

IS A WEBSITE MORE EFFECTIVE THAN WHATSAPP? AN EXPERIMENTAL STUDY TO INCREASE ADOLESCENT KNOWLEDGE AND PERCEPTION ABOUT ANEMIA

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Abstract

Adolescent anemia is a global health problem. The ability of adolescents to prevent and treat anemia is directly related to the knowledge and attitudes they possess. This was to determine the effectiveness of education using websites and WhatsApp to increase the knowledge and attitudes of adolescents regarding anemia. This was a quasi-experimental study with a pretest-posttest with control group design. The research was conducted in March and April 2023 in Yogyakarta, Indonesia. The intervention was a website and WhatsApp education, while the outcome were knowledge and attitude measured at baseline and end line. The study sample was 61 experimental group student and 44 control groups determined by multistage sampling. The data were analyzed using Wilcoxon and Mann-Whitney tests using SPSS. The results showed that knowledge and attitude of adolescents both in the website and WhatsApp groups increased; knowledge scores in the website group baseline and end line were 90.87 and 95.4, respectively, with a change of 5,1%. While in the WhatsApp group, there were 85.6 and 94.8, with a change of 10.7%. The average pre-test and post-test attitude scores in the website group were 63.8 and 69.3 with a change of 8.6%, while in the WhatsApp group they were 83.3 and 89.1 with a change of 40.6%. The results showed that the increase in knowledge and attitudes in the WhatsApp group was significant: 1.02 (1.00–1.84) and 1.07 (91.01-0.96), respectively. As a conclusion, WhatsApp is more effective in increasing knowledge and attitude compared to website education.

Keywords: Website, WhatsApp, Knowledge, Attitudes, Anemia

1. INTRODUCTION

Iron deficiency is the most current study from the Global Burden of children and adolescents[1], it was discovered that anemia is the top ten global leading causes of disability-adjusted life years. According to WHO, anemia affects around 40% of children between the ages of 6 and 59 months, 37% of pregnant women, and 30% of women between the ages of 15 and 49 years[2]. The prevalence of

female adolescent anemia between the ages of 15 and 24 years old was measured in surveys conducted in Indonesia in 2013 and 2018, and the results showed a rise from 18.4% in 2013 [3] to 32% in 2018[4]. In Yogyakarta, the prevalence of female adolescent anemia actually increased from 37.1% in 2013[3] to 48.9% in 2018[4], with the largest proportion of anemia in the group of 15-24 years and 25-34 years. Based on a survey in 2016 targeting 1500 female adolescent in 5 regencies and cities conducted by the Yogyakarta Health Office, it showed that as many as 19.3% of them have anemia[5].

Iron is an essential trace mineral that is necessary for the brain development and function[6]. The most prevalent cause of anemia is inadequate of iron and protein consumption, as well as deficiency folate, vitamin B12, vitamin A, vitamins B6, C, D, E, riboflavin, copper, and zinc [7]–[9]. Anemia is caused indirectly by environmental enteric dysfunction (EED), small intestine problem that lead to malabsorption, viral illnesses, inflammation, and all risk factors may lead to decrease iron absorption or increased nutrient losses[10][11]. Severe monthly bleeding of adolescent and women childbearing also contribute the primary risk factors anemia[7] [12]–[14]. According to the previous finding, anemia also caused by lack of adolescent knowledge, perception, and awareness [14], [15]. In addition, how adolescents feel about having anemia is a crucial component to consider when formulating an intervention strategy[16].

Anemia has a complicated set of causes and causes, which is characterized by a lower capacity to transport oxygen, include fatigue, a reduction in strength, and as well as a lessened physical capacity [17][18]. This may have an impact on one's cognitive processes academic performance, early disability-adjusted life years[19], effect on a person's quality of life as a whole, as well as associated with a lower overall quality of life in adolescents[12], interfering with reproduction even increases the risk of maternal morbidity and mortality[20]. Cohort studies showed that anemia in adolescence may continue to anemia during pregnancy[21] with the impact of poor pregnancy outcomes such as Intra Uterine Growth retardation (IUGR), low birthweight, stunting, and anemic babies [22], [23].

Eliminating anemia is essential for enhancing women and children health, as well as for bettering academic achievement, workplace productivity, safer pregnancy outcomes, and intergenerational benefits for improved health, economic growth, and development[15]. Education is strategy to prevent and tackle early anemia[21], in general adolescents have the potential for good brain development and need to be continuously stimulated[24] and the prospect of longer implementation for themselves, their family, and the environment. The previous results proven that the response of knowledge and attitudes of adolescents after being given educational interventions was good, such as research in Jordan[25], Indonesia[26], Malaysia[26], and many countries[26]. Currently almost all adolescents have used android, even they are the biggest android users in Indonesia. It is crucial to utilize android as a social media platform in order to make substantial progress in enhancing the efficacy and effectiveness of intervention education[27]. For this reason, this study aims to improve the knowledge and attitudes of adolescents through social media website and WhatsApp, and find out the difference in effectiveness.

2. MATERIALS AND METHODS

2.1 Study Design and Intervention

This research was a quasi-experimental study with a pretest-posttest with control group design. Intervention was education with website and WhatsApp media for 3 days, including material about understanding, symptoms and signs, impact, causes, and prevention of anemia. Knowledge and attitudes were assessed on days 1 and 5. Participants must obtain the shared materials while the researchers delivered a 60-minute presentation and PowerPoint slide three times during intervention. Before being used or implemented, website and WhatsApp media are assessed for

usability by multi-testing using the PSSUQ[28], and the result was usable (value 2.1). The intervention diagram depicted in Fig 1.

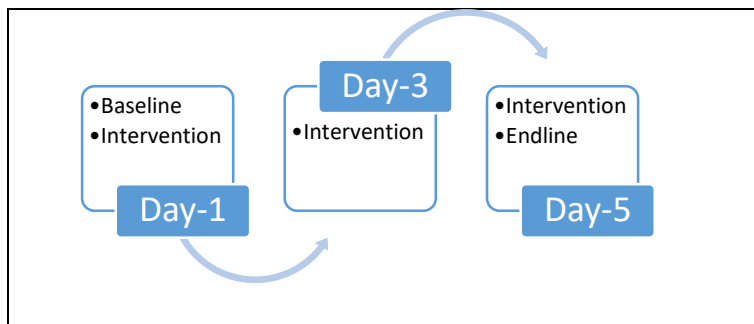


Fig 1: Study procedure

2.2 Study outcome and instrument

The outcomes measured are knowledge and attitudes observed at baseline and endline using structured questionnaires. Knowledge was asked in multiple choice with 4 choices as many as 15 questions with a value of 1 for correct answers and 0 for wrong answers, while attitudes were collected with a Likert scale of 15 favorable and non-favorable statements with a range of values strongly disagree to strongly agree. Both the value of knowledge and attitude are weighted so that the maximum value is 100. The questionnaire has been tested for validity and reliability with valid and reliable results.

2.3 Population and sample

The subjects of this study were students of high schools in Yogyakarta City. The number of subject was determined by the Lemeshow formula[28] with references previous study about nutrition education using media among elementary school in East Java[29] so that the minimum sample number of each group was 41 people. This study involved 105 female adolescents. The selected school was a high school in the Gondokusuman sub-district area of Yogyakarta as the highest anemia prevalence in Yogyakarta City. Senior High School of Stella Duce 2 is an educational intervention group using website and Bopkri is a group with WhatsApp intervention. The inclusion criteria are having a cellphone and or lap top, willing to be a respondent, and the data was complete. Data was collected in March-April 2023 with data collection and intervention settings during school hours.

2.4 Ethical consideration

This research has approved by IRB Health Polytechnic of the Ministry of Health Yogyakarta No.DP.04.03/e-KEPK.1/055/2023 on February 9, 2023. Participants are a people who capable to expressed their approval to become participants by signed informed consent.

3. RESULTS

3.1 Subject characteristic

All of subject were female, 15-17 age years old, living in urban areas and student at level A accreditation of senior high school in Yogyakarta city, Indonesia. Subject were recruited as detail depicted in Fig 2.

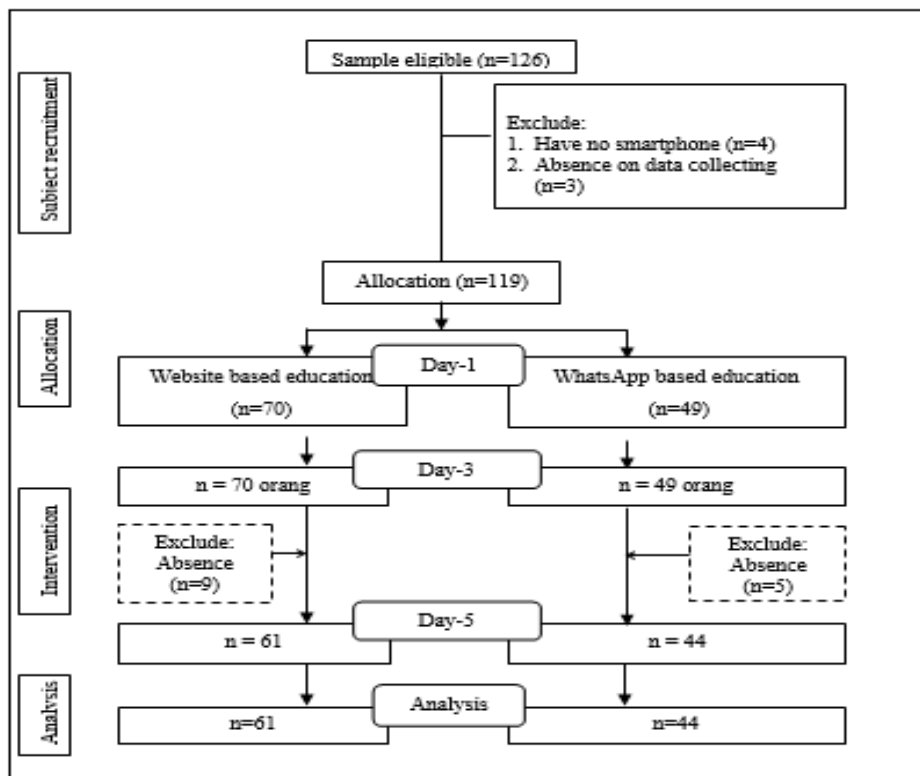


Fig 2: CONSORT study diagram

3.2 The Effect of Intervention on Adolescents Outcome

We analyzed changes in adolescent knowledge after educational interventions with website and WhatsApp media. Both groups experienced increased knowledge after receiving education, but overall the increase in knowledge in the intervention group with WhatsApp media was higher than websites. In detail in Figure 3 and 4.

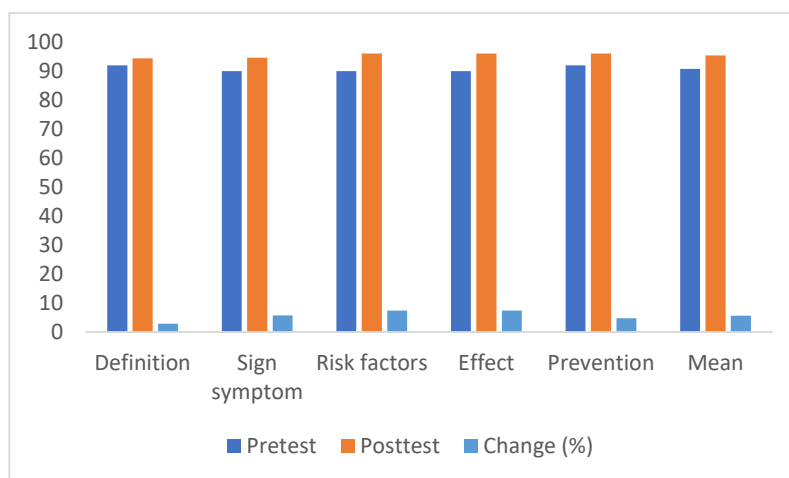


Fig 3: Adolescent knowledge at baseline and endline in website group

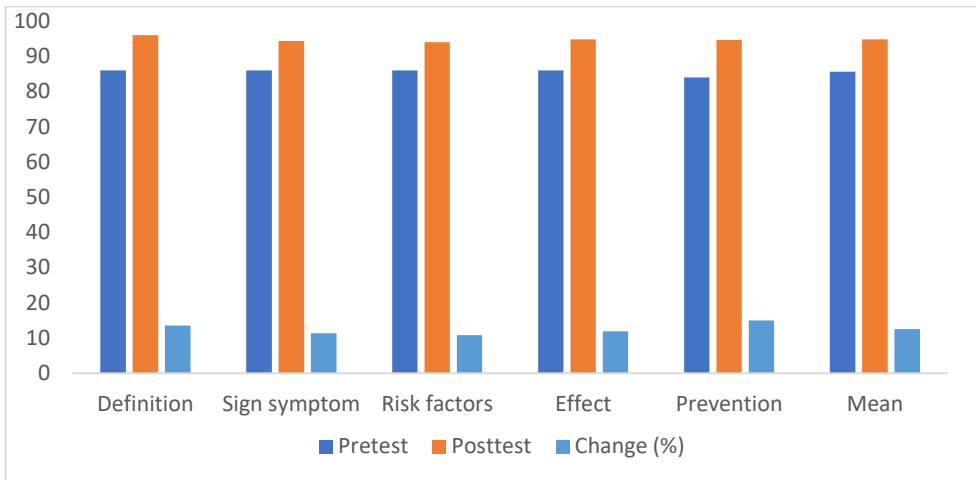


Fig 4: Adolescent knowledge at baseline and endline in WhatsApp group

Both groups showed an improvement in their attitudes after receiving instruction, although the intervention group that used WhatsApp's media showed a greater overall increase in knowledge than the group that used the website. In detail in Figure 5-6.

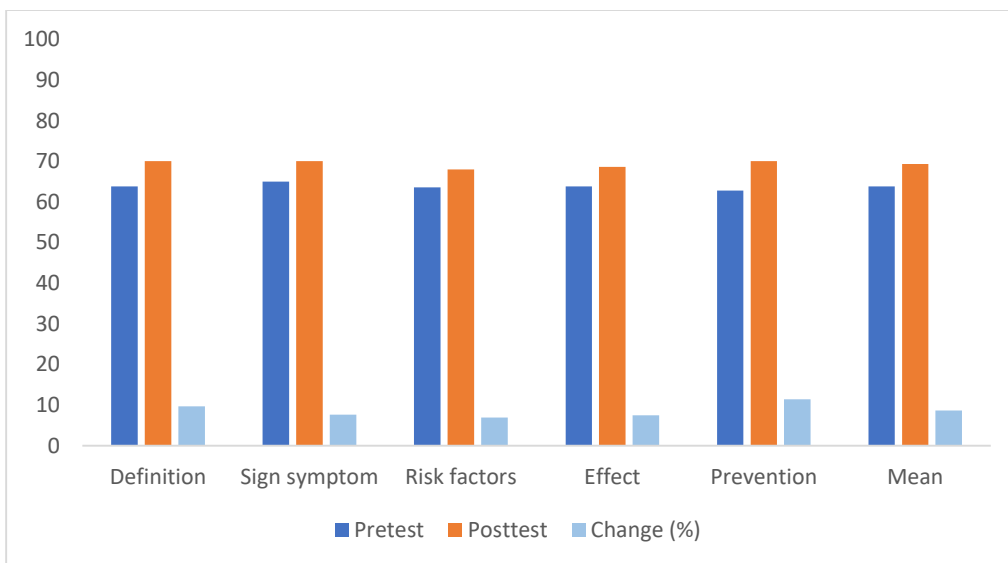


Fig 5: Adolescent attitude at baseline and endline in website group

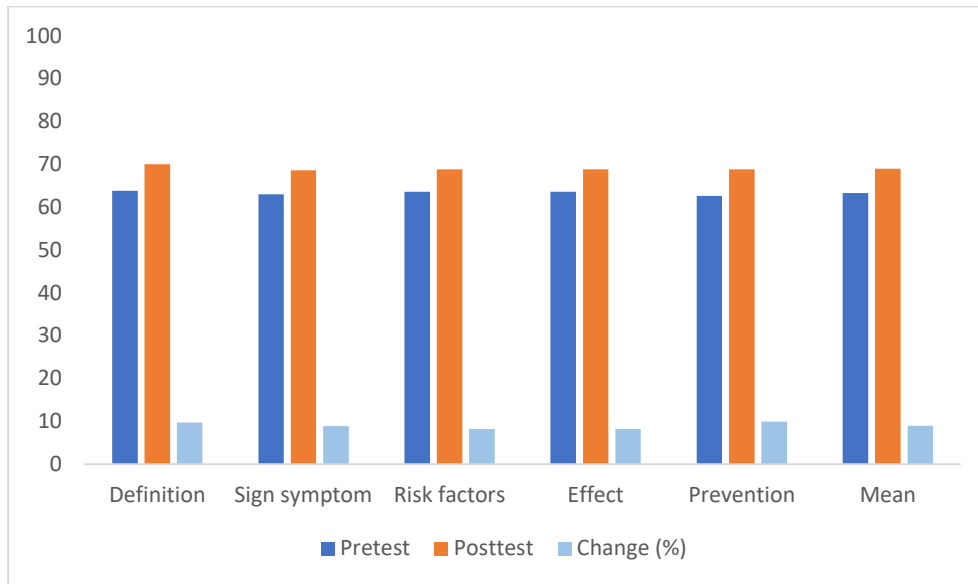


Fig 6: Adolescent attitude at baseline and endline in WhatsApp group

Then we compare the difference of adolescent knowledge and skill or percent change baseline and endline, this demonstrates that WhatsApp has a more successful media platform than the Website group. In detail in Figure 7.

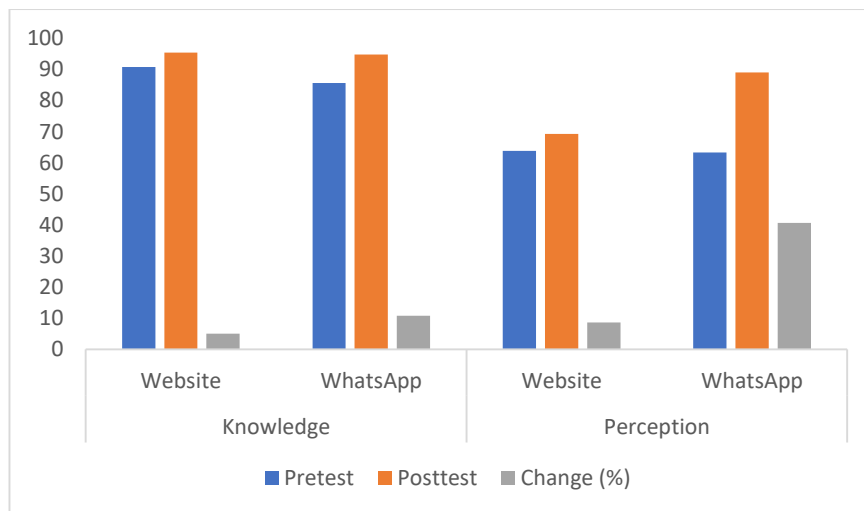


Fig 7: Changes in knowledge and attitudes of adolescents after education with websites and WhatsApp

3.3 The effect of anemia education intervention on adolescent knowledge and attitude among different time

The analysis presented in Table 1 revealed the relationship between intervention group and time. On baseline measurements, there were no significant differences between treatments; however, there were significant differences in adolescents' knowledge and attitudes on endline measurements.

Table 1: Association between Intervention and Research Outcome among Different Times

Variables	Website	WhatsApp	Mean difference (95%CI)
Baseline			
Knowledge	90.8±6.7	85.6±10.7	1.11 (0.77-1.28)
Attitude	63.8±4.8	63.3±4.8	1.02 (0.98-1.74)
Endline			
Knowledge	95.4±4.5	94.8±5.4	1.02 (1.00-1.84)*
Attitude	69.3±5.3	89.0±5.1	1.07 (1.01-1.96)*

*p<0,05

The analysis in Table 2, reveals that the WhatsApp grup intervention had a significant influence on knowledge and attitude adolescent, and statistically significant.

Table 2: The Effect of Anemia Education Intervention on Adolescent Knowledge and Perception Among Different Group

Variables	Baseline	Endline	Change (%)	Endline vs Baseline (95%CI)
Website				
Knowledge	90.8±6.7	95.4±4.5	5.1	1.03 (0.74-1.56)
perception	63.8±4.8	69.3±5.3	8.6	1.12 (0.99-1.94)
WhatsApp				
Knowledge	85.6±10.7	94.8±5.4	10.7	2.02 (1.89-2.74)*
perception	63.3±4.8	89.0±5.1	40.6	3.37 (2.82-4.56)*

*p<0.05

4. DISCUSSION

Participants in this study are high school students who are still in the developmental stages of growth and consolidation[30]. Education, including valuable health literacy to adolescent is strategy to fulfill their right to gain health knowledge and good practices[31]. Hence, anemia in adolescence has a serious impact such as disrupting their growth, development, intelligence, and productivity. Anemia also have continuing impact on the health status in the subsequent phase of life, which is the preconception stage to pregnancy[32]. Previous study stated that low hemoglobin levels during pregnancy would also threaten the health of neonates[22]. The infants of mothers with low hemoglobin levels have an increased risk of premature birth, low birth weight, and death[21][33]. Therefore, early education about anemia for female adolescents was necessary to prevent poor birth outcomes.

At the onset of the study, the adolescents' knowledge and attitudes were equivalent or comparable, so we estimated that the change in adolescents' knowledge and attitudes after treatment was due to the intervention. During the course of the investigation, adolescents did not have access to any information other than that provided by the researcher. The results indicated that adolescents' knowledge and attitudes increased after receiving interventions. This finding also showed that adolescents' knowledge and attitudes on WhatsApp group was higher and increased significant than website base intervention. It is possible to explain that firstly, WhatsApp has been more well-known and simpler to use than websites, and the secondly, the amount of memory storage required by WhatsApp media is less, which is why users tend to store it[34], thirdly, the majority of Android users

are using WhatsApp as social media, amounted to 41%[35]. So that this encourages the sustainability of WhatsApp intervention education use longer.

The cell phone has emerged as the most popular method of communication, particularly among younger generations, and a significant number of population used in for education, communication, work, and recreation[34]. According to the Central Statistics Agency, 67.88% of Indonesians aged 5 and older owned a mobile phone in 2022, and this number tends to increase from year to year[36]. In additional, other surveys showed that the majority of the time spent on a smartphone is devoted to communication, instant messaging (90.7%), and social networks (88.8%) [35]. This finding confirmed WhatsApp's impact on f efficient education intervention on Oman higher education[37], medical education especially for digital-pathology, radiology, and cardiology[38], education for maternal pregnancy[39], and maternal and newborn health[40]. In addition, the findings of this study have implications for school program policy makers to support the future optimization of the use of WhatsApp as an educational media to increase health and adolescent's welfare.

5. CONCLUSIONS

After nutrition education, there is an increase in the knowledge and attitudes of adolescent regarding the prevention of anemia. Website and WhatsApp media are equally effective in enhancing adolescent attitudes toward the prevention of anemia. However, WhatsApp media is more effective than website to increase knowledge about the prevention of anemia. In this study, both website and WhatsApp media can be combined with other educational tool to increase adolescents' knowledge and attitudes regarding health.

Acknowledgment

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Conflict of Interest

We declare that there is no potential for a conflict of interest.

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