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ORIGINAL ARTICLE

Psychological distress among postpartum mothers of preterm infants and associated factors: a neglected public health problem

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Objective: The aim of the present study was to determine the prevalence of psychological distress, depression, anxiety, and stress among postpartum Arab mothers of preterm or low birth weight (LBW) infants and to identify maternal characteristics that can predict psychological distress among mothers of preterm infants.
Methods: A hospital-based study was conducted. A representative sample of 2,091 postpartum mothers was surveyed and 1,659 women (79.3%) gave their consent to participate in the study. The study was based on a face-to-face interview with a designed questionnaire covering sociodemographic characteristics, anthropometric measures, medical history, and maternal characteristics. Depression, anxiety, and stress were measured using the Depression Anxiety Stress Scale (DASS-21).
Results: In the study sample, 10.2% of the postpartum mothers had preterm/LBW infants. Depression (29.4 vs. 17.3%) and anxiety (26.5 vs. 11.6%) were significantly more common among mothers of preterm births compared to mothers of full term infants ($p < 0.001$). The risk of depression in mothers of preterm/LBW infants was two times the risk in mothers of full term infants, while the risk of anxiety was 2.7 times in mothers of preterm/LBW infants than in mothers of full term infants. Young mothers and those who had less than secondary education (42.0 vs. 21.7%; $p = 0.007$) and lower monthly household income (72.0 vs. 53.3%; $p = 0.024$) were more depressed and anxious after the preterm birth when compared with mothers of full term infants. Psychological distress was higher in mothers with history of preterm birth (30.0 vs. 21.7%) and delivery complications (52.0 vs. 33.3%).
Conclusions: We found a greater risk of depression and anxiety in mothers of preterm births than in mothers of full term infants. Our analysis revealed that depressed and anxious women of preterm infants were younger, less educated, had a lower body weight and low household income than non-depressed and non-anxious women.

Keywords: Prevalence; obstetric risks; low birth weight; preterm; depression; postpartum; Arab

Introduction

Postpartum women experience changes in their physiological and psychological function as they adapt to their parenting role. Preterm birth is likely to increase a mother's distress and slow her physical recovery because of the special care required by a preterm infant. It has been reported that preterm birth causes higher emotional distress in mothers of preterm infants than in parents of healthy infants.[1] Postpartum depression affects approximately 10-15% of women and is one of the most common complications of childbearing.[2] During the first year of life, preterm infants represent a more difficult challenge for parents because they tend to be less adaptable, less predictable, and fussier than full term infants. Behrman et al.[3] reported that more than 500,000 premature babies are born every year in the United States. Preterm birth is responsible for 70% of neonatal mortality and morbidity.[4] Although advances in technology have allowed a greater survival rate of preterm infants, morbidity remains high and imposes great emotional and financial burdens on both the families and the health care system. The provision of intensive care for preterm newborns is an enormous burden on the health care system.[5]

Mothers of preterm infants exhibit high levels of psychological distress. A study of Zelkowitz et al.[6] mentioned that about 50% of mothers of preterm infants have elevated levels of anxiety or depressive symptoms during hospitalization. Thus, it is important to identify the long-term psychological consequences of a very preterm birth for the mothers. Despite the widely held belief that a preterm birth is a stressful experience, neither preterm birth nor low birth weight has been examined in Arab

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populations. In Qatar, the prevalence of postpartum depression has been well studied in full term infant populations, but there is a paucity of research investigating the experience of postpartum depression in mothers of preterm infants. A recent study by Bener et al.[7] reported higher levels of postnatal distress including depression, anxiety, and stress in young mothers in Qatar. Since mothers of preterm infants report more severe levels of depression and anxiety during their neonatal period, the authors took the initiative to explore the prevalence and consequences of preterm births on the mothers' psychological health. Maintaining optimal health is very important for mothers who are undertaking major responsibilities, such as caring for their infant and family. The aim of the present study was to investigate the prevalence of postpartum depression, anxiety, and stress in mothers of preterm/LBW infants and to examine the factors associated with psychological distress.

Subjects and methods

This was a hospital-based study including Arab women within 6 months of postnatal period. All deliveries took place in hospitals and women received postnatal care in women's hospitals. The data were collected using a validated questionnaire with the help of qualified nurses. Recruited nurses were Arab nationals who could speak and write in English and Arabic languages. The nurses were familiar with the Arabic culture. Thus, they were able to gain the trust of the study participants if they were not open to discuss their problems and answer the questions. Data collection took place from January 2010 to May 2011. The sample size was calculated as 2,091 subjects. It was determined based on the presumption that the prevalence rate of postpartum depression in Qatar would be more or less similar to the rates found in other countries in the eastern Mediterranean, where the reported prevalence of postpartum depression is 20%, with the 95% confidence interval (95%CI) for 2.5% error of estimation. The list of mothers who delivered preterm and full term infants during the study period was provided by the postnatal ward. According to the list, postpartum mothers were approached in the postnatal wards of the women's hospital during the study period. Mothers were systematically sampled at a 1-in-2 rate. Similarly, each participant was provided with brief information about the study and was assured of strict confidentiality. Those who were willing to participate gave their verbal consent and were included in the study.

A total of 2,091 Arab mothers were approached and 1,659 mothers agreed to participate in the study, totaling a response rate of 79.3%. Qualified nurses were trained to interview the patients and complete the questionnaires. The survey instrument was initially tested for validity on 100 postnatal mothers through face-to-face interviews conducted by research nurses. We excluded mothers whose postnatal period was over 6 months and who refused to give consent to take part in the study. Preterm birth is defined as birth in or before the 37th week of pregnancy and low birth weight infant is defined as birth weight $< 2{,}500$ g.

The questionnaire had four parts. The first part included the sociodemographic details of the patients; the second part contained medical and family history; the third part consisted of obstetric variables; and the fourth part was the diagnostic screening questionnaire. Maternal characteristics and missing information of the postpartum mothers were collected from patient files. The Depression Anxiety Stress Scale (DASS-21) is a quantitative measure of distress on the basis of three subscales of depression, anxiety, and stress.[8,9] The DASS-21 is a brief 21-item version of the full DASS, which originally consisted of 42 items. Each of the three DASS-21 subscales contains seven items representing the dimensions of depression, anxiety, and stress. The DASS consists of three self-report scales that have been designed to measure the negative emotional scales of depression, anxiety, and stress. Each question has a score range of three subscales ranging from 0 to 3. The rating scores are as follows: 0 means ''did not apply to me at all'', 1 means ''applied to me to some degree, or some of the time'', 2 means ''applied to me to a considerable degree, or a good part of the time'', and 3 means ''applied to me very much, or most of the time''. The scores for the DASS-21 subscales of depression, anxiety, and stress were derived by totaling the scores for each subscale and multiplying them by two. A score of $\geqslant 10$ on the DASS was used to distinguish women suffering from depression; a score of $\geqslant 8$ was used to diagnose anxiety disorders; and a score of $\geqslant 15$ was used to identify stress.[8,9]

The study was approved by the institutional review board (IRB) and the Research Ethics Committee of the Hamad Medical Corporation (HMC-MRC), and by the IRB of the Weill Cornell Medical College (WCMC-Q).

Data were analyzed using the SPSS version 19. Student's *t* test was used to ascertain the significance of differences between mean values of two continuous variables. Chi-square analysis was performed to test for differences in proportions of categorical variables between two or more groups. Multivariate logistic regression analysis using the forward inclusion and backward deletion method was used to assess the relationship between dependent and independent variables and to adjust for potential confounders and orders of importance of risk factors (determinants) for postpartum depression, anxiety, and stress. All statistical tests were two-sided, and $p < 0.05$ was considered statistically significant.

Results

The sociodemographic characteristics of the postpartum mothers of preterm/LBW and full term infants are shown in Table 1. The prevalence of preterm/LBW infants among postpartum mothers was 10.2%. Preterm births were significantly higher in Qatari mothers (57.1%) compared to non-Qatari mothers (42.9%) ($p = 0.002$). Most of the mothers of preterm infants (63%) had more than a secondary school education and 44.1% were

Table 1 Prevalence of psychological distress in postpartum mothers and their sociodemographic characteristics according to preterm/LBW and full term infants (n=1,659)

Variables	Postpartum mothers of infants (n=1,659), n (%)		p-value
	Preterm/LBW (n=170)	Full term (n=1,489)	
Age (mean ± SD)	33.4±6.1	31.9±6.2	0.003
Maternal age (years)			
< 30 years	74 (43.5)	612 (41.1)	0.006
30-34	45 (26.5)	381 (25.6)	
35-39	43 (25.3)	292 (19.6)	
40-45	8 (4.7)	204 (13.7)	
Nationality			
Qatari	97 (57.1)	665 (44.7)	0.002
Non-Qatari	73 (42.9)	824 (55.3)	
Educational level			
Illiterate	17 (10.0)	93 (6.2)	0.008
Primary	26 (15.3)	133 (8.9)	
Intermediate	20 (11.8)	182 (12.2)	
Secondary	37 (21.8)	458 (30.8)	
Higher	70 (41.2)	623 (41.8)	
Occupation			
Housewife	75 (44.1)	694 (46.6)	0.008
Sedentary/professional	46 (27.1)	418 (28.1)	
Manual	3 (1.8)	108 (7.3)	
Businesswoman	27 (15.9)	152 (10.2)	
Army/police	19 (11.2)	117 (7.9)	
Monthly household income (QR)			
< 5,000	18 (10.6)	124 (8.3)	0.792
5,000-9,999	68 (40.0)	569 (38.2)	
10,000-14,999	35 (20.6)	312 (21.0)	
15,000-20,000	33 (19.4)	327 (22.0)	
> 20,000	16 (9.4)	157 (10.5)	
Parental consanguinity			
Yes	61 (35.9)	621 (41.7)	0.144
No	109 (64.1)	868 (58.3)	
Depression			
Yes	50 (29.4)	258 (17.3)	< 0.001
No	120 (70.6)	1,231 (82.7)	
Anxiety			
Yes	45 (26.5)	173 (11.6)	< 0.001
No	125 (73.5)	1,316 (88.4)	
Stress			
Yes	19 (11.2)	126 (8.5)	0.237
No	151 (88.8)	1,363 (91.5)	

LBW = low birth weight; QR = Qatari Riyal (US$ 1 = QR 3.64); SD = standard deviation.

housewives. Half of the mothers (50.6%) of preterm infants had a household income less than Qatari Riyal (QR) 10,000. There were statistically significant differences between mothers of preterm and full term infants considering the following sociodemographic characteristics: age group (p = 0.006), nationality (p = 0.002), educational level (p = 0.008), and occupation (p = 0.008).

Table 2 shows the multivariate logistic regression analysis of preterm/LBW infants among postpartum mothers. The risk of depression in mothers of preterm/LBW infants was two times (adjusted OR = 2.0; 95%CI 1.4-2.9; p < 0.001) higher than the risk in mothers of full term infants, whereas the risk of anxiety was 2.7 times (adjusted OR = 2.7; 95%CI 1.9-3.9; p < 0.001) the risk in mothers of preterm/LBW as compared to mothers of full term infants (adjusting for the potential confounders and covariates). No significant difference was found in terms of stress, although the risk of stress was higher in mothers of preterm infants (adjusted OR = 1.4; 95%CI 0.8-2.3; p = 0.237).

Table 3 shows the description of postpartum mothers of preterm/LBW infants according to psychological distress. Psychological distress was significantly higher in postpartum mothers of preterm infants who had less than secondary school education (42.0 vs. 21.7%; p = 0.007) and low monthly household income < QR 10,000 (72.0 vs. 53.3%; p = 0.024). Primiparous (26%; p = 0.004), medical history of miscarriages (50%), and preterm birth (30%) (p = 0.043) and delivery complications (52%; p = 0.023) were significantly associated with psychological distress in postpartum mothers of preterm births.

Table 4 compares the prevalence rate of postpartum depression in mothers of preterm births globally.

Table 2 Multivariable regression analysis of preterm/LBW infants among postpartum mothers (n=1,659)

Variables	Adjusted OR (95%CI)	p-value
Depression		
No	1	
Yes	2.0 (1.4-2.9)	< 0.001
Anxiety		
No	1	
Yes	2.7 (1.9-3.9)	< 0.001
Stress		
No	1	
Yes	1.40 (0.8-2.3)	0.237
Nationality		
Qatari	1	
Non-Qatari	0.6 (0.4-0.8)	0.003
Maternal education		
Illiterate	1.7 (1.0-3.1)	
Primary	1.6 (1.0-2.6)	
Intermediate	1.1 (0.6-1.7)	
Secondary	0.7 (0.4-1.0)	
Higher	1	0.015
Unplanned pregnancy	1.5 (1.1-2.1)	0.033
Smoking in pregnancy	3.2 (1.9-5.4)	< 0.001

95%CI = 95% confidence interval; LBW = low birth weight; OR = odds ratio.
Dependent variable LBW (1 = yes, 0 = no), OR adjusted for parity, family support, baby gender, complicated pregnancy, complicated delivery, and gestational age.

Discussion

Postpartum psychiatric disorders are a complex mix of physical, emotional, and behavioral changes that occur after giving birth. Mothers of preterm infants are at greater risk of psychological distress. In the present study, the prevalence rates of depression, anxiety, and stress in a group of postpartum mothers of preterm infants were compared to those of mothers of healthy full term infants. We found higher maternal psychological distress in postpartum mothers as observed in other studies.[19,20] In our sample, depression (29.4 vs. 17.3%; $p < 0.001$) and anxiety (26.5 vs. 11.6%, $p < 0.001$) levels of mothers who delivered preterm infants were all significantly increased in comparison with mothers of full term infants. The prevalence of depressive symptoms in our study is similar to that of a study by Meyer et al.[21] (28%). Also, another study[11] with 181 mothers of preterm infants revealed a similar rate, since 32% of mothers had postpartum depression. These rates are comparable to the estimates of psychological distress of postpartum mothers of preterm infants demonstrated in other studies[21,22] (28-70%). The depression and stress disorders experienced by mothers after a preterm birth include not only their concerns over premature birth and its possible consequences to the infant's health, but also concerns over their own health and life style. This may lead to maternal psychological distress that can be displayed as depression, anxiety, and stress in mothers.

A previous study[22] demonstrated a greater risk for psychological distress, depression, anxiety, and stress among mothers of preterm infants. In the study sample, the risk of depression in mothers of preterm infants was two times the risk in mothers of full term infants. Drewett et al.[11] found that the risk of depression was 1.6 times in mothers of preterm births, which is lower than the rate reported in the current sample. The risk of anxiety was higher (2.7 times) in the mothers of preterm infants in our sample. Stress was also higher in mothers of preterm infants (11.2 vs. 8.5%; OR = 1.4), but this was not statistically different from the risk of stress in mothers of healthy infants. There has been a wide variety of estimates of psychological distress in mothers of preterm infants depending on the instrument used.

Our findings revealed that low socioeconomic status was a significant contributor for psychological distress in mothers of premature infants. Postpartum mothers with higher psychological distress were younger, less educated, and had low household income. Most of the mothers of preterm births with psychological distress had less than secondary school education (42.0 vs. 21.7%) and a low monthly income less than QR 10,000/- per month (72.0 vs. 53.3%) compared to the mothers of full term infants, showing a significant difference ($p < 0.05$). The mean age of these postpartum mothers was 34.6 years. In line with our findings, other studies reported that psychological distress was higher in mothers from lower socioeconomic groups.[23,24] There is a similar trend for mothers of preterm infants with a low pre-pregnancy BMI (44%; $p = 0.011$), which is similar to the findings of Sebire et al.[25] Conversely, a study conducted by Finello et al.[26] failed to reveal an association between depression and socioeconomic factors as an important influence on maternal depression after the birth of a preterm infant.

The mothers of preterm infants who had a previous history of preterm birth (30.0 vs. 21.7%) and miscarriage (50.0 vs. 38.3%) and delivery complications (52.0 vs. 33.3%) reported significantly more severe levels of depression and anxiety in the neonatal period than the mothers of full term infants ($p < 0.05$). Findings from another study[4] documented that a previous history of preterm birth or delivery of a LBW infant is an important risk factor for subsequent preterm delivery. After one preterm birth, the recurrence risk is approximately 20%. A preterm birth can cause significantly greater maternal stress because of the infant's uncertain health. In addition, the stress of normal transition to motherhood becomes more complicated by unexpected alteration in mothering.

Maternal depression is of concern not only because of its disabling effects on women, but also because it has been associated with infant emotional and developmental milestones. Very few studies have examined maternal characteristics that may modify the relationship between preterm birth and psychological distress. The present study demonstrated a high level of psychological distress among mothers of preterm infants. In addition, we found that their physical and psychological health was significantly poorer than that of mothers of full term infants. However, a study by Peacock et al.,[27] examining the impact of preterm birth on psychological distress during neonatal period, did not find any association.

Table 3 Description of postpartum mothers of preterm/LBW infants according to psychological distress (n=170)

Variables	Postpartum mothers of preterm or LBW infants (n=170), n (%)		p-value
	With psychological distress (n=50)	Without psychological distress (n=120)	
Socioeconomic			
Age (mean ± SD)	34.6±5.9	32.6±6.4	0.031
Education			
< Secondary	21 (42.0)	26 (21.7)	0.007
> Secondary	29 (58.0)	94 (78.3)	
Monthly house hold income (QR)			
< 10,000	36 (72.0)	64 (53.3)	0.024
> 10,000	14 (28.0)	56 (46.7)	
Anthropometry			
BMI (mean ± SD)	28.1±5.1	28.2±6.2	0.819
Parity			
Primipara	13 (26.0)	11 (9.2)	0.004
Multipara	37 (74.0)	109 (90.8)	
BMI group			
< 18.5	22 (44.0)	46 (38.3)	0.011
18.5-24.99	13 (26.0)	57 (47.5)	
> 30	15 (30.0)	17 (14.2)	
Maternal characteristics			
Medical history			
Abortion	10 (20.0)	48 (40.0)	0.043
Miscarriages	25 (50.0)	46 (38.3)	
Preterm birth	15 (30.0)	26 (21.7)	
Planned pregnancies			
Yes	38 (76.0)	70 (58.3)	0.029
No	12 (24.0)	50 (41.7)	
Delivery complications			
Yes	26 (52.0)	40 (33.3)	0.023
No	24 (48.0)	80 (66.7)	
Type of feeding			
Breast milk	13 (26.0)	43 (35.8)	0.309
Formula	25 (50.0)	58 (48.3)	
Multi formula	12 (24.0)	19 (15.8)	

BMI = body mass index; LBW = low birth weight; QR = Qatari Riyal (US$ 1 = QR 3.64); SD = standard deviation.

Table 4 Prevalence rate of postpartum depression in mothers of preterm/low birth weight infants: global comparison

Country	Age group (year)	Sample size	Prevalence (%)	Study year	Reference
Bangladesh	18-35	720	18	2008-2009	Nasreen et al.[10]
UK	18-35	12,391	12.3	2004	Drewett et al.[11]
Nigeria	18-40	876	14.6	2005	Adewuya et al.[12]
India	18-37	171	23	2003	Patel et al.[13]
Italy	18-37	5,812	23.5	2012	Barbadoro et al.[14]
USA	18-35	5,089	14	2001	Paulson et al.[15]
Finland	18-35	125	12.6	2001	Korja et al.[16]
Brazil	18-35	701	27.9	2006-2007	Faisal-Cury et al.[17]
Japan	18-35	2,657	26.1	2004	Sato et al.[18]
Present study, Qatar	18-35	1,659	29.4	2010	Bener

Our study highlights the high level of depression, anxiety, and stress that may be experienced by mothers of preterm infants. This shows that psychological distress during the postpartum period is a major public health problem that requires early detection, early intervention, educational efforts to increase awareness, and research efforts to understand its mechanisms in order to prevent the development of more serious symptoms.

It is important to mention the limitations of the present study. The study sample included postnatal mothers of preterm and full term infants during the study period irrespective of their nationality. Therefore, these mothers can be considered a heterogeneous group and their response to the diagnostic screening questionnaire (DASS-21) might have differed because some of them may not have disclosed their symptoms of depression,

anxiety, and stress openly. Also, during the study period, we might not have targeted the appropriate postnatal mothers. Since 20% of the postnatal mothers did not give their consent to take part in the study. Some of the mothers had serious maternal complications and they were not included in the study. Hence, these issues might have affected the study results.

Our findings revealed that psychological distress was potentially exacerbated by preterm births in the postpartum period. We found a greater risk of depression and anxiety in mothers of preterm infants than in mothers of full term infants.

Sociodemographic factors like younger age, lower educational level, and lower household income were associated with depression, anxiety, and stress disorders in mothers of preterm births. History of preterm birth and delivery complications were significantly higher in mothers of preterm infants. It is recommended that mothers of preterm infants be routinely screened for postpartum depression and anxiety.

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Disclosure

The author reports no conflicts of interest.

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