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Designing Weekly Food Plan: A Complementary Food Planning Tool for Families at Risk of Stunting

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ABSTRACT

The complementary food plan for families at risk of stunting is a pressing issue in contemporary society. Addressing this issue, encompassing not only the dissemination of education on the subject of stunting but also the consideration of the accessibility of educational media. This research employed the ADDIE model to develop media. The target population for this study comprised 24 mothers with toddlers at risk of stunting residing in Giripurno village. The development of the weekly food plan media involves analysis, design, development, implementation, and evaluation. Media validation tests were conducted by experts. The results show that the weekly food plan is in the category of feasible use. It has the potential to serve as an educational medium for meal planning in families at risk of stunting and use during Integrated Health Service Posts (Pos Pelayanan Terpadu / Posyandu). Further, it needs to assess the effectiveness of the media and the incorporation of stunting-related content accessible via barcode.

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Introduction

The responsibility for ensuring a healthy and productive future generation does not lie with a single entity. Achieving this objective necessitates a concerted, large-scale, and exhaustive effort from multiple sectors within both the government and the community. In

the absence of these efforts, children are at risk of being born with a high probability of chronic malnutrition, which can result in stunting during their growth. Stunting, also known as being short or undersized, is a condition in which children under five years of age (toddlers) experience growth failure due to chronic malnutrition and recurrent infections, particularly during the first 1,000 days of life (Hari Pertama Kelahiran/HPK). The term "stunted" is employed to denote a child whose height is below the minimum of two standard deviations (-2SD) from the height of children of the same age [1].

This condition of malnutrition, which has become a matter of national and global concern, is a manifestation of nutritional deficiency that is also closely linked to infant mortality [2], [3], [4]. In the long term, stunting poses a number of health risks, including the potential for impaired physical growth and increased vulnerability to disease. In the future, this condition may have a deleterious effect on cognitive development, which in turn may have a negative impact on children's intelligence levels and productivity[5]. It is estimated that these conditions could potentially reduce gross domestic product by approximately 3% annually, meaning the country's economic growth will also be impacted [6].

However, the 2018 Basic Health Research (*Riset Kesehatan Dasar*/Riskesdas) reported a 6.4% decrease in the national prevalence of stunting over the past five years. Conversely, Indonesia's prevalence of stunting is ranked 108th out of 132 countries, and it is listed as one of 17 nations facing a double burden of malnutrition. Within the Southeast Asian region, Indonesia has the second-highest prevalence of stunting after Cambodia [7]. This observation underscores the necessity for rigorous intervention and prevention strategies to address this condition. A subsequent examination of the phenomenon reveals that stunting in Indonesia is influenced by various factors, including the child's age, birth weight, and the mother's nutritional status. Additionally, significant disparities have been observed between urban and rural areas [8] [9].

The government has expressed its commitment to implementing the strategy for accelerating the reduction of stunting, as outlined in the 2020–2024 National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*/RPJMN) [10]. Nevertheless, the various strategies that have been implemented thus far have not yet effectively addressed the issue of stunting in the community. It is imperative that the efforts undertaken involve the role and contribution of the community as catalysts for change. The community should rightfully be central to the implementation process. Parents play an essential role in reducing stunting rates by ensuring their children receive appropriate parenting education [11], [12]. Consequently, the active involvement of parents and various stakeholders, such as Posyandu cadres, is expected to reduce the likelihood of stunting [13], [14]. Cadres are community members, not professional health workers, who help other

members of the community access health care [15], [16]. A nutrition-sensitive communication intervention strategy is required, supported by comprehensive health education materials on stunting.

In the course of its development, the Integrated Health Service Posts (Pos Pelayanan Terpadu/Posyandu), as the frontline of the effort, still require media strategies or educational tools to support the monitoring of toddler nutrition [15]. A preliminary study conducted earlier revealed that the limited availability of educational tools or media poses a significant obstacle and challenge. Additionally, parents' competencies in the domains of food management and budgetary adjustment are found to be deficient. The media currently available for stunting education are limited to posters and fliers. The necessity for media that fosters maternal competencies in meal planning and budget management, tailored to individual household income levels, is evident. A weekly food plan has the potential to serve as a tool to facilitate stunting prevention education. This tool has the potential to facilitate a learning experience for individuals [17]. This pedagogical approach is designed to impart knowledge and cultivate skills in the process of planning meal menus. The objective of this study is to develop a medium for planning and managing complementary feeding (MPASI) for families at risk of stunting.

Material and Methods

A. Research Design

The present study was conducted from January to October of 2024 in Giripurno Village, Bumiaji District, Batu City. The target population comprised 24 mothers with at-risk toddlers. The needs assessment also involved local Posyandu cadres. Cadres are community members, not professional health workers, who help other members of the community access health care [15], [16]. Concurrently, the validation of the educational materials was conducted by health promotion experts. Informed consent was obtained from all respondents. This study has been deemed ethically sound by the Research and Community Service Institute (LPPM) of Malang State University, with the approval number 08.07.20/UN32.14.2.8/LT/2024. The media development process adapted the ADDIE model to assess the situation and conduct a needs analysis, thereby yielding a media concept aligned with the target group's conditions [18].

B. Stages of Media Development

This model encompasses the following stages: analysis, design, development, implementation, and evaluation. The objective of these stages is to produce effective and interactive designs [19]. As illustrated in Figure 1, the design and development stages of the Weekly Food Plan media have been adapted from the ADDIE model.

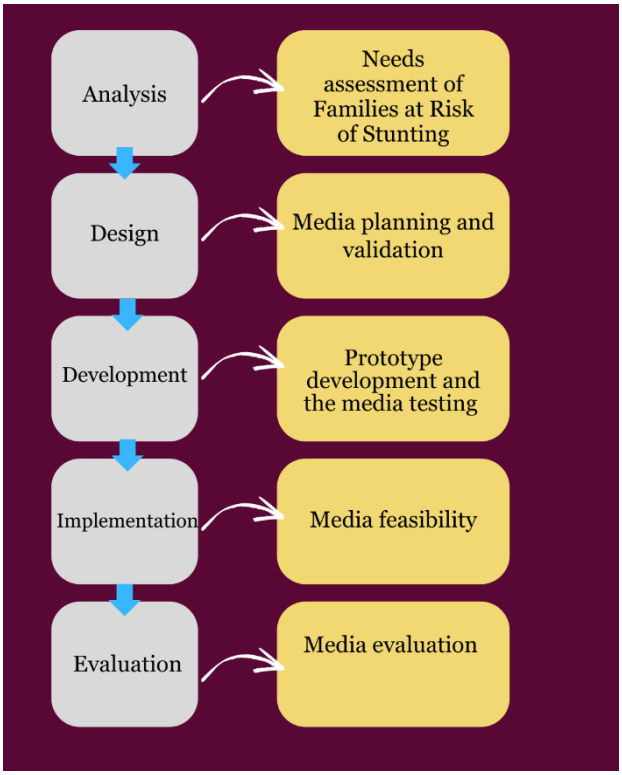


Fig. 1. Framework for Developing a Weekly Food Plan Using ADDIE Model

The initial phase of this study entailed conducting an analysis. The objective of this phase was to identify potential issues faced by the target group and assess their needs through the aggregation of information via literature reviews, surveys, and interviews. The subsequent phase entailed the formulation of a design and the validation of the media. The existing design was validated by media experts to provide revisions regarding the developed media. The subsequent stage in the process is the development of a media prototype based on the design that has been approved by media experts. This encompasses the procurement of materials, the assembly of components, and the creation of media. The media created in the preceding stage will then enter the implementation phase. In this stage, the media is tested on the target group, followed by a feasibility test. The feasibility test criteria are derived from Arikunto's educational media feasibility criteria, as illustrated in Table 1 [20].

Table 1. According to Arikunto (2018), the following criteria are to be considered in order to determine the suitability of instructional media

Assessment percentage	Category	Description
81% - 100%	Highly appropriate	No revisions needed
61% - 80%	Appropriate	No revisions needed
41% - 60%	Less appropriate	Revision
21% - 40%	Very inappropriate	Revision
0 - 20%	Completely inappropriate	Revision

Implementation is the final stage of the ADDIE model. Once the material has gone through the revision stage and been deemed suitable for use, the next step is to conduct a follow-up evaluation.

Results

A. Analysis

The analysis of issues and needs in this study involved mothers of toddlers at risk of stunting. As an initial step, this analysis aimed to comprehensively identify the characteristics, problems, and needs of the target population. Therefore, it was conducted to assess users' perceptions of what is needed to develop health education materials or tools [21], [22]. Then, the media can be designed to align with these needs, ensuring it is appropriate and effective. A survey of mothers with toddlers at risk of stunting was conducted to obtain comprehensive information. The results of the target group's characteristics are presented in Table 2 below:

Table 2. Characteristics of mothers with toddlers at risk of stunting

Variable	Freq. (n)	Percentage (%)
Age		
≤19 years	1	4
>19 years	23	96
Type of work		
Housewife	23	96
Teacher	1	4
Education		
Primary school	3	12
Junior high school	11	44
Senior high school	10	40
University	1	4
Experience with learning about complementary foods		
Have you ever received any information	24	100
Sources of information on complementary feeding that were accessed		
Social media	4	17
Healthcare workers	18	75
Community health worker	2	8

Based on the National Action Plan for society generally the majority of mothers with toddlers at risk of stunting are adults, that is, over the age of 19 [23]. However, in reality, there is still one mother who falls into the adolescent category. The health consequences associated with teenage pregnancy include the onset of stunting [14], [24], [25]. Additionally, the high risk of maternal mortality, as well as complications such as anemia, hypertension, and preeclampsia, may also arise in the future[26]. Not only the mother but also the fetus or the newborn may experience complications leading to death [27]. Teenage pregnancy remains a significant challenge in developing countries, including Indonesia. Approximately 19% of women under the age of 19 have been pregnant, and this situation will lead to immaturity in future parenting [28]. Sociocultural factors such as economic status, low education levels, family conflicts, early menarche, and premature sexual activity can contribute to this issue [29], [30], [31]. In fact, the government continues to strive to address

the issue of stunting. One of these efforts is the regulation of the Minimum Marriage Age (PUP) contained in UU No. 16 Tahun 2019 [32]. Nevertheless, teenage marriage remains a persistent dilemma in society. Analysis of surveys and interviews with mothers and community health workers revealed that educational resources on stunting remain limited. Educational efforts are still primarily focused on health workers and social media, with health workers providing information only during Posyandu sessions. Further analysis also confirms that there is a critical need for resources that help mothers develop the knowledge and skills required to plan and manage complementary feeding.

B. Design

In this phase, the product design is developed with consideration for the media size, material type, color combinations, images, and the variety of fonts used. Color variations are important in developing educational media because they can influence cognitive processes as well as metacognitive and affective perceptions among the target audience [33]. The design is predominantly blue. This design draft aims to provide an initial visualization of the final product. At this stage, the Weekly Food Plan is created in A4 paper size (21x29.7 cm) in landscape orientation. Next, the material used is art paper or thick paper with a specification of 120 grams per square meter (gsm), which is then laminated on both sides—the front and back. The choice of A4 paper is based on the fact that this size is more familiar for note-taking or writing, so it is hoped that this Weekly Food Plan will facilitate the recording of the family's daily menu. Art paper 120 gsm has sufficient thickness, so it is expected that this medium will not easily tear during use. The fonts used in this medium consist of three types: Le Petit Cochon, Funtastic, and TT Commons Pro Condensed. Previous research has shown that typefaces and typographic design in general have the potential to influence text readability, the clarity of information presentation, and to affect reading fluency [34], [35], [36], [37], [38], [39], [40]. The design of the Weekly Food Plan can be seen in Fig. 2.

C. Development

At this stage, the Weekly Food Plan is undergoing validation by experts in health promotion media. The experts are validating the design of the media that has been created, including the media's dimensions, composition, colors, typography, images, and print quality. Validation is conducted in two stages: initial and final. Revisions are made to the materials based on validation results that indicate deficiencies in certain components. The results of the experts' validation of the Weekly Food Plan materials are shown in Table 3.



Fig. 2. Initial design of the weekly food plan

Table 3. Results of the validation of the "Weekly Food Plan" by experts

Components	Assessment results	
	Beginning (%)	End (%)
Media size *Weekly food plan*		
Standard media size	75	75
The media size is tailored to the material	75	75
Media design *Weekly food plan*		
The layout's composition is harmonious and clarifies its function	50	100
The colors of the layout elements create a harmonious look and clarify their functions	50	100
The fonts and images used are attractive and easy to see	50	100
Does not use many combinations of letters, images, and colors	75	75
Media content illustration *Weekly food plan*		
The images are clear and engaging, and the colors complement the content	50	100
Consistency of images and content	50	100
Media content design *Weekly food plan*		
The spacing between the text and illustrations is appropriate	75	100
The use of different fonts is not excessive	75	100
Media Quality *Weekly food plan*		
The media material is durable and reusable	50	100
High quality printing	50	100

In general, the media validation results indicate that nearly all components—particularly the illustrations and media quality—require improvement, as the images presented do not yet align with the topic or subject matter regarding meal planning. The print quality of the media also does not yet meet standards, as the paper is still considered too thin. After improvements were made to the subpar components, the average score increased from 60.42 to 93.75. This average increase is shown in Fig. 3.

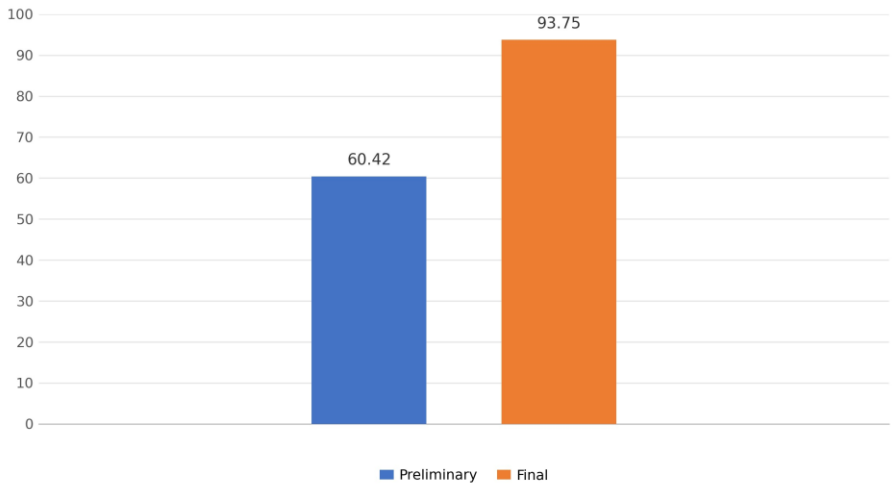


Fig. 3. Average validation results for the "Weekly Food Plan" by experts

The design of the "Weekly Food Plan" media shows differences before and after revisions were made. The final design incorporated expert recommendations to include more varied and vibrant colors, as well as images relevant to the content or topic of family meal planning. "Warung Makan Keluarga" was chosen as the title to reinforce the message about the importance of cooking and serving meals for the family. Meanwhile, "Cabang Giripurno" is the research location. The addition of "Bu" serves as an identifier so that mothers can add their names and feel a greater sense of ownership over the media used. Thicker 310 gsm paper was also selected to ensure the media is durable. The components and materials are organized with the following detailed descriptions:

Table 3. Description of the components of the Weekly Food Plan

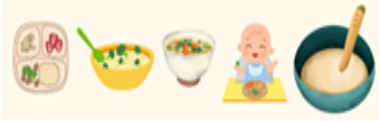
Image	Components	Description and Objectives
	Title and identity	This element is located at the top of the front page, which contains the title and the identity of the toddler's mother, the owner of the weekly plan.
	Sample food images	This image relates to the target audience, which consists of toddlers.
	Day and time	The description of the day and time outlines the meal plan for toddlers according to the specific day and time. Based on the 2013 Guidelines for the Introduction of Complementary Feeding Using Local Foods issued by the Indonesian Ministry of Health, complementary feeding for toddlers is provided three times a day, scheduled for morning, afternoon, and evening.

Image	Components	Description and Objectives
	Budget and expenses	On the back of the product, there is a description outlining the list of items to be purchased and the budget required. This is complemented by quotes designed to inspire mothers to give their children the very best. These quotes convey the message that a mother's love is the most comforting and sincere thing of all.

The initial design showed only one side, whereas the final design was expanded to include two sides: the front and the back. A laminate layer was also added to both sides so that participants could practice meal planning skills by writing on and erasing the material using the writing tools provided. The following is a comparison of the design of the material in the initial and final stages, as shown in Fig. 4.



Fig. 4. The final stages of the Weekly Food Plan media revision process

D. Implementation

The media suitability assessment targeted 24 mothers of toddlers at risk of stunting as the study participants. The participants' characteristics are shown in the table. All participants rated the media's suitability based on the assessment criteria: excellent, good, fair, and very poor. Based on the results of the media feasibility assessment, the majority of participants agreed that the size, color, images, and image quality used in the weekly food planner were excellent. Additionally, the Weekly Food Plan was equipped with writing tools that could be used, making it easier for the participants. The results of the media feasibility assessment can be seen in Fig. 5.

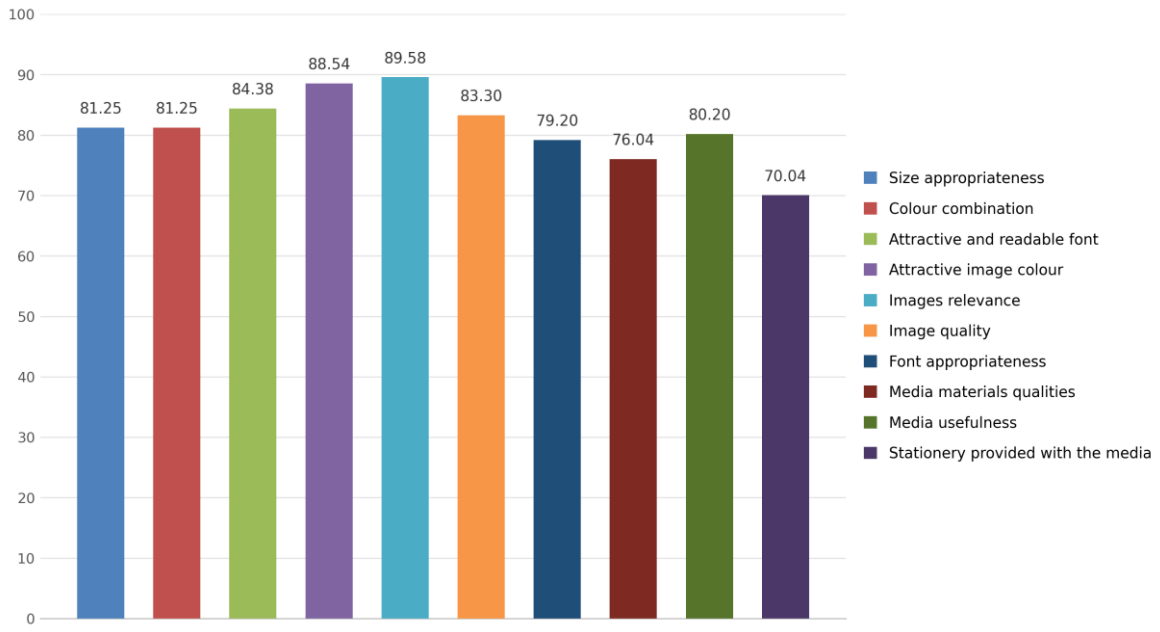


Fig. 5. Results of the feasibility test for the "Weekly Food Plan"

The results of the media feasibility test generally fell into the "suitable for use" category and did not require improvement. Upon closer examination, the completeness of stationery and media materials scored the lowest compared to other components. This is because the Weekly Food Plan media developed is equipped only with standard stationery, such as board markers and erasers, as well as hanging strings, as shown in Figure 6. Additionally, the paper used is still 310 gsm in thickness. Therefore, this phase is continued and explored further through the next phase, namely evaluation.



Sisi depan Sisi belakang

Fig. 6. Final design of the "Weekly Food Plan"

E. Evaluation

Evaluation is the final stage of the Weekly Food Plan media development process. In this stage, the media is evaluated to obtain a comprehensive overview of its strengths and weaknesses. The media's strengths can be seen in Figure 6, which shows that the images align well with the topic and are considered appropriate. The topic addressed in the development of this media is family meal planning for households at risk of stunting. As seen in Figure 5,

several food images placed at the top near the media title have been added to convey a strong message regarding meal planning. Additionally, the choice of font, color composition, and media size has been well-received by the target audience. Color is essentially a visual aid that helps people gather information. With the right color selection, it is hoped that users can obtain optimal information. The use of bright colors evokes a warm and comfortable feeling when viewed and is generally preferred by younger age groups [41], [42]. On the other hand, this medium still requires the addition of content regarding stunting in the form of an online barcode so that the target audience can scan it to access the material. This is a shortcoming of the weekly food plan that requires further development.

Conclusion

Meal planning for families at risk of stunting still requires access to educational materials. A weekly meal plan has the potential to serve as an alternative tool for strengthening mothers' skills in planning daily meals. This tool can be used to record meal menus and family budgets. Users can write on it and erase the entries, allowing the tool to be reused multiple times. In the future, this tool can be further developed to assess its effectiveness and incorporate additional content. Posyandu cadres and mothers of toddlers at risk of stunting can use this tool to strengthen their meal planning skills during regular activities at the Posyandu.

Conflict of Interest

The authors declare no conflict of interest.

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