

Development of the "Mother Give Me Exclusive Breastfeeding" e-booklet based on Android as a nutrition educational media

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Abstract

Undernutrition is one of the most serious and least addressed challenges worldwide. The significant relationship between this condition and children's feeding practices makes exclusive breastfeeding an early and appropriate intervention. Therefore, this study aimed to develop health promotion media in the form of an Android-based booklet titled "Mother Give Me Exclusive Breastfeeding". The development method model adopted was ADDIE (Analysis, Design, Development, Implementation, Evaluation). A total of 20 mothers of toddlers participated in product feasibility testing. The results showed that the product had an average total percentage of 80%, signifying high suitability for usage. The study subjects rated the E-Booklet very positively, showing great enthusiasm for engaging with the content presented in the "Mother Give Me Exclusive Breastfeeding" E-Booklet. In conclusion, further study was needed to maximize the role of this product in enhancing mothers' understanding of exclusive breastfeeding and ensuring access to facilities such as gadgets, technology devices, and internet or wifi networks.

Introduction

Undernutrition is a leading cause of death among children under the age of 5, affecting nearly half of these young lives globally. In addition, low- and middle-income countries are particularly vulnerable to this condition.¹ Undernutrition is divided into four forms, namely wasting, stunted, underweight, and vitamin and mineral deficiencies. According to global statistics from 2020, 149, 45, and 38.9 million children under 5 are estimated to be stunted (too short for age), wasted (too thin for height), and overweight or obese, respectively.^{1,2} The World Bank and Nutrition report in 2019 stated that undernutrition is one of the most serious and least addressed challenges worldwide.³ The significant relationship between this condition and children's feeding practices makes exclusive breastfeeding an early and effective combating approach.⁴ This is in accordance with the 2030 Sustainable Development Goals (SDGs), where breastfeeding is considered the first step towards ensuring a healthy and prosperous life.⁵

Numerous mothers around the world still do not adhere to exclusive breastfeeding practices. According to data from UNICEF in 2021, only 65% of mothers worldwide provide exclusive breastfeeding to babies for up to 2 years, with a mere 48% initiating the practices.⁶ In Indonesia, the 2018 National Basic Health Research Report, known as Riskesdas, showed that out of 94% of mothers with children under 2 years old, only 37.7% practiced exclusive breastfeeding. The province with the lowest coverage was West Nusa Tenggara (NTB), standing at 20.3%. While there has been progress, with NTB reporting a coverage rate of 81.8% in 2020, certain districts such as Mataram City still fall behind the national target of 80%, recording only a 68.2% coverage rate in the same year.^{7,8}

Low coverage of exclusive breastfeeding in the Mataram area is caused by various factors, including sociodemographic, pre- and postnatal, and psychosocial factors. Sociodemographic factors comprise age, occupation, education, knowledge, socioeconomic status, and place of residence. Additionally, pre- and postnatal factors such as parietal and type of delivery contribute to this issue. Psychosocial factors, including family support, health worker support, exposure to formula milk, and attitudes, also influence breastfeeding practices.^{9,10} An influence of psychosocial factors is the misconception among some mothers that formula milk is better than exclusive breastfeeding. This misconception may arise due to a lack of understanding of proper breastfeeding techniques, limited access to counseling services, inadequate family and medical support, and insufficient education on breastfeeding. Education level, as a sociodemographic factor, is particularly significant. Lower levels of education among mothers often correlate with the levels of breastfeeding, thereby hindering the achievement of exclusive breastfeeding at the age of 0 to 6 months.¹¹ Nutrition education can be provided to help increase knowledge and awareness of the importance and benefits of exclusive breastfeeding, enhancing the practices in the Mataram area. According to WHO in the book *The Health Aspects of Food and Nutrition*, nutrition education is a planned effort to improve nutritional status through changes in behavior related to food production, preparation, food distribution in the family, prevention of dietary diseases, and child care.¹² In essence, nutrition educators serve as a multidimensional process to change the behavior of people related to diet and healthy living in everyday life.¹³

Significance for public health

The 2030 Sustainable Development Goals underscore the significance of breastfeeding as a pivotal step toward attaining a robust and prosperous life. Implementing e-books can facilitate convenient access to information and enrich understanding of exclusive breastfeeding through electronic devices, advancing cognitive function and comprehension. Consequently, this may precipitate favourable behavioural shifts, particularly among breastfeeding mothers, within their daily routines.

Nutrition education can be provided through educational media, including E-Booklets. E-books, or electronic books, are media used as a learning environment with applications containing multimedia databases of instructional resources.¹⁴ The increasing number of activities related to gadgets and the user-friendly nature of these devices enhance their use as a breakthrough medium for exclusive breastfeeding nutrition education. The introduction of E-Booklets can significantly facilitate mothers' access to educational material and increase knowledge related to exclusive breastfeeding anytime and anywhere. Furthermore, E-booklets offer several advantages, including search and cross-reference functions, hyper-text links, bookmarks, explanations, highlighting, multimedia objects, and interactive tools. These features render the material exceptionally beneficial for increasing the knowledge of mothers through the use of gadgets or smartphones.¹⁵

Android-based E-Booklet with visual technology is a breakthrough that needs to be developed as a medium of nutrition education for breastfeeding mothers in Mataram. This medium can stimulate more optimal brain performance, thereby enhancing comprehension and fostering positive behavioral changes in everyday life. Furthermore, the resulting long-term impact of the initiative is an increase in the coverage of exclusive breastfeeding in the city of Mataram, NTB. Therefore, it is crucial to conduct a study titled "Development of the "Mother Give Me Exclusive Breastfeeding" E-Booklet based on Android as a nutrition educational media".

Materials and Methods

In this study, the development method adopted adhered to the ADDIE model, a learning design based on a systems approach. ADDIE stands for Analysis, Design, Development (or Production), Implementation (or Delivery), and Evaluation. This model is versatile and applicable to diverse forms of product development including models, learning strategies, methods, media, and teaching materials. Utilizing the ADDIE model streamlines and enhances the efficiency and effectiveness of product development processes.¹⁶ Robert Maribe Branch's review of the book "Instructional Design: The ADDIE Approach" describes the activities conducted at each stage.¹⁷

Analysis

In the analysis phase, instructional problems, instructional goals, and learning objectives were defined. This phase also identified the learning environment as well as current knowledge and skills. Furthermore, it was the initial stage where the problem of exclusive breastfeeding coverage in Indonesia was analyzed. Based on the results of the literature study, the lowest exclusive breastfeeding coverage observed was in the West Nusa Tenggara region. In addition to analyzing the problems to be studied, a solution analysis was also conducted in media development. The analysis showed that booklet media was developed from digital form into an E-Booklet related to exclusive breastfeeding.

Design

During the design phase, the focus shifts to defining targets, selecting assessment instruments, determining content to be developed, and analyzing the material to be presented along with the choice of media to be used. At this stage, the framework for the E-Booklet framework to be developed was discussed, comprising aspects such as the title, colors used, content structure, and digital

media functionalities.

Development

The creation and incorporation of the designed content assets were conducted in this phase. Subsequently, the programmer worked to integrate the necessary technology.

Implementation

In this phase, the product series was tested on several groups of people by assessing the feasibility and effectiveness using a questionnaire. Subjects for evaluation were selected through the probability sampling technique, ensuring an equal opportunity for each element (member) of the population to be included as a sample member. In this study, respondents were selected using consecutive sampling techniques, with inclusion criteria specifying mothers with children aged 6-60 months, willingness to participate, and proficiency in reading and writing. The sample size comprised 20 mothers selected from 2 health centers with the lowest exclusive breastfeeding coverage, namely Ampenan and Cakranegara Health Centers in Mataram City.¹⁸

Evaluation

The evaluation phase is used to provide opportunities for feedback from users through the analysis of administered questionnaires. The study conducted is in the form of quantitative data analysis. The results of the assessment in the validation and trial process, comprising statements such as not good, less good, good, and very good were converted into quantitative data with a score of 1 to 4. Product data analysis was conducted by validators using a Likert scale. The criteria for Likert Scale Assessment are presented in Table 1.

Descriptive data analysis was adopted to convert quantitative data into qualitative data. After obtaining the score, the feasibility percentage was calculated and interpreted in line with the theory applied by Suharsimi Arikunto in 2013.¹⁹

$$P = \frac{f}{N} \times 100\%$$

where:

P = percentage number

f = score obtained

N = overall score

After determining the percentage, the feasibility of the media can be evaluated based on the following criteria in Table 2.

Table 1. Likert scale assessment.

Alternative answer	Score
Very good	4
Good	3
Not good	2
Not good at all	1

Table 2. Likert scale assessment.

Percentage	Criteria
76% < skor ≤ 100%	Excellent
51% < skor ≤ 75.5%	Good to go with minor revisions
26% < skor ≤ 50%	Promising with major revisions
0% skor ≤ 25%	Unsuitable for use

A feasibility analysis was conducted on each aspect of the assessment, categorizing results into not feasible, less feasible, feasible, and very feasible. Additionally, the need for revisions was determined based on feedback from material experts, media experts, and respondents engaged in the E-Booklet trial group at the Cakranegara Health Center and Ampenan Health Center areas of Mataram City. The study adhered to the code of ethics, designated by ethics number 421/PP2MKEI/II/2021.

Results and Discussion

Respondent characteristics

The sample size of respondents in this study amounted to 20 mothers with children aged 0-3 years. Furthermore, information on the characteristics of respondents, including age, latest education, and occupation, are presented in Table 3.

Table 3. Respondent characteristics.

Respondent characteristics	Total	Percentage (%)
Age		
≥ 24 years	4	20
25-35 years	12	60
≤ 36 years	4	20
Last Edu		
Not in School	1	5
Elementary	2	10
Junior High School	2	10
Senior High School	10	50
Diploma/ Bachelor Degree	3	15
No information	2	10
Work		
Employed	5	25
Not Working/Housewife	15	75

Table 4. Product feasibility results.

No	Question	Average (%)	Category
1	The design on the cover of E-Booklet is attractive.	78	Excellent
2	The typeface on the cover of E-Booklet is attractive.	78	Excellent
3	The typeface on the content of E-Booklet is attractive	78	Excellent
4	The font size on the content of E-Booklet is easy to read.	79	Excellent
5	The color on E-Booklet is attractive.	83	Excellent
6	The font color on the cover is attractive.	81	Excellent
7	The font color on the content of E-Booklet is attractive.	81	Excellent
8	The picture on E-Booklet is clear.	89	Excellent
9	Images on the content of E-Booklet help in understanding the material.	81	Excellent
10	Images on the content of E-Booklet help in remembering the material.	81	Excellent
11	The material in E-Booklet is easy to understand.	84	Excellent
12	The material in E-Booklet is easy to remember.	79	Excellent
13	The message contained in E-Booklet is easy to apply.	76	Excellent
14	The message contained in E-Booklet is easy to remember.	76	Excellent
15	The material in E-Booklet is complete.	79	Excellent
16	The material in E-Booklet is presented sequentially.	84	Excellent
Total	80	Excellent	

The distribution of respondents according to the characteristics showed that the majority of mothers fell within the age range of 25 - 35 (60%). Age played a significant role in readiness, comprising physical, mental, and social aspects. Maternal age also influences maternal health throughout pregnancy, childbirth, postpartum development, and child care. Mothers over 25 years of age and above have more experience and mental availability to care for children. However, hormone production decreases at age 30, which can interfere with lactation. Mothers over 30 years old have more children, and their cumulative experience may impact current breastfeeding practices.^{20,21} Based on the level of education and the characteristics of respondents, the majority had at least a high school education (50%). It is important to note that mothers' education level influences nutritional status. Higher levels of maternal education often facilitate greater receptiveness to change and adaptation. It enhances understanding about nutrition and elevates attention to children's nutritional needs.²¹⁻²³ In addition to education level, employment status can also determine the level of exclusive breastfeeding, with 75% of respondents being unemployed or homemakers. Work will provide experience and influence a person's knowledge. Mothers who are busy outside the home and interacting with many people will have broader knowledge than those spending more time at home. This is because there are many relationships and opportunities to obtain wider information.^{24,25} With the rapid development of technology, innovation is needed for easy understanding of information and knowledge. An android-based E-Booklet product with visual technology was introduced as a medium for nutritional education on exclusive breastfeeding in the working area of Mataram City, NTB. With the majority of respondents being homemakers or not employed, the flexibility of accessing E-Booklet anytime and anywhere is particularly advantageous.

Product feasibility trial results

The results of the feasibility trial of android-based E-Booklet products with visual technology as a medium for nutrition education on exclusive breastfeeding in the working area of Mataram City NTB are presented in Table 4.

The assessment results of 20 respondents who had filled out a questionnaire as a feasibility test stated that the E-Booklet was “very suitable for use” (80%). This positive reception was a result of the meticulous attention paid to various aspects of the media design, aimed at enhancing readers’ comprehension and practical application of the information in everyday life. These aspects include the design of the product cover, font selection, color scheme, image clarity, and understanding of the material provided.

Education in health promotion interventions is an approach commonly used to provide knowledge and information as well as enhance the development of individuals/groups to make informed choices regarding certain health-related behaviors. The 3 aspects of learning in health education activities include cognitive (information and understanding), affective (attitudes and emotions), and behavioral (skills). The integration of online media in the learning process facilitates interaction among users, enabling two-way communication even across different locations.²⁶ The study results showed that education using technology is much more effective in providing knowledge about Health. This was also conveyed by Goncalves in 2019, where the use of technology in increasing knowledge and attitudes had a much more significant increase compared to conventional media.²⁷ Technology-based Health Education is also important for breastfeeding mothers. According to a study conducted by Tama 2020, breastfeeding mothers tend to refrain from receiving information about appropriate and accurate practices, which comprised the success rate of early initiation.²⁸

Several studies have been conducted on developing educational media for managing exclusive breastfeeding. Katmawanti’s study in 2021 stated that the emo demo method effectively increased the knowledge and attitudes of mothers. The recommendations of this study include implementing other educational media to increase the knowledge and attitudes of mothers who do not offer exclusive breastfeeding.²⁹ Katmawanti also conducted investigations on measuring knowledge and attitudes regarding exclusive breastfeeding in 2021 in Batu City, East Java. The results show that the booklet can increase the knowledge and attitudes of mothers who have not previously provided the intervention. This study is an innovation from several previous reports using technology-based education Yektiastuti in 2016 explained that Android users could improve cognitive, metacognitive, and socio-cultural abilities.³⁰

Conclusions

In conclusion, E-Booklet media was suitable for use and implementation as a nutritional education medium to increase coverage of exclusive breastfeeding. Based on suggestions, the limited gadget facilities and internet networks owned by respondents in the local area caused the need for further development related to E-books. Additionally, further study was needed to maximize the role of this product in the comprehension of exclusive breastfeeding, such as testing the effectiveness of the level of knowledge and attitudes before and after the provision of E-Booklet intervention. This report can be used as a reference for health practitioners in developing health education media regarding exclusive breastfeeding. With the development of an Android-based E-Booklet product with visual technology as a media for nutritional education in the working area of Mataram City, NTB, the coverage of exclusive breastfeeding was expected to increase.

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