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The effectiveness of media-based family education on healthy lifestyle behaviors among adolescents in Gunungkidul as a Strategy for preventing stunting

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ABSTRACT

Stunting remains a major public health issue in Indonesia, particularly in regions such as Gunungkidul, where prevalence exceeds the national average. Most interventions focus on the first 1,000 days of life, with limited involvement of adolescents, despite their potential role as future parents and family health advocates. This study aimed to evaluate the effectiveness of media-based family education in improving adolescents' healthy lifestyle behaviors as part of a strategy to prevent stunting. A quasi-experimental design with a one-group pretest–posttest approach was conducted involving 35 adolescents aged 12–15 years and their parents in Gunungkidul. The intervention consisted of adolescent training, parental education, and family habit monitoring over four weeks, utilizing educational videos, posters, and interactive sessions. Data were collected through observations and structured family diaries, then analyzed with the Mann–Whitney test and effect size calculation. Results showed a significant increase in adolescents' healthy lifestyle behaviors, including balanced nutrition (13.2 ± 2.5 vs. 17.1 ± 1.8, $p < 0.001$; $d = 1.79$) and handwashing with soap (12.5 ± 2.2 vs. 16.3 ± 1.7, $p = 0.001$; $d = 1.93$). Family diaries also indicated improvements in parents' meal planning and adolescents' consistent implementation of clean and healthy living practices. These findings suggest that media-based family education effectively strengthens adolescent–parent collaboration, improves health communication, and fosters sustainable household behaviors relevant to stunting prevention. The integration of adolescent-focused modules into school and community health programs is recommended to support national efforts aimed at reducing stunting.

1. Introduction

Stunting, or a condition of failing to grow in children due to chronic malnutrition and recurrent diseases, is still a serious global public health problem, especially in developing countries, including Indonesia. UNICEF data estimates that 148 million children under the age of five are stunting worldwide, with South Asia and Sub-Saharan Africa recording the highest prevalence [1]. Despite the global downward trend, the prevalence of stunting in Indonesia remains above the threshold set by the WHO, which is less than 20% [2]. Reducing the incidence of stunting is the first of the 6 goals in the global nutrition target. The World Health Organization aims to decrease stunting rates by 40%

by 2025 [3]. The prevalence of stunting worldwide in 2022 is 22.3%, while in Indonesia, this figure remains far from the expected target [1].

In Indonesia, stunting is still a significant issue in the public health sector, with a high prevalence in children. In 2023, although it has shown a decrease from previous years, the prevalence of stunting is still at 20.8%, far from the RPJMN target of 14% in 2024 [2]. The Special Region of Yogyakarta (DIY) is still facing challenges in the problem of nutrition (stunting). In Yogyakarta, the prevalence of stunting in 2023 is still at 18% with the highest district being Gunungkidul at 22.2% [4].

Most interventions in Indonesia focus on the First 1,000 Days of Life (HPK), targeting mothers and toddlers. However, this does not sufficiently address systemic household behaviors that contribute to stunting. Adolescents, as future parents and active family members, represent an underutilized resource [5–7]. The Ecological Model framework underlines that adolescent behavior is shaped not only by individual knowledge but also by family and community environments [8,9]. Adolescents can act as “strong advocates” for health change, fostering intergenerational communication and healthy routines at home [10,11]. Yet their role in official stunting programs remains incidental rather than structured. Studies show that sustainable stunting prevention requires a cross-lifecycle approach, including by involving adolescents as potential parents and an integral part of the family system [12]. Adolescents has great potential as an agent of social change.

When equipped with the right knowledge and skills, they can become pioneers of a healthy lifestyle at home. Bader et al. mention that adolescents are "strong advocates" in initiating social and health change globally [13]. Similarly, the Raeside study noted that adolescents involved in nutrition and health education programs experienced an increase in family communication skills and encouraged positive behavior changes at home [14]. Unfortunately, until now, the role of adolescents in stunting prevention is still incidental and has not become an integral part of official intervention programs. This is a gap that needs to be filled with a more structured and evidence-based approach [15,16].

On the other hand, parents remain the main determinant in the formation of healthy living habits at home, starting from food consumption decision-making, environmental hygiene management, to children's health care. However, behavioral changes in the household are often not sustainable if they rely solely on parents without the support of other family members, especially adolescents [1]. Special attention also needs to be given to adolescent girls, whose nutritional status plays a major role in the quality of pregnancy and the health of children in the future [17]. Therefore, building collaboration between adolescents and parents is a promising strategic approach. This collaboration not only supports health education to be more effective, but also strengthens intergenerational relationships that accelerate collective and sustainable behavioral change at the household level [18–21]. This study aims to evaluate the effectiveness of family-based education on improving healthy living behaviors in adolescents. This study fills the gap by assessing the efficacy of media-based family education in shaping healthy lifestyle behaviors that support stunting prevention among adolescents and their parents.

2. Method

This study employed a quasi-experimental design with a one-group pretest-posttest approach to measure the effectiveness of adolescent–parent collaboration in promoting a healthy living culture at home as a strategy for preventing stunting. Educational sessions were delivered using media-based tools, including short videos and posters, complemented by interactive Q&A sessions. The intervention consisted of three main stages conducted over four weeks: a) Stages 1: Adolescent training: covering nutrition, environmental health, and family communication skills, preparing them as family health ambassadors; b) Stages 2: Parental education and training: focused on Clean and

Healthy Living Behavior (PHBS), balanced nutrition, and healthy parenting practices; c) Stages 3: Monitoring of family habits: weekly observation of behavioral changes and review of family diaries.

Data were collected using observation sheets to monitor adolescents' activities at home and structured family diaries to document daily practices related to nutrition, hygiene, and household routines. Trained enumerators conducted observations, while both adolescents and parents completed family diaries. Reliability of data collection was ensured through triangulation of self-reports, parental reports, and researcher observations.

The study involved 35 adolescents aged 12–15 years recruited using cluster sampling from SMP Negeri 1 Patuk, Gunungkidul Regency, an area with a relatively high prevalence of stunting. Both adolescents and their parents participated in the intervention program. A simple power estimate confirmed that the sample size was sufficient for non-parametric testing. Ethical approval was obtained from the Health Research Ethics Committee of Dr. Moewardi General Hospital (No. 1.538/VI/HREC/2024). Written informed consent was collected from adolescents and their parents or guardians. To ensure confidentiality, participant identities were coded anonymously. Pre and posttest differences in adolescent health behaviors were analyzed using the Mann-Whitney test to determine the effectiveness of the intervention model. Effect sizes (Cohen's d) were also calculated to measure the magnitude of practical impact.

3. Results and Discussion

3.1. Results

After all stages of the intervention were implemented, an analysis was conducted to evaluate the effectiveness of the collaboration program between adolescents and their parents in fostering a healthy living culture at home. This evaluation is crucial for determining the extent to which the intervention affects daily behavioral changes related to stunting prevention practices. As described in the method, the intervention was implemented through a four-week educational and participatory approach, which included training for adolescents, counseling, training for parents, and monitoring of family activities. Data is collected through a combination of quantitative methods to obtain a comprehensive picture of the changes that occur.

Pretest and *posttest measurements* were conducted to assess significant changes in healthy living practices, providing context for the relational and participatory dynamics within the family. The following table presents research results that illustrate the differences in adolescent knowledge scores before and after the intervention in each group.

Table 1. Respondent Characteristics

Characteristic		Frequencies	Percentage (%)
Age	13 Years Old	16	45.7
	14 Years Old	19	54.3
Parents' Last Education	Junior High School	22	62.9
	Primary School	13	37.1

Table 1 presents the distribution of respondent characteristics in this study. The respondent consisted of 35 adolescents aged 12 to 15 years, with the majority being 14 years old (54.3%). Regarding parental education, 62.9% of parents had at least a junior high school education, while 37.1% had less than a junior high school education. This indicates a moderate educational background that may influence health-related decision-making within the household.

The results of the Pretest-Posttest Score of Healthy Living Habits of Adolescents, healthy lifestyle habits score before and after the intervention, are shown in Table 2 below.

Table 2. Pretest-Posttest Score of Healthy Living Habits of Adolescents

Aspects Assessed	Pretest (Mean ± SD)	Posttest (Mean ± SD)	P-value (Mann-Whitney)	d
Eat a balanced nutritious diet	13.2 ± 2.5	17.1 ± 1.8	0,000	1.79
Hand washing habits with soap (CTPS)	12.5 ± 2.2	16.3 ± 1.7	0,001	1.93
Total Healthy Living Score	56.4 ± 8.3	75.7 ± 6.1	0,000	

Table 2 presents the average scores and standard deviations (Mean ± SD) of adolescent healthy lifestyle habits before and after the intervention, along with the results of the Mann-Whitney statistical test. In general, there was an increase in scores across all assessed aspects following the intervention. The highest improvement was observed in child-parent communication about health, with a pretest score of 9.9 ± 2.3 rising to 14.8 ± 1.6 in the posttest. Other aspects—such as consuming balanced, nutritious food, washing hands with soap, and managing household waste—also showed notable gains. For instance, the score for nutritious food consumption increased from 13.2 ± 2.5 to 17.1 ± 1.8. The Mann-Whitney test yielded p-values of less than 0.05 for all aspects, indicating statistically significant differences between pretest and posttest scores.

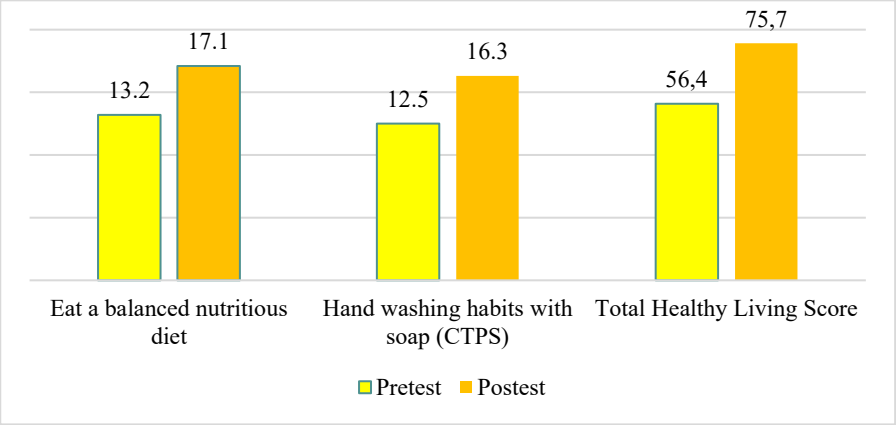

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Fig. 1. Mean Score of Healthy Living Habits of Adolescents

Fig. 1. Mean Score of Healthy Living Habits of Adolescents shows that other aspects, such as consuming balanced, nutritious food, washing hands with soap, and managing waste at home, also showed significant improvements. For example, the consumption of nutritious food increased from 13.2 ± 2.5 to 17.1 ± 1.8. The results *of the Mann-Whitney* test showed a p-value of 0.05 for all aspects, indicating that the difference in scores before and after the intervention was statistically significant. This suggests that collaborative interventions between adolescents and their parents are effective in promoting healthy living habits at home, which is particularly relevant to family-based efforts aimed at preventing stunting.

Table 3. Family Observation and Diaries

Indicators of Change	Before Intervention	After Intervention	Information
Adolescents consistently implement PHBS	34,3%	82,9%	Significant improvement
Parents compile a daily nutritious menu	28,6%	71,4%	Improved thanks to training and guidance

Table 3. Family Observation and Diaries illustrate the changes in family and adolescent behavior before and after the 4-week intervention. These interventions include youth training and parent education through educational media and interactive sessions. Overall, the data in this table

show that collaboration-based interventions between adolescents and parents have a positive impact on healthy behavior changes in families. Two key indicators emerged as significant outcomes of the intervention.

First, the application of Clean and Healthy Living Behaviors (PHBS) among adolescents at home showed remarkable improvement. Prior to the intervention, only a small fraction of adolescents consistently practiced these behaviors. However, following targeted educational efforts, the proportion rose sharply to over 80%, demonstrating that direct education can effectively influence and transform adolescent health behaviors. Second, the role of parents in preparing nutritious meals also saw substantial progress. Initially, fewer than one-third of parents planned daily meals based on balanced nutrition principles. After receiving training and guidance, this number increased significantly, indicating that active parental involvement in nutrition education plays a crucial role in fostering healthier eating habits within the household.

3.2. Discussion

The results of this study demonstrate that family-based interventions in promoting a healthy living culture at home have proven effective and significant in improving adolescents' healthy living behaviors, which is an important strategy in stunting prevention. Consistent improvement in pretest–posttest scores across all aspects of healthy living habits, as well as findings from observations and family diaries, suggest that active family involvement is able to create a home environment that supports sustainable changes in adolescent health behaviors. This intervention is particularly relevant in the context of stunting prevention, considering that adolescence is a critical phase in the human life cycle, especially in terms of nutritional and health readiness before entering reproductive age. When adolescents are equipped with an understanding of nutrition, environmental health, and family communication skills, they not only become agents of change for themselves but also for their home environment.

Findings align with global evidence that family-based interventions are effective in shaping adolescent behaviors. Similar studies reported that adolescent engagement improved family communication and dietary practices [22,23]. This study reinforces evidence that simple, culturally adapted media are effective educational tools. This model demonstrates that adolescents can serve as co-educators in household health, supporting Indonesia’s agenda to reduce stunting. Incorporating adolescent-focused modules into school health programs and Community Integrated Health Service Post (POSYANDU) could accelerate behavioral change [24–26].

In line with these findings, various studies in Indonesia also concluded that collaboration between adolescents and parents in building a healthy living culture significantly contributes to the increase in preventive behaviors related to stunting [27–29]. The family approach is considered more effective because it is able to reach social values, norms, and daily practices in the household. A study conducted by Champion also showed that parent-based interventions targeting a variety of adolescent risk behaviors, such as high-sugar diets and excessive screen time, were able to increase moderate to heavy levels of physical activity and decrease discretionary food consumption [30]. This means that behavioral changes not only occur in adolescents, but also in supportive family systems [30]. Further, family-based lifestyle interventions are recognized globally as an effective mechanism in improving health status through education and the collective adoption of healthy behaviors [31]. These interventions create cross-generational engagement and strengthen the relationship between health knowledge, attitudes, and practices at the household level.

The significant increase in the consumption of balanced, nutritious food and the habit of washing hands with soap observed in this study highlights the effectiveness of health education when delivered in a targeted and contextually relevant manner. Such education has proven capable of fostering new habits that support clean and healthy living behaviors at the household level.

Interventions utilizing communicative yet straightforward media—such as videos, posters, and Q&A sessions are particularly effective in engaging both adolescents and parents, the two primary actors in family health management. These findings are consistent with previous studies demonstrate that simple, media-based health education can successfully promote behavioral changes in daily practices, including improved dietary habits and personal hygiene [32,33]. Furthermore, prior studies have emphasized that an educational approach involving the whole family is more effective than individual education, as it leverages social influences within the household, reinforces new norms, and fosters behavioral consistency in the domestic environment [34].

This study faced several limitations that should be acknowledged. The intervention period was relatively short, lasting only four weeks, which may not have been sufficient to capture sustained behavioral changes. Additionally, the sample size was limited, potentially affecting the generalizability of the findings. The absence of long-term follow-up further restricts the ability to assess the durability of the intervention's impact over time. To strengthen future research, it is recommended that studies adopt longitudinal designs, engage larger and more diverse populations, and explore the scalability of interventions across varied cultural contexts.

4. Conclusion

Collaboration-based interventions involving both adolescents and parents have proven effective in cultivating a healthy living culture at home, particularly in relation to stunting prevention. The study demonstrated a significant improvement across all aspects of healthy living behaviors, as evidenced by pre-test scores, direct observations, and entries in family diaries. Notably, patterns of balanced and nutritious food consumption, along with the habit of washing hands with soap, showed marked enhancement following the implementation of educational activities using video media, posters, and interactive Q&A sessions. This success was further strengthened by the active participation of parents, whose involvement created a synergistic environment that promoted health-conscious behaviors within the household. A family-based educational approach is especially impactful, as it engages all key influences in adolescents' lives and builds strong social support for lasting behavior change. Consequently, this intervention model holds strong potential for development and replication in stunting prevention programs across school, family, and community settings.

A family-based education approach should be prioritized for integration into health education curricula and counseling programs at the school, health center, and Community Integrated Health Service Post (POSYANDU) levels. Active parental involvement has been proven to be a critical factor in the success of such interventions, underscoring the need for high-quality training and counseling for parents to effectively foster a culture of healthy living within the household. In Gunungkidul, media-based family education significantly enhanced adolescents' health-related behaviors, particularly in nutrition and hygiene practices. These outcomes support the inclusion of adolescent-focused modules within school, family, and community health initiatives. The model's adaptability to diverse cultural settings, through the use of simple digital media, makes it a scalable and promising strategy for nationwide stunting prevention efforts.

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Author Contribution

FB contributed to the conceptualization, methodology, formal analysis, and writing of the original draft. BK was responsible for initiating data collection and conducting the investigation, as well as contributing to the writing, reviewing, and editing process. LL supported the validation process, provided resources, managed data curation, and participated in the writing, review, and editing of the manuscript.

Conflict of Interest

The authors declare no conflicts of interest in this research.

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