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Development of Mobile Health EPDS for Early Detection of Postpartum Blues for Postpartum Mothers

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ABSTRACT

Background: Postpartum mothers who cannot adapt to their new role as parents or have no family support can experience psychological (mental) disorders, namely postpartum blues, postpartum depression, and even postpartum psychosis. The purpose of this study was to develop MHEPDS for early detection of postpartum blues.
Subjects and Method: Research and Development (R&D) & quasi-experimental research was conducted on postpartum mothers in the work area of the Sentani Health Center, Jayapura Regency from May 2022 to July 2022. A sample of 30 postpartum mothers was selected by simple random sampling. The dependent variable is mobile health EPDS. The independent variable is the EPDS scale. Other data collected by questionnaire. Data were analyzed by analyzing paired sample T test using the Stata 13 application.
Results: Based on the results of the feasibility test of the MHEPDS application by psychologists, media and midwives for the design aspect the figure was 89.33% and for the clarity of information aspect it was 82.67%. For scores ranging from 81-100%, it is declared very feasible. The paired samples T test showed no difference between MHEPDS (Mean=15.2; SD=6.70) and EPDS (Mean=14.9; SD=6.52), and this result was not statistically significant (p= 0.662).
Conclusion: The MHEPDS application has been made and can be used to detect postpartum blues events. The feasibility test for the application is declared feasible and can be used in postpartum mothers.

Keywords: postpartum blues, EPDS, MHEPDS, research and development

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BACKGROUND

Postpartum mothers can experience problems if they cannot adapt physiologically or psychologically. If the postpartum mother's body is unable to adapt, several physical health problems will occur such as uterine subinvolution and bleeding (Magowan et al., 2014). Postpartum mothers who cannot adapt to their new role as parents or have no family support can experience psychological (mental) disorders, namely postpartum blues, postpartum depression, and even postpartum psychosis (Moore et al., 2010).

There are three types of psychological disorders in postpartum mothers which are distinguished according to the level of seve-

rity. The first psychological disorder for postpartum mothers is postpartum blues with symptoms of sadness and even crying for no reason, sleep disturbances, anxiety, inability to concentrate, headaches, and refusal to pay attention to the baby. The second is postpartum depression with symptoms of decreased libido, decreased appetite, lack of enthusiasm for activities (anhedonia), and a feeling of not being able to care for the baby. The third is postpartum psychosis with symptoms of insomnia, delusions, hallucinations, thought disturbances which can occur from the 3rd day of the postpartum period and even up to one year (Marcano et al., 2014).

The prevalence of psychological disorders in postpartum mothers in Indonesia is not known for certain because there is no institution that has conducted a survey of these cases. However, there are several studies regarding the incidence of postpartum maternal psychological disorders in several districts or cities in Indonesia which were assessed using the Edinburgh Postnatal Depression Scale (EPDS) with the highest prevalence, namely postpartum blues. Postpartum blues has a 10% risk of progressing to depression and even postpartum psychosis if left untreated (Anderson and Maes, 2013).

Research on the prevalence and risk factors for postpartum depression in the city of Denpasar using the EPDS questionnaire in the conventional form showed that the prevalence of postpartum depression in the city of Denpasar using the EPDS scoring was 9 mothers (20.5%) and 4 mothers (9.1%) needed extra care. This prevalence rate is almost the same as the prevalence of postpartum depression in Bangladesh, which is 22% (Dira and Wahyuni, 2016). Current technological advances have made the EPDS questionnaire innovative in conventional form made in the form of a website by utilizing the internet network (Handayani et al., 2020).

The web-based EPDS was created by Mufidati, et al in 2018 as a form of business innovation to efficiently detect symptoms of postpartum depression by utilizing technology. The web-based EPDS has been tested on 44 postpartum mothers in Semarang City. The effectiveness of the web-based EPDS screening was assessed using the Technology Acceptance Model (TAM) with an average ease of use score of 4.32, meaning that all respondents in the study agreed that web-based EPDS was very easy to use. The average value of the benefits of web-based EPDS is 4.83, meaning that all respondents in the study benefited very well from web-based EPDS (Mufidati et al., 2018). However, currently the web-based EPDS cannot be accessed because the creator didn't maintain the system (Handayani et al., 2020).

SUBJECTS AND METHOD

1. Study Design

The method in this research is Research and Development (R&D) & quasi-experimental research carried out on postpartum mothers in the work area of the Sentani Health Center, Jayapura Regency from May 2022 to July 2022.

2. Population and Sample

The population in this study were all adolescents aged 20-24 years in Surabaya. The sample size in this study was 100 samples using the accidental sampling technique.

3. Study Variables

The dependent variable in this study is the mobile health EPDS dependent variable. The independent variable is the EPDS scale.

4. Operational Definition of Variables

MHEPDS is an android application that is used in early detection of postpartum blues. Using applications on smartphone-based mobile phones developed by IT experts. The data scale is continuous, but changed to

dichotomous, coded 0 = mother with psychological disorders (< mean) and 1 = normal postpartum mother (≥ mean).

The Edinburgh postnatal depression scale (EPDS) is a questionnaire consisting of 10 questions specifically designed to screen for mood deviations, measure the intensity of changes in depressive feelings during the 7 days postpartum and detect postpartum blues events. the maximum score in using EPDS is 30. The instrument used is a continuous data scale, but changed to a dichotomy, coded 0 = mothers with psychological disorders (< mean) and 1 = normal postpartum mothers (≥ mean).

5. Instrument

The instrument was the android with the Mobile Health EPDS for Early Detection (MHEPDS) of postpartum blues.

6. Data Analysis

The data analysis used in this study was univariate for each research variable. Categorical data is described with a frequency distribution table. The characteristics of continuous data samples are described in the parameters n, mean, SD, minimum and maximum. The univariate analysis also displays the due diligence analysis. The feasibility test was carried out using a tool in the form of a questionnaire given to midwives, psychologists and IT experts. The aspects assessed are the compatibility of the design and the clarity of the information. The scale used is the Likert scale with the maximum value of the answer being 5. Bivariate analysis in this study used a paired sample T test. This test is to find out how much influence the variables X and Y have in the small group test.

RESULTS

1. Sample Characteristics

The number of samples in this study were 30 people, which shows that the average age of the subjects was 28 years with a maximum value of 39. The MHEPDS variable showed an average value of 15.2 with a maximum value of 33 (Table 1).

Table 2 shows the results of the MHEPDS application feasibility test by psychologists, media and midwives for the design aspect showing the figure of 8933% and for the clarity of information aspect of 82.67%. For scores ranging from 81% -100%, it is declared very feasible.

Table 1. Sample Characteristics based of age, MHEPDS, and EPDS

Variable	N	Mean	SD	Min.	Max.
Age	30	28.1	6.15	17	39
MHEPDS	30	15.2	6.70	7	33
EPDS	30	14.9	6.52	8	31

1. Bivariate Analysis

From table 3 it shows that family support that is not supported by their family experiences postpartum blues with a probability value of 0.232 and an odds ratio of 1.42 which means that in detection using MHEPDS postpartum women who are not supported by their families will experience postpartum blues 1.42 times greater than mothers who are supported family (OR: 1.41; 95% CI: 1.41 to 1.78; p: 0.232).

The variable planning a pregnancy shows that research subjects who are not planning a pregnancy experience postpartum blues with a probability value of 0.025 and an odds ratio of 5, meaning that using early detection of MHEPDS postpartum women who are not planning a pregnancy experience a risk of post partum blues 5 times greater than those planning a pregnancy (OR= 1.34; 95% CI= 1.34 to 1.72; p= 0.025).

Table 2. Sample Characteristics based of expert

Expert	Design Aspects					Aspects of Information Clarity				
	1	2	3	4	5	1	2	3	4	5
Psycholog	5	5	4	5	4	4	4	3	4	4
Media	5	4	4	5	4	5	5	4	5	4
Midwife	5	4	4	5	4	5	4	4	4	3
Score	15	13	12	15	12	14	13	11	13	11
Score (%)	100	86.67	80	100	80	93.33	86.67	73.3 3	86.67	73.33
Final Score			89.33					82.67		

Table 3. Bivariate results between family support, pregnancy planning, and breastfeeding with MHEPDS.

Variable	MHEPDS		OR	95% CI		p
	Normal	PPB		Lower limit	Upper limit	
Family Support						
Not supported	0	2	1.42	1.41	1.78	0.232
Supported	12	16				
Pregnancy Planning						
Unplanned	0	2	5	1.34	1.72	0.025
Planned	12	16				
Breastfeeding						
Not breastfeed	12	12	1.43	1.40	1.81	0.232
Breastfeed	0	6				

The breastfeeding variable showed that 6 postpartum women who did not breastfeed experienced postpartum blues with a probability value of 0.232 and an odds ratio of 1.43, which means that women who did not breastfeed had a 1.43 times greater risk of experiencing postpartum blues than non-breastfeeding women (OR: 1.43) ; 95% CI: 1.40 to 1.81; p: 0.232).

Table 4 show that the paired sample t test between the mobile health and manual EPDS groups showed that there was no difference between MHEPDS (Mean= 15.2; SD= 6.70) and EPDS (Mean=14.9; SD= 6.52), and this result was not statistically significant (p= 0.662).

Table 4. Comparison of the paired sample T test between MPS and EPDS

Model EPDS	Mean	SD	P
MHEPDS	15.2	6.70	0.662
EPDS	14.9	6.52	

The figure 1 show that the initial display is in the form of a menu for logging in or registering for the use of the MHEPDS application. The list menu uses an email address and creates a password by each user. The menu is made as easy to use as possible for women with low to high levels of IT knowledge. Furthermore, after entering the application, users are presented with three menus as the beginning of early detection of postpartum blues, namely the biodata menu, examination, and history of early detection examinations.

The figure 2 show that biodata display contains several statuses that must be filled in by the user, there are 23 columns that must be filled before entering the examination questions, namely those related to personal identity and pregnancy and childbirth information. The 23 columns have different

variables, each of which can be grouped into user characteristics or research subjects. Filling in virtual biodata through typing is like writing messages as usual.

The figure 3 show that the early detection examination questionnaire is made exactly the same as the EPDS questionnaire by simply clicking on the answer choices. This model will be more practical to use and carry. anywhere so that users can more freely find a place to fill in or a place that suits the user's needs. The contents of the questions are made exactly the same with the hope that the effectiveness of the questionnaire will not decrease when transferred to the mobile health model.

In this display, the total score of the user's answers is presented, then a clear diagnosis result is displayed. From the results of this diagnosis the user can read and decide what action will be the continuation of the results of the early detection examination.

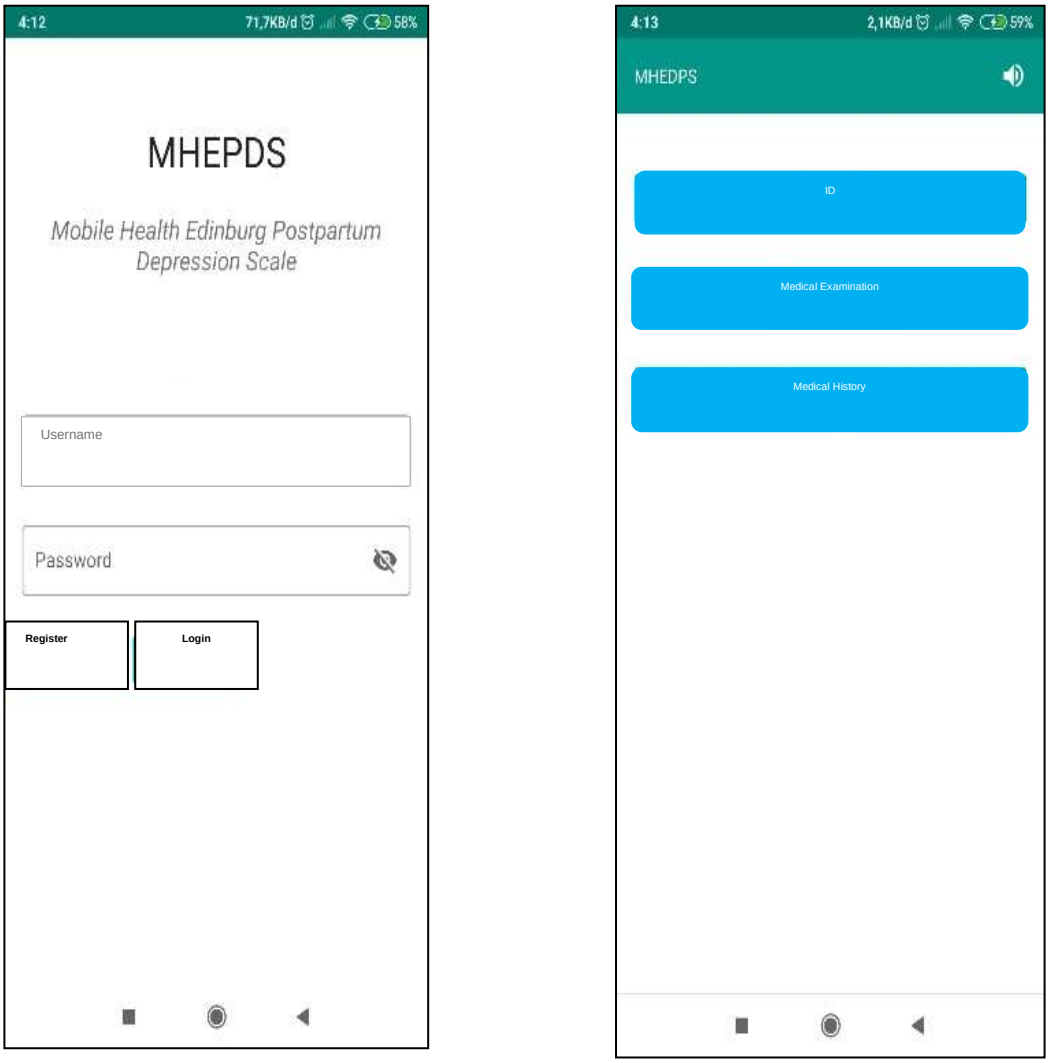

Figure 1. Initial view of MHEPDS

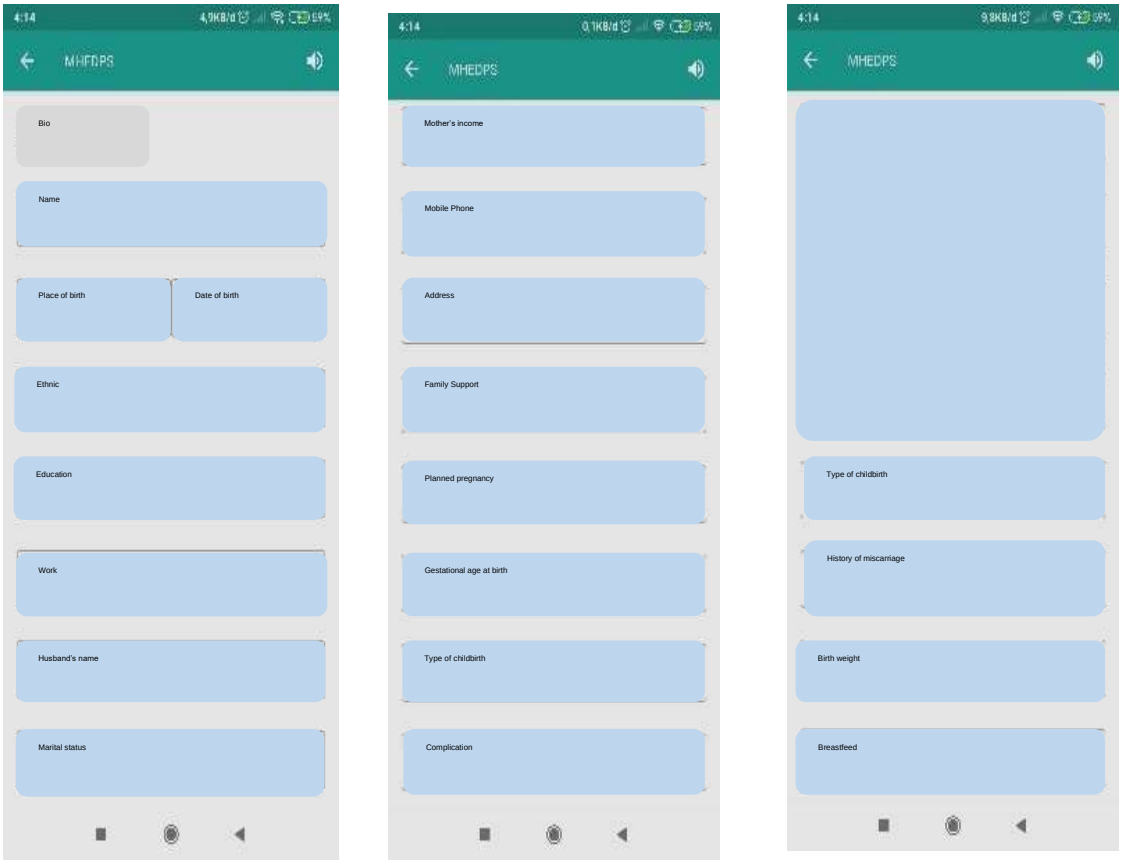

Figure 2. Display of MHEPDS registration form

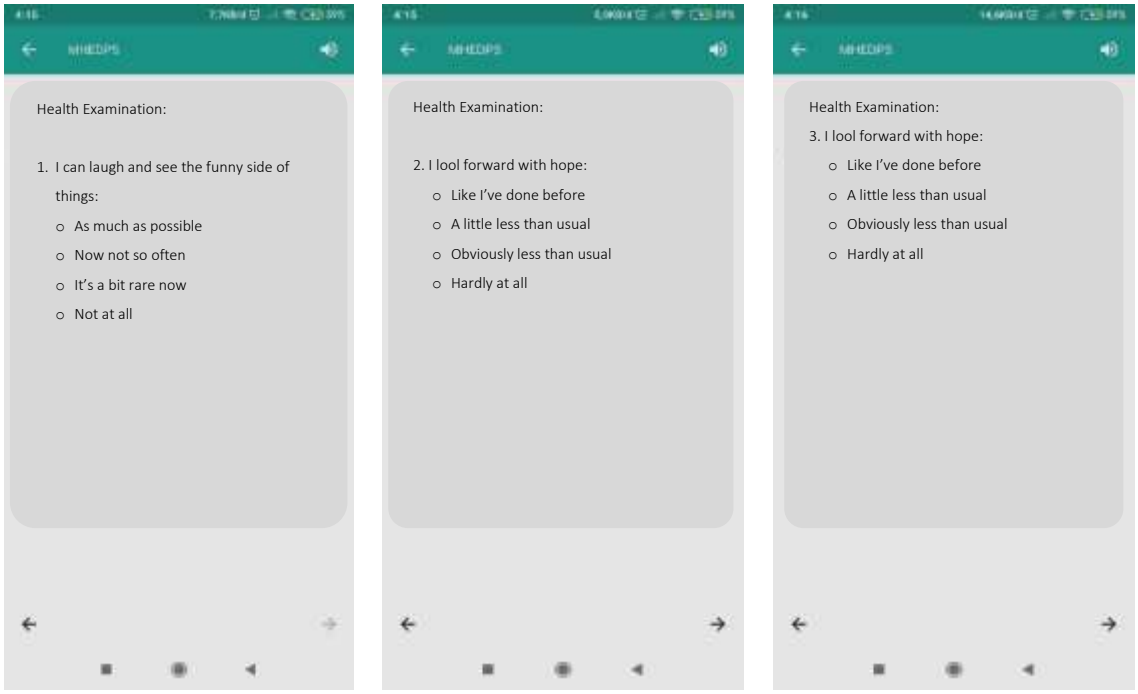

Figure 3. Example of an EPDS Questionnaire Display

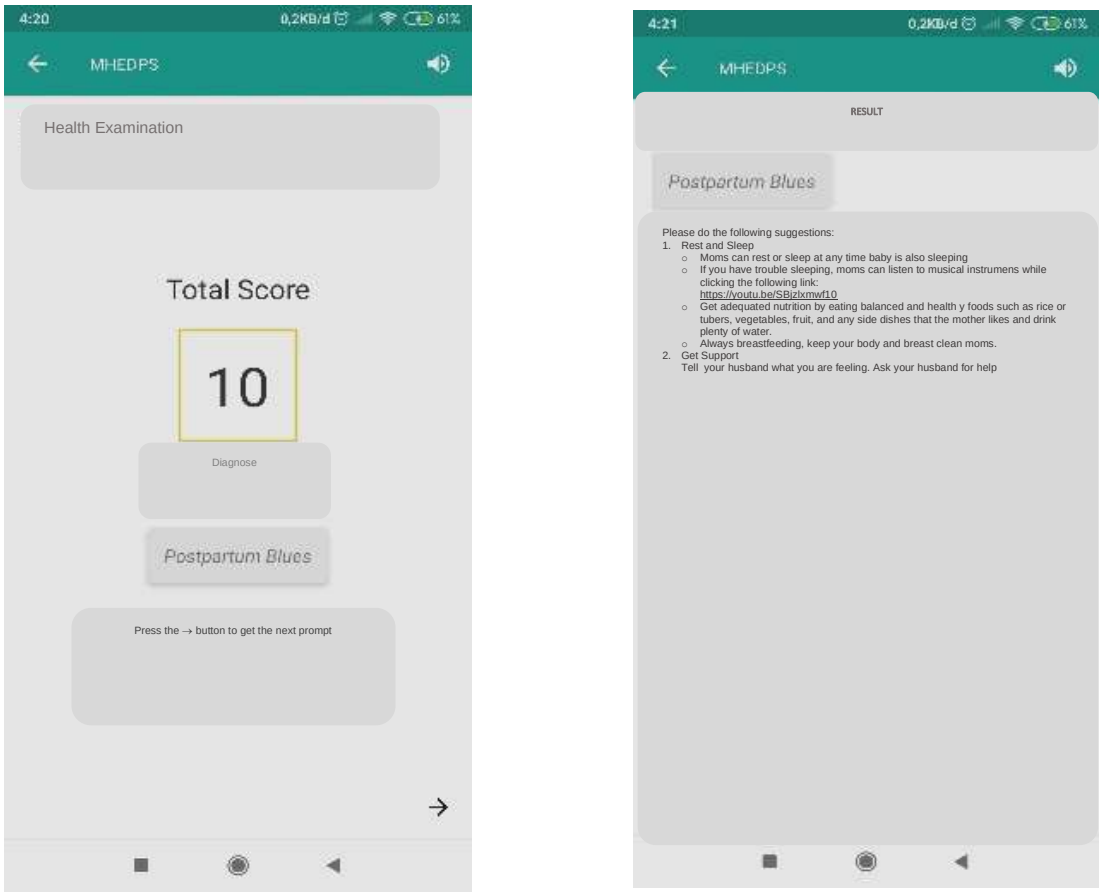

Figure 3. Results of the MHEPDS Questionnaire

DISCUSSION

Assessment of postpartum blues status generally still uses a paper-based questionnaire in which health workers estimate postpartum depression status by manual calculation of the total score of the EPDS questionnaire. This EPDS questionnaire is used to predict the status of psychological disorders of the mother.

Testing of the MHEPDS application was carried out by three experts. Where the three experts give an average value of 4 and 5, which means this application is very feasible. However, in the aspect of clarity of information, namely the point of the exercise video link that is given is easy to do at home, the psychologist gives point 3 with the reason that the link that is connected to YouTube should be a personal video link. However, the author does not yet have a postpartum exercise video on a personal YouTube link, so it uses a video link that is easy and can be followed by postpartum mothers at home. In addition to these points, there are also low points for information about psychological problems during the puerperium, which are complete, given 3 points from obstetricians. It was conveyed that for the results of application answers regarding psychological problems the information conveyed was incomplete but could still be understood when reading the results.

The results of the research data for the characteristics of the respondents, the average age of the respondents is 28.1 where according to the results of research cited by Singh & Landmark (2017) that the

productive age is the most active age and has solid activities and has good cognitive abilities. So, at this age it has an influence on the level of knowledge of the mother regarding the psychological condition she is experiencing. Apart from the mother's age, family support factors can also influence the occurrence of postpartum blues cases. The results of this study indicate that there were 2 mothers who were not supported by their families since pregnancy and experienced postpartum blues. This is in line with research conducted by Dihan (2010) with the results of research which stated that the higher the family support provided, the lower the incidence of postpartum blues, conversely the lower the family support provided, the higher the incidence of postpartum blues

The average EPDS score obtained by respondents was 15.2. The use of android-based applications in this study shows the same thing as what has been done by other researchers. Previous studies have compared conventional and information systems-based depression screening. A study by Ningrum (2017) shows that online format questionnaires also produce valid results like paper-based questionnaires. Research over the past decade has established that online packaged questionnaires are capable of producing more accurate information than paper-based manual questionnaires. In addition, the same screening method, the respondents independently filling out the questionnaire (not by interview) in both online and paper formats, is considered to be able to produce comparable results as well.

The development of the use of applications makes it easy to access all forms of information about health, including postpartum blues. The presence of this postpartum blues screening system has become a promising clinical tool to help mothers assess their postpartum blues status. Screening using an android application can be used widely in society and has been proven valid and reliable (Osma et al, 2014). This application is considered interesting for mothers who have difficulty understanding emotional disorders and fear of being labeled as suffering from mental illness. This increases the tendency of mothers to be more proactive in utilizing the postpartum blues screening system as a tool that can provide comfort and privacy for mothers (Miyansaki et al., 2014).

Online screening has many advantages over manual screening. Ease of filling in, increasing data completeness, minimizing data entry errors are the advantages of screening using the Android application. In addition, filling out a questionnaire using an application has a faster speed than filling out a paper-based questionnaire (Mulyati et al, 2018). This was reinforced by the results of previous research which stated that the time to complete filling in the online questionnaire was approximately 2 minutes while paper-based was approximately 5 minutes. The use of information systems can identify more women at risk of postpartum blues because they do not need to go out of the house, the ease of access allows them to find out their own postpartum blues status more quickly than having to visit a health worker. Therefore screening based on android applications can help make an earlier diagnosis so that it makes a good prognosis (Hilt, 2015). In addition, Android application-based screening can also reduce the burden on health workers with the ease and effectiveness of diagnosis. The results of this study show that it is 100% valid that screening using an information system is appropriate for recruiting and screening mothers with symptoms of postpartum blues. Thus, the use of information systems that can help determi-

ne the status of psychological disorders for postpartum mothers is a good innovative solution.

AUTHOR CONTRIBUTION

In this study, Woro Setia Ningtyas and Ayu Novia Christanti collaborated to develop a conceptual framework and research methodology. Ayu Novia Christanti collects data. Woro Setia Ningtyas, Annisa Nur Rohma, and Azimatul Karimah collaborated to analyze the data. Endah Purwanti Handayani is the main researcher whose role is in collecting research data, formulating research articles, and processing data. Susi Lestari played a role in formulating the background and formulating the research framework and discussion.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

REFERENCES

Anderson-Lewis C, Darville G, Mercado RE, Howell S, Di Maggio S (2018). mHealth technology use and implications in historically underserved and minority populations in the united states: systematic literature review. JMIR Mhealth Uhealth. 6(6):e128. doi: 10.2196/mhealth.8383.

Cox JL, Holden JM, Sagovsky R, Detection of postnatal depression (1987). Development of the 10-item edinburgh postnatal depression scale. Br J Psychiatry. 150:782-6. doi: 10.1192/bjp.-150.6.782. PMID: 3651732.

Degner D (2017). Differentiating between “baby blues,” severe depression, and psychosis. BMJ (Online), 359, 4692. doi: https://doi.org/10.1136/bmj.j4692.

Dewi MM, Djamil M, Anwar MC (2019). Education m-health android-based smartphone media application "mama asix" for third trimester pregnant women as preparation for exclusive breastfeeding. J. Health Promotion Behavior. https://doi.org/10.26911/thejhpb.2019.04.02.02

Dihan FN (2010). Smartphone: antara kebutuhan dan e-lifestyle (Smartphone: between necessity and e-lifestyle). SemnasIF 2010

Dira KI, Wahyuni A (2016). Prevalensi dan faktor risiko depresi postpartum di kota Denpasar menggunakan edinburgh postnatal depression scale (Prevalence and risk factors for postpartum depression in the city of Denpasar using the Edinburgh postnatal depression scale). E-Jurnal Medika Udayana, 5(7), 5–9.

Efendi D, Sari D (2017). Aplikasi mobile–health sebagai upaya peningkatan kualitas pelayanan keperawatan anak dengan penyakit kronis pada setting home hospital (Mobile–health application as an effort to improve the quality of nursing services for children with chronic diseases in home hospital settings). J Keperawatan Indonesia. doi: 10.7454/jki.v20i1.447.

El-Hachem C, Rohayem J, Bou Khalil R, Richa, et al. (2014). Early identifica-

tion of women at risk of postpartum depression using the edinburgh postnatal depression scale (EPDS) in a sample of Lebanese women. BMC Psychiatry. doi: 10.1186/s12888-014-0242-7.

Ernawati I (2017). Uji kelayakan media pembelajaran interaktif pada mata pelajaran administrasi server (Feasibility test of interactive learning media on server administration subjects). Elinvo (electronics, informatics, and vocational education). 2(2): 204. Elinvo. doi: https://doi.org/10.21831/-elinvo.v2i2.17315.

Faisal-Cury A, Menezes PR, Tedesco JJ, Kahalle S, Zugaib M (2008). Maternity "blues": prevalence and risk factors. Span J Psychol.11(2):593-9.

Fellmeth G, Opondo C, Henderson J, Redshaw M, Mcneill J, Lynn F, Alderdice F (2009). Identifying postnatal depression: comparison of a self-reported depression item with Edinburgh Postnatal Depression Scale scores at three months postpartum. J Affect Disord. 251:8-14. doi: 10.1016/j.jad.-2019.03.002.

Goh J, Flyyn M (2011). Examination Obstetrics & Gynaecology. Elsevier.

Gund A, Sjöqvist BA, Wigert H, Hentz E, Lindecrantz K, Bry K (2013). A randomized controlled study about the use of eHealth in the home health care of premature infants. BMC Med Inform Decis Mak. 13:22. doi: 10.1186/1472-6947-13-22.

Guze SB (2006). Diagnostic and statistical manual of mental disorders, fourth edition. Am J Psychiatry. 152(8): 1228-1228. https://doi.org/10.1176/-ajp.152.8.1228

Hammes T, Sebold LF, Kempfer S S, Girondi (2014). Nursing care in postpartum adaptation: perceptions of Brazilian mothers. J Nurs Educ Pract. 4(12). doi:10.5430/jnep.v4n12p125.

Handayani EP, Fatmasari D, Sumarni S (2020). Comparison of the use mobile health Edinburg postnatal depression scale (EPDS) and conventional questionnaire on early detection of incidents postpartum blues. J Matern Fetal Neonatal Med. doi: 10.1080/1476-7058.2018.1560413.

Haryati S (2012). Research and development (R&D) sebagai salah satu model penelitian dalam bidang pendidikan. Research And development (r&d) sebagai salah satu model penelitian dalam bidang pendidikan (Research And development (r&d) sebagai salah satu model penelitian dalam bidang pendidikan).

Hilt RJ (2015). Postpartum depression screening. Pediatric Annals.

Hirst KP, Moutier CY (2010). Postpartum major depression. American Family Physician.

Irawati D, Yuliani F (2014). Pengaruh faktor psikososial dan cara persalinan terhadap terjadinya post partum blues pada ibu nifas (studi di ruang nifas RSUD Bosoeni Mojokerto) (The influence of psychosocial factors and the method of delivery on the occurrence of post partum blues in postpartum women (study in the postpartum room of Bosoeni Hospital, Mojokerto). e-Proceeding of Management ISSN : 2355-9357.

Jardri R, Pelta J, Maron M, Thomas P, Delion P, Codaccioni X, Goudemand M (2016). Predictive validation study of the Edinburgh postnatal depression scale in the first week after delivery and risk analysis for postnatal depression. J Affect Disord. 93(1-3): 169-76. doi: 10.1016/j.jad.2006-.03.009.

Jemiawaty S, Utami S, MQ (2016). Asuhan keperawatan psikososial pada ibu nifas dalam menghadapi ASI belum keluar pada 0-3 hari pascasalin (Psychosocial nursing care for postpartum mothers in dealing with breast milk has not come out at 0-3 days postpartum). Jurnal Ners, 11.

Peraturan Menteri Kesehatan Republik Indonesia Nomor 97 Tahun 2014 (Regulation of the Minister of Health of the Republic of Indonesia Number 97 of 2014). (2014).

Keminfo (2015). Indonesia raksasa teknologi digital Asia Indonesia (Asia's digital technology giant.).

Kernot J, Olds T, Lewis LK (2014). Test retest reliability of the english version of the edinburgh postnatal depression scale. Arch Women's Mental Health. 18(2): 255–257. https://doi.org/10.1007/s00737-014-0461-4

Lind A, Richter S, Craft C, Shapiro, et al. (2017). Implementation of routine postpartum depression screening and care initiation across a multispecialty health care organization: an 18-month retrospective analysis. Matern Child Health J. 21(6): 1234–1239. https://doi.org/10.1007/s10995-017-2264-5

Magowan BA, Owen P, Thomson, A (2014). Clinical obstetrics and gynaecology e-book. saunders elsevier.

Manurung S, Lestari TR, Suryati B, Miradwiyana, et al. (2011). Efektivitas terapi musik terhadap pencegahan postpartum blues pada ibu primipara di ruang kebidanan RSUP Cipto Mangunkusumo Jakarta Pusat (The effectiveness of music therapy on the prevention of postpartum blues in primiparous women in the midwifery room of Cipto Mangunkusumo General Hospital, Central Jakarta). HSR. doi: 10.22435/bpsk.v14i1 Jan.2269

Marcano-Belisario JS, Gupta AK, O'Donoghue J, Ramchandani, et al (2017). Implementation of depression screening in antenatal clinics through tablet computers: results of a feasibility study. BMC Med Inform Decis Mak 17, 59 (2017). https://doi.org/10.1186/s1 29-11-017-0459-8.

Martinez R, Johnston-Robledo I, Ulsh H M, Chrisler, et al. (2000). Singing "the baby blues": A content analysis of popular press articles about postpartum affective disturbances. Women Health. 31(2–3):37–56. https://doi.org/10.1300/J013v31n02_02

Metthews M, Xylander VZJ (2010). WHO technical consultation on postpartum and postnatal care. World Health Organization. 1–56.

Miyansaski AU (2014). Perbandingan kejadian post partum blues pada ibu postpartum dengan persalinan normal dan sectio caesarea (Comparison of the incidence of post partum blues in postpartum mothers with normal deliveries and sectio caesarea). JOM Psi. 1(2): 1–10.

Moore M, Lam SJ, Kay AR (2010). Rapid obstetrics and gynaecology e-book. Wiley Blackwell.

Mufidati D, Widyawati MN, Suryono (2018). Web-based rule-based expert system to screen postpartum depression. International Technical Conference Proceedings. doi: 10.1088/1757-899X-/1108/1/012020

Muliyati D, Bakri F, Ambarwulan D (2018). Aplikasi android modul digital fisika berbasis discovery learning. wapfi (wahana pendidikan fisika) (Aplikasi android modul digital fisika berbasis discovery learning. wapfi (wahana pendidikan fisika)).

Ningrum SP (2017). Faktor-faktor psikologis yang mempengaruhi postpartum

blues (Psychological factors that influence postpartum blues). psympathic: J. ilm. psikol. doi: https://doi.org/10.15575/psy.v4i2.1589

Osma J, Plaza I, Crespo E, Medrano C (2014). Proposal of use of smartphones to evaluate and diagnose depression and anxiety symptoms during pregnancy and after birth. 2014 IEEE-EMBS BHI 2014. doi: 10.1109/BHI.2014.6864423.

Paykel ES, Emms EM, Fletcher J, Rassaby, et al (2000). Life events and social support in puerperal depression. Br J Psychiatry. 1980 Apr;136:339-46. doi: 10.1192/bjp.136.4.339

Peraturan Pemerintah Republik Indonesia Nomor 61 Tahun 2014 Tentang Kesehatan Reproduksi (Peraturan Pemerintah Republik Indonesia Nomor 61 Tahun 2014 Tentang Kesehatan Reproduksi). (2014).

Rai S, Pathak A, Sharma I (2015). Postpartum psychiatric disorders: Early diagnosis and management. Indian J Psychiatry. 2015 Jul;57(Suppl 2):S216-21. doi: 10.4103/0019-5545.161481

Rustikayanti, R. (2016). Profil risiko depresi postpartum pada ibu nifas (Risk profile of postpartum depression in postpartum mothers). Sehat Masada, X. doi: https://doi.org/10.38037/jsm.v10i2.15

Singh K, Landman AB (2017). Mobile health. key advances in clinical informatics: transforming health care through health information technology e-book. Academic Press.

Sinsuw A, Najoan X (2013). Prototipe aplikasi sistem informasi akademik pada perangkat android (Academic information system application prototype on android device). E-Journal Teknik Elektro Dan Komputer. doi: https://doi.org/10.35793/jtek.2.5.2013.4291

Sugiono (2016). Metode penelitian administrasi dilengkapi metode R&D (Administrative research methods are complemented by R&D methods). Alfabeta.