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

Endah Purwanti Handayani
Program Study of Diploma III Midwifery, Jayapura College of Health Sciences

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

Correspondence: Endah Purwanti Handayani, Jayapura College of Health Sciences. Jl. Youmakhe Kelurahan Hinekombe Sentani 99352, Papua. Email: kakaendhanmanise@gmail.com. Mobile: 085254440490.


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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., 2018). However, currently the web-based EPDS cannot be accessed because the creator did not 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>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30</td>
<td>28.1</td>
<td>6.15</td>
<td>17</td>
<td>39</td>
</tr>
<tr>
<td>MHEPDS</td>
<td>30</td>
<td>15.2</td>
<td>6.70</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td>EPDS</td>
<td>30</td>
<td>14.9</td>
<td>6.52</td>
<td>8</td>
<td>31</td>
</tr>
</tbody>
</table>

Table 2 shows the results of the MHEPDS application feasibility test by psychologists, media and midwives for the design aspect showing the figure of 89.33% and for the clarity of information aspect of 82.67%. For scores ranging from 81% - 100%, it is declared very feasible.

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 on expert

<table>
<thead>
<tr>
<th>Expert</th>
<th>Design Aspects</th>
<th>Aspects of Information Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Psycholog</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Media</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Midwife</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Score</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Score (%)</td>
<td>100</td>
<td>86.67</td>
</tr>
<tr>
<td>Final Score</td>
<td>89.33</td>
<td>82.67</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>MHEPDS</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>PPB</td>
<td>Lower limit</td>
<td>Upper limit</td>
</tr>
<tr>
<td>Family Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not supported</td>
<td>0</td>
<td>2</td>
<td>1.42</td>
<td>1.41</td>
</tr>
<tr>
<td>Supported</td>
<td>12</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unplanned</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>1.34</td>
</tr>
<tr>
<td>Planned</td>
<td>12</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not breastfeed</td>
<td>12</td>
<td>12</td>
<td>1.43</td>
<td>1.40</td>
</tr>
<tr>
<td>Breastfeed</td>
<td>0</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Mean</th>
<th>SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHEPDS</td>
<td>15.2</td>
<td>6.70</td>
<td>0.662</td>
</tr>
<tr>
<td>EPDS</td>
<td>14.9</td>
<td>6.52</td>
<td></td>
</tr>
</tbody>
</table>

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
**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 (Muliyati 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 determin-
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.

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