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Prevention of Early Marriage and Stunting through the CARE Program for Adolescents in Raja Ampat, Southwest Papua

Nahdiyah Karimah[1]*, Entan Afriannisyah[2]

[1]Midwifery Department, Vocational School, Universitas Sebelas Maret, Surakarta, Indonesia
[2]Midwifery Professional Education Program, STIKes Sapta Bakti, Bengkulu, Indonesia

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Abstract In 2023, Southwest Papua reported a stunting prevalence of 31%. Raja Ampat was identified as the district with the highest contribution to stunting cases in the region. Early marriage accounted for 55% of these cases. This community service initiative aimed to prevent early marriage and stunting through the Comprehend, Ask, Respond, Evaluate (CARE) program for adolescents in Raja Ampat, Southwest Papua. The program involved all 51 third-year students at SMKN 2 Raja Ampat (Vocational High School 2 Raja Ampat). Participants' knowledge and attitudes regarding early marriage and stunting were measured before and after the intervention using two instruments: an 18-item questionnaire on knowledge of early marriage and stunting and a 20-item questionnaire assessing attitudes toward early marriage. Univariate analysis was conducted to describe participant characteristics, knowledge levels, and attitudes. Bivariate analysis using the Wilcoxon signed-rank test was performed to assess changes in knowledge and attitudes. Data were analyzed using SPSS version 22. The results showed that participants' knowledge improved significantly after the intervention, with low knowledge decreasing from 90.2% at pretest and 58.8% of participants demonstrating excellent knowledge at posttest (p = 0.0001). Participants' attitudes also changed significantly, from predominantly supporting early marriage at pretest (66.7%) to rejecting it after the intervention (88.2%) (p = 0.0001). These findings indicate that the CARE program improved adolescents' awareness of, and critical attitudes toward, early marriage, adolescent pregnancy, and stunting in a geographically isolated area. However, this evaluation measured only short-term outcomes immediately after the intervention, was conducted in a single school, and did not assess long-term behavioral changes. Overall, the CARE program demonstrates the potential of participatory school-based health education as a community engagement strategy for preventing early marriage and reducing future stunting risks in remote areas such as Raja Ampat.

1. INTRODUCTION

Nutritional status in children under five years of age, specifically those aged 0 to 59 months, is a key indicator of overall child health. Nutritional status can be assessed using anthropometric measurements, such as body length (Sholihah et al., 2024). In infants and young children, body length is measured while the child lies on a specialized examination table. The result is then compared with the child's age using the World Health Organization (WHO) growth standards. The length-for-age (L/A) index can detect chronic nutritional problems, including stunting. Stunting refers to a condition in which a child's L/A is more than 2 standard deviations below the median of the WHO growth standards (FAO et al., 2023).

Although Indonesia's national stunting rate among children under five declined slightly from 21.6% in 2022 to 21.5% in 2023, this change remained minimal. In 2023,

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*Corresponding author: Nahdiyah Karimah
Midwifery Department, Vocational School, Universitas Sebelas Maret, Ir. Sutami Street Number 36, Kentingan, Jebres, Surakarta, Indonesia, 57126
Email: nahdiyahkarimah@staff.uns.ac.id

Papua Island recorded the highest stunting prevalence, with three provinces contributing the most: Central Papua (39.4%), Highland Papua (37.3%), and Southwest Papua (31%). As Indonesia's easternmost region, Papua Island faces challenges such as limited access to and quality of healthcare services, along with low public awareness of healthy living practices Kemenkes RI (2024).

Stunting has severe effects on children, including reduced cognitive ability and delayed motor development. Stunting also contributes to 419.84 disability-adjusted life years (DALYs) per 1,000 children. In addition, it imposes a substantial economic burden on the country, with approximately 975.68 billion rupiah spent annually to address stunting and wasting (Trujillo et al., 2024). One of the leading causes of stunting in young children is adolescent pregnancy, which often results from early marriage (Pangaribuan et al., 2020). Pregnant adolescents are 1.25 times more likely to give birth to children who will experience stunting later in life (Syah et al., 2020).

Southwest Papua, one of the main contributors to stunting on Papua Island, became an official province in 2022 through Law No. 29 of 2022, after previously being part of West Papua. In 2022, 4.5% of adolescent girls in West Papua married before the age of 15, making it one of Indonesia's provinces with the highest early marriage rates. In addition, 44 of every 1,000 girls aged 15 to 19 years had experienced pregnancy. Early marriage contributed to 55% of stunting cases in West Papua. Within Southwest Papua, Raja Ampat Regency recorded a high stunting rate of 31.1% in 2022, which was the same as the rate reported in 2021 (Dinkes Papua Barat, 2023).

Raja Ampat, internationally renowned for its extraordinary natural beauty, is one of Indonesia's premier tourist destinations. However, behind this considerable tourism potential lies a serious public health challenge. The lack of adequate healthcare infrastructure remains one of the region's most pressing issues. Health centers and medical personnel remain limited, particularly on smaller islands far from the regency capital. Access to health services is also difficult because of weather-dependent inter-island transportation and inadequate infrastructure. These conditions pose challenges to the implementation of preventive efforts, such as broad health education and awareness campaigns about the dangers of early marriage, which may lead to adolescent pregnancy and, subsequently, a higher risk of childhood stunting (Dinkes Papua Barat, 2023).

The Raja Ampat District Government has undertaken several initiatives to address early marriage and adolescent pregnancy. These include education and outreach campaigns conducted by the health department and relevant agencies, efforts to encourage adolescents to pursue higher education as a way to delay marriage, involvement of religious and community leaders, and provision of youth counseling services at health centers. However, these efforts have not yet significantly reduced early marriage and adolescent pregnancy rates in Raja Ampat (Dinkes Papua Barat, 2023).

Although the Raja Ampat District Government has implemented educational and counseling programs related to early marriage prevention, these efforts have not significantly reduced early marriage and adolescent pregnancy rates. Limited health infrastructure, geographical barriers, and the absence of participatory educational approaches may contribute to adolescents' limited knowledge and permissive attitudes toward early marriage. In addition, most previous programs have not specifically integrated education on early marriage, adolescent pregnancy, and stunting prevention within an interactive learning approach tailored to adolescents in remote areas. Therefore, the CARE (Comprehend, Ask, Respond, and Evaluate) program was developed as a participatory educational approach combining lectures, videos, discussions, question-and-answer sessions, and interactive quizzes to improve adolescents' knowledge and attitudes regarding early marriage and stunting prevention in Raja Ampat.

Comprehensive knowledge of the consequences of early marriage has been shown to increase adolescents' awareness of the associated risks (Bagi, 2025). Adolescents with adequate understanding are 0.51 times more likely to reject early marriage than those with limited knowledge (Gustina et al., 2024). Educational programs using PowerPoint presentations, videos featuring real-life examples, and question-and-answer (Q&A) sessions have effectively improved adolescents' knowledge (Eghbal et al., 2023). Another method shown to improve understanding of early marriage and its indirect relationship with stunting is the use of interactive quizzes (Deswinda et al., 2020).

These methods were integrated into the CARE (Comprehend, Ask, Respond, and Evaluate) program. The Comprehend component involves the delivery of in-depth education on the effects of early marriage; the Ask component refers to a question session; Respond involves answering participants' questions; and Evaluate consists of an interactive quiz to assess comprehension. The CARE program adopts an educational and participatory approach aimed at improving adolescents' knowledge and attitudes.

Therefore, this community service project aimed to prevent early marriage and stunting among adolescents in Raja Ampat, Southwest Papua, through implementation of the CARE program..

2. METHOD

This community service project was conducted at SMKN 2 Raja Ampat (Vocational High School 2 Raja Ampat) in Southwest Papua on January 24, 2023. The participants included all 51 third-year students enrolled at the school.

The activity implemented the CARE program. The sequence began with a pretest to measure students' knowledge and attitudes toward early marriage. During the Comprehend phase, facilitators delivered educational material through PowerPoint presentations, videos, and real-life examples. The topics included adolescent development, early marriage, adolescent pregnancy, stunting, and future planning. The Ask and Respond

sessions allowed participants to discuss the material and receive clarification. The program concluded with an interactive quiz and a posttest to evaluate changes in participants' knowledge and attitudes.

The facilitators used a validated questionnaire adapted from Gustina et al. (2024) to measure knowledge regarding early marriage and stunting. Before implementation, the questionnaire was reviewed and re-evaluated by the research team to ensure that the language, terminology, and examples were understandable and culturally appropriate for adolescents in Raja Ampat. Minor linguistic adjustments were made to simplify several statements without changing the original meaning of the items. The revised questionnaire was then discussed with local teachers to ensure contextual suitability for the participants. The questionnaire contained 18 multiple-choice items covering the definition, causes, and consequences of early marriage, as well as the risks of adolescent pregnancy, including stunting. Each item included one correct option and three incorrect options. Correct answers were scored as 1, and incorrect answers were scored as 0. The total score ranged from 0 to 18 and was categorized as follows: low knowledge, 0 to 9; moderate knowledge, 10 to 13; and high knowledge, 14 to 18.

Attitudes toward early marriage were measured using a 20-item attitude questionnaire. Each item was rated on a 5-point Likert scale, as follows: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree. The Likert scale was used to capture varying levels of agreement and disagreement toward early marriage rather than binary responses only. However, for descriptive presentation, the final scores were grouped into broader categories to simplify interpretation of the findings. The researchers acknowledged that adolescents' attitudes toward early marriage may be influenced by family expectations, cultural values, and social norms, which may not be fully captured through quantitative questionnaires alone. The total score ranged from 20 to 100 and was categorized into two groups: agree, score < 59; and disagree, score > 60.

In addition to measuring pretest and posttest scores, the implementation process included observations of participant engagement during discussions, question-and-answer sessions, and interactive quizzes. Participants who actively engaged in the activities appeared more confident in expressing disagreement toward early marriage during the posttest evaluation. Nevertheless, this study did not specifically analyze the statistical relationship between participant engagement and attitude change, which should be explored in future studies using mixed-method or qualitative approaches to better understand adolescents' genuine perspectives and cultural considerations regarding early marriage.

The study also collected sociodemographic data, including age, gender, parental education, and family income. Univariate analysis was conducted to describe respondent characteristics. Age was analyzed descriptively using the mean, minimum, and maximum values. Gender, parental education, family income, knowledge levels, and attitudes were analyzed using frequency distributions, including frequencies and percentages. To assess changes in knowledge and attitudes toward early marriage, bivariate analysis was performed using the Wilcoxon signed-rank test in SPSS version 22.

This community service activity used a one-group pretest and posttest design without a control or comparison group. Therefore, the findings should be interpreted as changes observed after the intervention rather than definitive causal effects of the CARE program. In addition, the posttest evaluation was conducted immediately after the intervention, meaning that the study assessed only short-term changes in participants' knowledge and attitudes. The long-term sustainability of attitude or behavioral changes related to early marriage was not evaluated in this activity.

3. RESULT AND DISCUSSION

This community service project consisted of three phases: preparation, implementation, and evaluation. During the preparation phase, the project team obtained official permission from the Raja Ampat Regency Government. After receiving authorization from the Regent of Raja Ampat, the team secured approval from SMKN 2 Raja Ampat (Vocational High School 2 Raja Ampat). The team then conducted a site survey at the project location, SMKN 2 Raja Ampat, Southwest Papua. The team also prepared the necessary materials and equipment, including a laptop, banner, stationery, PowerPoint slides containing educational content, an educational video on early marriage, printed sociodemographic data forms, validated questionnaires on knowledge and attitudes toward early marriage, and prizes.

Figure 1 . Community service implementation

As a showed on Figure 1, all third-year students at SMKN 2 Raja Ampat gathered in the school hall. The project team opened the event by introducing themselves and explaining the purpose of the activity. The team distributed pens and questionnaires and asked all participants to complete the sociodemographic data form and the pretest questionnaire assessing knowledge and attitudes toward early marriage. The team then implemented the CARE program as follows.

3.1 Comprehend

The team delivered educational material through a lecture using PowerPoint slides and an accompanying video, supported by real-life examples. The topics included adolescent physical and psychological development; definitions of early marriage and adolescent pregnancy; consequences of early marriage and adolescent pregnancy; the relationship between adolescent pregnancy and stunting; the effects of stunting on health and the economy; and motivation to focus on the future and pursue personal goals.

3.2 Ask

All participants had the opportunity to ask questions about the material. This session generated enthusiastic engagement, as reflected in the number of questions participants asked the team.

3.3 Respond

The team answered participants' questions clearly and comprehensively using simple and understandable language.

3.4 Evaluate

The team conducted a relaxed and enjoyable evaluation through an interactive quiz. A team representative read each question aloud, and participants wrote their answers on individual sheets of paper and held them up for the team to see. Participants who answered correctly and quickly advanced to the next round until a winner was determined. At the end of the session, all participants completed the posttest questionnaire on knowledge and attitudes toward early marriage to evaluate changes after the program.

The data from this community service activity are presented in tables and pie charts. Respondents' age characteristics were analyzed descriptively, including the mean, minimum, and maximum values. Data on gender, parental education, and family income were analyzed using frequency distributions and are reported as frequencies and percentages.

Table 1 shows that the average age of the participants was 17 years. Most respondents were male (56.9%). Most participants had fathers whose highest level of education was elementary school (28.6%) and mothers whose highest level of education was also elementary school (44.0%). A large proportion of participants came from low-income families (74.5%).

The percentages of participants' knowledge and attitudes regarding early marriage are presented in the following pie charts.

Figure 2 shows that, during the pretest, most participants had a low level of knowledge about early marriage (90.2%). However, after the community service activity, as measured in the posttest, most participants demonstrated an excellent level of knowledge (58.8%).

Figure 3 indicates that, before the intervention, as measured in the pretest, most participants agreed with early marriage (66.7%). After the intervention, as measured in the posttest, most participants disagreed with early marriage (88.2%).

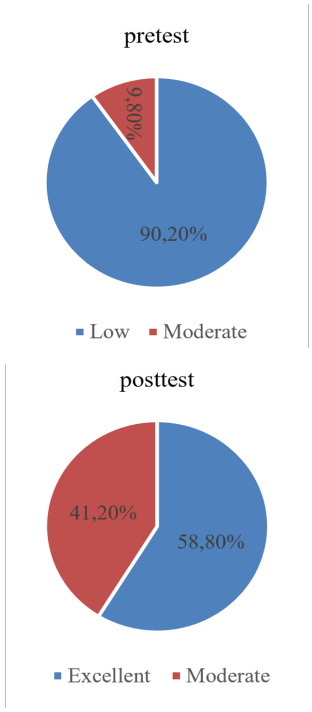

Figure 2 . Participants' level of knowledge about early marriage

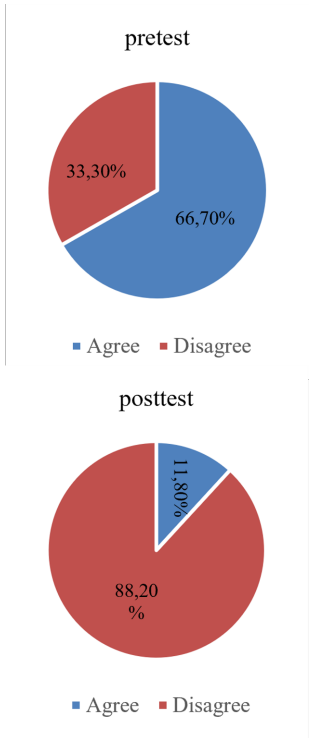

Figure 3 . Participants' attitudes toward early marriage

Table 2 shows a significant difference between pretest and posttest scores for both knowledge and attitude variables. For knowledge, the mean rank was 24.5, the Z value was -6.25, and the significance level was $p = 0.0001$ ($p < 0.05$), indicating a statistically significant increase in knowledge after the intervention. Similarly, for attitude, the mean rank was 14.5, the Z value was -5.29, and the p value was 0.0001 ($p < 0.05$), indicating a significant change in attitude. These results show that the program was

Table 1 . Participant characteristics

Characteristics	Category	Frequency	Percentage (%)
Age (N = 51)	Mean		17
	Min-Max		17-20
Gender (N = 51)	Male	29	56.9
	Female	22	43.1
Father's education (N = 49)	Not completed elementary school	7	14.3
	Elementary school	14	28.6
	Junior high school	6	12.2
	Senior high school	12	24.5
	University	10	20.4
Mother's education (N = 50)	Not completed elementary school	8	16
	Elementary school	22	44
	Junior high school	9	18
	Senior high school	6	12
	University	5	10
Family income (N = 51)	Low-income (Rp 2.500.000-4.000.000)	38	74.5
	Prosperous (>Rp 4.000.000)	13	25.5

Table 2 . Changes in knowledge and attitudes from pretest to posttest regarding early marriage

Variable	N	Mean Rank	Z	P Value
Knowledge	51	24.5	-6.25	0.0001a
Attitude	51	14.5	-5.29	0.0001a

associated with statistically significant improvements in participants' knowledge and attitudes.

During the evaluation phase, the entire project team conducted a structured, process-based evaluation after returning to Java. The structured evaluation focused on the condition of supporting infrastructure, such as the availability of training spaces, technological equipment, and access to learning resources. The results showed that, although basic facilities were available, improvements were still needed, particularly in digital equipment and internet connectivity.

The process evaluation reviewed the implementation of the CARE program, with attention to the execution of activities, participant engagement, and participants' responses to both the material and the methods used. Overall, the implementation process ran smoothly, with high student participation and positive enthusiasm. However, the team identified a need to better tailor the educational approach to the local context and learner characteristics.

Marriage in Indonesia is governed by marital regulations that permit individuals, both male and female, to marry only after reaching at least 19 years of age. Any marriage that occurs below this legal minimum age is considered child marriage. Child marriage refers to the union of individuals under the age of 19 years (UU Nomor 16 , Tahun 2019) tentang Perubahan atas Undang-Undang Nomor 1 Tahun 1974 tentang Perkawinan (Law No. 16 of 2019 Amending Law No. 1 of 1974 on Marriage). The average age of respondents in this community service activity was 17 years. In Raja Ampat, this age is considered highly vulnerable to early marriage. Previous research has indicated that education on early marriage should be provided to adolescents beginning at the age of 17 years, as they are in a transitional stage toward adulthood and are beginning to face major life choices, including marriage (Sainun et al., 2024). Providing accurate education at this age helps adolescents understand the risks and consequences of early marriage in relation to health, education, psychological well-being, and economic impact. This education also plays a critical role in fostering responsible attitudes among adolescents (Gundi & Dayal, 2024).

Most participants in this activity had parents whose highest level of education was elementary school. Previous studies have indicated that lower levels of educational attainment are significantly associated with an increased risk of early marriage. Individuals who completed only elementary school or its equivalent have been reported to be 448.93 times more likely to experience early marriage. This trend is largely attributed to limited parental capacity to explain the health, social, psychological, and economic risks associated with child marriage. In other words, parents with only an elementary-level education are more likely to permit their children to marry at a young age (Fitria et al., 2024).

The participants in this program generally came from low-income families. Low household income is recognized as one of the contributing factors to child marriage. Previous research has confirmed a statistically significant

correlation between low family income and early marriage practices (p = 0.036). In such circumstances, parents may pressure their children to marry at an early age as a strategy to reduce the family's financial burden, including costs related to schooling, daily allowances, and other needs (Tahir et al., 2020).

In Raja Ampat and several other regions in Papua, early marriage practices may also be influenced by structural and sociocultural factors, including customary values, gender norms, family expectations, and the influence of religious or community leaders. In certain communities, marriage at a young age may still be perceived as socially acceptable or even as a coping strategy to alleviate household economic pressures. These conditions can shape adolescents' attitudes toward early marriage and may influence the effectiveness of educational interventions.

Although the CARE program was followed by improvements in participants' knowledge and attitudes, this community service initiative did not specifically examine the deeper influence of cultural and structural factors on adolescents' decisions regarding early marriage. Therefore, future programs should involve parents, traditional leaders, religious leaders, and local communities to develop more culturally sensitive and sustainable strategies for preventing early marriage in remote areas such as Raja Ampat.

After the community service program, most participants demonstrated improved knowledge about early marriage, representing a notable change from the previous condition, in which low knowledge levels predominated. Initially, most participants supported early marriage; however, after the intervention, the majority expressed opposition to early marriage. This outcome indicates that the CARE program may contribute to improvements in both knowledge and attitudes. These findings align with previous research showing that adolescents with higher levels of knowledge are 0.51 times more likely to reject early marriage than those with limited knowledge (Gustina et al., 2024). Educated adolescents tend to recognize the negative consequences of early marriage across multiple domains, including health, education, psychological well-being, and economic outcomes. Well-informed adolescents are therefore more likely to think rationally and make informed decisions regarding early marriage (Naghizadeh et al., 2021).

The CARE program included an interactive quiz on early marriage, which enabled participants to test and reinforce their understanding in real time and helped make the information more memorable. Moreover, the engaging and participatory quiz format increased student involvement, stimulated curiosity, and motivated active learning. Evaluation results indicated that adolescents who participated in the interactive quiz demonstrated an understanding of the harmful effects of child marriage and the importance of delaying marriage until they had reached emotional and social maturity (Fausi & Asmuni, 2024).

The implementation of the CARE program showed positive outcomes in improving participants' knowledge about early marriage. Through an educational approach that focused on character development and critical awareness, participants became more conscious of the negative effects of marrying during adolescence, including consequences for health, education, and social life (Ashar et al., 2024). The evaluation results revealed that participants developed a more thoughtful stance on the issue of early marriage. The program strengthened participants' understanding that marriage should occur only when an individual is physically, mentally, and socially mature. As a result, participants are expected to be better equipped to avoid the risks associated with adolescent pregnancy.

Adolescent pregnancy significantly increases the risk of complications for both mothers and infants, including low birth weight, premature delivery, and malnutrition, which are recognized as leading causes of stunting. Moreover, babies born to young mothers are often deprived of adequate breastfeeding. Poverty and low educational attainment further reinforce the cycle of stunting (Fausi & Asmuni, 2024). By preventing early marriage, adolescent girls have more time to complete their education, gain reproductive health knowledge, and prepare themselves for motherhood. Such preparation is essential for ensuring the birth of a healthier and higher-quality future generation (Wells et al., 2022).

4. CONCLUSION

The CARE (Comprehend, Ask, Respond, and Evaluate) program implemented at SMKN 2 Raja Ampat (Vocational High School 2 Raja Ampat(significantly improved adolescents' knowledge and attitudes regarding early marriage, adolescent pregnancy, and stunting. Before the intervention, most participants had low knowledge regarding early marriage (90.2%), whereas after the intervention, 58.8% demonstrated excellent knowledge. Knowledge scores increased significantly after the intervention (Z = -6.25; p = 0.0001). Participants' attitudes also changed significantly, from predominantly supporting early marriage during the pretest (66.7%) to rejecting it after the intervention (88.2%) (Z = -5.29; p = 0.0001). These findings indicate that participatory educational approaches can improve adolescents' awareness of, and attitudes toward, early marriage in remote areas such as Raja Ampat.

This program also demonstrates that participatory, school-based adolescent health education can contribute to community engagement efforts in geographically isolated settings. However, the findings should be interpreted cautiously because of several limitations, including the single-site setting, small sample size, absence of a control group, and short-term evaluation design. Overall, the CARE program showed potential as a community-based intervention for preventing early marriage and reducing future stunting risks among adolescents in Southwest Papua.

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CONFLICT OF INTERESTS

The authors declare no conflicts of interest in the implementation of this community service activity.

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