MINISTRY OF EDUCATION AND TRAINING MINISTRY OF HEALTH
NATIONAL INSTITUTE OF HYGIENE AND EPIDEMIOLOGY

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NONG MINH HOANG

CURRENT STATUS OF DEPRESSIVE SYMPTOMS AMONG PRETERM BIRTH MOTHERS AND INTERVENTION OUTCOMES IN SEVERAL OBSTETRICS AND GYNECOLOGY HOSPITAL IN HANOI

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Scientific instructor:

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Reviewer 1:. .....

Reviewer 2:. .....

Reviewer 3:.....

The dissertation will be defended before the Institute-level doctoral thesis judging committee meeting at the National Institute of Hygiene and Epidemiology.

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- National Institute of Hygiene and Epidemiology

LIST OF PUBLISHED RESEARCH WORKS

1. Nong Minh Hoang, Vu Van Du, Pham Phuong Lan (2023), "The relationship between of health and reproductive factors and postpartum depression in mothers of preterm infants at some Obstetrics and Gynecology Hospitals in Hanoi", Vietnam Medical Journal, vol. 531 No. 2 October 2023.
2. Nong Minh Hoang, Vu Van Du, Pham Phuong Lan, Vu Thi Thu Hien (2023), "Postpartum depression status and some personal, family and social factors influencing postpartum depression in mothers of preterm infants at some maternity hospitals in Hanoi", Journal of Community Medicine, Episode 64, No. 6 of 2023.
3. Nong Minh Hoang, Vu Van Du, Pham Phuong Lan (2024), "Effectiveness of some intervention activities in reducing symptoms of postpartum depression in mothers of premature birth", Vietnam Medical Journal, vol. 535 No. 1 February 2024.

INTRODUCTION

According to the World Health Organization, preterm birth is labor that occurs between the 22nd and before the 37th week of pregnancy according to the last menstrual period [5], [176].

Maternal depression leads to negative emotions such as sadness, anxiety, stress, and irritability. More seriously, they may develop suicidal thoughts, self-destruction, and harm their child [93]. In addition to the impact on maternal health, post-partum depression also affects the child's raising period and child's development. [118], [126], [128]

Currently, interventions aimed at reducing maternal symptoms of post-partum depression are known, such as psychological interventions using medications. However, the use of drugs as a post-partum depression intervention often causes mothers to worry about complications and affects the child's health. Thus, psychological intervention and intervention with mobile applications in combination with other methods are still the preferred choices for mothers [131]. However, in Vietnam, few published studies have evaluated the effectiveness of psychological interventions in this population. Therefore, it is crucial to identify, assess and intervene for premature mothers with signs of depression, which not only improves the mother's condition but also improves the mother-child relationship and helps the physical and mental development of the children in their lives. Stemming from the above reasons, we conduct research: "***Current status of depressive symptoms among preterm birth mothers and intervention outcomes in several obstetrics and gynecology hospitals in Hanoi***" with the objectives of:

1. Describe the prevalence of depressive symptoms in mothers of preterm infants at the National Hospital of Obstetrics and Gynecology and Hanoi Obstetrics and Gynecology Hospital, 2022-2023.
2. Analysis of several factors associated with mothers of preterm infants with depressive symptoms at two researched hospitals, 2022 – 2023.
3. Evaluation of several interventions results that reduce depressive symptoms in mothers of preterm infants, 2023.

*** Significance and new contributions of the thesis**

- The multi-center study provided an overall picture of the situation of depressive symptoms as well as influencing factors in mothers of preterm infants at several OBGY hospitals in Hanoi.
- For the first time, psychologists with doctors specializing in obstetrics, gynecology and neonatology participated in supporting, caring and treating mothers and babies at the Obstetrics and Gynecology Hospitals.
- The study has developed psychological counselling intervention plans and a smart mobile application, "Postpartum Support". The smart mobile application provide knowledge and skills for postpartum mothers about depression, newborn care, postpartum mother care. In addition, the application also screens and manages postpartum mothers at risk of depression in the community. This is also a reference basis for replicating this intervention model in other health facilities.

*** Structure of Thesis:**

The thesis consists of 144 pages (excluding appendices), 4 chapters include: Introduction: 2 pages; Chapter 1- Literature review: 34 pages; Chapter 2 - Subject and methodology: 25 pages; Chapter 3 - Results: 45 pages; Chapter 4 - Discussion: 37 pages; Conclusion: 2 pages, Recommendation: 1 page.

The thesis comprised 38 tables, 5 charts, 28 infoboxes, 3 diagrams and 180 references.

CHAPTER I: LITERATURE REVIEW

1.1. Overview of preterm birth and post-partum depression

Postpartum Depression (PD)

According to the American Psychiatric Association (APA), depression is a common and severe condition that directly affects feelings, thoughts, and actions. Depression causes feelings of sadness and loss of interest in activities you love. It can lead to a variety of emotional and physical problems and can impair the ability to work. Postpartum depression has similar symptoms to regular depression and usually appears for 4 weeks and lasts for the first year after birth[76]. Symptoms of depression vary from mild to severe.

In the postpartum period, most women experience feelings of sadness or emptiness within a few days of giving birth. For the majority of women, this feeling disappeared 3 to 5 days after giving birth. If the boredom has not gone or mothers feel sad, hopeless or empty... for more than 2 weeks, this can lead to postpartum depression [144].

Definition of preterm birth: According to the World Health Organization, preterm birth is labor that occurs between the 22^{nd} and before the 37^{th} week of pregnancy according to the last menstrual period [5], [176].

Methods for diagnosing depression

Depressive disorders are assessed in two ways: one is to use clinical diagnostic criteria, the other is to use scales to screen for depression [99].

Depression Scale during pregnancy and postpartum: EPDS (Edinburgh Postnatal Depression Scale), PHQ-9 (Patient Health Questionnaire-9), BDI (Beck Depression Inventory), BDI-II (Beck Depression Inventory-II), Zung SDS (Zung Selt-Rating Depression Scale), PDSS (Postpartum Depression Screening Scale), CES-D (Center for Epidemiologic Studies Depression Scale)

1.2. Studies related to depression in premature mothers

1.2.1. International research

The prevalence of maternal postpartum depression in European countries with the EPDS scale ranged from 9.1% to 32.7%. In Asia, the rate of postpartum depression was higher, ranging from 5.9% to 39.4%. Two studies in Thailand have recorded 16.8% and 8.4%, respectively, with 2 cut-off scores (10 and above and 13 and above) [119], [149].

1.2.2. Researches in Vietnam

For premature mothers in Vietnam, there were several studies at hospitals treating premature babies showing that the rate of post-partum depression ranged from 66.0% to 70.8% [13], [19]. Specifically, Nguyen Ngoc Loan's study of 398 mothers of premature babies who were hospitalized at the Neonatal Center, National Children's Hospital from July 2022 to February 2023 showed depression rates of 66%, and the study at Children's Hospital I in 2011, over 48 premature mothers recorded the depression rate of 70.8%; [19]. However, studies assessing premature mothers, in general, were limited, such as Tran Tho Nhi's study on 57 premature mothers with a depression rate of 17.5% [16].

1.3. Factors associated with postpartum depression

Personal factors, psychological factors, lifestyle behaviours: history of depression, smoking, alcohol, frequent use of mobile

phones. Cultural – family – social factors: preference for boys, support from family – society, maternity leave, relationships of family members. Mother and baby health factors: premature birth, obstetric complications, unwanted pregnancy.

1.4. Postpartum depression support intervention

There are two common methods for managing post-partum depression: medication, psychotherapy, or a combination of both. In addition, if these treatments do not relieve symptoms, biological/brain stimulation therapy may be selected as needed [138].

The first-line approach to patients with postpartum depression is step-by-step psychotherapies. Non-interventional psychotherapy is also more appropriate at the community scale, and for breastfeeding mothers, antidepressants entering breast milk are also a consideration when making treatment indications.

CHAPTER II: SUBJECT AND METHODOLOGY

2.1. Subjects of study

The mother gave birth prematurely at the National Hospital of Obstetrics and Gynecology and Hanoi Obstetrics and Gynecology Hospital.

2.1.1. Selection criteria

2.1.1.1. Objectives 1 and 2: cross-sectional studies

Quantitative research:

- All mothers gave birth between 22 weeks and 36–6 weeks during the study period.
- Participate 3 times at the time of the interview.
- Subjects voluntarily participated in the study.

Qualitative research:

- Mothers who participated in the quantitative study were evaluated on the EPDS scale with scores ≥ 10 points.
- Subjects voluntarily participate in qualitative research.

2.1.1.2. Objective 3: Intervention research

- Mothers with EPDS scores ≥ 13 were screened from the cross-sectional study.
- Agree to participate in a psychological counselling program of a psychologist in person or by phone.
- Mothers voluntarily participated in the research's intervention program.

- For groups using the smart mobile application "Postpartum support": Agree to install and use the application on personal phones (or relatives if it cannot be installed on personal devices)

2.1.2. Exclusion criteria

2.1.2.1. Objectives 1 and 2: cross-sectional descriptive studies

- Inability to interview (deaf and dumb, postpartum development of severe maternal illness requiring hospital treatment ...).
- Suspension of pregnancy due to abnormal pregnancy.
- Stillbirth or postpartum death prior to the time of the interview.
- Undergoing treatment for depression.

2.1.2.2. Objective 3: Intervention research

- The mother had an EPDS score of < 13 points.
- The mother did not participate in the entire three assessments under the NC process.

2.2. Research period

Study period: from 06/2021 to 10/2023.

2.3. Study location

- National Hospital of Obstetrics and Gynecology, No. 43, Trang Thi, Hang Bong, Hoan Kiem, Hanoi.
- Hanoi Obstetrics & Gyencology Hospital, No. 929, La Thanh, Ngoc Khanh, Ba Dinh, Hanoi.

2.4. Research methodology

2.4.1. Study design: descriptive research and intervention research.

2.4.2. Sample Size

2.4.2.1. Sample size for objectives 1 and 2:

The sample size for quantitative research. Apply the formula for estimating a proportion in a population:

$$n = Z^2_{1-\frac{\alpha}{2}} \frac{(1-p)p}{d^2}$$

Where:

n: The minimum sample size.

p: Prevalence of maternal post-partum depression (p=0.175 taken from a 2018 study by Tran Tho Nhi on premature mothers using the EPDS scale) [16].

α: Statistical significance level, (= 0.05)

d: The absolute deviation value

With 95% confidence: Z=1.96; $d = 0.04$

Using the formula, the minimum sample size was calculated as 347. We collected information on 568 mothers who participated in the 1st interview, 503 mothers in the 1st and 2nd interviews, and 466 mothers in the three interviews.

The sample size for qualitative research

The study in-depth interviewed 15 mothers with EPDS scores ≥ 10 points; including 10 mothers at the National Hospital of Obstetrics & Gynecologyand 05 mothers at Hanoi Obstetrics & Gyencology Hospital.

2.4.2.2. Sample size for target 3

a) Intervention sample size: Using the formula to test 2 means value:

$$n1 = n2 = 2\left(\frac{Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}}{ES}\right)^2$$

With:

$$ES = \frac{\mu_1 - \mu_2}{\sigma}$$

Where:

- n is the sample size of each group
- μ_1 is the point average calculated on the EPDS scale of the pre-intervention. μ_2 is the average score on the expected post-intervention EPDS scale for depression risk according to the criteria of this study (EPDS < 10) here we selected as 9.9.
- $Z_{1-\frac{\alpha}{2}}$ is the value from the standard distribution, calculated based on the probability of type 1 error ($Z_{1-\frac{\alpha}{2}}$=1.96 if the probability of type 1 error = 5% and two-tailed testing). $Z_{1-\beta}$ is the value calculated based on statistical force ($Z_{1-\beta}$=1.28 if statistical force is 90%). ES is the difference. σ is the standard deviation of the intervention group
- The sample size formula for the intervention study is based on Nanzer's study of interventions in the postpartum depression group with a pre-intervention EPDS score of 13.25 ± 4.4 [137]. From this we calculate the minimum theoretical sample size for each group n1=n2= 37 mothers. We had 89 mothers participating in the intervention, including 43 mothers who both counseled and installed the smart mobile application "Postpartum support" (Group 1) and 46 mothers who participated and interviewed (group 2).

2.4.3. Sample selection method

Quantitative research: convenient sample selection. Mothers born prematurely at the National Hospital of Obstetrics and Gynecology and Hanoi Obstetrics & Gynecology Hospital between February 2023 and July 2023 are eligible to be selected for the study. Proceed to take until the sample size is sufficient, then stop.

Qualitative research: Using a targeted and purposive sampling method. Dividing the group of quantitative interviewers into 30 groups in order of first-past-the-post interview. Group 1 from order 1 to 30, group 2 from 31 to 60, group 3 from 61 to 90;... Each group selects the first mother from the list with an EPDS score ≥ 10 to conduct an in-depth interview; in case the mother does not agree to participate in the in-depth interview, the next mother with an EPDS score of ≥ 10 will be conducted. The study was divided into 15 groups, of which the National Hospital of Obstetrics & Gynecology had 10 groups (the last group had 49 mothers) and Hanoi Obstetrics & Gyencology Hospital had 5 groups (the previous group had 27 mothers).

2.4.3.2. Intervention research

Selecting a sample of all mothers with EPDS scores ≥ 13 points at two assessments (4 weeks and 6 weeks) to be eligible for intervention participation. After 2 assessments, 113 mothers had EPDS scores ≥ 13 points. However, 19 mothers were excluded from the study due to the death of their children, family chores, refusal to continue participation or inability to contact (of which 12 mothers stopped the survey at 6 weeks and 05 mothers stopped the study at 10-12 weeks). 05 mothers refused to participate in the intervention, so the total number of people with diabetes participating in the intervention study was 89 mothers.

2.5. Research variables and indicators

The group of variables in the study includes **the subjects' characteristics**

Target variable group 1: Maternal post-partum depression status after premature birth: a group of variables on depressive characteristics according to the EPDS scale, variable group on clinical symptom characteristics of depression.

Target variable group 2: Some factors related to postpartum depression: a group of variables related to postpartum depression 4 weeks, 6 weeks, 10 – 12 weeks with

independent variables including general information about diabetes; husband characteristics; family and social characteristics; maternal health characteristics; health characteristics of the child. The dependent variable was that the mother showed signs of depression at 4 weeks postpartum (EPDS ≥ 10 points).

Target variable group 3: Intervention evaluation: a group of variables on the effectiveness of the intervention program, a group of depressive reality variables according to the EPDS scale, and a group of variables on clinical characteristics before and after the intervention.

2.7. Techniques and tools for information collection

For quantitative research, mothers are interviewed in person or by phone, and online forms are filled out on Kobotoolbox software. For qualitative research, use a face-to-face or telephone interview.

Intervention activities: In the 1st and 2nd interviews, mothers with EPDS scores of ≥ 13 who agree to the intervention will be consulted directly by a psychologist after their child's follow-up visit or schedule a consultation with mothers caring for their children at the hospital. Patients will be consulted on a psychological intervention plan consisting of 04 sessions and using the smart mobile application "Postpartum Support". Mothers can choose one of 2 options: receive psychological counselling or receive psychological counselling and use the smart mobile application "Postpartum support". High-risk patients are consulted for postpartum depression screening at the Institute of Mental Health, No. 78 – Giai Phong Street, Phuong Mai, Dong Da, Hanoi. The team contacted an examining psychiatrist to assess and monitor the patient if the mother consented to the visit. The research team financially supported these mothers with 02 examinations (an initial visit and 01 follow-up visit). However, only 01 patient self-examined a psychiatrist at Hanoi Medical University Hospital. Mothers continued to be followed for up to 12 weeks.

2.8. Data management and analysis

- *Quantitative data:* Using medical statistical algorithms: Quantitative variables are described by mean, standard deviation, and median. Qualitative variables are defined by frequency and percentages. Testing statistical differences with qualitative variables between groups, comparising pre-intervention and a post-intervention.

- *Qualitative data:* Remove tapes, synthesize, and present in-depth interview results using matrix tables.

- The Efficiency Index (EI) is calculated according to the formula

$$EI = \frac{|p2-p1|}{p1} \times 100$$

Where p1 is the pre-intervention % and p2 is the post-intervention %.

2.9. Ethics in research

The Biomedical Research and Ethics Council of the National Hospital of Obstetrics and Gynecology and Hanoi Obstetrics and Gynecology Hospital approved the study. The study was conducted when approved by PhD student outline Council under Decision No. 1596/QD-VSDTTU dated November 05, 11, 2018 of the Director of the National Institute of Hygiene and Epidemiology.

CHAPTER III: RESEARCH RESULTS

3.1. Characteristics of research subjects

The study reached 568 mothers, of whom 102 women dropped out, accounting for 18.0%. Drop-out mothers were characterized by an average age of 30.1 ± 6.1 years; the average gestational age at calving was 33.2 ± 3.0 weeks; The prevalence of depression at 4 weeks postpartum was 30.4% (details attached in Appendix 7 attached). The quantitative study evaluated 466 mothers by an average age of 30.0 ± 5.4 years (participating in 03 interviews), in-depth interviews with 15 mothers, and 89 mothers with intervention.

3.2. Current situation of depression in mothers after premature birth

3.2.1. Characteristics of maternal post-partum depression according to the EPDS scale

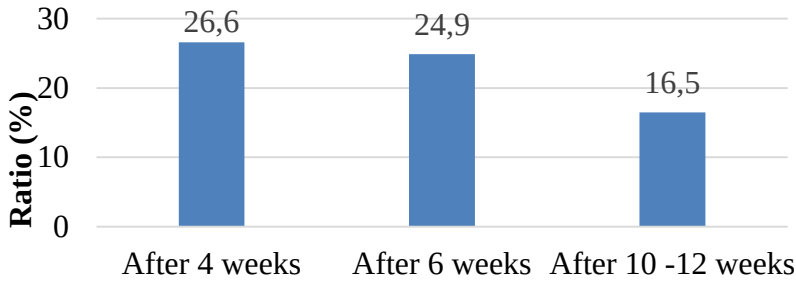

Figure 3.1. Percentage of premature mothers showing signs of depression on the EPDS scale (n=466)

According to the depression rating standard of the EPDS scale, a score of ≥ 10 is rated as depression. The assessment results

showed that after 4 weeks of birth, 26.6% (124/466) of mothers were at risk of depression; after 6 weeks, this rate decreased to 24.9% (116/466) and then reduced to 16.5% (77/466) by 10-12 weeks.

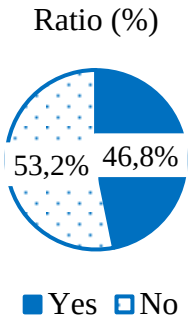

Figure 3.2. The proportion of premature mothers showing signs of postpartum depression between 4 weeks and 10-12 weeks (n=466)

After 3 assessments at 4 weeks, 6 weeks, and 10-12 weeks, 46.8% (218/248) of mothers had experienced signs of depression (EPDS ≥ 10 points) in at least 1 assessment.

3.2.2. Characteristics of depressive symptoms of postpartum mothers

Table 3.1. Prevalence of characteristic symptoms in mothers with signs of depression

Symptom characteristic	4 weeks (n = 124)	6 weeks (n=116)	10-12 weeks (n = 77)
	n (%)	n (%)	n (%)
Decreased mood	100 (80.6)	96 (82.8)	65 (84.4)
Diminished interest/hobbies	104 (83.9)	103 (88.8)	61 (79.2)
Decreased energy and increased fatigue	105 (84.7)	109 (94.0)	69 (89.6)

Three characteristic maternal symptoms with signs of postpartum depression accounted for a high prevalence at all three

assessment points, including 4 weeks, 6 weeks, and 10-12 weeks postpartum.

The results of our in-depth interviews provided better information about the clinical symptoms of maternal depression. The mother shared about her depression and loss of interest in life. They have no desire or interest to engage in social or recreational activities with friends or family. *"I'm bored sometimes. I don't want to do anything; I'm not interested. Friends and people invite out to gather and carry children. I don't want to hang out with" Mother C03 – 25 years old.*

Table 3.2. Prevalence of common symptoms in mothers with signs of depression

Common symptoms	4 weeks (n = 124)	6 weeks (n = 116)	10-12 weeks (n = 77)
	n (%)	n (%)	n (%)
Decreased concentration of attention	65 (52.4)	105 (90.5)	54 (70.1)
Loss of confidence or self-esteem, difficulty in making decisions	51 (41.1)	92 (79.3)	58 (75.3)
Feeling guilty, blaming yourself	58 (46.8)	36 (31.0)	40 (51.9)
Feeling the future bleak and pessimistic	72 (58.1)	30 (25.9)	40 (51.9)
Having self-destructive/suicidal thoughts and behaviors	27 (21.8)	35 (30.2)	12 (15.6)
Sleep disturbances	109 (87.9)	103 (88.8)	65 (84.4)
Changes in appetite	75 (60.5)	81 (69.8)	62 (80.5)

The study assessed seven common symptoms and found that the incidence ranged from 15.6% to 90.5%. Symptoms include sleep disturbances, changes in appetite, Decreased concentration of attention, loss of confidence or self-esteem, and difficulty in deciding to have the highest incidence of encounters.

The results of in-depth interviews with mothers also indicated that mothers after giving birth are often absent-minded, absent-minded and unable to concentrate. They may have difficulty concentrating on daily tasks such as cooking or searching for objects: "Sometimes I feel absent-minded. I forget when I am cooking porridge, sometimes the whole pot burns. I put the milk bottle somewhere and then can't find it. Now I feel absent-minded and unable to concentrate"

Mother C09 – 40 years old

Table 3.3. The incidence of body symptoms in mothers with signs of depression

Body symptoms	4 weeks (n = 124)	6 weeks (n = 116)	10-12 weeks (n = 77)
	n (%)	n (%)	n (%)
Loss or decreased interest in daily activities	88 (71.0)	89 (76.7)	63 (81.8)
Lack or loss of emotional response to events and surroundings	33 (26.6)	75 (64.7)	24 (31.2)
Morning wakes up early 2 hours before usual	77 (62.1)	99 (85.3)	63 (81.8)
Depressive states worse in the morning	15 (12.1)	14 (12.1)	8 (10.4)
Psychomotor sluggishness or agitation of the body stupor	18 (14.5)	19 (16.4)	5 (6.5)
Decreased appetite	104 (83.9)	79 (68.1)	67 (87.0

The physical symptoms recorded in mothers with signs of depression (EPDS ≥ points) ranged from 6.5% to 87.0%. Physical symptoms included decreased appetite, early morning awakenings 2 hours before usual, and loss or reduced interest in daily activities, which had the highest incidence at all 3 assessment times.

3.3. Some factors related to post-preterm depression

Table 3.4. Multivariate analysis of several factors associated with signs of depression in mothers 4 weeks postpartum (n=466)

general information	OR (95% CI)	AOR (95% CI)
Maternal individual characteristics		
Maternal age ≤ 35 years	2.3 (1.1-4.6)*	**3.4 (1.5-7.6)****
Husband characteristics		
No empathy, sharing in life	2.4 (1.2-5.1)*	**2.8 (1.1-7.7)***
Maternal health features		
Stress, psychological during pregnancy	5.1 (3.2-7.9)**	**3.4 (2.0-5.7)****
Having experienced psychological problems in the past 12 months	5.9 (3.5-9.9)**	**2.7 (1.4-5.2)****
History of obstetric accidents	1.8 (1.1-2.8)*	**1.8 (1.1-3.1)***

**p<0.05; **p<0.01; OR: Kill ratio; 95%CI: 95% confidence interval*

The results of multivariate analysis between factors of general maternal information, family characteristics, broom characteristics, health characteristics of the child, maternal health, and postpartum depression showed that after including the factors mentioned earlier in the logistic regression model, the factors included maternal age, empathy, husband's share after pregnancy; stress, psychological during pregnancy; experiencing psychological problems in the past 12 months; History of obstetric accidents is associated with postpartum depression ($p<0.05$).

Table 3.5. Multivariate analysis of several factors associated with signs of postpartum depression 6 weeks (n=466)

Character	n (%)	OR (95% CI)	AOR (95% CI)
Young characteristics			
Worry about the weight of the child who is not gaining enough weight			
Worry	309 (66.3)	3.1 (1.8-5.2)**	**2.1 (1.2-3.9)***
Current child health status			
Poor/very poor	25 (5.4)	7.3 (3.1-17.5) **	**7.6 (2.8-21.0) ** **
Features of maternal health and work			
Mother's current health			
Very weak/weak	24 (5.2)	5.6 (2.4-13.2) **	**4.2 (1.5-11.4) ** **
Thoughts of not wanting to live after giving birth			
Have	20 (4.3)	13.9 (4.5- 42) **	**7.9 (2.1-29.2) ** **
Current Job Status			
Wrong	49 (10.5)	6.1 (3.3-11) **	**4.4 (2.1-9.3) ** **
Living with your parents	338 (72.5)	2.3 (1.3-4.0) **	**2.0 (1.1-3.8)***
Occasionally/rarely/never.	112 (24.0)	3.1 (2.0-5.0) **	**2.4 (1.2-4.9)***

**p<0.05; **p<0.01; OR: Kill ratio; 95%CI: 95% confidence interval*

The results of a multivariate analysis between factors of child health characteristics, maternal health, family characteristics and work characteristics with postpartum depression showed that after including the factors mentioned earlier in the logistic regression model, the factors included anxiety about the child's weight, state of health of the child; maternal state of health; thoughts of not wanting to live postpartum; postpartum work status; Living with your parents and confiding in your husband is associated with postpartum depression ($p<0.05$).

Table 3.6. Multivariate analysis of several factors associated with signs of postpartum depression 10 to 12 weeks (n=466)

Information	n (%)	OR (95% CI)	AOR (95% CI)
Worry about the weight of the child who is not gaining enough weight			
Worry	291 (62.4)	4.9 (2.5-9.9)**	**3.0 (1.4-6.4)****
Current Job Status			
Wrong	51 (10.9)	6.7 (3.6-12.5)**	**2.3 (1.1-5.4)***

**p<0.05; **p<0.01; OR: Kill ratio; 95%CI: 95% confidence interval*

The results of a multivariate analysis between factors of child health characteristics, maternal health, family characteristics and work characteristics with postpartum depression showed that after the inclusion of the factors mentioned above in the logistic regression model, factors included anxiety about the child's weight, not gaining enough weight; Current job status was associated with postpartum depression (P<0.05).

3.4. Effectiveness of intervention

The study assessed the effectiveness of the intervention on 89 mothers divided into two groups: group 1 of 43 mothers participating in psychological intervention and using smart mobile applications and group 2 of 46 mothers participating only in psychological intervention. The effectiveness of the intervention is described as follows:

Table 3.7. EPDS score before and after 1st intervention (n=89)

Intervention groups	Pre-intervention	Post-intervention	p
Psychological counseling group & smart mobile app	15.2 ± 2.5 15 (13-17)	7.1 ± 3.7 8 (4-9)	0.000*
Psychological Counseling Group	16.0 ± 3.3 15 (13-17)	7.3 ± 4.0 7.5 (4-9)	0.000*
General	15.6 ± 2.9 15 (13-17)	7.2 ± 3.8 8 (4-9)	0.000*
p	0.329[a]	0.754[b]	-

[a] p according to the Mann–Whitney test; [b]p in Ttest; p in Sign test pairing*

After the intervention, EPDS scores dropped from 15.6 ± 2.9 points to 7.2 ± 3.8, a statistically significant difference ($p<0.05$). Both groups showed a decrease in EPDS scores after the intervention ($p<0.05$).

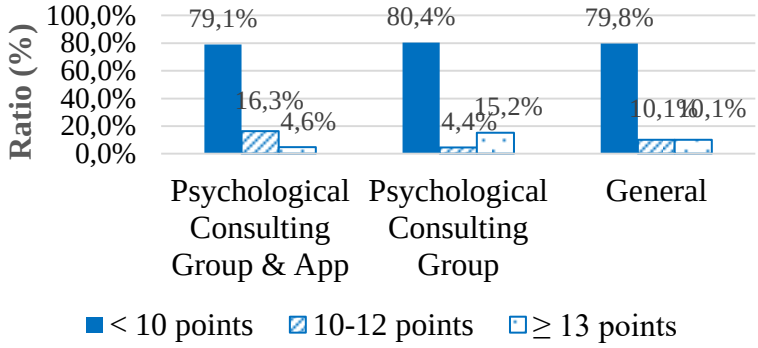

Table 3.8. ***Characteristics of depression grouping based on post-intervention EPDS scale (n=89)***

EPDS Scale	Psychological Consulting Group & App		Psychological Consulting Group		General		p
	n	%	n	%	n	%	
< 10 points	34	79.1	37	80.4	71	79.8	0,077
10-12 points	7	16.3	2	4.4	9	10.1	
≥ 13 points	2	4.6	7	15.2	9	10.1	
Total	**43**	100.0	**46**	100.0	**89**	100.0	

p according to Fisher's exact test

Before the intervention, 100% of mothers had EPDS scores ≥ 13 points. After the intervention, the percentage of mothers with EPDS scores ≥ 13 points decreased to 10.1%; 10.1% had EPDS scores of 10-12 points, and 79.8% had EPDS scores of < 10 points.

Table 3.9. Features of characteristic symptoms of interventional pre- and postpartum depression (n=89)

Characteristic symptoms	Pre-intervention n (%)	Post-intervention n (%)	p*	EI (%)
Decreased mood	82 (92.1)	23 (25.8)	0.000	72.0
Diminished interest/hobbies	80 (89.9)	17 (19.1)	0.000	78.7
Decreased energy and increased fatigue	84 (94.4)	19 (21.4)	0.000	77.3

**p as per McNemar test*

The characteristic symptoms had a reduced incidence after the intervention, a statistically significant difference (P<0.05). The effectiveness index of characteristic symptoms ranges from 72.0% to 78.7%.

Table 3.10. Features of common symptoms of interventional postpartum depression (n=89)

Common symptoms	Pre-intervention n (%)	Post-intervention n (%)	p*	EI (%)
Decreased concentration of attention	65 (73.0)	23 (25.8)	0.000	64.7
Loss of confidence or self-esteem, difficulty in making decisions	61 (68.5)	24 (27.0)	0.000	60.6
Feeling guilty, blaming yourself	50 (56.2)	16 (18.0)	0.000	68.0
Feeling the future bleak and pessimistic	51 (57.3)	14 (15.7)	0.000	72.6
Having self-destructive or suicidal thoughts and behaviors	32 (36.0)	3 (3.4)	0.000	90.6
Sleep disturbances	77 (86.5)	27 (30.3)	0.000	65.0
Changes in appetite	63 (70.8)	31 (34.8)	0.000	50.8

**p as per McNemar test*

All common symptoms of depression had a reduced incidence after the intervention, a statistically significant difference (p<0.05). The effectiveness index of common symptoms ranges from 50.8% to 90.6%.

Table 3.11. Features of the physical symptoms of interventional postpartum depression (n=89)

Body symptoms	Pre-intervention n (%)	Post-intervention n (%)	p*	EI (%)
Loss or decreased interest in daily activities	73 (82.0)	28 (31.5)	0.000	61.6
Lack or loss of emotional response to events and surroundings	49 (55.1)	9 (10.1)	0.000	81.7
Morning wakes up early 2 hours before usual	68 (76.4)	25 (28.1)	0.000	63.2
Depressive states worse in the morning	18 (20.2)	6 (6.7)	0.011	66.8
Psychomotor sluggishness or agitation of the body stupor	16 (18.0)	6 (6.7)	0.018	62.8
Decreased appetite	69 (77.5)	33 (37.1)	0.000	52.1

**p as per McNemar test*

All bodily symptoms of depression had a reduced incidence after the intervention, a statistically significant difference (p<0.05). The effectiveness index of body symptoms is from 52.1% to 81.7%.

CHAPTER IV: DISCUSSION

4.1. Current situation of depression in mothers after premature birth

4.1.1. Current situation of the proportion of mothers showing signs of postpartum depression

Our study used the EPDS scale to screen for early signs of postpartum maternal depression, with a cut-off score of ≥10 depression assessment results showing a prevalence of depression

of 26.6% (124/466) 4 weeks postpartum. The post-partum depression outcomes in this study were lower than some of the other studies around the world, such as Gulamani's study in Pakistan, which assessed the impact of preterm birth on postpartum maternal depression, which found that the prevalence of depression in postpartum mothers accounted for 35.3% [90]. This result can be explained by differences in the study area and timing of the study, so depression rates may be different.

The study results showed that the prevalence of maternal depression at 6 weeks after giving birth was 24.9%, down from 4 weeks postpartum. The 10-12 week prevalence of postpartum depression in our study (16.5%) was lower than most studies on preterm mothers found at 10-12 weeks, with depression rates remaining above 20% on different scales such as the Norwegian study of 61 post-partum mothers using EPDS scale with a cut-off score of ≥10, the results also showed a prevalence of depression after 3 months of 22.95%.

4.1.2. Clinical symptoms of postpartum depression

Characteristic symptoms: Our study shows that the proportion of postpartum mothers experiencing characteristic symptoms, including decreased mood, decreased interest/interest, decreased energy and increased fatigue, ranges from 17.6% to 44.2% at 4 weeks, 6 weeks and 10-12 weeks postpartum.

Common symptoms: The common symptoms ranged from 2.6% to 49.4%. The incidence of experiencing some of these common symptoms is lower than that of characteristic symptoms. This result is also shown in Tran Tho Nhi's study on 1274 postpartum mothers in Dong Anh district, Hanoi city. The study used the EPDS scale to assess depression in postpartum mothers.

Body symptoms: Physical symptoms are experienced between 2.4% and 35.4% of postpartum mothers. Morning symptoms wake up early 2 hours before usual; Loss or decreased interest in daily activities and reduced appetite are the symptoms the body has the highest incidence of. Physical symptoms were also recorded in Tran Tho Nhi's study on 1274 postpartum mothers

in Dong Anh district, Hanoi city. The study used the EPDS scale to assess depression in postpartum mothers. Other body symptoms recorded a proportion between 13.3% and 66.7%; symptoms of feeling sluggish and sluggish were 66.7%; poor appetite accounted for 13.3%; poor sleep accounted for 38.2% [16].

4.2. Some factors related to post-partum depression among premature mothers

4.2.1. Some factors associated with depression premature birth after 4 weeks

Personal characteristics of obstetricians: Our results show that women in the age group no older than 35 years are 2.3 times more likely to develop postpartum depression than those over 35. In Vietnam, in the previous study of Tran Tho Nhi, the results of the survey assessed two age groups, under 25 years old and 25 years old and above, also showed a lower tendency of pregnant women at older ages (> 25 years old) to suffer from postpartum depression compared to younger mothers [16]. Age is also one of the factors mentioned in the Australian study that found that the prevalence of postpartum depression in mothers aged 18-24 years was twice as high as in those aged 25-29 years [190].

Maternal health factors: Motherhood is a life transition associated with physical and emotional changes for a woman. The results of our study indicate that the physical health of pregnant women is one of the factors that are associated with postpartum depression. This association has also been mentioned in Dennis' study, which showed that poor maternal health increases the risk of postpartum maternal depression. Specifically, Dennis' research shows that poor maternal health (OR=4.48; 95%CI= 3.15-6.38) and life stress (OR=2.43; 95%CI= 1.88-3.15) increase maternal depression risk [69].

Newborn outcomes: The results of the study showed that factors such as weighing less than 1000 g, poor/inferior health status of the child and having concerns about the health, care and treatment of the child are all associated factors that increase the severity of postpartum depression. Previous studies have similarly

shown that very low birth weight is a risk factor for postpartum depression 4 to 18 times higher in mothers between 4 and 6 weeks after giving birth. [101] The prevalence of postpartum depression is as high as 40% in the early postpartum period in premature women, which is associated with low birth weight [183].

4.2.2. Some factors associated with depression after 6 weeks of preterm birth

In the multivariate regression analysis model, the factors that are associated with depression in pregnant women 6 weeks after giving birth include the health status of the baby, the health of the mother, thoughts of not wanting to live after birth, postpartum work status, living with parents and confiding in her husband. Therefore, intervention in the group of mothers from the hospital and husbands at 6 weeks will increase the effectiveness of treatment intervention on this group of people [177].

4.2.3. Some factors related to depression after 10-12 weeks of preterm birth

The results of the multivariate analysis in our study indicate that factors including anxiety about the weight of babies who do not gain weight and job status are associated with the risk of depression in pregnant women 10-12 weeks after birth. This association is similar to the study results at 6 weeks postpartum. However, at 10-12 weeks postpartum, postpartum women are not directly affected by factors such as their health, attention from husband and family or birth history. At this point, one of the factors that is emphasized is the status of work and the child's development [158]. Therefore, psychological interventions at this time need to consider the impact on work factors and the child's health.

4.3. Evaluating the effectiveness of interventions

The results of our study selected mothers with EPDS scores of ≥ 13 and agreed to participate in the intervention; after the intervention, 79.8% of mothers had EPDS scores fall below 10 points; 10.1% dropped to between 10-12 points and still 10.1% had EPDS scores ≥ 13 points. The effectiveness of cognitive-

behavioural interventions and combined psychological treatments have also been shown in most studies, such as the Morrell study also showed the effectiveness of psychological support measures. Study subjects were given weekly psychotherapy sessions for up to 8 weeks. The results showed that before the intervention, the maternal group had EPDS scores of ≥12 points; after 6 months of psychological intervention, 87.6% of mothers had EPDS scores of <12 points [131]. The study by Van Lieshout et al. used a cognitive-behavioural intervention on a group of mothers with signs of postpartum depression with a pre-intervention EPDS score of 16.09 (95%CI=14.89-17.29) score. The study found that it effectively reduced most symptoms of postpartum depression, and the EPDS score at 9 weeks was 10.82 (95%CI=9.54-12.09); after 6 months, it was 9.35 (8.01-10.68) points [182]. Or the study by Van Lieshout et al. used cognitive behavioral intervention on a group of mothers with signs of postpartum depression with a pre-intervention EPDS score of 16.09 (95%CI=14.89-17.29) points. The study showed that it was effective in reducing most postpartum depression symptoms and the EPDS score after 9 weeks was 10.82 (95%CI=9.54-12.09), after 6 months was 9.35 (8.01-10.68) points.

Our research, in addition to psychological counselling, also applies a new method, which is psychological intervention therapy combined with passive counselling through the smart mobile application "Postpartum support". This intervention group was also shown to be effective in reducing postpartum depression with a 79.1-point reduction rate of depression risk (EPDS<10 points, and only 4.6% of mothers had EPDS scores ≥ 13 points). Many countries also use the application of information technology to depression treatment in different forms. Branquinho et al.'s study used cognitive-behavioural therapy with 13 intervention sessions via online calling and video calling to treat depression in postpartum depressed mothers. Study results show that cognitive-behavioral therapy is effective in reducing symptoms of postpartum depression, with a pre-intervention EPDS score of 19

points and a post-intervention EPDS score of 8 points. Research also shows that online interventions make postpartum depression mothers more accessible to psychological counselling. Features of characteristic symptoms of postpartum depression in the intervention group, such as decreased mood, decreased interest/hobbies, decreased energy, and increased fatigue, all had a reduced rate after the intervention ($p<0.05$).

CONCLUSION

1. Current situation of depressive symptoms in preterm mothers at some maternity hospitals in Hanoi

The percentage of premature mothers showing signs of depression at 4 weeks was 26.6%, which drops to 16.5% by weeks 10-12. Characteristic depressive symptoms: decreased energy and increased fatigue (26.0% to 44.2%); reduced interest/interest (from 21.0% to 36.7%); decreased mood (from 17.6% to 24.3%). Common depressive symptoms: sleep disturbances (between 35.4% and 49.4%); changes in appetite (from 27.7% to 33.3%); decreased concentration of attention (from 24.3% to 44.4%), loss of confidence or self-esteem, difficulty in making decisions (from 13.7% to 30.9%).

2. Some factors related to depressive symptoms in mothers of preterm infants at some maternity hospitals in Hanoi

4 weeks postpartum: maternal age ≤ 35 years (OR=3.4); husband does not empathize or share in life (OR=2.8); psychological stress during pregnancy (OR=3.4); psychological problems in the past 12 months (OR=2.7); history of obstetric accident (OR=1.8). ***6 weeks postpartum:*** worry about the baby's weight (OR=2.1); the current state of health of the child is poor/very poor (OR=7.6); the current health of the mother is weak/very weak (OR=4.2); thoughts of not wanting to live after birth (OR=7.9); poor job status (OR=4.4); living with parents (OR=2.0); occasionally/rarely/never confiding in her husband (OR=2,4). ***10-12 weeks postpartum***: worry about the baby's weight (OR=3.0); poor job status (OR=2.3).

3. Evaluating the effectiveness of postpartum depression interventions in mothers of preterm infants

The interventions in the study were effective in reducing postpartum depression. Specifically, with a pre-intervention EPDS score of 15.6 ± 2.9 points, a post-intervention decrease of 7.2 ± 3.8 ($p<0.05$). Before the intervention, 100% of mothers had EPDS scores ≥ 13 points. After the intervention, the percentage of mothers with EPDS scores ≥ 13 points decreased to 10.1%; 10.1% had EPDS scores of 10-12 points, and 79.8% had EPDS scores of < 10 points.

RECOMMENDATIONS

1. Women and their loved ones should be equipped with knowledge and understanding of PD to avoid, understand and provide timely support.
2. Health facilities need to organize screening and monitoring of postpartum psychological problems, especially in the period of 4 to 12 weeks after giving birth.
3. Mothers with high risk factors for postpartum depression include: age ≤ 35 years old, experienced psychological stress during pregnancy, obstetric complications and mothers with children with health problems, need to be screened early for psychological problems to have appropriate interventions.
4. Organizing psychological counseling sessions or building postpartum support applications to provide knowledge about child health care and early psychological screening for mothers, are effective intervention programs to reduce postpartum depression in mothers.
5. Conduct intervention research on a larger scale evaluating the effectiveness of interventions.