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Android-based Kasih Ibu application for postpartum mothers using the research and development method

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Key word: application; Kasih Ibu; endorphin massage; TAM; RnD.

Abstract

Endorphin massage is a light massage technique performed to help milk production. The purpose of this study is to develop the application of Kasih Ibu as a medium of education that can support the application of Endorphin Massage. The method used in this study is Research and Development (RnD) with Brog and Gall models. The subjects of the research are two media experts, two material experts, and 40 postpartum mothers. The results showed that the validation test results from material experts averaged 92% and validation results from media experts averaged 87%, which showed that the Kasih Ibu application was very feasible to use. Test user validity using a TAM (Technology Acceptance Model) questionnaire. Small-scale trials resulted in 95% and large-scale trials resulted in 96% with the very Worth it category. The Kasih Ibu application as a medium of Education and Communication is very worthy of use and can be accepted by postpartum mothers.

Introduction

Regulation of the Minister of Health Number 23 of 2014 concerning Efforts to Improve Nutrition. The implementation of balanced nutrition efforts for each family must be able to recognize, prevent, and overcome the nutritional problems of each family member. One of the efforts made is by breastfeeding newborns up to 6 months of age without additional food or drink.[1]

Breast milk contains complex nutrients, which contain colostrum which is rich in protein as an antibody so breastfeeding can reduce the risk of infant death due to infection. Breast milk also contains immunoglobulins, proteins, fats, calories, and lactose. In addition to containing food substances, breast milk also contains absorbent substances in the form of enzymes that will not interfere with enzymes in the intestine. Formula milk does not contain enzymes so the absorption of food depends on the enzymes present in the baby's intestine.[2,3]

Based on the results of nutritional status monitoring in 2017, the percentage of infants who get exclusive breastfeeding in Indonesia is 35.73%. For South Sulawesi Province it is 42.13%, while for Makassar City it is 45.8%.[2]

The factor that becomes a problem in breastfeeding is the intensity of breastfeeding which is less so that it affects milk expenditure. This is due to the lack of stimulation of the hormone oxytocin which is a hormone that plays a role in the production of breast milk. Some studies prove that the work of the hormone oxytocin is influenced by psychological states. So a method is needed that can control the mother's psychology so that she can relax, and not worry excessively, the mother is happy, calm, and confident because this is very instrumental in the breastfeeding process.[4,5]

Endorphin Massage is a light massage technique performed at certain points of the body, namely on the neck, back, and arms to create a sense of relaxation, and confidence and reduce stress in nursing mothers. With a feeling of pleasure, calm, relaxed, and confident, breast milk will come out smoothly. Endorphin massage in several studies is influential in the release of the hormone oxytocin which plays a role in the process of milk secretion.[4–6]

Previous studies have scientifically proven the effects of endorphin massage. A study conducted by Masning (2017) found that endorphin massage affects breast milk expenditure with a value of p = 0.000. The results of the above research are in line with the results of research conducted by Tri Budi Rahayu (2019), based on the results of the study it can be analyzed that endorphins massage has an effect on the length of breast milk expenditure with a value of p = 0.026, the results showed that mothers with endorphins massage intervention, milk expenditure earlier/faster than the control group, which is <24 hours. Research conducted by Nurfaizah Alza (2020) found that endorphin massage affects breast milk production in breastfeeding mothers with a value of p = 0.0001.[7–9]

Based on the description above, it can be concluded that endorphins massage is a non-pharmacological alternative that can be applied to helping mothers succeed in breastfeeding. This research is ongoing. Based on previous research, it was found that the endorphin massage module is very feasible to use and is very influential in increasing knowledge. So researchers want to develop the results of the research into an application that contains more complex education.[10]

Along with the development of the digital world, people's need for information is easily obtained by accessing news or sources from the media, one of which is by using smartphones or *smartphones*. Research by Rizky *et al.*, shows that the use of Android application-based learning media has a significant influence on student learning outcomes and has a positive influence of 80.05%. The results of this study are supported by research by Nisa *et al.*, providing conclusions that Android-based health applications can add understanding, are interesting to use, easy to understand and the material is easy to remember. This shows that the dissemination of information today can take place quickly through information technology that can be applied through the use of mobile applications.[11,12]

Based on the description above, researchers consider it necessary to design an Android-based application as an effective and efficient educational and communication medium for Postpartum mothers.

Materials and Methods

Research design

This study used Research and Development (RnD). RnD design is intended for creating and developing new products. This product development process adopts the Brog and Gall development theory, where the stages in this research begin research and information collecting, planning, developing a preliminary form of the product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation). The product is declared suitable for use after going through product feasibility trials using the TAM (Technology Acceptance Model) questionnaire.[13–17] However, the research method used was only able to create the product and analyze product acceptance from users and was not able to describe the effectiveness of the product in increasing the knowledge and skills of breastfeeding mothers in carrying out endorphin massage.

Study participants

The participants of the research are two media experts, two material experts, and 40 postpartum mothers for small and big group examinations.

Variable, instrument, and data collection

The variables in this study are as described in Table 1.

The research instrument used a questionnaire previously tested for validity and reliability and was declared valid and reliable. The instrument used a 5-point Likert scale: strongly agree = 5, agree = 4, mediocre =3 disagree = 2 and strongly disagree = 1.

Data Analysis

The assessment in this development research is determined by scoring product test questionnaires (Table 2)

The results of the validation test will then be compared against the range of application eligibility values. To determine the feasibility value of the product, the following formula is used:

$$\textbf{Eligibility Percentage } (\%) = \frac{\text{Total score obtained}}{\text{Maximum Score}} \times 100$$

Feasibility criteria

Feasibility criteria are discussed in Table 3.

Ethical clearance

The research has received ethical approval from the Health Research Ethics Committee, Health Polytechnic Makassar, based on ethical certificate 080/KEPK-PTKMS/III/2022. During the research, the researcher pays attention to the ethical principles of information to consent, respect for human rights, beneficence, and non-maleficence.

Results

This research uses Research and Development (RnD) Methods to produce products in the form of the "Kasih Ibu" Application. In the RnD method, there are 6 stages of development as follows.

Research and information collecting (needs analysis)

Based on the results of the needs analysis, 8 out of 10 postpartum mothers consider it necessary to be able to access all forms of information related to the postpartum period and breastfeeding without being limited by space and time. So that an application is needed that can be accessed by Postpartum mothers effectively and efficiently. So researchers consider it necessary to design an android-based application as an effective and efficient educational and communication medium for postpartum mothers.

Planning

Product design

The Kasih Ibu application is designed with 3 main menus, namely: i) endorphin massage module; ii) video of endorphins massage practice iii) live chat; iv) material preparation.

The material is prepared based on a pre-arranged module entitled "Application of Endorphins Massage to Postpartum Mothers" and standardized Endorphins massage SOPs.

Develop a preliminary form of product (early products created)

As for the initial products that have been applied for Kasih Ibu, we display as depicted in (Figure 1 and 2).

Validation test

The feasibility assessment of the Kasih Ibu Application is carried out through three validation processes, namely media expert validation, material expert, and user validation. The assessment results were obtained by filling out media expert validation questionnaires, material expert validation questionnaires, and TAM (Technology Accepted Model) questionnaires for user validation (postpartum mothers). The following is the data from the eligibility validation of the Kasih Ibu Application.

Material expert validation

Based on the graph of the results of material expert research, the average result of the assessment of aspects of content, presentation, language, and contextual aspects in 1st material expert is 94%, and in 2nd material expert is 91% so that can be interpreted that the eligibility criteria for the application are in the category very worthy of use (Figure 3).

Media expert validation

Based on the results of the assessment of media experts from the aspects of display, programming, and presentation of media, the results of the assessment of 1st media experts amounted to 82% with feasible criteria, and the results of the assessment of 2nd media experts amounted to 92% with very worth it criteria to use (Figure 4).

User validation (postpartum mothers)

User validation (Postpartum mothers) is carried out through two stages, namely small-scale trials and large-scale trials. The validation results are described in graphic form as follows (Figure 5 and 6).

A small-scale trial was conducted on 10 Postpartum mothers using the TAM (Technology Accepted Model) questionnaire. The results of the small-scale trial are described in graphic form (Figure 5)

The percentage of eligibility for the Kasih Ibu Application is viewed from five aspects, namely easy to use by 95%, usefulness by 94%, Attitude Toward by 97%, Behavioral Intention by 96%, and Actual Usage by 97%. The average percentage of the five aspects is 95%, so it can be concluded that the Kasih Ibu Application as a learning medium, is very feasible to use.

A large-scale trial was conducted on 30 postpartum mothers using the TAM (Technology Accepted Model) questionnaire. The results of the small-scale trial are described in graphic form as described in Figure 6.

The percentage of eligibility for the Kasih Ibu Application is viewed from five aspects, namely easy to use by 94%, usefulness by 94%, Attitude Toward by 97%, Behavioral Intention by 97%, and Actual Usage by 97%. The average percentage of the five aspects is 96%, so it can be concluded that the Kasih Ibu Application as a learning medium, is very feasible to use.

Discussion

This research was conducted to design to produce an educational media and communication media that can be used as a forum that can connect postpartum mothers and health workers and postpartum mothers who are in the working area of the puskesmas where she is. This product development process adopts the Brog and Gall development theory, where the stages in this research start from needs analysis, development design, learning model development, evaluation or trial, implementation, and final product.[16,18-20]

The feasibility test of the Kasih Ibu Application was carried out using the Technology Acceptance Model (TAM) questionnaire. Several studies show that the use of TAM can predict the acceptance of information technology. TAM includes aspects of perceived ease of use, perceived usefulness, attitude toward attitude, behavioral intention, and actual usage.[17,21-28]

Some previous studies have also used TAM to describe the perception of user acceptance of an information system or technology that has been designed. Some previous studies such as Rahimi's research (2018) which used the Technology Acceptance Model (TAM) approach to analyze the acceptance of the use of health information systems[23] Jeffrey Campbell (2017) analyzed the use of TAM as a proposed acceptance of *Mobile Health Intervention technology*[29] Then in Bagot's study (2019) which used TAM to analyze user acceptance of acute stroke telemedicine services with the results obtained that from the aspect of perceived benefits, it was found that there were clinical improvements and patient care. From the aspect of ease of use, convenience is obtained in terms of clinical, technical, and consulting relationship aspects.[13]

The feasibility test on the Kasih Ibu Application is carried out in two stages, namely small-scale feasibility tests and large-scale feasibility tests. The results of the feasibility test on a small scale resulted in 95%, While in large-scale tests obtained was 96%, so it can be concluded that the Kasih Ibu Application as an educational medium is very feasible to use and acceptable to users.

The percentage of the five aspects, namely, easy to use, usefulness, attitude toward, behavior intention, and actual usage, can describe user acceptance of the Kasih Ibu Application. This is in line with the results of Fiyah's research (2019) which states that the factors of ease of use, usefulness, attitude toward, behavior intention, and actual usage each have a significant effect on user acceptance of the application.[30,31]

The limitation of this research is that it cannot describe the effectiveness of the product in increasing the knowledge and skills of breastfeeding mothers in carrying out endorphin massage.

Conclusions

Based on the results of validation tests conducted by media experts, material experts, and users (postpartum mothers), the Kasih Ibu Application is very feasible to use.

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Table 1. Variables.

No	Variable	Operational Definition
1	**Independent Variable:** Application Kasih Ibu	Kasih Ibu is an application developed as a medium of education and communication for postpartum mothers which is equipped with an Education menu consisting of Endorphin Massage modules and videos and communication media with live chat features that can directly connect postpartum mothers and health workers
2	**Dependent Variable:** Postpartum Mother's Acceptance	The energy of Postpartum mothers is the feasibility of the application which reviews 5 aspects, namely perceived ease to use, perceived usefulness), attitude toward), behavioral intention, and actual usage

Table 2. Validation questionnaire scoring conditions table.

Answer	Score
Strongly agree	5
Agree	4
Mediocre	3
Disagree	2
Strongly disagree	1

Table 3. Feasibility criteria.

Category	Percentage
Very worth it	85 - 100
Proper	69 - 84
Pretty decent	53 - 68
Less decent	37 - 52
Not worth it	20 - 36
Very unworthy	0 - 19

Source: Novaeni *et al.* 2018[32]: https://creativecommons.org/licenses/by-nc-nd/4.0/

Figure 1. Main view.
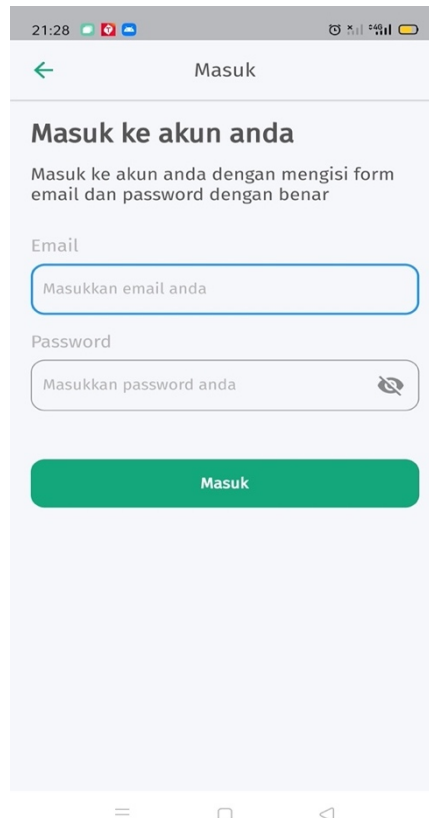
Figure 2. Main menu.

Figure 3. Material expert validation results.

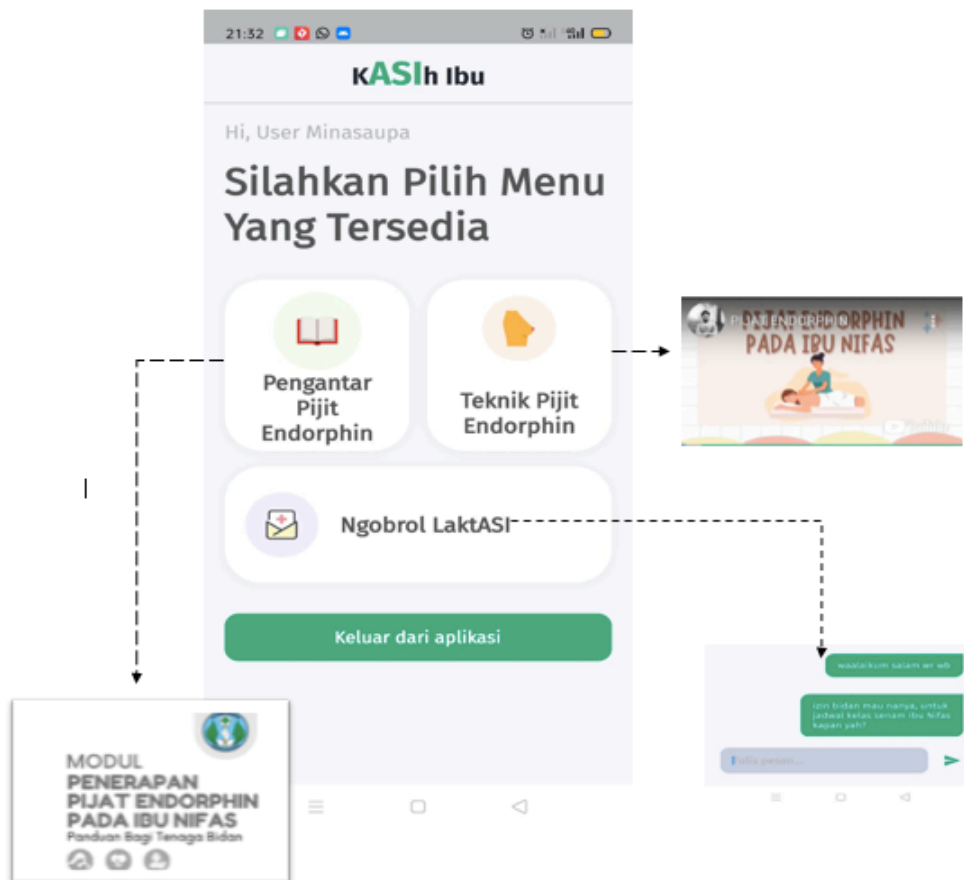|	Content	Serving	Language	Contextual	Feasibility
1st material expert	95%	90%	97%	93%	94%
2nd material expert	93%	95%	90%	87%	91%
Average	94%	93%	93%	90%	92%

Percentage of feasibility
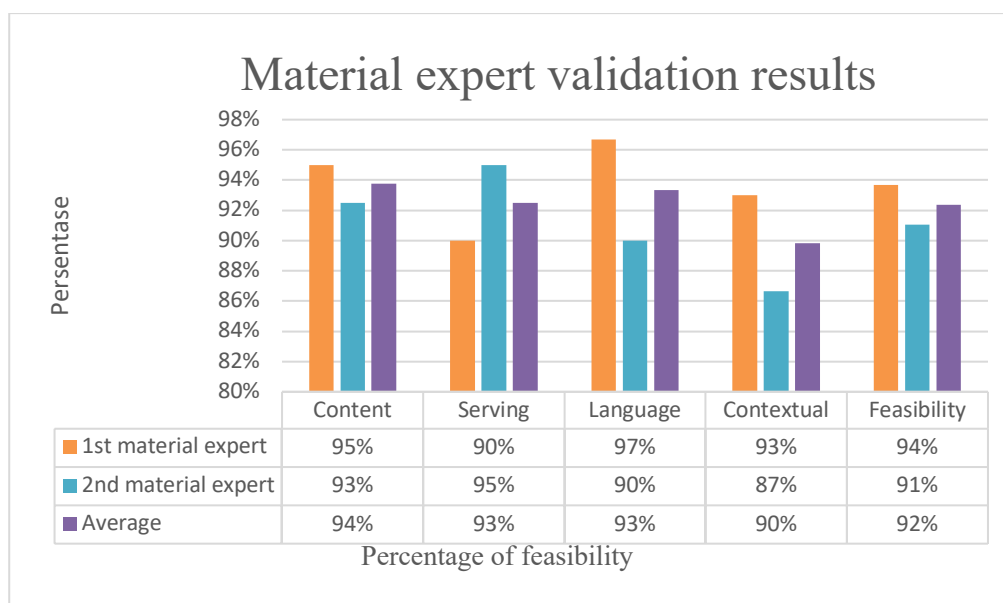
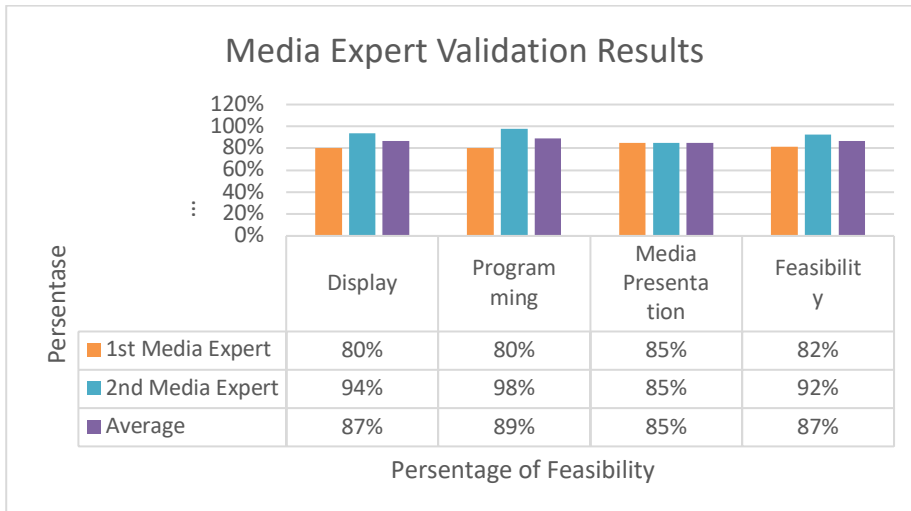**Figure 4.** Media expert validation results.

Media Expert Validation Results

	Display	Programming	Media Presentation	Feasibility
1st Media Expert	80%	80%	85%	82%
2nd Media Expert	94%	98%	85%	92%
Average	87%	89%	85%	87%

Persentage of Feasibility

Figure 5. Graph of small-scale trial results.

Result of Small-Scale Trials

Easy To Use	Usefulness	Attitude Toward	Bahavioral Intention	Actual Usage	Average
95%	94%	97%	96%	97%	95%

Percentage of Feasibility
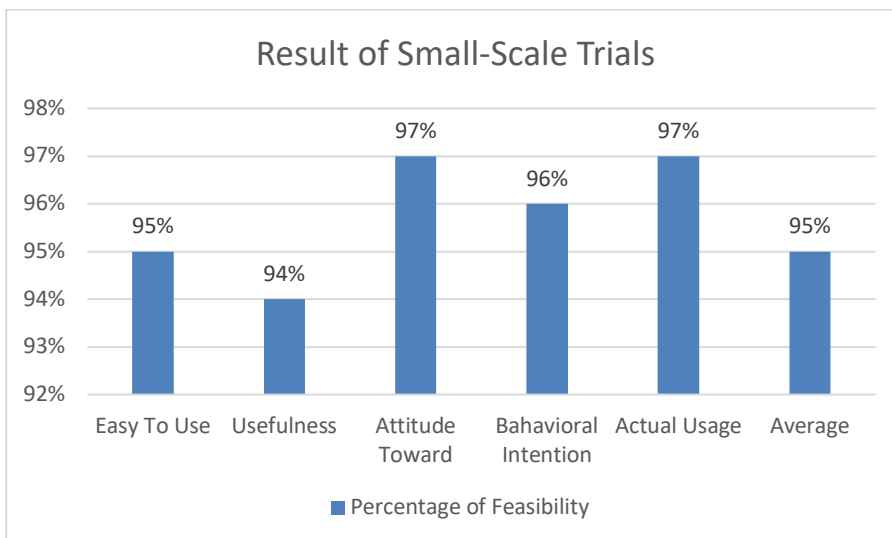
Figure 6. Graph of large-scale trial results.