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Empowering Partner Villages in Preventing Early Marriage as a Sustainable Effort to Prevent Stunting through the Healthy and Decent Housing Program (RUSELA)

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ABSTRACT Early marriage contributes to stunting through adolescent pregnancy, limited reproductive readiness, and inadequate knowledge of child care and nutrition, necessitating sustainable, multi-stakeholder empowerment approaches at the village level. This community service program aimed to empower partner villages to prevent early marriage as a sustainable strategy for stunting prevention through the Healthy and Decent Housing Program (RUSELA). Using a Participatory Rural Appraisal approach, the program was implemented in four stages: preparation, education, training and mentoring, and monitoring and evaluation. Thirty-eight participants, comprising adolescents, health cadres, integrated health post (Posyandu) cadres, and village officials, received education on adolescent reproductive health, maturation of marriage age, stunting prevention, and healthy housing indicators, followed by practical training and mentoring. Knowledge was assessed using a 20-item pretest and posttest questionnaire and analyzed descriptively, supported by observation of participation and feedback discussions. The mean knowledge score increased from 61.8 to 86.5 (a 40.0% relative increase), and 34 participants (89.5%) improved their scores. Participants with good or very good knowledge rose from 26.3% to 86.8%, while those with poor knowledge declined from 26.3% to 0%. A simple home assessment indicated that most households had access to clean water, although ventilation and waste management required improvement. The program also generated a shared commitment among village government, cadres, and the community to integrate RUSELA into village development activities. In conclusion, RUSELA is a promising and participatory empowerment model that strengthens community knowledge and supports sustainable stunting prevention at the village level. However, the evaluation was limited to short-term knowledge outcomes in a single village; therefore, continued mentoring and long-term monitoring of behavioral change are recommended.

INDEX TERMS Early Marriage, Stunting Prevention, Community Empowerment, Healthy Housing, Adolescent Reproductive Health

I. INTRODUCTION

Stunting remains a persistent public health challenge in Indonesia and arises from interacting causes, including maternal malnutrition, inadequate feeding practices, poor sanitation, and low socioeconomic status [1]. Its consequences extend beyond impaired growth: stunted children achieve lower cognitive and numeracy scores, enter school later, and complete fewer years of education [2]. Community-level evidence shows that the burden remains substantial, with approximately 22–23% of children under five stunted in recent Indonesian samples [3], [4].

Early marriage is increasingly recognized as an upstream determinant of this problem. Approximately 12% of Indonesian females aged 15–20 years have experienced child marriage [5], and a similar proportion has been reported among rural adolescent girls [6]. Low education is consistently associated with higher odds of child marriage [5], [6], as are poverty and rural residence [5], while dowry practices and gender-based violence shape its social acceptance [7]. Parental child marriage, in turn, is associated with higher odds of stunting and food insecurity among children [8]. Adolescent pregnancy increases the risk of anemia, preterm birth, and low birth weight [9], short birth intervals are linked to greater stunting risk [10], and maternal education remains a significant determinant [11].

The household environment further shapes child growth. In rural Indonesia, untreated water and inadequate sanitation facilities have been identified as contributing factors to stunting [12], and toddlers living in homes with poor environmental sanitation, ventilation, and lighting face a higher stunting risk [13]. These findings position healthy housing as a practical, community-level entry point

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for prevention.

Current approaches emphasize multisectoral, community-based action. Interprofessional collaboration and cadre training strengthen the early detection and prevention of stunting [14], cadre-led home visits improved maternal stunting-prevention knowledge, attitudes, and practices [15], and smartphone-based educational videos increased cadres' knowledge [16]. Participatory learning and action methods have supported community participation in rural health planning [17]. For adolescents, qualitative evidence favors engaging, serialized digital content on stunting prevention [18], although a school-based sexuality education trial in Jakarta found no significant effects on its outcomes [19]. Implementation quality also varies: districts with greater stunting reductions relied on priority programs and local innovation, whereas weaker performers struggled with leadership commitment and human resources [20]. Moreover, socioeconomic constraints and cultural feeding norms hinder the translation of knowledge into practice [21], and food availability showed the strongest association with prevention behaviors in one survey [22].

Despite these advances, existing evidence largely treats early marriage, adolescent reproductive health, and the residential environment as separate domains. Studies on child marriage mainly describe its prevalence and determinants [5]–[7], whereas stunting programs predominantly target mothers of toddlers and health cadres [15], [16]. To the best of our knowledge, community-based models that integrate early-marriage prevention with healthy housing improvement and village governance remain scarce.

Therefore, this community service program aimed to empower partner villages to prevent early marriage as a sustainable effort to prevent stunting through the Healthy and Decent Housing Program (RUSELA). This article contributes: (1) an integrated empowerment model combining adolescent reproductive health education, maturation of marriage age, and healthy housing indicators; (2) empirical evidence of improved knowledge among 38 participants, with the mean score rising from 61.8 to 86.5; (3) a participatory mentoring pathway that equips cadres and village officials to embed RUSELA in village development; and (4) a preliminary household assessment identifying ventilation and waste management as priorities for follow-up. The remainder of this article is organized as follows: Section II describes the method, Section III presents the results, Section IV discusses the findings and limitations, and Section V concludes the study.

II. METHODS

A. STUDY DESIGN

This community service program used a prospective, single-group pretest–posttest design without randomization or a control group. It followed a Participatory Rural Appraisal (PRA) approach, in which community members took part in problem identification, solution planning, implementation, and joint evaluation [17]. The primary outcome was the change in knowledge of early marriage, reproductive health, stunting prevention, and healthy housing between the pretest and posttest. Secondary outcomes were participation, the acceptability and sustainability of the Healthy and Decent Housing Program (RUSELA), and the condition of participants' homes. Pretest–posttest designs of this kind are commonly used to evaluate community education in Indonesia [23]; however, the absence of a comparison group limits causal inference.

B. SETTING AND PARTICIPANTS

The program was conducted in [Jabung Village, Panekan Community Health Center catchment area; confirm] between [start date] and [end date]. The target population comprised adolescents, prospective brides and grooms, health workers, integrated health post (Posyandu) cadres, and village officials. Participants were recruited through [sampling technique, e.g., purposive or total sampling] with the following eligibility criteria: [inclusion and exclusion criteria]. In total, 38 participants took part, and all completed both the pretest and the posttest.

C. IMPLEMENTATION STAGES

The program was carried out in four stages.

1) Preparation. The team coordinated with the village government, the community health center, and health cadres to agree on the schedule, target groups, and strategy. Local problems related to early marriage, stunting, and housing were identified through focus group discussions (FGDs) [24], [25]. Educational materials and the pretest–posttest questionnaire were then developed.
2) Education. Participants received counseling on adolescent reproductive health, maturation of marriage age, risk factors and prevention of stunting, nutritional fulfillment during adolescence and the first 1,000 days of life, and the RUSELA concept. The sessions used interactive lectures, group discussions, question-and-answer sessions, educational media screenings, leaflets, and simulations of healthy housing indicators.
3) Training and mentoring. Participants were trained to identify healthy and decent housing indicators, apply Clean and Healthy Living Behaviors (PHBS), and manage household sanitation. Health cadres were mentored to deliver education to families with adolescents and toddlers, following a cadre-based education approach [15]. Village officials were mentored to integrate RUSELA into village development activities.
4) Monitoring and evaluation. Knowledge was assessed using a pretest administered before the education session and a posttest administered after all activities were completed. Participation was observed throughout the program, and feedback discussions were held with health cadres and village officials to assess acceptability and sustainability.

D. MATERIALS AND INSTRUMENTS

The educational materials consisted of [slide presentations, leaflets, and educational media; specify titles or formats]. Knowledge was measured with a 20-item questionnaire covering early marriage, reproductive health, stunting

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prevention, and healthy housing indicators. Item scores were converted to a [0–100] scale and classified as very good, good, sufficient, or poor, using the cut-off values [state cut-offs]. Instrument validity and reliability were established by [expert review and pilot testing; report content validity index or Cronbach's alpha], consistent with established knowledge-questionnaire validation procedures [26]. Home conditions were assessed by health cadres and village officials using a simple checklist of healthy housing indicators: clean water availability, sanitation, ventilation, natural lighting, household waste management, and environmental cleanliness.

E. SUCCESS INDICATORS

Program success was defined by four indicators: (1) at least 80% of participants attended all activities; (2) the mean posttest score exceeded the mean pretest score; (3) participants' understanding of early marriage and stunting prevention improved; and (4) the village government and health cadres committed to continuing RUSELA as part of village-level stunting prevention.

F. DATA ANALYSIS

Pretest and posttest data were analyzed descriptively. Mean scores were calculated for each measurement, and the percentage increase was computed as (posttest mean − pretest mean) / pretest mean × 100. The number and proportion of participants whose scores increased and the frequency distribution of knowledge categories were also reported. Data from observations, feedback discussions, and the home assessment were summarized descriptively. Analyses were performed using [software and version].

III. RESULTS

TABLE 1
Level of Knowledge About Early Marriage and Stunting Prevention Before and After Education

Category	Pre-test n (%)	Post-test n (%)
Very good	3 (7.9%)	19 (50.0%)
Good	7 (18.4%)	14 (36.8%)
Enough	18 (47.4%)	5 (13.2%)
Not enough	10 (26.3%)	0 (0.0%)
Amount	**38 (100%)**	**38 (100%)**

A. IMPLEMENTATION OF ACTIVITIES

Community service activities were carried out in partner villages, involving 38 participants consisting of adolescents, health cadres, Posyandu cadres, and village officials. The activity began with coordination with the village government and community health centers to determine the schedule, targets, and strategies for program implementation. Next, counseling was provided on adolescent reproductive health, maturing marriage age, preventing stunting from adolescence, and implementing the Healthy and Decent Homes (RUSELA) concept. The material was delivered through interactive lectures, group discussions, questions and answers, and simulations of implementing healthy home indicators.

Participants demonstrated high enthusiasm throughout the event. This was evident in their active participation in discussion sessions, sharing experiences related to early marriage issues in their local communities, and their involvement in identifying healthy housing conditions based on the indicators provided. Furthermore, health cadres and village government officials expressed their commitment to integrating the RUSELA Program into integrated health service posts (Posyandu), community health posts (Posbindu), and youth development at the village level.

B. KNOWLEDGE EVALUATION RESULTS

The evaluation was conducted using pretest and posttest instruments given to all participants before and after the educational activity. The results showed an increase in participants' knowledge regarding early marriage, reproductive health, stunting prevention, and the implementation of healthy homes.

TABEL 1. Following the implementation of education through the Healthy and Decent Homes Program (RUSELA), participants' knowledge regarding the prevention of early marriage and stunting increased. Participants in the good and very good categories increased from 26.3% (10 people) in the pre-test to 86.8% (33 people) in the post-test. Conversely, participants in the poor category decreased from 26.3% to 0% after the program. These results indicate that the education and mentoring provided were able to increase community understanding of the importance of preventing early marriage as a sustainable effort to prevent stunting.

C. IMPLEMENTATION OF THE HEALTHY AND DECENCT HOUSING PROGRAM (RUSELA)

In addition to increasing knowledge, community service activities resulted in initial behavioral changes through the implementation of the Healthy and Decent Homes (RUSELA) concept. Participants gained an understanding of the importance of maintaining a clean home environment, clean water use, household waste management, proper sanitation, home ventilation, natural lighting, and efforts to prevent infectious diseases associated with stunting.

Health cadres, along with the village government, conducted a simple assessment of the participants' homes using healthy home indicators. The results showed that most families had access to clean water, but several homes still had suboptimal ventilation and waste management that did not meet healthy sanitation principles. These findings formed the basis for developing a follow-up plan through routine outreach activities and family mentoring by health cadres.

IV. DISCUSSION

A. INTERPRETATION OF THE FINDINGS

The program was followed by a marked improvement in participants' knowledge of early marriage, reproductive health, stunting prevention, and healthy housing. The mean score rose from 61.8 to 86.5, a gain of 24.7 points (a 40.0% relative increase), and 34 of 38 participants (89.5%) improved their scores. The distribution of knowledge categories shifted in the same direction: participants classified as good or very good increased from 26.3% (n = 10) to 86.8% (n = 33), and no participant remained in the

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poor category after the program. Because 73.7% of participants began in the sufficient or poor categories, this shift is consistent with substantial gains among those with the lowest baseline knowledge. Together, these findings suggest that combining interactive education, practical training, and mentoring can raise short-term knowledge effectively in this setting. Four participants (10.5%) did not improve; their characteristics were not examined, so the reasons remain unknown.

The knowledge gain should be regarded as a necessary but insufficient step toward behavior change, because behavior was not measured in this study. The simple household assessment complemented the knowledge outcomes. Most participating families had access to clean water, whereas ventilation and waste management were suboptimal in several homes. As poor sanitation, untreated water, and inadequate ventilation and lighting have been associated with higher stunting risk in Indonesian settings [12], [13], these gaps identify concrete, modifiable targets for follow-up through cadre-led family mentoring. The assessment was descriptive, however, and was not designed to estimate the effect of housing on child growth.

The commitment of village government and health cadres to integrate RUSELA into Posyandu, Posbindu, and youth development activities reflects the participatory logic of the PRA approach, in which community members act as co-planners rather than passive recipients [17]. Sustainability, however, depends on the capacity of these platforms. A national assessment found that most Indonesian health posts were only moderately ready for primary health care integration, with staffing, facilities, and reporting systems as the main constraints [28].

B. COMPARISON WITH PREVIOUS STUDIES

The direction and magnitude of the knowledge gain are consistent with other Indonesian community education programs. Weekly cadre-led home visits improved maternal stunting-prevention knowledge, attitudes, and practices [15], and video-based education improved cadres' knowledge of child growth and development [16]. A single community education session for older adults in Bogor raised mean knowledge from 66.25 to 75.16 [23]. The larger gain observed here (24.7 points) may reflect the multi-component, multi-stage design of RUSELA, although differences in population, topic, and instrument preclude direct comparison.

The topics addressed also correspond to established determinants. Low education is associated with higher odds of child marriage [5], [6] and with child stunting [11], which supports education as an entry point. The household findings echo studies linking water treatment and sanitation deficits [12] and poor ventilation and lighting [13] to stunting among toddlers.

In contrast, not all educational interventions for adolescents yield benefits. A cluster randomized trial of comprehensive sexuality education in Jakarta found no significant differences between intervention and control schools [19]. In a quasi-experimental study of Instagram-based education among Indonesian adolescents, both the intervention and control groups improved significantly [29], illustrating that pretest–posttest improvements can occur irrespective of the intervention. Because the present study lacked a comparison group, its results must be interpreted with similar caution.

Evidence on whether knowledge translates into the prevention of early marriage is also mixed. A community-based empowerment program reduced the proportion of girls ever married in India but showed no effect in Malawi, Mali, or Niger, which the authors attributed to context-specific drivers [30]. A systematic review in sub-Saharan Africa likewise found that few interventions were consistently effective, notably scholarship programs and systematically implemented community dialogues [31]. In Indonesia, dowry practices and gender-based violence shape the social acceptance of child marriage [7], suggesting that adolescent education alone may be insufficient and that dialogue with families and village leaders may be equally important.

A similar gap between knowledge and outcomes has been reported for stunting. Maternal nutritional literacy showed no significant association with child growth outcomes in a Pakistani sample in which feeding practices remained largely unsatisfactory [32], and socioeconomic status was associated with both maternal nutrition knowledge and child stunting in a recent analysis [33]. In rural Indonesia, economic constraints and cultural feeding norms likewise hinder the translation of knowledge into practice [21]. These reports explain why the knowledge outcomes of this study cannot be taken as evidence of an effect on stunting.

Finally, program governance matters. Districts achieving greater stunting reductions relied on priority programs and local innovation, whereas weaker performers lacked leadership commitment and human resources [20]. The commitment obtained from the village government in this program is therefore promising, but it needs to be converted into planned, funded, and monitored activities.

C. LIMITATIONS AND IMPLICATIONS

Several limitations should be acknowledged. First, the single-group pretest–posttest design, without randomization or a control group, precludes causal attribution; the observed improvement may partly reflect repeated testing with the same instrument, participant enthusiasm, or other concurrent influences. Second, only short-term knowledge was measured, so the durability of knowledge, behavior change, housing improvements, age at marriage, and nutritional status remain unknown. Third, the sample was small (n = 38), drawn from one village, and heterogeneous, comprising adolescents, cadres, and officials; consequently, the findings cannot be generalized, and subgroup differences could not be examined. Fourth, the analysis was descriptive, without inferential statistics or confidence intervals, and the home assessment used a simple checklist rather than a standardized tool.

Despite these limitations, the findings have implications for practice, policy, and research. For practice, the RUSELA package, which comprises education on adolescent reproductive health and stunting, practical training on housing indicators, and cadre mentoring, can be delivered through existing community health center and village structures and replicated in similar

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villages. The household checklist gives cadres a structured way to identify and prioritize improvements such as ventilation and waste management. For policy, village governments could incorporate RUSELA into planning for Posyandu, Posbindu, and youth programs, provided that cadre capacity and facilities are strengthened [28].

For research, future studies should include a comparison group and follow participants for several months, using outcomes that reflect the program's causal chain, such as marriage-age intentions, housing improvements, adolescent nutritional status, and child growth, rather than knowledge alone. Interventions that combine education with community dialogue and with measures addressing dowry practices, gender-based violence, and economic constraints [7], [21], [31] merit testing within the RUSELA framework.

V. CONCLUSIONS

This community service program aimed to empower partner villages to prevent early marriage as a sustainable effort to prevent stunting through the Healthy and Decent Housing Program (RUSELA). Using a participatory, four-stage approach comprising preparation, education, training and mentoring, and monitoring and evaluation, the program involved 38 adolescents, health cadres, Posyandu cadres, and village officials. Participants' knowledge improved substantially: the mean score increased from 61.8 to 86.5, a gain of 24.7 points (a 40.0% relative increase), and 34 participants (89.5%) improved their scores. The proportion of participants with good or very good knowledge rose from 26.3% (n = 10) to 86.8% (n = 33), while the proportion with poor knowledge fell from 26.3% to 0%. The simple household assessment showed that most families had access to clean water, whereas ventilation and waste management required improvement, providing concrete priorities for follow-up. In addition, the village government and health cadres committed to integrating RUSELA into Posyandu, Posbindu, and youth development activities, which indicates its potential as a sustainable, community-owned model. These findings should be interpreted cautiously, because the single-group pretest–posttest design lacked a control group, only short-term knowledge was measured, and the sample was limited to 38 participants from one village. Future work should therefore evaluate RUSELA using a comparison group and a larger, more diverse sample drawn from multiple villages, with follow-up at several months to assess the retention of knowledge. Subsequent studies should also measure outcomes along the program's causal pathway, including marriage-age intentions, adolescent nutritional status, observed improvements in housing conditions, and child growth indicators, using validated instruments and appropriate inferential analyses. Finally, research should examine how mentoring by health cadres and the integration of RUSELA into village planning and budgeting can be strengthened to ensure that the program is sustained and that gains in knowledge translate into lasting behavioral and environmental change.

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FUNDING

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DATA AVAILABILITY

The data supporting the findings of this evaluation are included within the article. Further details are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTION

Sulikah led the conceptualization, methodology design, and writing of the original draft, while supervising the adolescent reproductive health outreach. Nurlailis Saadah, serving as the corresponding author, managed overall project administration, community coordination, data collection, and manuscript revision. Aries Prasetya developed the RUSELA healthy home framework, oversaw environmental health training, and conducted data curation. Budi Yulianto handled field implementation for sanitation assessments, pre-test and post-test statistical analysis, and visual documentation. Uswatun Khasanah contributed through the development of educational media, participant mentoring, evaluation design, and critical editing of the final manuscript. All authors reviewed and approved the final manuscript.

DECLARATIONS

ETHICAL APPROVAL

Informed consent was obtained from all individual participants (adolescents, families, and village cadres) prior to the pre-test, post-test, and implementation of activities.

CONSENT FOR PUBLICATION PARTICIPANTS

Participants consented to the use of their anonymized data and activity documentation for publication

COMPETING INTERESTS

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DOCUMENTATION

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Opening of the Community Service Activity



Implementation of Reproductive Health Community Service Activities



Implementation of the Child Growth and Development Community Service Activity



Implementation of the Child-Friendly Home Environment Community Service Activity



Closing of the Community Service Activity

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