



# Prevalence of Anxiety and Depression among Mothers of Newborns Admitted to Neonatal Intensive Care Units in Gaza Strip

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## Abstract

**Objective:** To determine the prevalence and level of anxiety and depression among mothers of newborns admitted to neonatal intensive care units in Gaza Strip.

**Methods:** It is a cross-sectional study including 195 mothers whose neonates have been admitted to NICU at the three governmental hospitals in Gaza Strip between November 2017 to September 2018. Two psychological tests were applied, the Hamilton Anxiety Rating Scale and the Beck Depression Inventory. Collected data include sociodemographic profile for mother and neonates who include characteristic of mothers, number and types of deliveries, level of education, work status and family income. In addition, characteristics of neonates, gender, gestational age and birth weight, cause of admission and length of stay.

**Results:** The results of our study indicated that 50.8% of mothers have severe to very severe symptoms of anxiety, 38.5% of mothers have severe to very severe symptoms of depression. There was a statistically significant difference in levels of anxiety ( $p = 0.044$ ) and levels of depression ( $p = 0.005$ ) among mothers related to hospital. The mothers of preterm and low birth weight babies had higher levels of anxiety ( $p = 0.010, 0.026$ ), but there were insignificant differences in levels of depression, while there were no insignificant differences in levels of anxiety and depression among mothers related to gender of neonate, cause of admission, and length of stay in NICU.

**Conclusion:** The effect of different maternal and neonatal factors on levels of anxiety and depression were examined and most of them revealed insignificant differences, which means that admission to NICU as a stressful event caused elevation in levels of anxiety and depression among mothers regardless of any other factors.

**Keywords:** Anxiety, Depression and Mothers of newborn.

## Introduction

Preterm birth (PTB) and low birth weight (LBW) remain major global health problems [1]. Globally, an estimated 15 million babies were born preterm (before 37 weeks gestation) accounting for 11% of all live births worldwide, ranging from about 5% in Western European countries to 18% in some African countries [2]. In term, locally in Palestine latest statistic 2015, it was reported that, the percentage of PTB and LBW (below 2,500 g) was 8.4% in West Bank (WB) while in Gaza Strip (GS) was 8.3%, and the neonatal mortality rate is 11/1000 live birth in WB and 12/1000 live birth in GS [3]. In the same issues, it was mentioned that stressful events might have a negative impact on individual's adjustment and may provoke psychological distress, including anxiety and depression [4,5].

The birth of premature or sick baby is a stressful event associated with parental anxiety and other psychological problems [6], and that admission of a neonate to the NICU is unexpected and is stressful for their mothers [7]. The situation of health care system and infrastructure in the GS is different from other areas all over the world; there is lack of a comfortable place where mothers can meet their baby's needs such as feeding, drinking, insufficient information regarding baby status, lack of communication with health care providers due to work overload, not participating in the care of their babies, and lack of social support may increase their anxiety level and depression that will affect their mental wellbeing and affect their ability to function properly and carry out their roles properly. The aim of the present study is to examine the prevalence and level of anxiety and depression among mothers of sick newborn admitted to NICU in Gaza Strip.

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This study would be the first one that examines anxiety and depression among mothers of sick newborns admitted to NICU in GS. Moreover, the results of this study will highlight the need for developing and implementing a strategy to reduce the risk of developing anxiety and depression among mothers of sick newborns admitted to NICU.

## Research Methodology

The study was cross-sectional design conducted in NICUs at Al Shifa hospital, Al Tahreer hospital, and EGH. The study population included all the mothers whose neonates have been admitted to NICU in governmental hospitals in GS, and according to records of the three hospitals, an average of 389 neonates are admitted to NICU monthly during the year 2017. By using the sample size calculator at 95% confidence level and confidence interval 5, the study sample consisted of 195 mothers who's their neonates have been admitted to NICU at the three governmental hospitals in GS.

The sample of this study was a convenience sample. The study was conducted during the period from November 2017 to September 2018. The mothers of neonates admitted in NICU at the selected hospitals and being hospitalized for 3 days and more were included while the mothers with a previous history of mental illness or a prior intake of a psychotropic medication were excluded. Collected data include sociodemographic profile for mother and neonates who include characteristic of mothers, number and types of deliveries, level of education, work status and family income.

In addition, characteristics of neonates, gender, gestational age and birth weight, cause of admission and length of stay. Approval to carry out the study obtained from Helsinki Committee and approval from Ministry of Health, Also, voluntary participation was ensured, confidentiality of information maintained. Data regarding the prevalence of anxiety and depression among mothers of newborns admitted to NICU were collected using and the Hamilton Anxiety Rating Scale and the Beck Depression Inventory. Beck Depression Inventory is a 21-item scale largely used to measure the intensity of depression [8].

It was translated to Arabic language by Ahmed Abed El-Khaleg, and modified by Asma Al-Hussein 2002. Scoring for each item ranges from (0 to 4) scores. The total scores for the scale ranges from (0-73) as follows: (0-9) no depression, (10-15) mild depression, (16-23) moderate depression (24-36) severe depression, and (37 and above) very severe depression. The Hamilton Anxiety Rating Scale is a widely used measure of the severity of anxiety symptoms [1]. The scale was translated by Mustafa Fahmey and Mohammad Ahmed Ghaley, Cairo University.

This scale was used in Palestinian culture [9]. The scale consists of 50 items describing events that may evoke anxiety. The scale scores are yes (1) and no (zero). The total score ranges from (0 to 50) as follows: (0-16) very mild anxiety, (17-19) mild anxiety and (20-24) moderate anxiety, (25-29) above moderate anxiety, (30-34) severe anxiety, and (35-50) very severe anxiety. The data were analyzed by using the Statistical Package for the Social Sciences program version 22.

The stages of data analysis included: coding the questionnaire, data entry and data cleaning. Data cleaning were performed by reviewing frequency tables, random selection of questionnaire to ensure that accurateness of data entry. The frequencies and descriptive data (mean, ranges, percentage, and standard deviations) were conducted to assess the research variables. Multivariate statistics such as ANOVA, post Hoc test and t- test were used to find out the significance and differences between variables.

## Results

**Table 1** showed that the study included 195 mothers whose their babies admitted to NICU in the selected hospitals, 46.2% were from Al Shifa hospital which is the largest hospital in GS, 38.4% from Al Tahreer hospital, and 15.4% from EGH. the mean age for mothers was 28.22 ±5.954, and the highest number of mothers 3 (47.7%) aged 25-34 years, 86 (44.1%) delivered 2-4 times, more than two thirds 124 (63.6%) had NVD, 90 (46.2%) had secondary school education, the majority of mothers 176 (90.3%) do not work, and the majority of them 166 (85.1%) had low income less than 1000 NIS.

Variable	N	%
<b>Distribution of mothers by hospital</b>		
Al Shifa hospital	90	46.2
Al Tahreer hospital	75	38.4
EGH	30	15.4
<b>Age</b>		
24 years and less	66	33.8
25 – 34 years	93	47.7
35 years and more	36	18.5
Mean age = 28.22 SD = 5.954		
<b>Number of deliveries</b>		
Primiparous	48	24.6
2 – 4 deliveries	86	44.1
5 deliveries and more	61	31.3
<b>Type of delivery</b>		
Normal vaginal delivery (NVD)	124	63.6
Cesarean section	71	36.4
<b>Level of education</b>		
Prep school	29	14.9
Secondary school	90	46.2
University	76	39.0
<b>Work status</b>		
Working	19	9.7
Do not work	176	90.3
<b>Family income</b>		
Less than 1000 NIS	166	85.1
1000 NIS and more	29	14.9

**Table 1:** Distribution of mothers by demographic characteristics (N = 195).

**Table 2** showed that 103 (52.8%) of neonates were males and 92 (47.2%) were females. The results indicated that the mean gestational age was 36.09 ±3.094 weeks and 48.2% of neonates were preterm (less than 37 weeks gestation), and the mean birth weight was 2768.1 ±809.588 gm and 30.8% of neonates had LBW less than 2500 gm.

The highest cause of admission to NICU was prematurity and accounted for 60 (30.8%) of cases followed by respiratory distress 55 (28.2). In addition, the majority of neonates 140 (71.8%) stayed in NICU for 3-6 days, while 25 (12.8%) stayed in NICU for 11 days and more.

The highest scores obtained on the anxiety scale were as follows: 172 (88.2%) of study mothers wish that they could be as happy as others seem to be, 167 (85.6%) have had periods in which they lost sleep over worry, 166 (85.1%) of mothers said that they are usually calm and not easily upset, and 160 (82.1%) frequently find their-self worrying about something. These results reflected the main features of anxiety including worry, difficulty in sleeping, and feeling of unhappiness.

Regarding the frequency and degree of depression scores, and the highest scores were in pessimism as 84 (43.1%) of mothers were Pessimistic about the future, followed by self-criticism as 81 (41.5%) of mothers blame themselves for any fault, and loss of pleasure as 78



(40%) of mothers were dissatisfied or bored with many things in their life, while the lowest score was in suicide thoughts.

Variable	N	%
<b>Neonates Gender</b>		
Males	103	52.8
Female	92	47.2
<b>Gestational age</b>		
Preterm	94	48.2
Fullterm	101	51.8
mean gestational age was 36.09 ±3.094		
<b>Birth weight</b>		
Less than 2500 gm	60	30.8
2500gm and more	135	69.2
<b>Cause of admission to NICU</b>		
Premature	60	30.8
Respiratory distress	55	28.2
Jaundice	15	7.7
Septicemia	14	7.2
Congenital anomaly	6	3.1
Others	45	23.1
<b>Number of admission days in NICU</b>		
3 – 6 days	140	71.8
7 – 10 days	30	15.4
11 days and more	25	12.8

**Table 2:** Distribution of neonates by demographic characteristics (N=195).

**Table 3** indicated that half of mothers 99 (50.8%) have severe to very severe anxiety, and the highest frequency was among mothers from Nasser hospital in Khanyounis as 43 (22.1%) have severe to very severe anxiety, while the lowest frequency was among mothers from EGH as 19 (9.8%) of mothers have severe to very severe anxiety. Also, 75 (38.5%) of mothers have severe to very severe symptoms of depression, and the highest symptoms were among mothers from Nasser hospital as 31 (15.9%) of mothers have severe to very severe symptoms while the lowest symptoms were in EGH as 16 (8.2%) of mothers have severe to very severe symptoms of depression.

Variable	Score	Al Shifa	Nasser	EGH	Total
		N (%)	N (%)	N (%)	N (%)
<b>Anxiety symptoms</b>					
Very mild	0 – 16	7 (3.7)	2 (1.0)	3 (1.5)	12 (6.2)
Mild	17 – 19	5 (2.6)	2 (1.0)	1 (0.5)	8 (4.1)
Moderate	20 – 24	16 (8.2)	9 (4.6)	2 (1.0)	27 (13.8)
Above moderate	25 – 29	25 (12.8)	19 (9.7)	5 (2.6)	49 (25.1)
Severe	30 – 34	18 (9.2)	20 (10.3)	15 (7.7)	53 (27.2)
Very severe	35 – 50	19 (9.7)	23 (11.8)	4 (2.1)	46 (23.6)
<b>Depression symptoms</b>					
No	0 – 9	25 (12.8)	8 (4.1)	4 (2.1)	37 (19.0)
Mild	10 – 15	16 (8.1)	15 (7.7)	4 (2.1)	35 (17.9)
Moderate	16 – 23	21 (10.8)	21 (10.8)	6 (3.0)	48 (24.6)
Severe	24 – 36	23 (11.8)	17 (8.8)	11 (5.6)	51 (26.2)
Very severe	37 and more	5 (2.6)	14 (7.1)	5 (2.6)	24 (12.3)

**Table 3:** Distribution of levels of anxiety and depression among mothers (N=195).

**Table 4** indicated statistically significant differences in levels of anxiety (F=3.177, P=0.044) and levels of depression (F=5.524, P=0.005) among mothers related to hospital. To identify these differences, Post hoc Scheffe test was performed and the results reflected that mothers whom their neonates were admitted to NICU in Nasser hospital had higher levels of anxiety and depression. In addition, there is insignificant differences in levels of anxiety related to age of mothers (F=1.972, P=0.142), but differences in levels of depression were statistically significant (F=3.61, P=0.029). To identify these differences, Post hoc Scheffe test was performed and the results reflected that mothers aged 35 years and more had higher level of depression compared to mothers aged 24 years and less. In contrast, there was not a statistical difference in levels of anxiety and levels of depression among mothers related to number of deliveries, mode of delivery, level of education, work and income of mother.

Variable		Sum of squares	df	Mean square	F	P value
<b>Hospital</b>						
Anxiety	Between groups	374.195	2	187.098	3.17	0.044*
	Within groups	11305.75	192	58.884		
	Total	11679.95	194			
Depression	Between groups	1562.737	2	781.369	5.52	0.005*
	Within groups	27160.44	192	141.461		
	Total	28723.18	194			
<b>Age of mother</b>						
Anxiety	Between groups	235.145	2	117.572	1.97	0.142
	Within groups	11444.80	192	59.608		
	Total	11679.95	194			
Depression	Between groups	1041.933	2	520.966	3.61	0.029*
	Within groups	27681.25	192	144.173		
	Total	28723.18	194			

**Table 4:** Association between anxiety, depression and mothers' factors. Test p value using ANOVA.

**Table 5** indicated statistically significant differences in levels of anxiety (t=2.593, P=0.010) which means that mothers of preterm babies had higher levels of anxiety compared to mothers of full-term babies, but there were insignificant differences in levels of depression (t=1.026, P=0.306). In addition, there was a statistically significant differences in levels of anxiety (t=2.239, P=0.026) which means that mothers of LBW babies had higher levels of anxiety compared to mothers of normal weight babies, but there were insignificant differences in levels of depression (t=0.654, P=0.514).

Variable	Gestational age	N	Mean	SD	t	P value
Anxiety	<37 weeks	94	30.574	7.097	2.593	0.010*
	≥37 weeks	101	27.732	8.125		
Depression	<37 weeks	94	21.67	11.896	1.026	0.306
	≥37 weeks	101	19.881	12.411		
<b>Birth weight</b>						
Anxiety	<2500 g	60	30.95	7.279	2.239	0.026*
	≥2500 g	135	28.281	7.849		
Depression	<2500 g	60	21.6	12.231	0.654	0.514
	≥2500 g	135	20.363	12.165		

Test p value using t-test\*

**Table 5:** Association between anxiety, depression and neonatal factors.





## Discussion

The sample of the study consisted of 195 mothers whose neonates admitted to NICU with mean age  $28.22 \pm 5.954$  years, about one fourth of them were primiparous mothers, two thirds of them had NVD, more than one third had university education, the vast majority were not working, and had low family income less than 1000 NIS. Also, 52.8% of neonates were males, 48.2% were preterm, and one third of neonates had LBW less than 2500 gm. Concerning admission to NICU, the main cause for admission was prematurity followed by respiratory distress, and 71.8% of neonates stayed in NICU for 3-6 days. Ashwani et al. found that mean age of the parents participating in the study was  $23.9 \pm 3.2$  years [10].

About 13.0% were not formally educated, 14% went to primary school, and 49 % received high school education while 24% were graduates, 57% of neonates were the first child, 57% were boys, their mean birth weight was  $2093 \pm 755$  g, and mean gestational age was  $34.58 \pm 3.6$  weeks. Causes of admission to NICU included Sepsis (37%), followed by prematurity with hyaline membrane disease (26%), respiratory distress syndrome (18%), and birth asphyxia (8%). Another study carried out by Umasankar and Sathiadas found that 51% of mothers were primiparous, 52% aged 30 – 39 years, 51% had normal vaginal delivery, 38.7% of neonates were premature, 52% had low birth weight, 30.7% had respiratory problems, and mean stay in NICU was 10 days [11].

Another study carried out by Ramos et al., found that mean age of mothers was  $27.12 \pm 8.25$  years, 48% of mothers completed high school, 52% were no working, 52% were primiparous, 44% had vaginal delivery, 12% were preterm, low birth weight, mean gestational age was  $32.64 \pm 3.94$  weeks, mean birth weight was  $1595 \pm 725$  g, and mean days of hospitalization to NICU was  $44 \pm 29$  days [12]. Also, Hedstrom et al., (2014) found that the most common admission diagnoses were infection (30%), prematurity (30%), respiratory distress (28%) and asphyxia (22%) [13]. The results of our study indicated that 50.8% of mothers have severe to very severe symptoms of anxiety, 38.5% of mothers have severe to very severe symptoms of depression. Our results were consistent with Miles et al., (2007) who found that 63% of NICU mothers had elevated depression symptoms when the infant was hospitalized [14].

Also, prevalence of anxiety symptoms among NICU mothers range from 18% to 43% [15,16]. Furthermore, Segre et al., found that one quarter of the NICU mothers reported elevated depression symptoms, and moderate to severe anxiety symptoms [17], while Alkozei et al., reported that 52% of mothers experienced increased stress and 38% had significant depressive symptoms [18], and Garfield et al., found that 42% of NICU mothers had elevated depression [19]. Another study carried out by Padovani et al. found that 44% of mothers showed emotional symptoms such as anxiety or depression during their infant's admission to NICU [20], and Davis et al., reported that about 50% of mothers of premature infants have elevated levels of anxiety symptoms during hospitalization to NICU [21].

Higher levels of depression symptoms obtained by Miles et al., who found that 63% of NICU mothers had elevated depression symptoms scores early when the infant was hospitalized [14]. Moreover, Segre et al., found that 25.5 % of NICU mothers reported clinically significant symptoms of depression, 17.4% of mothers had moderate anxiety symptoms and 10.3% of mothers had severe anxiety symptoms [17].

The results of our study indicated that the highest symptoms of anxiety and depression were among mothers from Nasser hospital. Moreover, the results indicated insignificant differences in levels of anxiety related to age of mothers but mothers aged 35 years and more had higher level of depression. Also, there were no significance differences in levels of anxiety and depression related to number of deliveries, mode of delivery, level of education, work, and family income. Alkozei

et al. reported that demographic factors and pregnancy related factors were not associated with increased stress and thus did not affect levels of anxiety and depression [18]. Carter et al. reported that lower family income was associated with higher levels of anxiety and depression symptoms in NICU mothers [15].

In addition, Yurdakul et al. reported that the majority of babies admitted to NICU delivered by CS mode, and that maternal age, working status, education level, parity, and gender of the baby did not contribute to higher levels of maternal anxiety and depression [22]. Experience of anxiety and depression is associated with different neonatal factors such as gestational age, birth weight, and severity of health problems. Our results reflected that mothers of preterm and low birth weight babies had higher levels of anxiety, but there were insignificant differences in levels of depression. In addition, our results indicated insignificant differences in levels of anxiety and depression among mothers related to gender of neonate, cause of admission, and length of stay in NICU.

Previous studies showed variations in results as some studies showed consistent results with our results and other studies showed inconsistent results with our results. Grosik et al. mentioned that parents' experience of stress is influenced by some factors including, birth variables, and immaturity [23]. Erdem found that maternal anxiety was significantly related to duration of hospitalization, and anxiety was higher if their infant was a boy, while gestational age, reasons for hospitalization of the infant and birth weight did not affect maternal anxiety levels [7].

## Conclusion

The hospitalization of premature, LBW babies to NICU is a major stressful event for family members especially for the mother. It is a turning point in the emotional, personal, and social life for many mothers who will result in subsequent changes in the way they view themselves, their relationships with husbands, and their place in the family. This study aimed to examine the prevalence and level of anxiety and depression among mothers whose babies admitted to NICU, and to determine differences in levels of anxiety and depression in relation to selected variables. The results of the study indicated presence of anxiety and depression symptoms to a considerable degree, and that could be reflected in their behavior and their ability to carry out the role of mother due to separation from the newborn.

The effect of different maternal and neonatal factors on levels of anxiety and depression were examined and most of them revealed insignificant differences, which means that admission to NICU as a stressful event caused elevation in levels of anxiety and depression among mothers regardless of any other factors. The results obtained from this study raised the need for attention and support for the mothers whose babies are admitted and treated in NICU; as these mothers do not need physical aids but they need psychological support to enable them pass this difficult situation with the best possible psychological status.

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