

**DEVELOPMENT OF MOBILE-APPLICATION SUN4CATIN TO  
INCREASE KNOWLEDGE AND ATTITUDE OF  
PROSPECTIVE BRIDES REGARDING ANEMIA AND  
CHRONIC ENERGY DEFICIENCY**

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***ABSTRACT***

Anemia and Chronic Energy Deficiency (CED) are nutritional problems that often occur in women of childbearing age. Efforts to increase knowledge about nutrition can be done through counseling, flip sheets, leaflets or using smartphone applications (Arieska & Arieska, 2023). This study aims to understand the development of applications (SUN4Catin) for the knowledge and attitudes of prospective brides and grooms regarding anemia and CED.

This research is quasi experiment and using simple random sampling. This research is conducted on 21 pairs of prospective brides and grooms in Bacukiki district

in Pare-pare. Data collection is done by taking secondary and primary data. Primary data was taken through a pre-post test on prospective bride and groom couples. Secondary data was obtained from Bacukiki religious affairs office.

The results of this study show the p-value for increasing knowledge about anemia is 0.011 and CED is 0.012, means there is a significant increase in knowledge among prospective bride and groom couples. Meanwhile, the p-value for the change in attitude of the prospective bride and groom regarding anemia is 0.004 and for CED is 0.007, meaning that there is a quite significant change in attitude among the prospective bride and groom regarding anemia and CED

**Keywords:** *mobile-application, anemia, chronic energy deficiency, prospective bride and groom, knowledge, attitude*

## **1. Introduction**

One of the nutritional problems that still occurs in Indonesia among women of childbearing age is chronic energy deficiency (CED) and anemia. Women of childbearing age (WUS) are women whose reproductive condition is functioning well between the ages of 20-45 years Kementrian Kesehatan (Kemenkes, 2015). According to WHO, it is estimated that one third of all women of reproductive age suffer from anemia. In 2019, the global prevalence of anemia was 29.9% in women of childbearing age World Health Organization (WHO, 2021).

Riskesdas in 2018 reported that the prevalence of anemia in Indonesian people aged 15 to 24 years was 32%, aged 25 to 34 was 15.1%, aged 35 to 44 years was 16.7%. Based on gender, the incidence of anemia in women is reported to be 27.2%. The prevalence of anemia in pregnant women in Indonesia aged 15 to 24 years is 84.6%, aged

25 to 34 years is 33.7%, aged 35 to 44 years is 33.6%. This figure is a high number and is considered a health problem that must be addressed immediately (Risikesdas, 2018). The prevalence of chronic energy deficiency in women of childbearing age, both pregnant and non-pregnant women, based on the results of the 2013 Basic Health Research (Risikesdas), shows that the proportion of women of childbearing age at risk of CED aged 15-49 years who are pregnant is 24.2% and who are not. pregnancy was 20.8% and there was a decrease in the prevalence of CED based on the results of the 2018 Risikesdas to 17.3% of those aged 15-49 years who were pregnant and 14.5% of women who were not pregnant (National CED = 31.8%) (Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat & Litbangkes, n.d.). The highest prevalence of CED based on the proportion of age groups is in WUS aged 15-19 years as much as 33.5% in pregnant WUS and 36.3% in non-pregnant women. The prevalence of CED in South Sulawesi province is still above the national average, namely 34.59%, with the prevalence of CED in women of childbearing age who are pregnant at 16.87% and 17.72% in women who are not pregnant Riset Kesehatan Dasar (Risikesdas, 2013)

Anemia is caused by a lack of macro and micro nutrients, namely protein, iron and folic acid. Women who experience anemia during pregnancy are at high risk of giving birth to low birth weight (LBW) babies and have an increased risk of death for both mother and baby during the birth process. Lack of iron consumption is caused by several factors including lack of knowledge, food availability, and wrong eating habits (Hidayah et al., 2020).

Other factors causing anemia include poor nutritional status or known as chronic energy deficiency (CED). CED measurements can be done by measuring the upper arm circumference (LILA) if < 23.5 cm. The results of Mutmainnah's research in Majene

Regency with 126 respondents with a cross-sectional study design showed that there was a relationship between Chronic Energy Deficiency (CED) and the incidence of anemia with a p-value of 0.025 (Muthmainnah et al., 2021).

CED is a condition where women experience a long-lasting or chronic lack of calories and protein. In women with CED, iron deficit will develop over time, which can then develop into anemia. If the condition of the arm size tends to have less nutrition, the incidence of anemia will be more severe. Women who suffer from CED and anemia have a greater risk of disease compared to normal pregnant women. As a result, they have a greater risk of having babies with Low Birth Weight (LBW), bleeding, tiring postpartum labor because they are weak and susceptible to infectious diseases (Mastuti et al., 2023)

The problem of nutritional anemia and CED does not occur suddenly, so it can actually be prevented, so providing information as early as possible to prospective mothers (bride-to-be) is one effort to overcome this problem. Prospective brides and grooms are a strategic target group in efforts to improve their health before pregnancy.

One of the countries with rapidly growing internet users is Indonesia, where 85% of users access the internet via mobile phones. Android or the application is one of the technology-based health education media that has great potential to be implemented in Indonesia. In accordance with technological developments which are increasing in the use of educational media, especially Android-based, in health (Qudratullah, 2021). Adolescents have the opportunity to develop their digital health literacy, specifically concerning anemia and chronic energy deficiency. This study aims to understand the development of applications (SUN4Catin) for the knowledge and attitudes of prospective brides and grooms regarding anemia and chronic energy deficiency. This study was prompted by lack of knowledge and attitude of the prospective bride and groom and

enhancement of adults using smartphones. Therefore, the Android-based educational approach (SUN4Catin) is a serious method to enhance prospective bride and groom's knowledge and attitude.

## **2. Material and Methods**

This type of research is quasi-experimental research using a one group pre-test and post-test research design. In this study, a pre-test (initial observation) was also given before the intervention was given, after the intervention was given, a post-test (final observation) was given. In this study, the pre-test was carried out before the education of the prospective bride and groom. Next, the post-test is carried out 3 weeks after the bride and groom's education. The sampling technique was carried out using a simple random sampling method with a sample size of 21 prospective bride and groom couples or 42 prospective brides and grooms.

Data collected in this study included definition of anemia and CED, symptoms of anemia and CED, causes of anemia and CED, how to prevent anemia and CED, foods recommended to prevent anemia and CED which were obtained by filling out a questionnaire of 10 questions and the measurement results obtained from correct answers were given a value of 1 and incorrect answers were given a value of 0. The data collection technique is by collecting primary data through the results of pre and post-test knowledge and attitudes of prospective bride and groom couples regarding exclusive breastfeeding and lactation management. Meanwhile, secondary data consists of data on the number of prospective bride and groom couples registered at the KUA, Bacukiki District, Parepare City.

The research was conducted between November and December of 2023 for 4 weeks. Before the respondent using the mobile-application they will do pre-test to

measure their knowledge before getting intervention. On week 4 they will do the post test on the app to measure their newest knowledge and attitude.

Using the SPSS version 15 program, all data obtained from questionnaires in the application. The ordinal data were extracted and analysed using Wilcoxon test to determine the increase in knowledge and attitudes of prospective brides and grooms regarding anemia and CED before and after intervention. Data are considered significantly different if p value < 0.05.

### 3. Results and Discussion

This research was carried out at the Religious Affairs Office Bacukiki District, Parepare City. The respondent completed the intervention in one month. The Religious Affairs Office (KUA) is a place to provide education and outreach regarding applications related to anemia and CED to prospective bride and groom couples registered with the KUA. The following are the results of the distribution of characteristics of prospective bride and groom couples in the KUA Bacukiki District, Parepare City

**Table 1. Distribution of Characteristics of Prospective Bridal Couples Registered at the KUA, Bacukiki District, Parepare City in 2023**

Characteristic	n = 42	%
<b>Age</b>		
19-21	8	19,2
22-24	12	28,5
25-27	22	52,3
<b>Job</b>		
Not working	8	19,0
BUMN Employee	5	12,0
Private Sector Employee	20	47,6
Self-employed	8	19,0
Laborer	1	2,4
<b>Education</b>		
Primary School	5	11,9

Junior High School	4	9,5
Senior High School	14	33,3
Diploma	2	4,8
Bachelor	17	40,5
<b>Gender</b>		
Men	21	50
Women	21	50

Source : Primary Data, 2024

Table 1 according to age group, occupation, highest level of education and gender. Based on the research results, it shows that the highest age of prospective bride and groom couples is 25-27 years old, as many as 22 people (52.3%), while the minimum age of prospective bride and groom couples is aged 19-21 years, as many as 8 people (19.2%). Work also determines the fate of the prospective bride and groom's household. From the results of this research, it was found that the majority of work was carried out by the prospective bride and groom, namely private employees as many as 20 people (47.6%), prospective bride and groom couples who had not worked as many as 8 people (19.0%) , 5 BUMN employees (12.0%), 8 self-employed people (19.0%) and 1 worker/farmer (2.4%). Furthermore, the most recent education of prospective bride and groom couples is S1/D4 as many as 17 people (40.5%), D3 as many as 2 people (4.8%), high school as many as 14 people (33.3%), junior high school as many as 4 people (9, 5%) and elementary school as many as 5 people (11.9%). The research results showed that the number of prospective male and female brides who took part in this research each amounted to 21 people (50%).

Data on respondent characteristics according to age group, occupation, highest level of education and gender. Based on the research results, it shows that the highest age of prospective bride and groom couples is 25-27 years old, as many as 22 people (52.3%),

while the minimum age of prospective bride and groom couples is aged 19-21 years, as many as 8 people (19.2%). Work also determines the fate of the prospective bride and groom's household. From the results of this research, it was found that the majority of work was carried out by the prospective bride and groom, namely private employees as many as 20 people (47.6%), prospective bride and groom couples who had not worked as many as 8 people (19.0%) , 5 BUMN employees (12.0%), 8 self-employed people (19.0%) and 1 worker/farmer (2.4%). Furthermore, the most recent education of prospective bride and groom couples is S1/D4 as many as 17 people (40.5%), D3 as many as 2 people (4.8%), high school as many as 14 people (33.3%), junior high school as many as 4 people (9, 5%) and elementary school as many as 5 people (11.9%). The research results showed that the number of prospective male and female brides who took part in this research each amounted to 21 people (50%).

**Table 2. Prospective Bride and Groom Couple's Knowledge Level Regarding Anemia Using the SUN 4 Catin Application at KUA Bacukiki District, Parepare City in 2024**

Knowledge		Modul Application Sun 4 Catin		p-value
		n	%	
Pre-Test	Good	0	0.0	0,01
	Enough	24	42.9	
	Less	18	57.1	
Post-Test	Good	5	11.9	
	Enough	26	61.9	
	Less	11	26.2	

Source: Primary Data, 2024

Based on table 2 above, with a sample of 42 people, and using Wilcoxon test, it was found that there was an increase in the knowledge of prospective bride and groom couples before and after being given education with the Sun 4 Catin application module, namely for the good category there was none at the pretest while there was an increase to



5 people (11.9%). Furthermore, the sufficient category also experienced an increase in knowledge from 24 people (42.9%) at the pre-test to 26 people (61.9%) at the post-test. And for the underprivileged category, there was a decrease from 18 people (57.2%) down to 11 people (26.2%).

This research discusses increasing knowledge among prospective bride and groom couples (Catin) regarding anemia and CED by providing educational interventions through the SUN 4 Catin application. The results showed that there was an increase in catin's knowledge about anemia after using the application with a p-value of 0.011 ( $p < 0.05$ ). These results are in line with research by Rizki Septia, et al in 2020 which stated that there were significant differences in knowledge levels ( $p = 0.0001$ ) in each group. In the intervention group, the mean knowledge score increased from 64.29 to 76.10. This indicates that there is a significant difference in respondents' knowledge between before and after using the Aneminfo application (Saraswati et al., 2020).

Notoadmodjo states that knowledge is the result of knowing and this occurs after someone senses a particular object, which involves the five human senses. The more health information that is obtained, both directly and indirectly, will be able to expand the prospective bride and groom's knowledge. Good knowledge that a person has cannot confirm his attitudes or behavior, because knowledge also cannot confirm what kind of lifestyle that person lives. The knowledge possessed by the prospective bride and groom must be based on understanding so as to foster a positive attitude in efforts to prevent anemia (Notoatmodjo, 2010).

Education is a common predictor of anemia risk. A study conducted among educated Thai women showed 21% suffered from anemia, of which 85% were cases of IDA (Munira & Viwattanakulvanid, 2024). Factors that can cause anemia in women

include increasing age, lack of education or awareness, high parity, low socioeconomic status, and poor nutritional status. Improving literacy and diet will improve anemia, especially in developing countries (Shah et al., 2023)

Based on table 3 attitudes of prospective couples regarding anemia using the sun 4 catin application, the attitude category of respondents regarding anemia using the SUN 4 Catin application module is known to have increased, where the category supporting anemia prevention was 25 people (59.5%) at the pre-test, increasing to 35 people (83.3%) at the post -test. Meanwhile, those who did not support it decreased from 17 people (40.5%) at the pre-test down to 7 people (16.7%) at the post-test.

An attitude is said to be supportive if the respondent's score is  $>$  the mean of the scores of all respondents and is said to be unsupportive if the respondent's score is  $\leq$  the mean of the scores of all respondents. The mean result at the pre-test was 23.35 and the mean result at the post-test was 25.28.

Attitude is a reaction or response that is still closed from a person to a stimulus or object. The results of this research regarding prospective bride and groom's attitude regarding anemia showed an increase where the category supporting anemia prevention was 25 people (59.5%) at the pre-test, increasing to 35 people (83.3%) at the post-test. Meanwhile, those who did not support it decreased from 17 people (40.5%) at the pre-test down to 7 people (16.7%) at the post-test. The Wilcoxon test result is  $p= 0.004$  ( $<0.05$ ) which means there are differences in attitudes shown by the prospective bride and groom.

Based on table 4 prospective bride and groom couple's knowledge level regarding CED using the sun 4 catin application, with a sample of 42 people, it was found that there was an increase in the knowledge of prospective bride and groom couples before and after

being given education with the Sun 4 Catin application, namely for the good category there was none at the pretest while there was an increase to 7 people (16.7%). Furthermore, the sufficient category also experienced an increase in knowledge from 31 people (73.8%) at the pre-test to 27 people (64.3%) at the post-test. And for the underprivileged category, there was a decrease from 11 people (26.2%) down to 8 people (19.0%).

Based on table 5 attitudes of prospective bride and groom couples regarding CED using the sun 4 catin application, the attitude category of respondents regarding CED using the SUN 4 Catin application module is known to have increased, where the category supporting the reduction of CED was 30 people (71.4%) at the time of the pre-test and increased to 39 people (92.9%) at the time. post-test. Meanwhile, those who did not support it decreased from 12 people (28.8%) at the pre-test and fell to 3 people (7.1%) at the post-test.

Apart from that, the results of research related to respondents' attitudes regarding CED using the SUN 4 Catin application module are known to have increased, where the category supporting the reduction of CED was 30 people (71.4%) at the pre-test and increased to 39 people (92.9%) at the post-test. test. Meanwhile, those who did not support it decreased from 12 people (28.8%) at the pre-test and fell to 3 people (7.1%) at the post-test. The Wilcoxon test results show a p-value of 0.007 ( $<0.05$ ), which means there are differences in attitudes shown by the prospective bride and groom.

The results of the research above show that there has been an increase in respondents who support the prevention of anemia and CED, however, this increase is not very significant. This is in line with Firmansyah's research in 2020 which showed results where respondents who had positive and negative attitudes towards preventing

anemia were not much different. Efforts to prevent anemia in respondents who have a positive attitude are almost the same as respondents who have a negative attitude. This means that it is not necessarily a positive attitude that a person has that can realize good practice in this case, namely good prevention efforts (Firmansyah & Fazri, 2022).

This is in accordance with the opinion of Notoatmodjo who says that attitudes are not automatically realized in the form of practice. To make it a real action, supporting factors or enabling conditions are needed. Knowledge of the benefits of something will cause people to have a positive attitude towards that thing. Knowledge contains positive and negative aspects. If an activity is considered to have more positive aspects, then it is likely that someone will take part in that activity (Notoatmodjo, 2012).

Steps to increase knowledge of prospective bride and groom couples and attitudes to prevent anemia and CED can be done by providing education. Providing education can be done using print or electronic media. This research uses electronic media in the form of the SUN 4 Catin application. Based on the results of research on respondents' knowledge and attitudes, it can be judged that this application is quite successful. This is in line with research conducted by Rizki in 2020 which shows that the Aneminfo Android application can be said to be quite effective in increasing the knowledge of respondents in the intervention group. (Saraswati et al., 2020). Apart from that, research conducted by Perdana, et al., in 2017 showed that providing nutrition education through an Android application was able to increase the level of better nutritional attitudes among respondents. (Perdana et al., 2017).

#### **4. Conclusion**

The SUN 4 Catin application can be a quite effective tool in providing education to prospective bride and groom couples regarding anemia and CED as an effort to increase

knowledge and attitudes of prospective bride and groom couples and remind them to prevent anemia and CED. Android applications can be an alternative media that can be used as a means of health education. Suggestions that can be made for future researchers are to compare respondents who use the SUN 4 Catin application and those who use e-poster as control group.

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