

## The effect of using educational stunting calendar on knowledge and motivation among prospective brides in KUA Poasia District, Kendari City

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### Abstract

**Background:** Stunting represents a public health issue with long-term impacts on human resource quality. Stunting prevention efforts must begin as early as possible, even before pregnancy occurs. Prospective brides constitute a strategic group requiring education on stunting prevention during the premarital period. Educational calendars represent a potential educational medium designed to enhance knowledge and motivation.

**Objective:** This study aims to analyze the effect of using educational stunting calendars on the knowledge and motivation of prospective brides at the Religious Affairs Office (KUA) of Poasia District, Kendari City.

**Methods:** The research employed a quantitative design with a pre-experimental one-group pretest-posttest approach. The sample consisted of 40 prospective brides who registered at KUA Poasia District during March-April 2025. The instruments included knowledge questionnaires and Likert motivation scales. Data analysis utilized Paired t-Test and Wilcoxon Signed Rank Test.

**Results:** Significant increases occurred in knowledge scores from 56.3 to 83.2 ( $p = 0.000$ ). Motivation also increased from 31.4 to 43.1 ( $p = 0.001$ ). Eighty-five percent of respondents stated that the educational calendar was attractive, informative, easy to understand, and beneficial for preparing themselves as parents. The calendar medium demonstrated effectiveness in strengthening awareness and encouraging action in stunting prevention from the premarital period.

**Conclusion:** Educational calendars effectively increase the knowledge and motivation of prospective brides in stunting prevention efforts. This medium deserves development as part of educational interventions in premarital guidance services.

**Recommendations:** Educational calendars should be integrated into national programs for prospective bride guidance such as "Ready to Marry, Ready to Conceive (SINSIH)," and facilitator training should be conducted for optimal utilization

**Keywords:** Educational Calendar; Stunting; Prospective Brides; Knowledge; Motivation; Early Prevention

### 1. Introduction

Stunting represents a chronic nutritional problem that remains a global concern. According to WHO and UNICEF data, approximately 148 million children under five worldwide experienced stunting in 2023, seriously impacting children's

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physical growth and cognitive development. Indonesia ranks among the top three countries with the highest number of stunted children in Southeast Asia, following the Philippines and Myanmar (UNICEF, WHO dan Group, 2023). The Indonesian government has committed to reducing stunting rates through various intervention programs, aligning with the 2030 Sustainable Development Goals (SDGs) targets that establish the elimination of all forms of malnutrition, including stunting. Based on Riskesdas 2018, national stunting prevalence reached 30.8% and decreased to 21.6% in 2022. Nevertheless, this figure remains above the WHO-established threshold of below 20% (Kemenkes, 2022).

At the regional level, Southeast Sulawesi Province recorded a stunting prevalence of 30.2% (Kemenkes RI, 2022), still considered high compared to other provinces in eastern Indonesia. Kendari City, as the provincial capital, recorded a stunting prevalence of approximately 23.8%, lower than the provincial figure but still indicating the need for intervention. Geographical factors such as coastal and archipelagic areas, along with demographic characteristics of communities with diverse educational and socioeconomic backgrounds, contribute to this prevalence. Compared to other areas in Southeast Sulawesi such as South Buton Regency and East Kolaka, Kendari City falls into the medium category but still requires specific strategies to sustainably reduce stunting rates (Dinkes Kesehatan Provinsi Sulawesi Tenggara, 2023).

Poasia District, as one of the administrative areas in Kendari City, becomes the focal point of this research. This area has relatively high population density and diverse socioeconomic backgrounds. The heterogeneous community characteristics, including varied educational levels, make this area important to study in the context of stunting prevention. The Religious Affairs Office (KUA) of Poasia District plays a strategic role in providing premarital guidance to prospective brides. KUA data shows that more than 100 prospective bride couples register annually, making this institution a potential intervention point for stunting prevention education from the pre-conception period.

Stunting does not occur suddenly but results from interactions among various factors at different levels. Directly, stunting stems from inadequate nutritional intake during the First 1000 Days of Life (HPK), repeated infections, and low birth weight (Beal *et al.*, 2018). Indirect factors include family food security, suboptimal parenting patterns, limited health services and healthy environments, and low parental education levels. Meanwhile, basic factors encompass broader social, economic, and political conditions, including structural poverty and limited access to information and education (Hastuti *et al.*, 2025).

Stunting impacts are severe, both short-term and long-term. In the short term, children with stunting experience physical and mental developmental disorders, low immune systems, and increased mortality risk from infections. Long-term, stunting impacts academic performance, low economic productivity, and increased risk of non-communicable diseases in adulthood, ultimately perpetuating intergenerational poverty cycles (Mulyani *et al.*, 2025).

Intervention among prospective bride groups becomes crucial because the premarital period represents a critical period in the reproductive life cycle. Education at this phase can prepare prospective parents to plan healthy pregnancies while encouraging awareness of the importance of the first 1000 HPK. This period is known as a window of opportunity that significantly determines stunting prevention, as maternal nutritional status before pregnancy greatly influences fetal and infant growth. Prospective brides have strategic roles as prospective parents. They generally are at optimal reproductive age and open to new information (Ratna Wulandari dan Ahmad Syafiq, 2023). Therefore, providing stunting prevention education to this group can increase their readiness to undergo pregnancy and raise children optimally. One potential educational approach involves using innovative and attractive visual media.

Educational calendar media represents a health communication tool with many advantages. Calendars are easily accessible, always visible in domestic spaces, present information gradually and continuously, and use attractive and easily understood visuals. Calendars can also serve as daily reminders that reinforce educational messages. In the context of stunting prevention, educational calendars can convey important messages related to nutrition, reproductive health, and good parenting practices (Habibie *et al.*, 2023). However, knowledge and motivation gaps still exist among communities, particularly prospective brides. Many do not comprehensively understand stunting and lack motivation to take preventive actions. This situation worsens with minimal educational media that is practical, easy to understand, and relevant to their daily lives (Fristiwi, Nugraheni dan Kartini, 2023). Therefore, innovation in the form of educational calendars should be able to address these needs.

This research has high urgency because the use of educational calendar media for stunting prevention has rarely been studied scientifically. No research has specifically examined the effect of this media on the knowledge and motivation of prospective brides, particularly in KUA institutions. Theoretically, this research will enrich health communication theory and contribute to developing visual media-based educational models. Practically, this research can provide effective, easily replicable educational media alternatives that support government programs in reducing stunting. The

urgency of this research is also strengthened by national targets in the 2020-2024 RPJMN that target stunting prevalence to fall to 14%. Indonesia's commitment to achieving the 2030 SDGs and opportunities from the ongoing demographic bonus make stunting prevention a priority agenda that cannot be delayed. Therefore, this research is important to address these challenges through innovative and applicable educational approaches.

### 1.1. Problem Statement

Stunting represents a chronic nutritional problem with long-term impacts on physical growth, cognitive development, and individual productivity. Stunting prevention efforts must begin from the premarital period, considering the importance of prospective parent readiness in understanding and implementing healthy living behaviors. However, many prospective brides still have limited knowledge and low motivation toward stunting prevention. Therefore, effective educational media innovation is needed to increase the knowledge and motivation of prospective brides, one of which is through educational stunting calendars.

The main problem in this research is: How does the use of educational stunting calendars affect the increase in knowledge and motivation of prospective brides at KUA Poasia District, Kendari City?

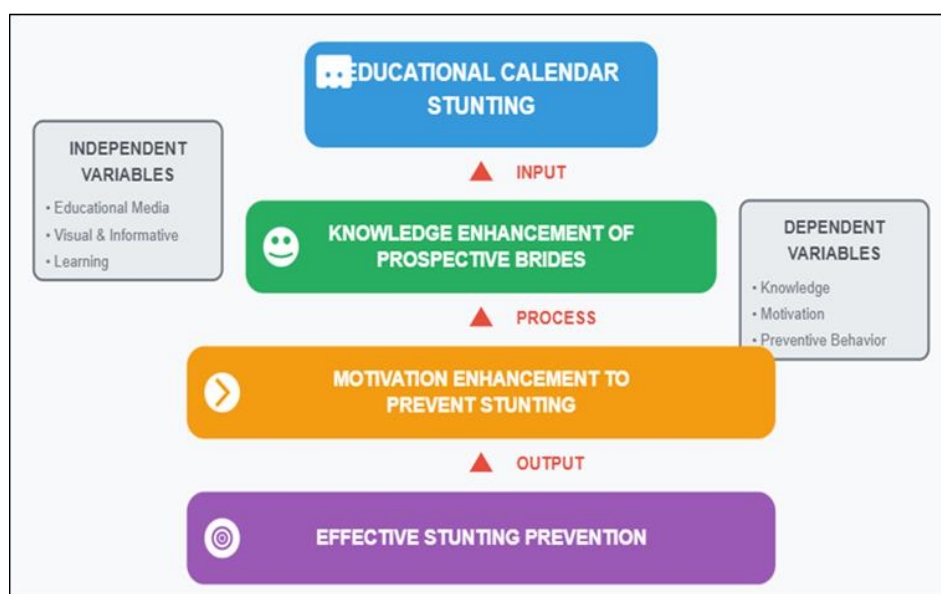
### 1.2. Research Objectives

The objectives of this research are:

- To determine the effect of using educational stunting calendars on the knowledge of prospective brides at KUA Poasia District, Kendari City.
- To determine the effect of using educational stunting calendars on the motivation of prospective brides in preventing stunting.

### 1.3. Conceptual Framework

This research refers to a health communication-based behavioral change model, where visual media (educational calendars) serve as stimuli that can increase individual knowledge and motivation. Calendars present information that is easy to understand, attractive, and continuous, expected to influence the attitudes and readiness of prospective brides in conducting stunting prevention efforts from pre-conception.



**Figure 1** Conceptual Framework

### 1.4. Research Significance

#### 1.4.1. Theoretical Significance

This research contributes to developing visual media-based health communication theory, particularly in the context of premarital education and stunting prevention.

#### 1.4.2. Practical Significance

- Provides alternative educational media that is easy to implement and effective in increasing the knowledge and motivation of prospective brides.
- Provides a basis for consideration by KUA and related institutions to adopt educational calendar media as part of premarital guidance programs.
- Supports government efforts to achieve national stunting reduction targets according to the 2020-2024 RPJMN and 2030 SDGs.

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## 2. Materials and Methods

### 2.1. Study Design

This research uses a quantitative approach with a pre-experimental design of the one-group pretest-posttest type. This design is used to observe changes in knowledge and motivation of prospective brides before and after being given educational stunting calendars (Sugiono, 2022).

### 2.2. Research Site

This research was conducted at the Religious Affairs Office (KUA) of Poasia District, Kendari City, Southeast Sulawesi. This location was chosen because it serves as a strategic marriage service and prospective bride guidance center for educational interventions.

### 2.3. Population, Sample, and Sampling Procedure

- Population: All prospective brides registered at KUA Poasia District during the research period.
- Sample: Prospective brides who meet inclusion criteria, namely willingness to participate in interventions and complete questionnaires before and after being given educational calendars.
- This research uses purposive sampling technique, namely deliberate sample selection based on certain criteria. The sample consists of prospective brides registered at KUA Poasia District in March-April 2025, willing to participate in educational calendar interventions, and complete pretest and posttest questionnaires. The minimum sample size was determined based on Lemeshow's formula for intervention studies, assuming a 95% confidence level and expected intervention effectiveness proportion. Calculation results show that an adequate minimum number is 40 respondents, including anticipation of potential dropouts.
- Sampling Technique: Purposive sampling technique selection is considered appropriate because it provides focus on respondents suitable for intervention objectives and allows researchers to directly evaluate the effect of educational calendars on the studied variables, namely knowledge and motivation for stunting prevention.

### 2.4. Data Analysis

Data were analyzed statistically using:

- Normality test (e.g., Shapiro-Wilk)
- Pretest-posttest difference test using Paired Sample t-Test (if data are normally distributed) or Wilcoxon Signed Rank Test (if data are not normal)
- Significance determined at  $p < 0.05$

### 2.5. Ethical Considerations

This research was conducted after obtaining approval from the Health Research Ethics Committee. All participants received explanations regarding research objectives and signed informed consent before participating in interventions. Data confidentiality and participant rights were maintained according to research ethics principles.

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## 3. Research Results

This research aims to evaluate the effectiveness of educational calendar media in increasing the knowledge and motivation of prospective brides regarding stunting prevention. This section presents data analysis results based on respondent characteristics, changes in knowledge and motivation levels before and after intervention, and respondent perceptions of the media used.

### 3.1. General Overview of Respondents

This section explains respondents' basic characteristics, such as age, gender, education, and occupation. This information is important for understanding the context of intervention results conducted. Complete details are presented in Table 1.

**Table 1** General Overview of Respondents

Characteristics	Category	Number (n=40)	Percentage (%)
Age	< 20 years	4	10%
	20-30 years	30	75%
	> 30 years	6	15%
Gender	Male	18	45%
	Female	22	55%
Education	Junior High School	6	15%
	Senior High School	24	60%
	Bachelor's Degree	10	25%
Occupation	Private Employee	14	35%
	Entrepreneur	16	40%
	Housewife/Others	10	25%

This table shows the distribution of basic characteristics from 40 respondents who participated in interventions using educational calendar media related to stunting prevention.

- **Age:** Most respondents (75%) are in the 20-30 year age range, which is productive age and ideal for marriage and pregnancy planning. This shows that intervention targets are appropriate because they are in the transition phase toward family life, which represents a window of opportunity for pre-conception education. Only 10% of respondents are aged <20 years, and 15% >30 years, showing that the majority of participants belong to the reproductively relevant age group.
- **Gender:** Gender distribution shows a fairly balanced proportion, with 55% female and 45% male. This is important because stunting prevention efforts require the involvement of both prospective parents, both mothers and fathers, in planning healthy family life.
- **Education:** Sixty percent of respondents have high school education, 25% bachelor's degrees, and 15% junior high school. This education level affects cognitive capacity in receiving and understanding health information. The majority of respondents have middle to upper educational backgrounds, which facilitates understanding of educational materials in calendars.
- **Occupation:** Respondent professions are quite varied, with the largest proportions being entrepreneurs (40%) and private employees (35%). Meanwhile, 25% are housewives or other categories. This variation shows that the educational media used has cross-professional and occupational background reach, adding to its applicative value in real-life contexts.

### 3.2. Knowledge Before and After Intervention

This section presents comparisons of respondent knowledge levels before and after interventions using educational calendars. Data in Table 2 shows average score changes analyzed statistically.

**Table 2** Knowledge Before and After Intervention

Aspect	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Difference	p-value	Description
Knowledge about Stunting	56.3 ± 9.5	83.2 ± 7.8	+26.9	0.000	Significant increase

Respondent knowledge about stunting experienced a very significant increase after educational calendar provision, from an average score of 56.3 (moderate category) to 83.2 (high category). The p-value of 0.000 (<0.05) shows that this increase is statistically meaningful. The average score difference of +26.9 points illustrates the effectiveness of educational media in increasing understanding. The decrease in standard deviation from 9.5 to 7.8 also indicates that score variation among individuals became more homogeneous post-intervention.

### 3.3. Motivation Before and After Intervention

This section describes changes in respondent motivation levels in stunting prevention efforts before and after being given interventions in the form of educational calendars. Data details are presented in Table 3.

**Table 3** Motivation Before and After Intervention

Aspect	Pretest (Average Score)	Posttest (Average Score)	Difference	p-value	Description
Stunting Prevention Motivation	31.4	43.1	+11.7	0.001	Significant increase

Respondent motivation in conducting stunting prevention also experienced significant increases, from an average score of 31.4 to 43.1 after intervention. The difference of +11.7 shows positive changes in respondent affective aspects. This increase shows that calendars not only increase cognitive aspects (knowledge) but also affective aspects (motivation), which are very important in behavioral change theory. The p-value of 0.001 confirms that these results did not occur by chance but as a result of the given intervention.

### 3.4. Respondent Perceptions of Educational Calendars

This section presents respondent responses to the use of educational calendars as information media. These perceptions include visual aspects, ease of understanding, benefits, motivation, and continuous use. Details are presented in Table 4 below.

**Table 4** Respondent Perceptions of Educational Calendars

Statement	Percentage of Respondents Agreeing (%)
Educational calendar is visually attractive	87%
Calendar is easy to understand and informative	90%
Calendar is beneficial for preparation to become parents	85%
Calendar motivates early stunting prevention	83%
Calendar will be kept and used as personal reference	78%

This table illustrates positive respondent perceptions of calendar media used in interventions. Ninety percent of respondents stated that calendars are easy to understand and informative, showing message content clarity. Eighty-seven percent consider calendars visually attractive, meaning graphic design, layout, and colors contribute to audience engagement (visual engagement). Eighty-five percent feel calendar benefits in preparing themselves to become parents, and 83% state that calendars motivate them to prevent stunting early. This shows the connection between media perception and increased motivation, consistent with Elaboration Likelihood Model theory (Petty and Cacioppo), that preferred media tends to produce deeper information processing. Finally, 78% of respondents stated they would keep calendars as personal references, indicating that this media has long-term utility and potential to reinforce behavioral changes sustainably.

## 4. Discussion

### 4.1. Increased Knowledge about Stunting through Educational Calendar Media Intervention: Academic Analysis

This research results show significant knowledge increases among prospective brides after being given interventions in the form of stunting-themed educational calendars. Average knowledge scores increased from 56.3 to 83.2, with a p-value of 0.000. Statistically, these results show very high significance ( $p < 0.001$ ), indicating that observed changes were not caused by chance alone but as direct consequences of given interventions. Prospective bride knowledge categories that were initially at low levels (0-60) increased substantially to reach high levels (81-100), with an average difference of 26.9 points or equivalent to a 47.8% increase. This increase is not only statistically significant but also clinically meaningful because it directly impacts pre-conception knowledge readiness that plays important roles in stunting prevention from the marriage phase.

This intervention effectiveness supports understanding in visual learning theory stating that approximately 65% of the human population are visual learners (Raiyn, 2016), so visual-based media like calendars tend to be more easily accepted, understood, and remembered. Educational calendars also support spaced repetition approaches because repeated exposure to information in daily life contexts can strengthen memory and long-term retention. Based on Dual Coding Theory by (Clark dan Paivio, 1991), information conveyed through text and image combinations will be processed through two cognitive channels, verbal and visual, which increases efficiency in storing and retrieving information in long-term memory.

In the context of health education media, calendars have several characteristics that make them strategic and effective tools. Calendars are accessible, do not require digital technology, and are always visible in daily routines, creating consistent passive exposure to information. Attractive design elements and concise yet meaningful language enable complex health message delivery to become simpler and acceptable to target audiences. This research aligns with findings by (Ichwan, Follona dan Sukanti, 2021), who reported that calendar-based visual media effectively increases reproductive health knowledge among adolescents, especially because of this media's ability to simplify health concepts through communicative visual approaches.

The achieved knowledge increase shows that prospective brides become more aware of the importance of pre-conception phase interventions, especially in preparing healthy pregnancies through adequate nutritional intake, environmental sanitation, and clean and healthy living behaviors. Acquired knowledge can form self-efficacy in prospective brides for making preventive decisions that directly impact the First 1000 Days of Life (HPK), the critical period of child development from conception to age two. This is important because ignorance about intergenerational stunting risks can impact permanently hindered child growth and development.

Therefore, educational calendar use is not only an alternative educational tool but can also be developed as part of behavior change communication strategies. By strengthening visual-based educational systems that are contextual, interactive, and integrated into pre-marriage guidance programs, stunting prevention efforts will be more structured and address root problems, namely lack of reproductive health and nutrition literacy from before pregnancy.

### 4.2. Increased Motivation of Prospective Brides through Educational Calendar Interventions as Stunting Prevention Strategy

This research results show that interventions in the form of educational calendars not only impact knowledge increases but also significantly increase prospective bride motivation in stunting prevention efforts. Average motivation scores increased from 31.4 to 43.1 after intervention, with a p-value of 0.001, showing statistically meaningful differences. This increase indicates that information delivery combined with emotional and persuasive elements through visual media can stimulate individual affective components, particularly in forming intentions and encouragement to act proactively in maintaining pre-conception health.

Motivation represents one of the main determinants in health behavior change (Michaelsen dan Esch, 2021). According to the Health Belief Model, healthy behavior is not only determined by knowledge but also by individual perceptions of benefits and barriers, as well as self-perceptions of vulnerability and seriousness of health problem risks, such as stunting (Alyafei A, 2025). In this context, educational calendars serve as stimuli that increase these perceptions through communicative, simple, and emotionally relevant methods. Messages emphasizing the importance of prospective mother and father roles, readiness to become parents, and long-term stunting impacts on future generations can activate perceived seriousness and cues to action in this model.

These findings also align with motivation theory proposed by David McClelland, stating that human motivation forms from three basic needs: achievement needs (need for achievement), affiliation (need for affiliation), and power or influence (need for power) (Baptista *et al.*, 2021). Educational calendars that raise narratives about strategic roles of prospective parents in preparing excellent generations indirectly stimulate achievement needs (becoming successful parents), affiliation needs (connecting emotionally with partners and children), and needs to influence family futures. Such narratives create intrinsic motivation, considered stronger and longer-lasting than extrinsic motivation.

From Self-Determination Theory perspectives (Ryan dan Deci, 2020), motivation increases created through this visual educational media show that interventions successfully fulfill three basic psychological needs: (1) autonomy, individuals feel they have control over decisions to prepare healthy pregnancies; (2) competence, individuals feel capable of taking preventive actions because of obtained information; and (3) relatedness, individuals feel emotionally connected with partners and prospective children. Simultaneous fulfillment of these three aspects encourages motivated behavior formation in stunting prevention contexts.

Applicatively, increased motivation among prospective brides is very important considering the pre-marriage phase represents a critical period for forming intentions, attitudes, and healthy behaviors before entering pregnancy periods. Without adequate motivation, possessed knowledge tends not to be internalized in real actions. Therefore, educational calendars packaged with emotional and positive approaches prove effective in raising awareness and encouraging behavioral changes oriented toward long-term health. Thus, it can be concluded that educational calendars not only function as information media but also as psychosocial intervention tools capable of forming intrinsic motivation and encouraging individual readiness to take active roles in stunting prevention. This effectiveness opens opportunities to integrate similar media into pre-marriage counseling programs and reproductive education, to strengthen human resource quality from early family formation stages.

#### **4.3. Positive Perceptions of Educational Calendar Media as Reproductive Health Promotion Instruments and Stunting Prevention**

Research findings show that the majority of respondents (85%) provide positive responses to educational calendar use as health promotion media, with assessments that the media is attractive, informative, and easy to understand. These positive perceptions reflect calendar success in meeting effective communication characteristics according to Shannon and Weaver's Communication Theory, namely message clarity, accessibility, and minimal interference in information delivery processes (noise). Calendars designed with attractive visualizations and concise language can bridge understanding gaps between health message providers and receivers.

Theoretically, individual perceptions of media are greatly influenced by perceived usefulness and perceived ease of use, as explained in the Technology Acceptance Model (Taherdoost, 2018), which in this context can be applied to educational print media adoption. When media is considered beneficial and easy to use, the likelihood of being accepted and utilized continuously will increase. In this case, positive perceptions of calendars as educational media reflect high user acceptability toward media content and format, which becomes an important indicator in health promotion intervention success.

Calendar media advantages compared to other print media, such as brochures or leaflets, lie in their static yet repetitive nature and ability to create environmental cues that support behavior reinforcement. Calendars installed in strategic places such as living rooms, kitchens, or bedrooms function as visual reminders that can be seen consistently in daily life. According to behavioral science approaches, repeated information exposure (repetition) in familiar contexts can increase memory retention and strengthen health message internalization processes ((Zhan *et al.*, 2018). This enables key messages regarding stunting prevention, such as the importance of nutrition, sanitation, and parental roles in the First 1000 Days of Life (HPK), to become part of collective consciousness in household environments.

Positive community perceptions of educational media like calendars open strategic opportunities to integrate them into community-based health promotion programs, especially in marriage guidance services at Religious Affairs Offices (KUA). This approach aligns with national policy directions through the Ready to Marry, Ready to Conceive (SINSIH) program developed by the National Population and Family Planning Agency (BKKBN). This program aims to increase prospective bride readiness physically, mentally, and socially in forming healthy, quality families free from stunting risks. Calendar media integration in SINSIH programs can strengthen behavior change communication (BCC) strategies through low-cost high-impact approaches.

Additionally, from Participatory Health Promotion perspectives, positive perceptions of calendars also indicate that the media has been designed participatively, considering social, cultural, and target literacy contexts. Contextual media



suitable for local values is more easily accepted by communities and can increase intervention effectiveness. This confirms that educational media success depends not only on content but also on audience-centered design approaches. Thus, positive perceptions of educational calendars reflect the great potential of this media as educational tools in promotive and preventive efforts in public health fields, particularly in stunting prevention. These findings support recommendations to expand similar media use in various family and community-based interventions, as well as supporting materials in premarital counseling at national levels.

## 5. Conclusion

- Educational stunting calendars prove effective in increasing prospective bride knowledge. This is demonstrated by knowledge score increases from an average of 56.3 to 83.2 after intervention, with statistically significant differences ( $p = 0.000$ ). This indicates that visual educational media can strengthen understanding about stunting and the importance of prevention before pregnancy.
- Educational calendar use also positively impacts prospective bride motivation in preventing stunting. Motivation scores increased from 31.4 to 43.1 after intervention ( $p = 0.001$ ), showing that the media can foster awareness and internal encouragement to prepare healthy pregnancies.
- Most respondents provide positive perceptions of educational calendars. Eighty-five percent assess calendars as attractive, informative, and easy to understand, as well as relevant to prospective bride needs in preparing parental roles.

## Recommendations

- For KUA and Health Offices
  - Educational stunting calendars can serve as official media in marriage guidance services and pre-marriage counseling.
  - Training for religious guidance officers and health personnel is needed to optimally utilize this media in prospective bride education processes.
- For Regional Governments
  - Support in budget and policy forms is needed to expand distribution and use of educational stunting calendars throughout work areas, especially in areas with high stunting rates.
  - Cross-sector collaboration (health, religion, education, and media) is important for forming integrated interventions.
- For Future Researchers
  - Conducting follow-up research with broader area coverage and larger respondent numbers is recommended.
  - Long-term impacts of increased knowledge and motivation on actual behaviors of prospective brides after marriage and having children also need examination.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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