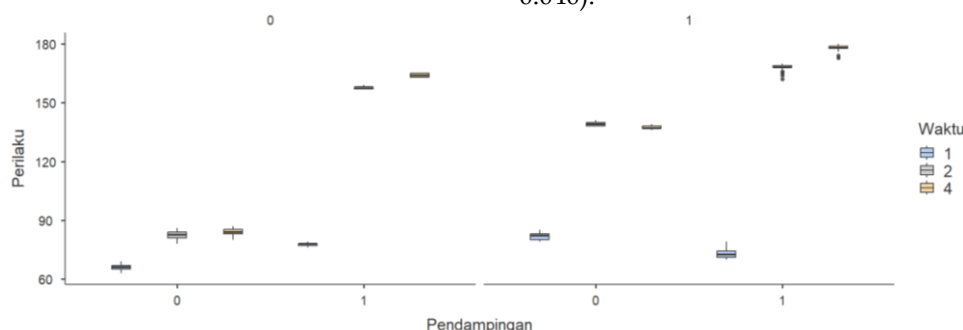


Figure 3: Behavioural Changes in 4 Groups Months 1-3.

d. Skills

The skill variable showed a significant increase since post 1, but showed a stable or declining trend in post 3. Bobong increased from 1.53 (SD = 0.060) to 4.21 (SD = 0.045), then to 4.49 (SD = 0.065), and decreased slightly to 4.25 (SD = 0.077). Lede rose from 1.76 (SD = 0.033) to 3.01 (SD = 0.023) and 3.10

(SD = 0.022), but then declined to 2.86 (SD = 0.023). Nggele experienced a surge from 1.71 (SD = 0.033) to 4.00 (SD = 0.017) and 4.15 (SD = 0.021), then declined slightly to 4.00 (SD = 0.017). Samuya showed a limited increase from 1.39 (SD = 0.035) to 1.76 (SD = 0.046), then decreased slightly to 1.72 (SD = 0.042) and 1.56 (SD = 0.040), remaining the sub-district with the lowest skill achievement.

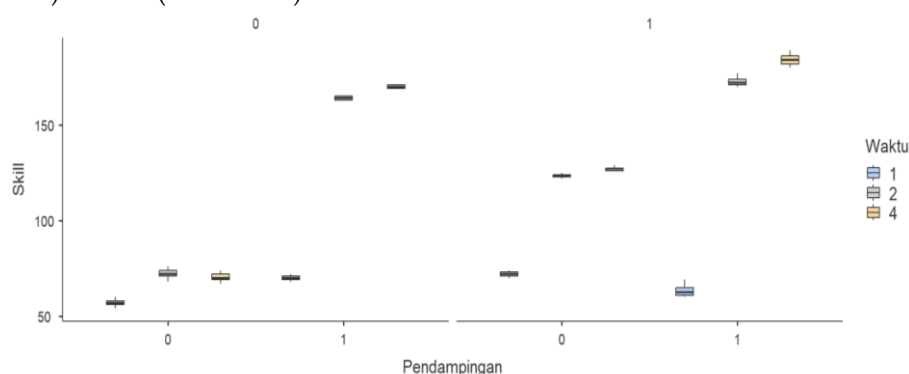


Figure 4: Skill Changes in 4 Groups Months 1-3.

4.2. Nutritional Status of Prospective Brides

a. Haemoglobin Levels

One of the main indicators of the success of the anaemia prevention programme is an increase in haemoglobin (Hb) levels in the blood. The results of the study show that the Hb levels of prospective

brides in all sub-districts increased consistently from the first to the third month, although the success rate varied between regions. In Bobong sub-district, Hb levels increased at the start of the study, with the average Hb level of respondents in Bobong being 10.90 g/dL. After receiving health literacy intervention and guidance on local food consumption, their Hb levels increased to 12.90 g/dL in the second month, and in the third month, Hb levels reached 14.80 g/dL. In Lede Subdistrict, Hb levels increased gradually from 11.40 g/dL at the beginning to 13.10 g/dL in the second month and finally reached 13.70 g/dL in the third month. In Nggele, although the initial Hb level was relatively low (10.80 g/dL), it was successfully increased to 12.40 g/dL in the second month and 12.70 g/dL in the third month. In Samuya sub-district, their initial Hb levels were actually the highest compared to other sub-districts (11.70 g/dL), but the increase was the smallest, only reaching 12.20 g/dL in the third month.

b. Body Weight

Body weight is an important indicator of the nutritional status of prospective brides. In general, most subdistricts showed an upward trend in body weight, although the pattern was more varied than that of Hb levels. Bobong recorded the most significant increase: from 48.40 kg to 55.10 kg in three months (an increase of almost 7 kg), indicating a strong improvement in nutrition. Lede experienced a moderate but positive increase, from 43.70 kg to 46.60 kg (an increase of almost 3 kg). Nggele showed a fluctuating pattern: it rose from 50.00 kg to 54.10 kg, but fell back to 51.00 kg in the third month, so it needs to be analysed further. Samuya showed the smallest increase, from 50.30 kg to 51.50 kg (approximately 1 kg), indicating minimal improvement in dietary patterns. Overall, most sub-districts experienced weight gain, but with considerable variation between regions.

4.3. Health Literacy based on Local Food and Haemoglobin Levels

The goodness-of-fit test results indicate that the multiple linear regression model has an excellent fit, with $R^2 = 0.809$ and $\text{Adj. } R^2 = 0.798$. This means that approximately 80% of the variation in Hb levels among prospective brides can be explained by the predictor variables in the model. The model validity test was also significant, $\chi^2(3) = 218$, $p < 0.001$, so the model was declared valid. There were three significant predictors based on the backward elimination method. The pretest attitude had a

significant negative effect ($\beta = -0.056$), indicating that a higher initial attitude was associated with a lower increase in Hb. Behavioural change had a significant positive effect ($\beta = 0.0265$), meaning that the greater the increase in healthy behaviour, the greater the increase in Hb. The use of pocket books** had a significant positive effect ($\beta = 1.2546$) (), with an average increase in Hb of approximately 1.25 g/dL in brides-to-be who received pocket books. Overall, the model is robust and these predictors play an important role in explaining changes in Hb after the intervention.

4.4. Nutritional Status of Prospective Brides Based on Haemoglobin Levels

The average Hb level of prospective brides increased across all subdistricts from the first month to the second month to the third month, although the magnitude of the increase varied between regions. Bobong experienced the highest increase, from 10.90 g/dL in the first month to 12.90 g/dL in the second month, then reaching 14.80 g/dL in the third month. Lede showed a consistent increase from 11.40 g/dL (first month) to 13.10 g/dL (second month) and 13.70 g/dL (third month). Nggele increased from 10.80 g/dL in the first month to 12.40 g/dL in the second month, then 12.70 g/dL in the third month, although the increase was lower than Bobong and Lede. Samuya had a fairly high initial Hb level of 11.70 g/dL in the first month, but the increase was smaller, reaching only 12.20 g/dL in the third month. Overall, the consistent increase in Hb levels from the first to the third month indicates that local food-based health literacy interventions are effective in preventing anaemia in prospective brides.

4.5. Health Literacy based on Local Food and Haemoglobin Levels

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(post-test 3 – pre-test) had a significant positive effect ($\beta = 0.0265$), confirming that the greater the increase in healthy behaviour, the greater the increase in Hb levels. The use of pocket books had a significant positive effect ($\beta = 1.2546$), with an average Hb increase of approximately 1.25 g/dL in participants who received the book. The model also has an intercept of 2.1424, which represents the baseline value of Hb change when all predictors are zero. Overall, these findings indicate that behavioural change and educational media have a strong contribution to increasing Hb levels in prospective brides.

4.6. The Effect of Intervention on Haemoglobin Levels

a. Sphericity Assumption Test

The assumption of sphericity is one of the main requirements in Repeated Measures ANOVA, namely the condition where the variance of the differences between pairs of measurement levels is the same. This test is performed using Mauchly's Test of Sphericity. If this assumption is not met, the F value may be biased, requiring Greenhouse–Geisser or Huynh–Feldt correction. The sphericity test results show that the F value and its significance under None, Greenhouse–Geisser, and Huynh–Feldt conditions are identical. For the time effect, $F(2, 280) = 749.42$, $p < 0.001$, and the same pattern appeared in the time $\times$ mentoring, time $\times$ pocket book, and three-way interactions. The similarity of these results indicates that the sphericity assumption is met, so no additional correction to the degrees of freedom is required.

b. Repeated Measures ANOVA

The research data were analysed using Repeated Measures ANOVA because the haemoglobin levels of the brides-to-be were measured at three different times (before intervention, after intervention, and follow-up). This technique was chosen because it reduces inter-individual variability by making each subject a control for themselves, making it more sensitive in detecting changes over time. The results of the analysis showed a significant difference in Hb levels between measurement times, $F(2, 280) = 749.40$, $p < 0.001$. The interaction between time and counselling was also significant, $F(2, 280) = 93.30$, $p < 0.001$, as was the interaction between time and pocket book, $F(2, 280) = 145.90$, $p < 0.001$. The three-way interaction between time, mentoring, and pocketbook was also significant, $F(2, 280) = 22.00$, $p < 0.001$. In the between-subjects analysis, mentoring did not show a significant effect on changes in Hb

levels, $F(1, 140) = 1.21$, $p = 0.273$. Conversely, the use of the pocket book had a significant effect, $F(1, 140) = 68.41$, $p < 0.001$. The interaction between mentoring and the pocket book was not significant, $F(1, 140) = 0.08$, $p = 0.777$, indicating that neither strengthened nor weakened the effect of the other.

c. Tukey Post-Hoc Test

A post hoc test was conducted after ANOVA showed significant differences to identify pairs of groups that were significantly different. The Tukey test results showed that there was a significant difference between the group without pocket books and the group with pocket books (mean difference = -0.891 , $t = -8.27$, $p < 0.001$). A significant difference was also found between the group without mentoring and the group with mentoring (mean difference = -0.891 , $t = -8.27$, $p < 0.001$). These findings confirm that both the use of pocket books and mentoring, separately, contribute significantly to increasing the haemoglobin levels of prospective brides.

5. DISCUSSION

5.1. Health Literacy and Anaemia Prevention

According to research by Sri Rahayu Mastuti, Rita Ayu Yolandia, et al., brides-to-be who have poor eating habits are at risk of anaemia because eating habits are related to nutrient intake, and certain nutrients (Fe) are needed for haemoglobin formation. Prospective brides and grooms who do not consume iron supplements properly will not get enough iron (Fe) intake. If Fe intake is insufficient, haemoglobin formation will be inhibited, causing anaemia. Therefore, prospective brides and grooms are advised to maintain their nutritional intake so that they do not experience anaemia. Preconception care programmes, including prenuptial courses, are an important step in preparing brides and grooms for married life. This enables them to create harmony in their household and avoid divorce. Health services for prospective brides and grooms or pre-pregnancy are one of the services for prospective brides and grooms, a series of activities aimed at adolescent women, until before pregnancy, so that these women are ready to undergo pregnancy, childbirth and give birth to their babies in a healthy manner, in accordance with Minister of Health Regulation No. 97 of 2014.

a. Behaviour

1). Knowledge

Knowledge is the capacity to acquire, store, and

use information; a mixture of understanding, experience, wisdom, and skills. The nature of knowledge depends on various ways of acquiring ideas: perception, imagination, memory, judgement, abstraction, and reasoning. The criteria for knowledge centre on understanding that allows us to distinguish between right and wrong, as studied by logic (deductive reasoning) and the scientific method (formulating and testing hypotheses). The main purpose of knowledge is truth and is studied by a branch of metaphysics known as epistemology. Education is a prerequisite for acquiring knowledge and is the process of raising children or adults so that they acquire intellectual and manual skills, develop moral qualities, and demonstrate good behaviour and manners to others.

2). *Attitude*

Attitudes refer to the tendency to react in a certain way to a particular situation; to view and interpret events according to certain tendencies; or to organise opinions into a coherent and interrelated structure. Values are closely related to attitudes. Values can be defined as the worth attributed to intellectual or moral status, the way in which services are valued, and sometimes the description of a series of ethical actions. Ethics occupies a very high position among all the elements that make up attitudes.

3). *Practice*

Practice is the application of rules and knowledge that leads to action. Good practice is an art related to advances in science and technology and is carried out in an ethical manner.

4). *Skills*

5.2. *Skills are the ability to translate knowledge into practice in order to achieve desired goals*

b. *Health Literacy*

Health literacy is a relatively new concept in health promotion. It is a combined term used to describe the various outcomes of health education and communication. The Centre for Disease Control and Prevention defines health literacy as "the extent to which an individual has the capacity to obtain, communicate, process and understand basic health information in order to make appropriate health decisions".

Health literacy is defined as a set of behaviours ranging from knowledge (understanding), attitudes (assessment), actions (action), and skills (skill), which enable recipients of health literacy to critically determine appropriate health decisions. Health

literacy requires knowledge, motivation and competence for people to access, understand, assess and apply health information to make judgements and decisions in their daily lives about healthcare, disease prevention and health promotion in order to maintain or improve their quality of life throughout their lives.

The World Health Organisation defines health literacy as the cognitive and social skills that determine an individual's motivation and ability to access health services, understand and use information in ways that promote and maintain good health. Health literacy enables individuals to make health-related decisions because they have the skills to find and understand health information.

Only about 40% of adults have good health literacy. This means that only 40% of adults can understand and follow health messages. It also means that only about 40% of adults are able to make good choices based on a thorough understanding of the issues they face with the health options available.

The results of the study indicate that health literacy levels, particularly among adolescents, are very low, leading to poor health in adulthood. Educating the public is a sound investment for the future, as well as improving health and preventing disease by changing and adapting lifestyles to healthier ones.

Low levels of individual health literacy are associated with lower use of preventive approaches. Low individual health literacy is associated with poorer health status and a higher risk of premature death. This suggests that age, gender, education, ethnicity and health status also play a role. Health literacy barriers are greater for people with lower levels of education. Programmes targeting health literacy may offer an effective entry point for intervention.

c. *Health of Prospective Brides*

1). *Anaemia Prevention*

Nutrition plays a crucial role in preventing anaemia. Adequate nutrition is not only necessary for maintaining general health, but also has a direct impact on blood formation, energy, and overall bodily function. UNICEF supports programmes that make nutritious food more accessible and affordable, and uses behaviour change communication to promote nutritious diets and change social norms and practices. Women have different nutritional needs throughout their lives, especially before and during pregnancy and while breastfeeding, when nutritional vulnerability is greatest. Ensuring that women have access to nutritious food and adequate

services and care is fundamental to the survival and well-being of mothers and their children. Before becoming pregnant, women need nutritious and safe food to build up sufficient reserves for pregnancy.

The following are several aspects of nutrition's role in preventing anaemia:

a). Intake of Iron, Vitamin B12, and Folic Acid

Iron is a key component in the formation of haemoglobin, which carries oxygen in the blood. Iron deficiency can lead to anaemia. Iron-rich foods, such as red meat, green leafy vegetables, and nuts, should be an integral part of the daily diet. Vitamin B12 and folic acid are both important for the formation of red blood cells. Sources of vitamin B12 include meat, fish, and dairy products, while folic acid can be found in green leafy vegetables, fruits, and cereals.

b). Energy and Nutritional Balance

Good nutritional balance helps maintain ideal body weight and ensures that the body gets the nutrients it needs to function optimally.

c). Other Vitamins and Minerals

Vitamin C can increase iron absorption from plant sources, such as vegetables. Vitamins A and B complex play a role in maintaining healthy blood cells and supporting the immune system. Other minerals (zinc and copper) are important for haemoglobin production and function.

d). Balanced Diet

Encourage the consumption of a varied and balanced diet to ensure optimal nutrient intake. Avoid extreme diets or unbalanced eating patterns that can lead to nutrient deficiencies.

e). Nutrition Education

Providing nutrition education to the community, especially prospective brides and grooms, on the importance of adequate nutritional intake to prevent anaemia. Encouraging the selection and preparation of healthy and nutritious foods.

d. The Role of Local Food in Anemia Prevention

Nutrition plays a crucial role in preventing anaemia. Adequate nutrition is not only necessary for maintaining general health, but also has a direct impact on blood formation, energy, and overall body function.

Local foods can play an important role in anaemia prevention efforts because some types of local foods are rich in iron, folate, vitamin B12, and other nutrients necessary for red blood cell production. The

potential of local foods on Taliabu Island is quite diverse, including ganemo, fish, shrimp, shellfish, moringa leaves, ferns, bananas, and lobi/tomi-tomi. Local foods are often more accessible to local communities, which can improve access to foods necessary for the prevention of anaemia. Increasing the consumption of local foods can also provide a sustainable solution to nutritional problems, reduce dependence on imported products, and strengthen community food security.

e. Effectiveness of Pocket Books as Educational Media

Printed educational media, particularly pocket books, have been proven effective in improving health literacy. This study is in line with research by Wulandari et al., which shows that prospective brides and grooms feel the need for information as motivation to read and become actively involved. Pocket books are packaged in a highly communicative manner and contain material related to premarital preparation. The results of the study show that the provision of pocket books contributes significantly to an increase in Hb levels ($\beta = 1.2546$, $p < 0.001$).

Pocket books have several benefits, including helping brides and grooms learn more and faster, making them interested in exploring the information, facilitating the discovery of information, and encouraging a desire to gain a better understanding. Printed educational media have advantages in terms of ease of access, portability, and wide availability, and can reach areas without internet access.

f. The Importance of Guidance in Behavioural Change

Although the pocketbook proved to be effective, this study also showed that mentoring played an important role, especially when combined with the pocketbook.

The results of the analysis show a significant interaction between time, mentoring, and pocketbooks ($F(2, 280) = 22.00$, $p < 0.001$), indicating that the combination of both interventions yields better results than a single intervention. Mentoring plays a role in strengthening motivation, providing cultural and social support, and helping prospective brides apply the material to their daily food consumption practices.

This is in line with research by Nahrishah et al., which proves that handbooks combined with intensive counselling can increase Hb levels and iron consumption compliance. Mentoring also helps overcome cultural barriers and local traditions that

can affect food consumption patterns.

g. Factors Affecting Changes in Haemoglobin Levels

Regression analysis identified several factors that influence changes in haemoglobin levels. Behavioural change (Δ behaviour) had a significant positive effect ($\beta = 0.0265$, $p < 0.001$), indicating that the greater the increase in healthy behaviour, the greater the increase in Hb.

This confirms the importance of concrete behavioural changes in local food consumption to improve nutritional status. Interestingly, initial attitude (pretest) had a significant negative effect ($\beta = -0.056$, $p < 0.001$), meaning that higher initial attitude scores were correlated with lower increases in Hb. This finding indicates that prospective brides and grooms with good initial attitudes may have more limited room for improvement compared to those who start from a lower level of attitude, or it may indicate a gap between attitudes and actual practices.

h. Implications for Pre-marital Health Programmes

The results of this study have important implications for premarital health programmes. The combination of local food-based health literacy interventions through mentoring and pocket books has been proven effective in improving the knowledge, attitudes, behaviours, skills, and nutritional status of prospective brides and grooms.

This programme is recommended to be integrated into premarital education at the KUA and health services as an effort to prevent anaemia and improve reproductive health. Preconception care programmes, including premarital courses, are an important step in equipping prospective brides and grooms to build a household.

Health services for prospective brides and grooms in accordance with Minister of Health Regulation No. 97 of 2014 need to be strengthened with local food-based health literacy components that have been proven effective in this study.

i. Research Limitations

This study has several limitations. First, the selection of key informants registered at the KUA, most of whom have been married according to customary law but not yet registered civilly, implies limitations in the representation of pre-conception data. For further research, it is recommended that informants focus on women of childbearing age (WUS) so that the data truly reflects pre-conception

conditions.

Second, there are limitations in the translation of local food terms. The indigenous communities of the islands of and Taliabu generally use their native languages, which poses challenges in finding equivalents in Indonesian and scientific terms, thereby potentially affecting the consistency of the classification and documentation of local food types.

6. CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Health literacy interventions based on local foods through mentoring and pocket books proved effective in improving the knowledge, attitudes, behaviours, skills, and nutritional status of prospective brides and grooms in Taliabu Island Regency. The results of the study show:

- a. A significant improvement in health literacy (knowledge, attitudes, behaviours, skills) after the intervention, particularly in the group that received both mentoring and pocket books.
- b. Haemoglobin levels increased consistently across all sub-districts, with the highest achievement in Bobong (from 10.9 g/dL to 14.8 g/dL).
- c. Changes in behaviour, initial skills, counselling, and pocket books contributed significantly to the increase in haemoglobin levels ($p < 0.05$).
- d. The combination of mentoring and pocket books yielded the best results compared to single interventions, with a significant interaction effect.

6.2. Recommendations

Based on the research findings, the following recommendations are made:

- a. Health Program
Integrating local food-based health literacy interventions into premarital education at the KUA and health services as an effort to prevent anaemia and improve reproductive health.
- b. Implementation
Using a combination of mentoring and pocket books for optimal results, with a focus on changing local food consumption behaviour.
- c. Further Research
Conduct research focusing on women of childbearing age (WUS) to obtain more representative pre-conception data, as well as further research on the nutritional content of local foods specific to Taliabu Island.
- d. Policy
Developing policies that support the use of local foods in premarital and preconception health

programmes, and involving traditional, religious, and community leaders in programme implementation.

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