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Development of Animated Video MAPS as Expressed Breast Milk Management Education to Increase Exclusive Breast Milk Coverage

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ABSTRACT

The global exclusive breastfeeding rate currently stands at 48%, slightly below the 50% global goal for 2025. In Indonesia, although the coverage rate has improved to 74.73%, it remains considerably below the national target of 80%, as stipulated by national policy and Minister of Health Decree No. 450/Menkes/IV/2004. This study aimed to evaluate the feasibility of an educational medium: an animated video called MAPS (Manajemen ASI Perah Sehat), designed to enhance mothers' knowledge about expressed breast milk and support exclusive breastfeeding practices. The research employed a Research and Development (R&D) approach through six stages. The subjects were 10 breastfeeding mothers with infants aged 0–3 months, selected via purposive sampling. Evaluation instruments included expert assessment questionnaires and user trials.The validation results confirmed the medium's high feasibility: Media 93% and Material 97.2%. User testing yielded a score of 90.38%, while the small-scale product trial resulted in an excellent score of 98.3%. The conclusion is that the MAPS animated video is highly feasible to be used as an educational tool. It effectively enhances mothers' understanding of expressed breast milk management, thereby supporting the success of exclusive breastfeeding, especially for working mothers.

INTRODUCTION

Exclusive breastfeeding is the primary recommended source of nutrition for infants from birth to six months of age, without any additional food or fluids. Providing exclusive breastfeeding during the first six months is the optimal standard for meeting infants' nutritional needs, in accordance with recommendations from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) [(1)]. However, the global coverage of exclusive breastfeeding in 2024 reached only 48%, according to WHO data, while the global target set is 50% by 2025.

The national coverage of exclusive breastfeeding has continued to increase, reaching 74.73% in 2024 according to Statistics Indonesia (BPS). Nevertheless, this figure still falls short of the minimum standard targeted by the government and international organizations such as WHO, which is at least 80%, as stated in the Decree of the Minister of Health of the Republic of Indonesia No.

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450/Menkes/IV/2004 [2]. In West Java Province, the coverage rate has reached 80.31%; however, Tasikmalaya City remains lower at 69.78%. A more concerning situation is observed at Kahuripan Public Health Center, which recorded a coverage rate of only 57.84% in 2024—declining from the previous year's figure of 68.8%.

Various factors contribute to the low rate of exclusive breastfeeding, particularly among working mothers. A study by Rosida & Mutiara (2020) showed that approximately 64.6% of working mothers experienced failure in practicing exclusive breastfeeding [3]. Work-related routines are the main barrier for working mothers in implementing exclusive breastfeeding, as they often struggle to manage breastfeeding time, leading them to opt for easier and more practical alternatives.

For working mothers, expressed breast milk serves as a strategic alternative to continue the exclusive breastfeeding program for their babies. The application of proper techniques and management can maintain the quality and benefits of breast milk, allowing it to be provided to the infant even when the mother is engaged in other activities. However, many working mothers still lack adequate knowledge about expressed breast milk, particularly regarding pumping techniques, proper storage methods, and appropriate feeding practices. A study by Azizah Noor et al. (2022) revealed that lactation education during the third trimester of pregnancy can enhance mothers' abilities in practicing exclusive breastfeeding [4].

The success of exclusive breastfeeding programs is highly influenced by the level of knowledge. Adequate understanding helps shape positive perceptions and essential competencies in lactation management practices. With the rapid advancement of globalization and information technology, learning tools have significantly evolved. Audio-visual media are considered effective learning instruments, as they stimulate both visual and auditory senses while enhancing focus. According to learning theory, individuals can absorb approximately 20% of information through hearing and 50% through sight.

A study by Kamila Khumairoh (2021) showed that audio-visual media are highly needed by health workers to enhance health promotion efforts, as they stimulate both auditory and visual senses and contribute significantly to behavioral change in the community [5]. Animated videos offer an ideal balance between the delivery of complex technical information (Expressed Breast Milk/EBM management) and the protection of privacy, alongside high visual appeal. This is crucial to ensure that educational information is effectively received and practiced by mothers.

MAPS is an animated video, approximately four minutes long, created to explain expressed breast milk management. MAPS is designed to support the success of exclusive breastfeeding, especially for working mothers or those who must be away from their babies, thereby reducing the risk of failure. Audio-visual media also enable working mothers to engage in self-directed learning and are more practical compared to conventional media such as leaflets or maternal and child health (MCH) books. Based on a preliminary study at Kahuripan Public Health Center, 6 out of 8 respondents—comprising third-trimester pregnant women and breastfeeding mothers—reported not knowing about exclusive breastfeeding and expressed breast milk, and preferred video media over reading books.

Considering the critical importance of exclusive breastfeeding for infant growth and development, as well as the challenges faced by working mothers in its implementation, there is a strong need for innovative, effective, and easily accessible educational media. The MAPS (Healthy Expressed Breast Milk Management) audio-visual media is expected to serve as a solution to enhance the knowledge and skills of working mothers regarding expressed breast milk management. Therefore, this study aims to develop and evaluate the feasibility of the MAPS audio-visual media as an educational tool to improve exclusive breastfeeding practices within the working area of Kahuripan Public Health Center, Tasikmalaya City.

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METHOD

This study adopted an R&D approach by implementing six of the ten phases, with the aim of creating and validating the feasibility of an audio-visual medium on expressed breast milk management for breastfeeding mothers with infants aged 0-3 months who are on maternity leave. The steps taken were: 1) Identification of potential and problems based on the high rate of exclusive breastfeeding failure in Tasikmalaya; 2) Data collection through the review of material sources; 3) Product design, which included narrative and storyboard development, voice-over recording, and animation finalization using Adobe After Effects; 4) Design validation by two experts (a material expert and a media expert); 5) Design refinement; 6) Limited-scale product testing, involving 8-10 breastfeeding mothers, adjusted for the limitations of the research duration and budget [6].

This research was conducted from May to June 2025 within the working area of Kahuripan Public Health Center, Tasikmalaya City. The study subjects included all breastfeeding mothers with infants aged 0–3 months in the Kahuripan service area, totaling 52 individuals. A purposive sampling method was applied, with inclusion criteria involving 8–10 breastfeeding mothers with infants aged 0–3 months who were still on maternity leave, for a small-scale trial—considering that the study focused solely on the performance and availability of mothers currently on leave.

Data collection in this study was conducted using questionnaires adapted from the research by Bunga Diana (2023), employing a Likert scale (1–5) [7]. The research instruments consisted of three types of questionnaires. The first was a media expert feasibility questionnaire, which included seven evaluation criteria: variable (4 items), interesting (3 items), simple (3 items), useful (2 items), accurate (5 items), legitimate (4 items), and structure (2 items). The second was a material expert feasibility questionnaire, which assessed five aspects: the breadth, accuracy, and depth of the material (6 items), language (2 items), feasibility of implementation (6 items), video appearance (5 items), and video-related aspects (2 items). The third was a product trial evaluation questionnaire for breastfeeding mothers, consisting of two criteria: display quality (6 items) and content aspects (4 items).

The product validation process was carried out by two experts. The first was a material expert, a lactation counselor who ensured the appropriateness of the content. The second was a media expert, a specialist in health information systems who assessed the technical standards of the audio-visual medium. This validation phase aimed to guarantee the accuracy of the material content and the feasibility of the media before the product trials were conducted with respondents.

The research procedure was carried out through three interrelated phases. The preparation phase began with the identification of the phenomenon of exclusive breastfeeding failure, obtaining research permits, conducting preliminary reviews, and determining the content to be integrated into the media. The implementation phase included identifying potential problems based on exclusive breastfeeding failure data, collecting respondent data according to predetermined criteria, developing the MAPS (Healthy Expressed Breast Milk Management) audio-visual media, expert validation, product revisions based on expert feedback, and conducting limited-scale trials with respondents. The final phase involved compiling the research report and presenting the research findings as part of accountability.

This study adhered to the ethical standards outlined in the *International Ethical Guidelines for Health-related Research Involving Humans*, issued by CIOMS and the WHO [8]. The guidelines emphasize the principle of respect for persons through informed consent, as well as the principles of beneficence and non-maleficence. These were upheld by clearly explaining the purpose and benefits of the research. The principle of justice was implemented by treating respondents fairly, without discrimination based on social status or educational level. In addition, respondent confidentiality was strictly maintained by using codes or symbols on the questionnaire sheets. The application of these ethical principles ensured that the study was conducted with respect for the rights and dignity of the participants, while also making an optimal contribution to the advancement of scientific knowledge.

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Ethical clearance was publised by KEPK (Komite Etik Penelitian Kesehhatan) Poltekkes Kemenkes Tasikmalaya, No.DP.04.03/F.XVIII.20/KEPK/515/2025.

RESULT AND DISCUSSION

A preliminary study conducted on February 17, 2025, through interviews with eight third-trimester pregnant women and breastfeeding mothers on maternity leave, revealed that six of them still lacked knowledge about exclusive breastfeeding. Many working mothers tended to provide formula milk because they were unaware that breast milk could be expressed and stored in a refrigerator. Respondents also rarely read the Maternal and Child Health (MCH) handbook regarding exclusive breastfeeding and expressed breast milk management, stating that they found it difficult to understand and preferred watching videos, which they considered easier and more practical than reading. Interviews with midwives regarding the causes of exclusive breastfeeding failure revealed several key factors, including boredom among working mothers, lack of maternal knowledge, insufficient support from family and the MCH handbook, as well as low awareness among breastfeeding mothers.

The MAPS (Healthy Expressed Breast Milk Management) audio-visual media contains content covering the definition of exclusive breastfeeding, the meaning of expressed breast milk, the benefits of breast milk for infants, the ideal time to express breast milk, steps for expressing, how to store expressed breast milk, its shelf life, storage media, recommended containers, and methods of serving expressed milk. The product was designed through narrative and storyboard development using Microsoft Word, voice-over creation using Realtime and Clanger Client applications, and animation production and finalization using Adobe After Effects, in collaboration with Agus Ginjar as an animation expert. The media development process is illustrated in Figure 1.

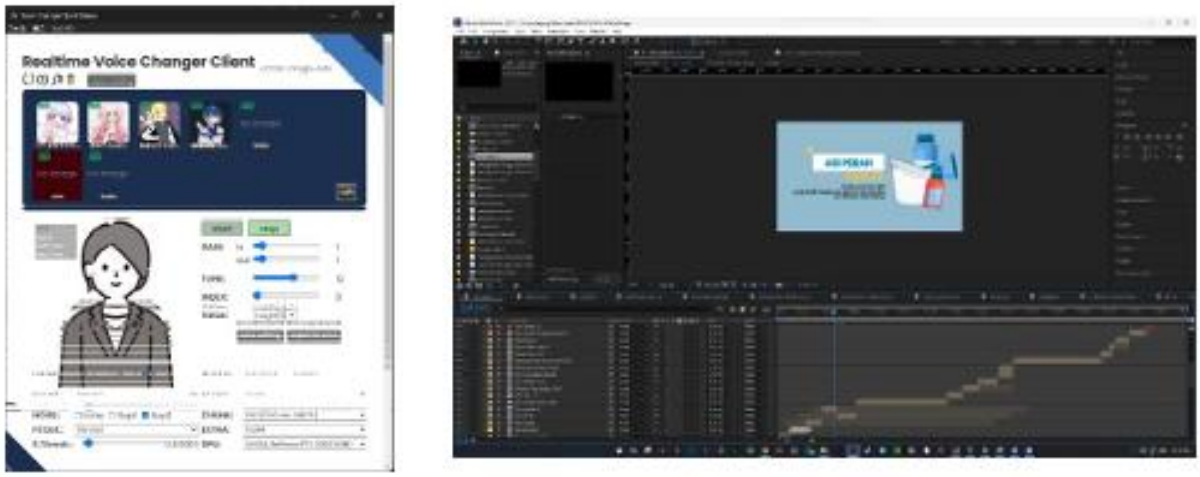

Figure 1. Realtime voice changer client application used for voice-over and adobe after effects used in the animation development process.

Material expert validation was conducted (lactation counselor) on May 19 and 27, 2025. The results of the media expert validation are presented in Table 1.

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Table 1.
Results of material expert validation

No	Aspect Assessed	First Validation	Second Validation
1	Aspects of the correctness, coverage, and depth	3.1	4.5
2	Language Aspect	4.0	5.0
3	Feasibility Aspect	4.0	4.8
4	Video Appearance Aspect	4.6	5.0
5	Audio Aspect	3.0	5.0
	Average Score	3.74	4.86
	Percentage (%)	74.8%	97.2%
	Category	Feasible	Highly Feasible

Suggestions and expert recommendations on the material include combining the slide containing the statement 'Breast milk is a good source of nutrition for babies' into one, adding content about the frequency of expressing breast milk, including illustrations of various breast milk storage containers, improving the sequence of the material, adding voice-over narration, and incorporating breast milk elements into the cup feeder.

The validation by the material expert, lactation counselor, showed a significant improvement from the first validation (74.8% – categorized as feasible) to the second validation (97.2% – categorized as highly feasible). Revisions were made based on the expert's suggestions, including merging slides, adding material on the frequency of expressing breast milk, inserting images of breast milk storage containers, improving the sequence of the material, adding voice-over narration, and incorporating breast milk elements into the cup feeder.

Media expert validation was carried out (a health information systems expert) on May 20 and June 2, 2025. The results of the media expert validation are presented in Table 2.

Table 2.
The results of the media expert validation

No	Aspect Assessed	First Validation	Second Validation
1	Visible	2.5	4.25
2	Interesting	2.3	4.3
3	Simple	2.0	5.0
4	Useful	2.5	5.0
5	Accurate	1.8	4.2
6	Legitimate	2.0	5.0
7	Structure	2.0	5.0
	Average Score	2.15	4.67
	Percentage (%)	43%	93%
	Category	Quite Feasible	Highly Feasible

Media expert validation also showed a drastic increase from the first validation (43% – categorized as fairly feasible) to the second validation (93% – categorized as highly feasible), following

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improvements in animation sequence, the addition of EBM delivery media elements, and voice-over narration. Suggestions and recommendations from the media expert included improving the animation sequence, adding media elements related to expressed breast milk (EBM) in the section explaining EBM, and incorporating voice-over narration. The design revisions were made based on the questionnaire results, suggestions, and recommendations from both experts, leading to the product being deemed highly appropriate for product trial.

Figure 2. Comparison of the display before and after the revision, in which the slides that were originally divided into two were combined into a single slide

The limited-scale product testing was conducted on May 29–30, 2025, involving 10 respondents of breastfeeding mothers with infants aged 0–3 months who were still on maternity leave in the working area of Kahuripan Community Health Center. The test was carried out using a questionnaire consisting of 10 questions. The results of the limited-scale product testing are presented in Table 3.

Table 3.
The results of the limited-scale product testing

No	Respondent	Display Quality	Content Aspect	Average
1	R1	5.0	5.0	5.0
2	R2	5.0	5.0	5.0
3	R3	5.0	5.0	5.0
4	R4	5.0	5.0	5.0
5	R5	4.6	5.0	4.8
6	R6	5.0	5.0	5.0
7	R7	5.0	5.0	5.0
8	R8	5.0	5.0	5.0
9	R9	5.0	5.0	5.0
10	R10	4.5	4.25	4.375
Average Score		4.91	4.93	4.92
Percentage (%)		98.2%	98.5%	98.35%
Category		Highly Feasible	Highly Feasible	Highly Feasible

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The results of the small-scale product trial showed that the MAPS audiovisual media was highly feasible to be used as an educational tool for improving exclusive breastfeeding, with an average overall score of 4.92 out of a maximum score of 5.0, equivalent to 98.35%

This study on the development of the MAPS (Healthy Expressed Breast Milk Management) audiovisual media successfully produced a 3-minute-and-50-second educational product developed through a Research and Development (R&D) approach based on the Sugiyono model (2019) [9]. The background of this study is the low rate of exclusive breastfeeding coverage at the Kahuripan Community Health Center, which was only 57.84% in 2024. Meanwhile, the practice of exclusive breastfeeding requires effective and systematic management to provide protection for infants against various diseases and infections [10]. Inadequate breastfeeding can be a risk factor for impaired child growth and development, potentially leading to serious consequences later in life [11].

Preliminary study results showed that 6 out of 8 respondents were unaware of exclusive breastfeeding and expressed breast milk (EBM) management, and expressed reluctance to read the MCH (Maternal and Child Health) handbook, preferring video media which they considered more practical. This finding aligns with the reality that many working mothers stop breastfeeding because they are unaware that breast milk can be expressed and properly stored. This lack of knowledge regarding EBM management poses a serious issue, as improperly stored expressed breast milk (EBM) can become contaminated with bacteria, viruses, or parasites, posing risks to the infant. Therefore, engaging and easy-to-understand educational media is needed to enhance mothers' knowledge of EBM management.

The MAPS audiovisual media developed in this study contains comprehensive educational content covering topics such as the definition of exclusive breastfeeding, understanding expressed breast milk (EBM), the benefits of breast milk for infants, the optimal time to express breast milk, steps in expressing breast milk, proper storage methods, the shelf life of EBM, recommended types of storage containers, media used for feeding EBM, and appropriate serving techniques. The material was tailored to meet the needs of working breastfeeding mothers, enabling them to understand and master various aspects of EBM management so they can continue providing exclusive breastfeeding even when not physically present with their babies. In the product development process, narration and storyboard were prepared using Microsoft Word, voice recordings were made using the Realtime Voice Changer Client application, and the final animation was produced using Adobe After Effects software, in collaboration with a professional animator.

Involving 10 breastfeeding mothers with infants aged 0–3 months who were on maternity leave, the small-scale trial results showed a very high level of product feasibility, reaching a score of 98.35%. The animated video proved to have a significant impact on the learning process due to its ability to capture attention, enhance memory retention, and facilitate the visualization of abstract concepts, objects, and their interrelationships [12]. The 3-minute-and-50-second video was designed with consideration for learning effectiveness, intended objectives, engaging and relevant content, and audience characteristics. To maintain viewer engagement and attention, an interactive format approach was used, incorporating storytelling and animation.

Some similar research results were obtained in a study by Bunga Diana, where the “SI MERAH” audiovisual media was categorized as very feasible with a very good response. Subsequently, a study titled 'The Influence of Video Media on the Knowledge and Attitude of Working Mothers Regarding Expressed Breast Milk and Exclusive Breastfeeding' showed that there was an influence on the attitudes and knowledge of working mothers.

The high level of respondent acceptance of the MAPS audiovisual media indicates that it can serve as an effective solution to address the low literacy of the MCH handbook and the lack of maternal interest in reading educational materials. The combination of visual and audio elements in the form of animation has proven effective in presenting complex information related to expressed breast milk

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(EBM) management in a simpler, more engaging, and easily understood manner. This phenomenon aligns with technological advancements and the tendency of modern society to prefer multimedia content over written texts.

The development of this media also highlights the urgency of innovation in health education methods, particularly for working breastfeeding mothers. MAPS media can serve as a supportive tool in posyandu activities, lactation counseling, and independent learning. With the widespread use of smartphones among mothers, this media can be accessed flexibly anytime and anywhere. As a result, access to information regarding EBM management improves, ultimately contributing to an increase in exclusive breastfeeding coverage.

CONCLUSION

The results of this study indicate that the MAPS (Healthy Expressed Breast Milk Management) audiovisual media was successfully developed through a structured six-stage process. The educational video proved to be feasible and effective as a learning tool to support exclusive breastfeeding, particularly in improving mothers' understanding and skills in managing expressed breast milk. The MAPS media is expected to assist breastfeeding mothers in enhancing their knowledge and practice related to exclusive breastfeeding. Educational institutions may use this media as a supplementary learning resource, and future research is encouraged to expand the study on a larger scale to strengthen and generalize the findings.

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