MEDISAINS
Jurnal Ilmiah Ilmu - Ilmu Kesehatan

Innovation Article

E-Postpartum mobile application to increase postnatal knowledge care

Refa' Khairunnisa [1]✉, *Sri Sumarni* [1], *Supriyana* [1]

[1] *Postgraduate Program In Applied Health, Poltekkes Kemenkes Semarang, Central Java, Indonesia*

ARTICLE INFORMATION

Received: October 21, 2021
Revised: December 14, 2021
Available online: December 30, 2021

KEYWORDS

Pregnancy; Postnatal Care; Mobile Applications

CORRESPONDENCE

Phone: +6282158693716

E-mail: refakhairunnisa96@gmail.com

A B S T R A C T

Background: During this pandemic, maternal health services must still be considered because it is feared that there will be an increase in postpartum maternal morbidity and mortality. Postpartum care knowledge is vital for postpartum mothers to maintain their condition, so it is necessary to make an application that helps mothers through the E-Postpartum application.

Objective: The study aims to develop and test the E-Postpartum mobile application to increase knowledge of postnatal care.

Method: This study employed Research & Development consisting of 4 stages, namely Literature Study, Development Stage, Validity Expert, and Trial.

Results: The E-Postpartum mobile application has six features, starting from education about postpartum care to consultation. The trial results showed that the application effectively increased the knowledge and action of postpartum mothers ($p < 0.001$).

Conclusion: The E-Postpartum application is beneficial for health workers in providing education, especially for postpartum mothers in carrying out care during the postpartum period. This postpartum application will make it easier for mothers to check their condition and make it easier for midwives to detect early and control the mother's condition even remotely.

INTRODUCTION

A mother's knowledge about postpartum care is fundamental because it will determine the good or bad condition of the mother in the future. During this pandemic, many mothers are reluctant to come to health facilities for postpartum visits, perhaps because they are afraid of contracting it or are lazy to implement existing health protocols. Because of this, it is feared that mothers will receive less education about postpartum care. In addition, if the mother ignores the postpartum visit, there will be a delay in detecting and treating complications during the puerperium, which can harm both the mother and the baby. Before the pandemic, the maternal mortality rate had become a big challenge, especially during this pandemic.[1,2]

During this pandemic, one of the health facilities and infrastructure recommended in the Indonesian Ministry of Health guidelines provides health services through telehealth or online media. The use of telehealth can be used as a strategy for behavior change because it provides information. In addition, through telehealth, it is hoped that mothers and babies will still receive essential services, risk factors can be identified early, and access emergency help and health workers get protection.[3,4]

Through online media such as text messaging, mobile applications, and social networking, one can receive critical information about health themes. Media users will be essential in health interventions, especially problematic or risky health behaviors.[5,6] In this era of information and communication technology, online media is the most widely used. It can be seen from the data on the percentage of internet users in Indonesia from 2019 to the second quarter of 2020, reaching 196.71 million users from the 266 million population.[7]

Currently, no research makes the E-Postpartum application. A similar study applies the knowledge of the husband's readiness in dealing with his wife's pregnancy, and the results of the husband's knowledge score increase. Then another study measured the speed of reporting the results of maternal health services by comparing the manual method and the application; the results obtained when

https://doi.org/10.30595/medisains.v19i3.11999

using the application were 4.19 minutes faster than the manual method.[8,9]

This study aims to create a mobile application that makes it easier for postpartum mothers to receive education about postpartum care. There are three main themes in the educational material: promotive, preventive, and curative. Each of these themes plays an essential role in the mother's condition. In addition, an examination feature helps monitor the mother's condition even though she is at a distance. This application hopes to help make it easier for postpartum mothers and health workers to undergo the postpartum period.

METHOD

The development model used in the research consists of Literature Study, Development Stage, Validity Expert and Trials.[10]

Stage 1 Literature Study

At this stage, the researcher conducted a literature study and data collection information by interviewing the Public Health Departments and midwives to obtain data on potential and problems in the field as application material.

Stage 2 Application Development

The results from the initial stage will be used to design an information system-based postpartum education model, adapted to the needs of learning methods in the form of education about the knowledge and actions of postpartum mothers. Then the design of this educational model uses the SDLC approach, where the stages consist of the planning, analysis, design, implementation, testing, and maintenance stages.[11]

Stage 3 Expert Validity

Expert validation tests are carried out by Information Technologies (IT) experts, material experts, and midwives. The data collection technique was carried out by circulating a questionnaire and then revising the use of the model if there was one according to expert advice. This test is carried out in order to produce a model that is feasible and ready to be implemented.

Stage 4 Application Testing

They tested the application using a quasi-experiment with a non-equivalent control group design. The sample consisted of 30 postpartum mothers who were divided into two groups. The treatment group was given education through the E-Postpartum application, and the control group was given education through leaflets. The first step was pre-test, and then intervention was given. After the postpartum period, the respondent filled out a post-test. The variables assessed were changes in the mother's knowledge and actions during the postpartum period after receiving education through the E-Postpartum application and leaflets. Data analysis was conducted using the Mann-Whitney Test to test the difference in knowledge and actions between the intervention and control groups.

RESULTS

Results of the Literature Review.

Based on a literature review and interviews, it was concluded that the obstacle during this pandemic period was having to comply with health protocols that made midwives and patients less than optimal in providing and receiving postpartum services. Therefore, the E-Postpartum application is designed to make it easier for midwives and patients to interact. In educational material, there are three themes, namely promotive, preventive and curative. Promotional and educational materials are basic things that mothers need to know during the postpartum period, such as about the postpartum period, tips for successful breastfeeding, and tips for caring for newborns. Then the preventive education material contains prevention that mothers can do at home, such as things that mothers should avoid during the postpartum period, early detection of postpartum disorders, and general procedures for postpartum mothers during the pandemic. Furthermore, curative education material cares that mothers can do while at home, such as breast care, mother's feeding recommendations, and how to consume vitamin A.[12,13]

Results of Application Development

E-Postpartum application can be downloaded at www.e-postpartum.online. In the application, there are six features available. Once downloaded, a login page will appear to enter the application (Figure 1). After logging in, a menu page will appear in the application (Figure 2). In feature 1 (Figure 3) is the postpartum period of the mother, which shows how many days the mother's postpartum period is and shows the date of the first, second, third, and fourth postpartum visits.

In feature 2 (Figure 4) is a schedule alarm where the midwife or mother can input the alarm according to the examination schedule in the postpartum menu. Then an alarm will automatically appear on the mother's smartphone to carry out an examination. In feature 3 (Figure 5) is an examination where there will be examination forms for the first, second, third, and fourth postpartum visits, each of which has a different form because it follows the MCH Handbook. The postpartum mother's education menu in feature 4 (Figure 6) consists of promotive, preventive, and curative. In feature 5 (Figure 7) is the E-Postpartum application guide, and in the last feature 6 (Figure 8) is a consultation menu that will connect directly to WhatsApp, the midwife in charge.

Results of Trial

The results of the trial found that the increase in knowledge and action in the group given the E-postpartum application (intervention group) was higher than the group that was only given leaflets (control group) (p<0.001) (Table 1).

Table 1. Differences in Knowledge and Actions Between Intervention and Control Groups

Variable	Intervention (Mean±SD)	Control (Mean±SD)	p-value
Knowledge			
Before	7.8±1.971	8.33±2.289	0.598
After	15.73±1.971	12.27±3.218	0.003
Difference	7.93±2.086	3.93±2.344	0.0001
Action			
Before	4±1.363	4.2±1.740	0.609
After	8.4 ±1.727	6.6±1.682	0.009
Difference	4.47±1.552	2.4±1.298	0.001

DISCUSSION

The features in this application are the postpartum period, alarm, examination, education, consultation, and application guidance features. The main point of this application is the educational menu which contains promotive, preventive, and curative information during the postpartum period. After the mother gets information from the application about her postpartum period, it is hoped to change the mother's behavior to pay more attention to her postpartum period. Starting from looking at the postpartum menu to find out how long the postpartum period is so that the mother can see if her condition is expected according to existing guidelines and carry out care that she can do at home.

There is also an alarm in this application that will remind the mother to carry out a postpartum examination according to the existing schedule. Then in this application, there is an examination menu where the mother fills out the examination form according to the time of her visit. If the midwife sees that the examination results are not appropriate, the midwife will immediately contact the postpartum woman. Alternatively, if the patient feels a problem, a patient can contact the midwife in charge through the consultation menu. The menus in the application are designed in such a way as to make it easier for mothers to receive education and carry out examinations remotely.

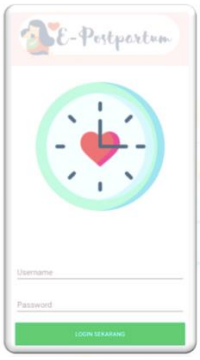

Figure 1. Login Menu

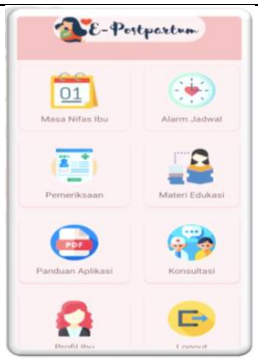

Figure 2. Application Menu

Figure 3. Feature 1, Postpartum Menu

Figure 4. Feature 2, Alarm Menu

Figure 5. Feature 3, Examination Menu

Figure 6. Feature 4, Education Menu

Figure 7. Feature 5, Application Guide

Figure 8. Feature 6, Consultation Menu

Expert or feasibility testing is an activity to assess the model's design by presenting several experts such as IT experts, material experts, and midwives. This is done so that something produced is more valid or can be trusted.[14] As we also know, now there are many applications that we can get for free. Even though it is free, the application is

not guaranteed to be correct and quality if it is not carried out with due diligence first. If it is not guaranteed, it can cause user failure.[15] From the expert's advice, this application can be added to the postpartum mother's diagnosis results. This application becomes better because the mother can find out her diagnosis after doing an online examination.

This study found that knowledge of postpartum mothers before and after treatment were different, both in the intervention group and the control group. However, the intervention group had the highest average difference of 7.93 from the control group, only 3.93. This means that the increase in knowledge of the intervention group is more significant than that of the control group. In the intervention group, using the E-Postpartum application made it easier for postpartum mothers to obtain postpartum education because it could be accessed anytime and anywhere when the mother was using a smartphone.[16,17] Moreover, as we know now, along with technological advances and the development of an increasingly modern era, smartphones have become a communication tool that can convey messages in seconds. With its practical form and various functions, the smartphone becomes a tool that makes life easier and increases one's knowledge. This is evidenced in the research of Ratnaeni et al. providing education to postpartum mothers through Whatsapp Group; the results obtained are an increase in knowledge of 84.6%.[18,19]

If the knowledge of postpartum mothers increases, it will also improve health services for postpartum mothers. In Prihanti's research, it was proven that 90,81% of mothers who had good knowledge had complete postpartum visits, 52.63% had sufficient knowledge of complete postpartum visits, and none of the mothers had less knowledge had complete postpartum visits.[20] Technology-based telehealth has improved one's understanding of the education provided; apart from being accessible anywhere and anytime, telehealth can also reduce the cost of obtaining the information individuals need.[21,22]

It was found that there was a difference after the two groups were given treatment so that the mean value of the intervention group was 8.47, and the mean of the control group was 6.6. It can be seen that the increase in activity in the E-Postpartum application treatment group was higher with a mean difference of 4.47, while the mean in the leaflet treatment group was only 2.4. This is in line with research by Ratneni et al., who provided education about the consumption of protein, vitamin A and vitamin C for postpartum mothers through Whatsapp media. The results showed that mothers who behaved less in protein consumption were 10.3%, then after treatment, it became 46.2%. Furthermore, the consumption behavior of vitamin A which behaves less is 15.4%, then it becomes 53.8% after treatment. Finally, consuming less vitamin C was 35.9% to 59% who behaved well after being given treatment.[18,23]

An individual's actions are formed after knowledge and attitudes change. Then with the application of media facilities where there is complete education to facilitate the delivery of information to users and influence user behavior. In addition, the media can sometimes give rise to an opinion or suggestion in the decision-making process of an individual in doing something.[24,25] An individual's actions are formed after knowledge and attitudes change. Then with the application of media facilities where there is complete education to facilitate the delivery of information to users and affect users' behavior.[21] In addition, the media can sometimes give rise to an opinion or suggestion in the decision-making process of an individual in doing something.[24,26]

In the results of the narrative literature review, it was found that the results of smartphone or web technology could produce benefits for treatment, behavior modification, and education. One example of the Glucose Buddy application, which is used to control diabetes patients, has been proven to help improve patient compliance and can be used efficiently during this COVID-19 pandemic.[19,27] When talking about individual actions or behavior, it is closely related to the knowledge and attitudes of the individual. A person's behavior will generally arise by starting through the cognitive domain that will form knowledge. Then there will be a perception of that knowledge and eventually will cause a response from the object that has been known so that it will form a behavior. This is in line with research that postpartum mothers' knowledge and attitudes affect breastfeeding patterns during the COVID-19 pandemic.[28,29].

CONCLUSIONS AND RECOMMENDATION

The E-Postpartum application is a form of midwifery technology that makes it easier for health workers to educate postpartum mothers about postpartum care. Education has been divided into three themes: promotive, preventive, and curative. The application of these three themes helps to change the behavior of postpartum mothers in conducting examinations so that the postpartum visits they carry out are complete until the fourth visit. Health workers can also monitor the examination results remotely, and if there is a problem, they will immediately contact the patient.

REFERENCES

1. Widiawati S, Puspita M, Lestari RD. Pengaruh Telenursing Terhadap Pengetahuan Ibu Tentang Perawatan Nifas. *J Endur Kaji Ilm Probl Kesehat*. 2020;5(2):305-312. http://ejournal.lldikti10.id/index.php/endurance/article/view/v5i2-5213. Accessed November 21, 2020.

2. Situmorang MH. Faktor – Faktor yang Mempengaruhi Kunjungan Nifas Lengkap di Indonesia : Analisis Lanjut Data Riskesdas 2018 The Determinants of Fully Postpartum Visit in Indonesia : Further Analysis of Riskesdas 2018. *J Ilm Kesehat Masyarakt*. 2021;13(2):78-86. https://jikm.upnvj.ac.id/index.php/home/article/view/179. Accessed September 2, 2020.
3. Kementrian Kesehatan Republik Indonesia. Pedoman Bagi Ibu Hamil, Ibu Nifas, dan Bayi Baru Lahir di Era Pandemi COVID-19. 2020. https://covid19.kemkes.go.id/protokol-covid-19/pedoman-bagi-ibu-hamil-ibu-nifas-dan-bbl-selama-social-distancing. Accessed August 15, 2020.
4. Barbosa EMG, Sousa AAS de, Vasconcelos MGF. Educational Technologies To Encourage (Self) Care In Postpartum Women. *Rev Bras Enferm*. 2016;69(3):582-590. doi:10.1590/0034-7167.2016690323i. https://www.scielo.br/j/reben/a/xYnmQd5FgmKcSC9vbsgcvrQ/abstract/?lang=en. Accessed September 17, 2020.
5. Gilliam M, Chor J, Hill B. Digital media and sexually transmitted infections. *Curr Opin Obstet Gynecol*. 2014;26(5):381-385. doi:10.1097/GCO.0000000000000104. https://journals.lww.com/co-obgyn/fulltext/2014/10000/digital_media_and_sexually_transmitted_infections.10.aspx. Accessed December 22, 2020.
6. Lefevre AE, Mohan D, Hutchful D, et al. Mobile Technology For Community Health In Ghana: What Happens When Technical Functionality Threatens The Effectiveness Of Digital Health Programs? *BMC Med Inform Decis Mak*. 2017;17(1):1-17. doi:10.1186/s12911-017-0421-9. https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-017-0421-9. Accessed December 2, 2020.
7. Badan Pusat Statistik. Survei Sosial Nasional. http://www.bps.go.id/index.php/pencarian?keywordforsearching=internet&yt1=. Accessed November 18, 2020.
8. Santoso HYD, Supriyana S, Bahiyatun B, et al. Android Application Model of "Suami Siaga Plus" as an Innovation in Birth Preparedness and Complication Readiness (BP/CR) Intervention. *J Fam Reprod Heal*.2017;11(1):30-36. http://www.ncbi.nlm.nih.gov/pubmed/29114266%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5664987. Accessed October 1, 2020.
9. Mujahidah S, Widyawati MN. Kecepatan Pelaporan Berbasis Sistem Informasi Dan Pemeriksaan Manual Sesuai Standar Pelayanan Kementerian Kesehatan. *J Keperawatan Silampari*. 2019;53(9):1689-1699.doi:10.1017/CBO9781107415324.004. https://journal.ipm2kpe.or.id/index.php/JKS/article/view/515. Accessed October 23, 2020.
10. Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif Dan R & D*. Bandung: Alfabeta cv; 2019. http://repository.um-palembang.ac.id/id/eprint/8411. Accessed July 2, 2020.
11. Hameed A. Software Development Lifecycle for Extreme Programming. *ITEE J*. 2016;5(1):7-13. http://www.iteejournal.org/Download_Feb16_pdf_2.pdf. Accessed October 19, 2020.
12. Kementrian Kesehatan Republik Indonesia. *Panduan Pelayanan Pasca Persalinan Bagi Ibu Dan Bayi Baru Lahir*. 618.2Indp. Jakarta; 2019. http://kesga.kemkes.go.id/images/pedoman/Buku Panduan Pelayanan Pasca Persalinan bagi Ibu dan Bayi Baru Lahir-Combination.pdf. Accessed September 1, 2020.
13. Sukma F, Hidayati E, Jamil SN. *Buku Asuhan Kebidanan Pada Masa Nifas*. Jakarta: Fakultas Kedokteran dan Kesehatan Universitas Muhammadiyah Jakarta; 2017. http://elearning.fkkumj.ac.id/pluginfile.php?file=%2F8638%2Fcourse%2Foverviewfiles%2FAsuhan%20Kebidanan%20Nifas.pdf&forcedownload=1. Accessed October 1, 2020.
14. Alfianika N. *Metode Penelitian Pengajaran Bahasa Indonesia*. Yogyakarta: Deepublish; 2018. https://books.google.co.id/books/about/Buku_Ajar_Metode_Penelitian_Pengajaran_B.html?id=oNOGDwAAQBAJ&redir_esc=y. Accessed August 25, 2020.
15. Hidayat HT. Uji Kelayakan Sistem Informasi Akademik Menggunakan Faktor Kualitas McCall A-34 A-35. 2018;2(1):34-38. http://e-jurnal.pnl.ac.id/semnaspnl/article/view/741. Accessed December 12, 2020.
16. Nuryati S, Yanti RD. Efektifitas Penggunaan Media Sosial Terhadap Peningkatan Pengetahuan Perawatan Nifas Dan Kepatuhan Kunjungan Ulang Pada Ibu Nifas Di Kota Bogor. *J Bidan "Midwife J*. 2017;3(01):52-59. www.jurnal.ibijabar.org52. Accessed October 6, 2020.
17. Hakim AA, Kellish AS, Atabek U, Spitz FR, Hong YK. Implications for the use of telehealth in surgical patients during the COVID-19 pandemic. *Am J Surg*. 2020;(xxxx):2-3. doi:10.1016/j.amjsurg.2020.04.026. https://www.americanjournalofsurgery.com/article/S0002-9610(20)30231-2/fulltext. Accessed July 5, 2020.
18. Ratnaeni, Bukhari A, Hidayanty H, Daud NA, Bahar B, Mastuti NLPH. Pengaruh Edukasi Media Whatsapp Tentang Gizi Laktasi , Involusi Uteri , Dan Lochea Terhadap Pengetahuan , Sikap Dan Perilaku Ibu Nifas. 2021;8(1):20-33. https://journal.ibrahimy.ac.id/index.php/oksitosin/article/view/724. Accessed June 19, 2020.
19. Rahmini JA, Rahayuningtyas K. Inovasi Kesehatan Terkini Sebagai Strategi Efektif Pada Manajemen Diabetes Di Masa Pandemi: Sebuah Tinjauan Literature. *Jkep*. 2020;5(2):196-211. doi:10.32668/jkep.v5i2.453. https://www.poltekkesjakarta3.ac.id/ejurnalnew/index.php/JKep/article/view/453. Accessed October 3, 2020.
20. Prihanti GS, Rayhana J, Wahyuningtias W, Carolina A, Hidiana A. Analisis Faktor Kunjungan ibu Nifas Di Wilayah Kerja Puskesmas PONDED X. *J Unimus*. 2019;6(1). https://jurnal.unimus.ac.id/index.php/APKKM/articl

e/view/5112. Accessed December 3, 2020.
21. Putri NMJW, Parastan RH, Dyatmika IKWP, Lesmana CBJ. Coaching caregiver : aplikasi telehealth berbasis edukasi. *JIMKI*. 2020;8(3):111-119. https://bapin-ismki.e-journal.id/jimki/article/view/239. Accessed October 31, 2020.
22. Caetano R, Silva AB, Guedes ACCM, et al. Challenges and opportunities for telehealth during the COVID-19 pandemic: ideas on spaces and initiative in the Brazilian context. *Cad Saude Publica*. 2020;36(5):1-16.doi:10.1590/0102-311x00088920. https://www.scielo.br/j/csp/a/swM7NVTrnYRw98Rz3drwpJf/?lang=en. Accessed April 14, 2021.
23. Fisk M, Livingstone A, Pit SW. Telehealth in the Context of COVID-19: Changing Perspectives in Australia, the United Kingdom, and the United States. *J Med Internet Res*. 2020;22(6):e19264. doi:10.2196/19264. https://www.jmir.org/2020/6/e19264. Accessed May 18, 2021.
24. Mubarak W. *Promosi Kesehatan Untuk Kebidanan*. Yogyakarta: Salemba Medika; 2012. http://ucs.sulsellib.net//index.php?p=show_detail&id=54941. Accessed January 16, 2021.
25. Madden N, Emeruwa UN, Friedman AM, et al. Telehealth Uptake into Prenatal Care and Provider Attitudes during the COVID-19 Pandemic in New York City: A Quantitative and Qualitative Analysis. *Am J Perinatol*. 2020;1(212). doi:10.1055/s-0040-1712939. https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0040-1712939. Accessed February 21, 2021.
26. Gultom D, Pinem MN. Pengaruh Promosi Kesehatan Dalam Meningkatkan Perilaku Pasangan Usia Subur Terhadap Keikutsertaan Dalam Program Kelurga Berencana. *J Kesehat Masy dan Lingkung Hidup*.2018:18-26.http://e-journal.sari-mutiara.ac.id/index.php/Kesehatan_Masyarakat/article/view/510. Accessed May 5, 2021.
27. Zhou X, Snoswell CL, Harding LE, et al. The Role of Telehealth in Reducing the Mental Health Burden from COVID-19. *Telemed e-Health*. 2020;26(4):377-379. doi:10.1089/tmj.2020.0068. https://www.liebertpub.com/doi/abs/10.1089/tmj.2020.0068. Accessed January 7, 2021.
28. Wijaningsih K. Psikologi Keperawatan. In: Jakarta: Trans Info Media; 2014:12-38 p. http://ucs.sulsellib.net//index.php?p=show_detail&id=54899. Accessed June 19, 2020.
29. Kusumaningrum AT, Sari PIA. Faktor-Faktor Yang Mempengaruhi Pola Menyusui Pada Masa Pandemi Covid-19. *J Ilm Kesehat Media Husada*. 2021;10(1):74-81. doi:10.33475/jikmh.v10i1.259. https://www.ojs.widyagamahusada.ac.id/index.php/JIK/article/download/259/197. Accessed April 30, 2021.