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Comparison of Postpartum Depression, Psychological Distress, Resilience, and Psychological Well-Being between Fathers with Infants Admitted to the Neonatal Intensive Care Unit and Fathers with Healthy Infants

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ABSTRACT

Background and Objective: Most new fathers experience a lot of stress when their newborn is admitted to the Neonatal Intensive Care Unit (NICU). However, most studies have focused on the needs of mothers. The aim of this study is to compare postpartum depression, psychological distress, resilience, and psychological well-being in new fathers of infants admitted to the NICU and fathers of healthy infants.

Methods: This case-control study was conducted on 120 new fathers in two groups of 60 cases (admitted to the NICU) and 60 controls (with healthy newborns) referring to the NICU and specialized clinics of Shafizadeh and Ayatollah Rouhani Hospitals in Babol. Participants completed the Edinburgh Postnatal Depression Scale (EPDS) with a score range of (0-30), the Ryff's Psychological Wellbeing Scale (RSPWB-18) with a score range of (18-108), the Connor-Davidson Resilience Scale (CD-RISC) with a score range of (0-100), and the Brief Symptom Inventory (BSI-18) with a score range of (0-72), and the results were reviewed and compared.

Findings: In the case group, the mean scores of postpartum depression (12.6±4.12 vs. 8.32±1.64) and psychological distress (54.55±10.48 vs. 44.45±7.03) were significantly higher than in the control group ($p<0.001$). Moreover, the scores of psychological well-being (80.66±10.18 vs. 86.73±5.80) and resilience (59.81±10.99 vs. 71.05±34.7) were significantly lower ($p<0.001$). The frequency of postpartum depression symptoms in Edinburgh questionnaire with cut-off point of EPDS≥10 in the group of fathers with infants admitted to the NICU was about 3.5 times that of fathers with healthy infants (46 vs. 12) ($p<0.001$). The results of logistic regression analysis showed that in new fathers with infants admitted to the NICU, the chance of developing depressive symptoms increases 5-fold ($p=0.002$, OR=5.217), which increases with age ($p=0.046$, OR=1.155), but decreases with the increase in resilience ($p=0.001$, OR=0.865).

Conclusion: The results of the study showed that the risk of depression in fathers with infants admitted to the NICU is 5 times higher than fathers with healthy infants. Therefore, timely identification and treatment of postpartum depression is recommended for new fathers with infants admitted to the NICU.

Keywords: *Fathers, Postpartum Depression, Neonatal Intensive Care Unit, Psychological Distress, Psychological Well-Being, Resilience.*

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Introduction

In early 2019, the American Academy of Pediatrics (AAP) issued a statement stating that "maternal depression impacts the entire family," urging pediatricians to include the diagnosis and management of perinatal depression in their work with children. The statement also confirmed paternal postpartum depression (PPD) as a recognized clinical problem and called on pediatricians to screen for maternal depression at 1, 2, 4, and 6-month child visits and for paternal depression at the 6-month child visit (1).

Epidemiological data indicate a relatively high prevalence of postpartum paternal depression. Although there are differences across cultures and study settings, it is generally 8-13% (2). However, higher rates of prenatal and postpartum paternal depression (14.1-25.5%) have been reported in the United States (3). Despite recent advances in postpartum mental health, the emotional and psychological well-being of new fathers appears to be overlooked (4, 5). This may be because revealing anger, fear, and sadness related to the birth of a baby can be perceived as a sign of weakness. As a result, mental disorders in new fathers are often underdiagnosed (6, 7). On the other hand, men tend to hide their psychological problems for cultural reasons, social image, or gender role. Rather than seeking help, they cope with stress through "externalizing" strategies such as smoking and overexerting themselves at work or in sports (8-10).

The experience of having a child in the neonatal intensive care unit (NICU) is often unexpected and traumatic; however, most research and intervention efforts to date have focused on the needs of mothers (11, 12). Fathers of premature infants have been found to be 3 to 9 times more likely to develop postpartum depression than fathers of healthy infants (13). While there is a growing body of research on parental distress in general, much less time has been devoted to addressing the unique needs of new fathers with infants in the NICU. According to Massoudi et al., about 90% of public health nurses stated that they rarely think about "fatherhood stress," and less than 20% suggested that fathers need supportive conversation. Furthermore, approximately 50% of public health nurses had ambivalent attitudes about the caregiving capacity of fathers compared with mothers (14). Men who experience a discrepancy between the more traditional male gender role and contemporary expectations of paternal behavior in the postpartum period often experience psychological distress, depression, and poor psychological well-being (15).

Some studies have shown that fathers of infants admitted to the NICU suffer from higher levels of psychological distress than normal fathers. In a longitudinal study of 1000 men, Petersen et al. showed that fathers of premature infants had significantly higher levels of anxiety and lower quality of life scores at 6 weeks after birth compared with fathers of healthy infants (16).

Cajiao-Nieto et al. showed that fathers of hospitalized infants experienced higher levels of depression and anxiety shortly after birth, and their symptom levels were higher compared to fathers of healthy infants (17). Weigl et al. showed that mothers and fathers of extremely premature infants had higher scores of depression, anxiety, and stress than parents of healthy infants (18). McMahon et al. found that fathers of extremely premature infants were at increased risk for chronic depressive and anxiety symptoms in the first year after birth, highlighting the need for ongoing screening and support (19).

In a study by Lonio et al., it was shown that for fathers, young age of the baby, lower gestational age, and worse condition of the baby at birth were significant predictors of stress and negative emotions (20). The results of a study by Abdullah et al. showed that parents with infants admitted to the NICU experienced high levels of stress, anxiety, depression, and sleep disturbance (21). The findings of a study by Helle et al. indicated that fathers of very low birth weight (VLBW) infants had higher state anxiety scores than fathers of term infants and were 2.9 times more likely to have major and minor anxiety symptoms at 4 to 6 weeks

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postpartum. Moreover, depending on the measurement, the risk of postpartum depression was 3 to 9 times higher in fathers (22). Kilicli et al. showed that stress, anxiety, and depression are very high in parents, and stress in mothers predicts 5% depression and stress in fathers predicts 30% anxiety (23).

In a systematic review, Prouhet et al. showed that fathers perceive the NICU environment to be stressful and are more stressed than fathers of full-term and healthy infants (24). In a study by Carson et al., the findings indicated that the risk of psychological distress was twice as high in fathers of moderately preterm infants compared to fathers of term infants (25). Rimmerman et al. also showed that fathers of preterm infants had significantly higher stress and depression scores and lower levels of involvement with their children compared to fathers of healthy infants (26). In general, it can be said that most studies that have focused on postpartum depression in new fathers are related to countries such as England, Norway or Australia, where public policies support father involvement in parenting. However, few studies have been conducted in countries where the role of the new father is still strongly associated with the role of the family provider. Therefore, we see a research gap in the field of postpartum depression in new fathers with infants hospitalized in intensive care units. Few studies in Iran have focused on fathers' mental health, and no published research has compared fathers of term infants with fathers of infants hospitalized in the NICU regarding postpartum depression. Therefore, the aim of this study was to compare postpartum depression, psychological distress, resilience, and psychological well-being in new fathers with infants hospitalized in the NICU and fathers with healthy infants.

Methods

After being approved by the Ethics Committee of Babol University of Medical Sciences with the code IR.MUBABOL.REC.1401.034, this case-control study was conducted on 120 new fathers who referred to Amirkola Shafizadeh Hospital, Ayatollah Rouhani Children's Hospitals and Amirkola Children's Hospital from May 2022 to October 2022 based on convenience sampling. The study included two groups; 60 cases (admitted to the NICU) and 60 controls (fathers with healthy babies). The sample size was calculated based on the formula used in the study of Rimmerman et al. (26); 60 samples were considered in each group.

In the case group, fathers with a hospitalized infant with the first experience of being a father, having at least fifth grade education, consent to enter the study, having an infant under 6 months with a history of being hospitalized in the NICU after birth due to prematurity, medical conditions such as respiratory distress, convulsions, cerebral hemorrhage and jaundice were included in the study. The conditions for entering the study for the control group (fathers with a healthy full-term infant) included the first experience of becoming a father, at least fifth grade education, consent to enter the study, having an infant under 6 months who was over 37 weeks old at the time of birth, looked healthy and had no disease and was not hospitalized in the NICU after birth. The subjects of the control group were compared with the case group in terms of age and education. The exclusion criteria in both groups were the abnormality of the infant at birth, having negative experiences regarding important life events such as the loss of a close relative or job in the past 6 months, a history of severe psychiatric disorders such as bipolar disorder or psychotic disorder based on the subjects' self-report.

The researcher was present at the teaching hospitals of Babol University of Medical Sciences and had a face-to-face interview with the fathers who were waiting to meet with the neonatologist at the end of the NICU visit. The researcher assessed the inclusion/exclusion criteria, and if the conditions for entering the study were met, the objectives of the study were explained to the fathers. If they agreed to enter the study,

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they were given questionnaires to fill out after obtaining written informed consent from them. The participants of the control group were selected from among new fathers who visited the children's clinics of Babol University of Medical Sciences to visit their child.

Research tools:

The Connor-Davidson Resilience scale (CD-RISC) (2003): This scale consists of 25 items, all in a 5-point range from 0 (not true at all) to 4 (true nearly all the time). The range of scores is between zero and 100. A high score in this scale indicates greater psychological resilience. This questionnaire includes 5 factors of "personal competence, high standards, and tenacity"; "trust in one's instincts, tolerance of negative affect, and strengthening effects of stress"; "positive acceptance of change and secure relationships"; "control"; and "spirituality." The reliability of the questionnaire reported by its creators was (0.92) and its validity was (0.95) (27). The psychometric properties of this scale were investigated in the research of Hosseini et al. (28), in a sample of 361 people, and the Cronbach's alpha coefficient was calculated as 0.86 in the above sample, which indicates the high validity and reliability of this tool in Iranian subjects.

Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987): This questionnaire has 10 items which was used to measure fathers' depression. Each answer has a value between 0-3. Therefore, the EPDS score is between 0-30. Scores from 0 to 9 show absence of depression and scores of 10 or higher are considered as symptoms of depression (29). The sensitivity, specificity and positive predictive value of this tool have been reported to be 85%, 77% and 83%, respectively. Moreover, split-half reliability (0.88) and alpha coefficient (0.87) were reported for the whole scale (29). In a study by Duan et al., the Cronbach's alpha of this questionnaire for fathers was 83% (30). For the Persian version, the sensitivity, specificity, and alpha coefficient for the EPDS were reported as 95.3%, 87.9%, and 0.83%, respectively, which indicates the high reliability of this tool (31).

The Brief Symptom Inventory-18 (BSI-18) (Derogatis & Melisaratos, 1983): This questionnaire contains 18 items with three dimensions of somatization, depression, anxiety and the Global Severity Index (GSI), which measures psychological distress. Each of these dimensions includes 6 items. Each item is rated on a 5-point Likert scale from 0 (not at all) to 4 (very much) (32). The psychological GSI score is the sum of the scores of the three subscales, followed by the Derogatis scoring guidelines; then, the four raw scores are converted to a standardized T score (with a mean of 50 and a standard deviation of 10) to facilitate interpretation (33). Participants with a T-SCORE score higher than 63 on the GSI are diagnosed as indicating psychological distress (34). In a study by Calderon et al., alpha coefficients varied between 0.75 and 0.88 in different dimensions (34). In a study by Akhavan et al., the Cronbach's alpha coefficient for somatization was 0.76, depression was 0.85, anxiety was 0.81, and GSI was 0.90 (35). In addition, the test-retest reliability coefficient (with an interval of two weeks) in 4 dimensions of somatization, depression, anxiety and GSI was reported as 0.67, 0.75, 0.82 and 0.81, respectively, which indicates the good validity of this tool.

Ryff psychological well-being (RSPWB-18) (1989): In this study, Ryff's 18-question scale was used to measure psychological well-being, which includes 6 sub-components: 1) self-acceptance; 2) positive relations; 3) autonomy; 4) environmental mastery; 5) purpose in life and 6) a sense of personal growth. Questions are scored on a 6-point scale from 1 (strongly disagree) to 6 (strongly agree). A higher score indicates better psychological well-being (36). In the study of Ryff et al., the correlation of the 18-question scale with the original scale fluctuated from 0.7 to 0.89 (36). In a study conducted by Ryff et al., the test-retest reliability coefficients for this scale in a 6-week period for self-acceptance were 0.85, positive relations 0.83, autonomy 0.88, environmental mastery 0.81, purpose in life 0.82 and personal growth 0.81 (37). The validity of this scale in Iran was assessed in a study by Khanjani et al., and the internal consistency of this scale using Cronbach's alpha in all six factors was appropriate (38).

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After collecting the data, they were entered into SPSS 26. Data were analyzed using descriptive indices (prevalence, percentage, mean and standard deviation), Chi-squared test (to investigate the relationship between the qualitative variables of the group and demographics, income level [below 10 million and above 10 million Tomans], occupation, education and age) and t-test and $p<0.05$ was considered significant.

Results

In this research, 120 new fathers with a healthy infant and admitted to the NICU were evaluated in terms of resilience, postpartum depression, psychological well-being, and psychological distress in two groups of 60. The mean age of new fathers with a hospitalized infant was 32.48±4.12 years and with a healthy infant was 31.45±3.09 years. The mean age of hospitalized and non-hospitalized infants was calculated as 31.50±30.90 and 28.98±18.98 weeks, respectively. In terms of education level, 11 (18.3%) of the fathers with hospitalized infants and 8 (13.3%) of the fathers with healthy infants didn't have high school diploma. 20 (33.3%) and 23 (38.3%) of the new fathers with hospitalized and healthy infants, respectively, had an associate's or bachelor's degree. Also, the two groups were equal in terms of numbers in diploma, master's and doctorate degrees; 18 (30%) of the new fathers with a healthy and hospitalized infant in each of the groups had a diploma and 11 (18.3%) of the new fathers in each of the groups had a master's or doctoral degree.

The results of chi-square test and independent T-test showed that the distribution of demographic variables in the two groups was the same and no significant difference was observed between the participants of the case and control groups in terms of age, education, occupation, and monthly income level (Table 1).

Table 1. Demographic characteristics of study subjects in the two groups

Variable / Group	Fathers with infants in the NICU Number(%)	Fathers with healthy infants Number(%)	p-value
Education			
Lower than diploma	11(18.3)	8(13.3)	0.877*
Diploma	18(30)	18(30)	
Associate and Bachelor	20(33.3)	23(38.3)	
Master's and PhD	11(18.3)	11(18.3)	
Job			
Self employed	51(85)	48(80)	0.471*
Employee	9(15)	12(20)	
Monthly income level			
Less than 10 million tomans	46(76.7)	46(76.7)	0.99*
More than 10 million tomans	14(23.3)	14(23.3)	
Gender of the infant			
Boy	31(51.7)	32(53.3)	0.855*
Girl	29(48.3)	28(46.7)	
Age (Mean±SD)	32.48±4.12	31.45±3.09	0.179**

*Chi-square test, **Independent t-test

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The results showed that the mean postpartum depression score according to the Edinburgh Postnatal Depression Scale in new fathers with a newborn hospitalized in NICU (12.6±4.12) was significantly higher than new fathers with a healthy newborn (8.32±1.64) (p<0.001). Based on Edinburgh questionnaire, the prevalence of postpartum depression with cut-off point of EPDS≥10 was 46 (76.7%) in fathers with hospitalized infants and 12 (20%) in fathers with healthy infants. Chi-square test showed that the frequency of postpartum depression in new fathers with newborns hospitalized in NICU is significantly higher than fathers with healthy infants (p<0.001) (Table 2).

Table 2. Comparison of the descriptive findings of the research variables in the two studied groups

Variable	Fathers with infants in the NICU Mean±SD	Fathers with healthy infants Mean±SD	Range of scores	p-value*
Postpartum depression	12.6±4.12	8.32±1.64	0-30	<0.001
Psychological well-being				
Self-acceptance	13.43±3.06	14.80±1.77	3-18	0.004
Purpose in life	14.15±2.58	15.33±1.98	3-18	0.006
Positive relations	13.48±2.66	14.25±2.07	3-18	0.082
Personal growth	14±2.99	15.38±1.74	3-18	0.003
Environmental mastery	12.70±2.48	13.81±1.71	3-18	0.005
Independence	12.90±2.52	13.15±2.09	3-18	0.556
Total	80.66±10.18	86.73±5.80	18-108	0.001
Resilience				
Perception of individual Competence	18.80±4.06	22.35±3.32	0-32	0.001
Trust in one's instincts	14.80±3.94	18.21±3	0-28	0.001
Positive acceptance	13.06±2.64	15.53±1.71	0-20	0.001
Control	6.35±1.96	7.83±1.32	0-12	0.001
Spirituality	6.80±1.74	7.11±0.99	0-8	0.225
Total	59.81±10.99	71.05±7.34	0-100	0.001
Psychological distress				
Anxiety	6.53±3.39	4.01±2.32	0-24	0.001
Depression	5±2.20	3.86±1.96	0-24	0.004
Somatization	5.90±2.88	3.63±2.29	0-24	<0.001
Total	17.43±6.81	11.51±4.57	0-72	<0.001
T Score	54.55±10.48	45.44±7.03	-	<0.001

*Independent t-test

Comparison of the mean psychological well-being score in two groups showed that new fathers with a hospitalized infant (80.66±10.18) had significantly lower psychological well-being than fathers with a healthy infant (86.73±5.80) (p<0.001). The highest and lowest mean differences regarding sub-components of psychological well-being in the two groups were respectively related to personal growth (14±2.99 vs. 15.38±1.74) and independence (12.90±2.52 vs. 13.15±2.09). It should be noted that the significance level of mean differences of the two groups regarding the sub-components of positive relations and independence were respectively p=0.082 and p=0.556, both of which had no statistically significant relationship. Moreover, the comparison of resilience score in the two groups showed that the mean total resilience score

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in new fathers with an infant in NICU (59.81±10.99) was significantly lower than new fathers with a healthy infant (71.05±7.34) (p<0.001). The highest and lowest mean differences in the two groups in sub-components of resilience were respectively related to personal competence (18.80±4.06 vs. 22.35±3.32) and spirituality (6.80±1.74 vs. 7.11±0.99). A significant level (p=0.225) was obtained only in spirituality, which was not statistically significant (Table 2).

Regarding psychological distress, the T-score for new fathers with hospitalized infant (54.55±10.48) was significantly higher than healthy infants (45.44±7.03) (p<0.001). The highest and lowest means differences regarding the sub-components of psychological distress in the two groups were respectively related to anxiety (6.53±3.39 vs. 4.01±2.32) and depression (5±2.20 vs. was 3.83±1.96) (Table 2).

Table 3 shows the results of the logistic regression analysis, in which the postpartum depression score of 10 and above in new fathers was considered as criterion variable, whereas father's age, education, hospitalization or non-hospitalization, and the resilience score were considered as predictor variables. A total of 120 people were included in the analysis and the complete model was significantly stable (p<0.001, df=4, X^2=68.27). With correct prediction (88.7%) of new fathers who received a postpartum depression score of less than 10 and a correct prediction (79.3%) for new fathers who received a postpartum depression score of 10 and above, this model had an acceptable validity; the overall correct prediction of the model was 84.2%.

The values of the coefficients show that fathers with infant hospitalized in the NICU have more than 5 times (p=0.002, OR=5.217) the risk of depression. Regarding the age variable, it was found that increase in each year of age is associated with an increased risk of postpartum depression (p=0.046, OR=1.155). In other words, it can be said that with one unit increase in new father's age, the risk of depression increases by 15%. Moreover, increase in resilience score was significantly associated with a decrease in the risk of depression (p=0.001, OR=0.865). In other words, with one unit increase in resilience score, the risk of depression decreases by 14%. However, the role of education level was not statistically significant (p=0.499, OR=0.701) (Table 3).

Table 3. Summary of logistic regression results to predict depression variable

Variable	β	Wald	Df	P	OR	upper limit	lower limit
Group (admission/non-admission)	1.65	10.01	1	0.002	5.217	14.51	1.87
Age	0.14	4.66	1	0.046	1.155	1.33	1.09
Resilience	-0.14	16.65	1	<0.001	0.865	0.92	0.80
Education (university/diploma or lower)	-0.35	0.45	1	0.499	0.701	1.96	0.24

Discussion

The results of this study showed that depression scores in the group of new fathers with a hospitalized infant are significantly higher than the group of new fathers with a healthy infant. Furthermore, the frequency of depression symptoms in new fathers with an infant the NICU was 3.5 times that of fathers with healthy an infant. This finding is consistent with the results obtained from the studies of Cajiao-Nieto et al. (17), Rimmerman et al. (26), McMahon et al. (19), Helle et al. (22) and Weigl et al. (18). Similar to the results obtained from the study of Doering et al. (39), in explaining this finding, it should be said that expecting an infant is a potential emotional experience for expectant fathers. They are often excited that an infant is on the way and imagine taking the infant home after birth. However, unexpected problems such as premature delivery, very low birth weight and admission to the NICU can increase the level of depression

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and psychological distress in new fathers. This issue is exacerbated when a new father is simultaneously affected by both the medical fragility of his baby and the negative impact of his wife's distress. Another factor related to the postpartum depression of fathers with a hospitalized infant can be that the father's mind wanders beyond the present to the problems and complications of the infant's future health. Infant problems may be associated with increased marital conflict, socioeconomic instability, fear of job loss (due to frequent hospital leave), and feelings of shame among friends, family, and society. On the other hand, not having proper health insurance, the high cost of treatment and stay in the ward will double the problems related to fathers' mental health and will become the basis for postpartum depression in new fathers. Finally, not being ready to be a father and having an infant in the hospital may be accompanied by sadness and isolation, all of which create very disturbing emotional conditions for fathers.

The findings of this research showed that the psychological distress scores in the group of new fathers with a hospitalized infant are significantly higher than the group of new fathers with a healthy infant. This finding is in line with the results obtained from the studies of Carson et al. (25), Mahmoodi et al. (40), Prouhet et al. (24), Weigl et al. (18) and Shahkolahi et al. In explaining this finding, it should be said that the advanced NICU environment, which includes monitors and breathing tubes, observing the appearance of the infant that is connected to various devices, as well as using advanced medical terms, can increase confusion and mental distress in new fathers. On the other hand, it should be noted that the focus of postpartum care programs is primarily on the needs and concerns of the mother, and this priority of the mother's needs and the attention of the staff of the NICU department towards her wishes, creates a feeling of rejection and psychological distress in new fathers.

This research showed that psychological well-being scores in the group of new fathers with a hospitalized infant are significantly lower than the group of new fathers with a healthy infant. In explaining this finding, many studies reported a negative correlation between the six dimensions of Ryff psychological well-being and depression both in non-clinical samples (43, 44) and in people who are currently recovering from a mental illness (45, 46). It can be said that not allowing fathers to participate in the care of the infant, lack of consultation with fathers in important decisions related to the health of the infant, and lack of sympathy and empathy with the father by the ward personnel can cause irreparable damage to the psychological well-being of new fathers. The dimension of environmental mastery significantly affects the changes in postpartum depression symptoms of new fathers. Allowing new fathers to participate in their infant's care can be significantly effective. For example, allowing new fathers to help nurses feed or bathe their infants and involving fathers in making decisions about their infant's health may help reduce their distress more quickly. In another explanation, it should be said that depression has a cognitive component that is characterized by a negative view of oneself, experiences and life. Therefore, mastering the environment may have a much greater effect on depression due to its cognitive components.

This research showed that resilience scores in the group of new fathers with a hospitalized infant are significantly lower than the group of new fathers with a healthy infant. Moreover, with increasing resilience, the chance of postpartum depression decreases. Resilience is a positive psychological trait possessed by new fathers that may control the stressors of the NICU experience and moderate the course of new fathers' psychological distress. The findings of this research are in line with the results of some studies that show that resilience has a negative correlation with symptoms of depression and anxiety (47-49). In explaining this finding, it should be said that the hospitalization of the infant will cause a lot of tension for the new fathers. At this point, the increased stress that fathers experience can be because fathers have significant problems understanding their infant's behaviors and experience stress from different sources. Due to the uncertainty of the diagnosis and treatment of the newborn, they have a higher perception of lack of control, which can in turn prevent the use of adaptive coping strategies with stressful events such as the

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hospitalization of the infant in the ward (50). On the other hand, the lack of resources and difficulties in matching one's expectations with others regarding fatherhood, as well as the existence of some masculinity ideas that often reinforce the outdated presence of the father as the breadwinner of the family, can be the source of feelings of loneliness and helplessness, which is usually associated with increased anxiety, decreased self-esteem, and a lower perception of efficacy. It should be noted that due to the COVID-19 pandemic, strict policies were formulated by hospitals in order to prevent the spread of the disease, one of which was preventing fathers from entering the NICU and not meeting their infants. In our research, most of the fathers reported that the pandemic has had a devastating effect on their emotional health, indirectly through the impact of restrictions on the experience of parenting and family visits, which in turn was associated with lower levels of resilience and the use of adaptive strategies.

This research, despite having many positive points, such as being the first study about depression symptoms of fathers with NICU-admitted infants in Iran, has been associated with limitations. One of the limitations in this study was that depression symptoms were addressed based on a questionnaire and diagnosis was not adopted. It is recommended that in future studies, a clinical structured interview is used to diagnose depression in new fathers with infants admitted to the NICU. The next limitation was that this study was conducted only in one city of Mazandaran province, and these results may be related to hospital or university facilities. Therefore, it is recommended that further multicenter studies be conducted in multiple cities and universities. Another limitation was that due to the cross-sectional nature of the study, we do not know the changes in depression symptoms over time. Therefore, it is recommended that longitudinal studies for new fathers' depression be conducted to measure changes and complications over time.

This study has clinical applications for different fields of medical sciences. These results suggest that pediatricians, in their newborn care programs or prenatal visits, include postpartum depression screening not only for mothers after childbirth, but for all fathers, especially new fathers with a newborn in the NICU. This study advises obstetricians and midwives to identify fathers' depression during postpartum visits along with screening programs for women's mental disorders. These results advise nurses, especially those working in NICU departments, try to establish comfort, security, and informational and psychological support for fathers with infants in NICU along with mothers.

The results of the study showed that the mean scores of postpartum depression and psychological distress are higher in fathers with an infant in the NICU, but the scores of psychological well-being and resilience are lower. Moreover, the frequency of postpartum depression symptoms in the group of fathers with babies hospitalized in NICU is about 3.5 times that of fathers with healthy infants. According to the obtained results, it is recommended that the health care system create a unique educational program for fathers of infants admitted to the NICU. This training can include crisis intervention, increasing fathers' awareness of their important role at this stage, and providing basic knowledge and skills on how to interact with the infant.

Conflict of interest: The authors report no conflict of interest.

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References

1.Walsh TB, Davis RN, Garfield C. A Call to Action: Screening Fathers for Perinatal Depression. Pediatrics. 2020;145(1):e20191193.

2.Rao WW, Zhu XM, Zong QQ, Zhang Q, Hall BJ, Ungvari GS, et al. Prevalence of prenatal and postpartum depression in fathers: A comprehensive meta-analysis of observational surveys. J Affect Disord. 2020;263:491-9.

3.Nishimura A, Fujita Y, Katsuta M, Ishihara A, Ohashi K. Paternal postnatal depression in Japan: an investigation of correlated factors including relationship with a partner. BMC Pregnancy Childbirth. 2015;15:128.

4.Kennedy E, Munyan K. Sensitivity and reliability of screening measures for paternal postpartum depression: an integrative review. J Perinatol. 2021;41(12):2713-21.

5.Pedersen SC, Maindal HT, Ryom K. "I Wanted to Be There as a Father, but I Couldn't": A Qualitative Study of Fathers' Experiences of Postpartum Depression and Their Help-Seeking Behavior. Am J Mens Health. 2021;15(3):15579883211024375.

6.Bruno A, Celebre L, Mento C, Rizzo A, Silvestri MC, De Stefano R, et al. When Fathers Begin to Falter: A Comprehensive Review on Paternal Perinatal Depression. Int J Environ Res Public Health. 2020;17(4):1139.

7.Jones HH. Paternal Perinatal Psychopathology and Stigma Related to NICU Admission [Doctoral Thesis]. Colorado, Denver: University of Denver; 2023.

8.Misri SK. History of Postpartum Psychiatric Disorders: Don't Forget the Dads. In: Misri SK, editor. Paternal Postnatal Psychiatr Illnesses: A Clinical Case Book. Springer Cham; 2018. p.10.

9.Musser AK, Ahmed AH, Foli KJ, Coddington JA. Paternal postpartum depression: what health care providers should know. J Pediatr Health Care. 2013;27(6):479-85.

10.Shafian AK, Mohamed S, Nasution Raduan NJ, Hway Ann AY. A systematic review and meta-analysis of studies validating Edinburgh Postnatal Depression Scale in fathers. Heliyon. 2022;8(5):e09441.

11.Filippa M, Saliba S, Esseily R, Gratier M, Grandjean D, Kuhn P. Systematic review shows the benefits of involving the fathers of preterm infants in early interventions in neonatal intensive care units. Acta Paediatr. 2021;110(9):2509-20.

12.Baldoni F, Ancora G, Latour JM. Being the Father of a Preterm-Born Child: Contemporary Research and Recommendations for NICU Staff. Front Pediatr. 2021;9:724992.

13.Kim P, Swain JE. Sad dads: paternal postpartum depression. Psychiatry (Edgmont). 2007;4(2):35-47.

14.Massoudi P, Hwang CP, Wickberg B. How well does the Edinburgh Postnatal Depression Scale identify depression and anxiety in fathers? A validation study in a population based Swedish sample. J Affect Disord. 2013;149(1-3):67-74.

15.Singley DB, Edwards LM. Men's perinatal mental health in the transition to fatherhood. Prof Psychol Res Pract. 2015;46(5):309-16.

16.Petersen IB, Quinlivan JA. Fatherhood too soon. Anxiety, depression and quality of life in fathers of preterm and term babies: a longitudinal study. J Psychosom Obstet Gynaecol. 2021;42(2):162-7.

17.Cajiao-Nieto J, Torres-Giménez A, Merelles-Tormo A, Botet-Mussons F. Paternal symptoms of anxiety and depression in the first month after childbirth: A comparison between fathers of full term and preterm infants. J Affect Disord. 2021;282:517-26.

18.Weigl T, Schneider N, Stein A, Felderhoff-Müser U, Schedlowski M, Engler H. Postpartal Affective and Endocrine Differences Between Parents of Preterm and Full-Term Infants. Front Psychiatry. 2020;11:251.

19.McMahon GE, Anderson PJ, Giallo R, Pace CC, Cheong JL, Doyle LW, et al. Mental Health Trajectories of Fathers Following Very Preterm Birth: Associations With Parenting. J Pediatr Psychol. 2020;45(7):725-35.

[DOI: 10.22088/jbums.27.1.6]

20.Ionio C, Mascheroni E, Colombo C, Castoldi F, Lista G. Stress and feelings in mothers and fathers in NICU: identifying risk factors for early interventions. Prim Health Care Res Dev. 2019;20:e81.
21.Al Maghaireh DF, Abdullah KL, Chong MC, Chua YP, Al Kawafha MM. Stress, Anxiety, Depression and Sleep Disturbance among Jordanian Mothers and Fathers of Infants Admitted to Neonatal Intensive Care Unit: A Preliminary Study. J Pediatr Nurs. 2017;36:132-40.
22.Helle N, Barkmann C, Ehrhardt S, von der Wense A, Nestoriuc Y, Bindt C. Postpartum anxiety and adjustment disorders in parents of infants with very low birth weight: Cross-sectional results from a controlled multicentre cohort study. J Affect Disord. 2016;194:128-34.
23.Kılıçlı A, Saraçoğlu G, Çetinkaya Büyükbodur A. Stress, Anxiety, and Postpartum Depression in Parents with Premature Infants in Neonatal Intensive Care Unit. Florence Nightingale J Nurs. 2023;31(2):82-90.
24.Prouhet PM, Gregory MR, Russell CL, Yaeger LH. Fathers' Stress in the Neonatal Intensive Care Unit: A Systematic Review. Adv Neonatal Care. 2018;18(2):105-20.
25.Carson C, Redshaw M, Gray R, Quigley MA. Risk of psychological distress in parents of preterm children in the first year: evidence from the UK Millennium Cohort Study. BMJ Open. 2015;5(12):e007942.
26.Rimmerman A, Sheran H. The transition of Israeli men to fatherhood: a comparison between new fathers of pre-term/full-term infants. Child Fam Soc Work. 2001;6(3):261-7.
27.Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). Depress Anxiety. 2003;18(2):76-82.
28.Hosseini SA, Mohammadi H, Saadat Z. Investigating the psychometric properties of the Cognitive Resilience Scale in a sample of Iranian society. Q Educ Meas. 2021;11(42):125-50. [In Persian]
29.Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry. 1987;150:782-6.
30.Duan Z, Wang Y, Jiang P, Wilson A, Guo Y, Lv Y, et al. Postpartum depression in mothers and fathers: a structural equation model. BMC Pregnancy Childbirth. 2020;20(1):537.
31.Mazhari S, Nakhaee N. Validation of the Edinburgh Postnatal Depression Scale in an Iranian sample. Arch Womens Ment Health. 2007;10(6):293-7.
32.Derogatis LR, Melisaratos N. The Brief Symptom Inventory: an introductory report. Psychol Med. 1983;13(3):595-605.
33.Prelow HM, Weaver SR, Swenson RR, Bowman MA. A preliminary investigation of the validity and reliability of the Brief-Symptom Inventory-18 in economically disadvantaged Latina American mothers. J Community Psychol. 2005;33(2):139-55.
34.Calderon C, Ferrando PJ, Lorenzo-Seva U, Hernández R, Oporto-Alonso M, Jiménez-Fonseca P. Factor structure and measurement invariance of the Brief Symptom Inventory (BSI-18) in cancer patients. Int J Clin Health Psychol. 2020;20(1):71-80.
35.Akhavan Abiri F, Shairi MR. Short Forms of Symptom Checklist (SCL): Investigation of validity & Reliability. J Clin Psychol Pers. 2020;18(1):137-62. [In Persian]
36.Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol. 1989;57(6):1069-81.
37.Ryff CD, Singer BH. Best news yet on the six-factor model of well-being. Soc Sci Res. 2006;35(4):1103-19.
38.Khanjani M, Shahidi S, Fathabadi J, Mazaheri MA, Shokri A. Factor structure and psychometric properties of the Ryff's scale of Psychological well-being, short form (18-item) among male and female students. Thought Behav Clin Psychol. 2014;8(32):27-36. [In Persian]

[DOI: 10.22088/jbums.27.1.6]

39.Doering LV, Moser DK, Dracup K. Correlates of anxiety, hostility, depression, and psychosocial adjustment in parents of NICU infants. Neonatal Netw. 2000;19(5):15-23.
40.Mahmoodi H, Golboni F, Nadrian H, Zareipour M, Shirzadi S, Gheshlagh RG. Mother-Father Differences in Postnatal Psychological Distress and Its Determinants in Iran. Open Access Maced J Med Sci. 2017;5(1):91-6.
41.Shahkolahi Z, Abdeyazdan Z, Mehrabi T, Hajiheidari M. Supporting fathers of premature infants hospitalized in Neonatal Intensive Care Unit (NICU). Iran J Crit Care Nurs. 2014;7(1):31-40.
42.Shahkolahi Z, Mahdavi Lenji Z, Jafari-Mianaei S. Challenging Experiences of the Fathers of the Premature Infants Admitted in the Neonatal Intensive Care Unit (NICU). Iran J Neonatol. 2018;9(1):53-9.
43.Liu Q, Shono M, Kitamura T. Psychological well-being, depression, and anxiety in Japanese university students. Depress Anxiety. 2009;26(8):E99-105.
44.Ruini C, Ottolini F, Rafanelli C, Tossani E, Ryff CD, Fava GA. The relationship of psychological well-being to distress and personality. Psychother Psychosom. 2003;72(5):268-75.
45.Fava GA, Rafanelli C, Ottolini F, Ruini C, Cazzaro M, Grandi S. Psychological well-being and residual symptoms in remitted patients with panic disorder and agoraphobia. J Affect Disord. 2001;65(2):185-90.
46.Rafanelli C, Park SK, Ruini C, Ottolini F, Cazzaro M, Fava GA. Rating well-being and distress. Stress Med. 2000;16(1):55-61.
47.Okito O, Yui Y, Wallace L, Knapp K, Streisand R, Tully C, et al. Parental resilience and psychological distress in the neonatal intensive care unit. J Perinatol. 2022;42(11):1504-11.
48.Sardella A, Lenzo V, Basile G, Musetti A, Franceschini C, Quattropani MC. Gender and Psychosocial Differences in Psychological Resilience among a Community of Older Adults during the COVID-19 Pandemic. J Pers Med. 2022;12(9):1414.
49.Long AC, Kross EK, Curtis JR. Family-centered outcomes during and after critical illness: current outcomes and opportunities for future investigation. Curr Opin Crit Care. 2016;22(6):613-20.
50.Binder WS, Zeltzer LK, Simmons CF, Mirocha J, Pandya A. The father in the hallway: posttraumatic stress reactions in fathers of NICU babies. Psychiat Ann. 2011;41(8):396-402.

[DOI: 10.22088/jbums.27.1.6]