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Prevalence of Postpartum Depression among Primary Health Care Centers Clients in Taif City, Kingdom of Saudi Arabia

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Abstract: **Post-partum depression affects a considerable proportion of women in developing countries. It has immediate health effects on the woman`s self-confidence as a mother, as well as its impact on baby`s social, cognitive, emotional as well as physical development.**

Objectives: To estimate prevalence and determine the socio-demographic and obstetric factors of depression amongst women attending primary health care centers in Taif within 2 months after delivery.

Subjects and Methods: The study was conducted in Taif governorate, in the western region of Saudi Arabia. It is a cross sectional study included a random sample of women in postpartum less than 1 year attending primary health care centers (PHCCs) in Taif governorate throughout the study period (January-February, 2018), for post-natal services or "well-baby" clinic services. A self-administered questionnaire was used for data collection. It consists of three main parts: socio-demographic characteristics, obstetric history and the Arabic version of the Patient Health Questionnaire (PHQ-9) to assess depression.

Results: Two hundred fifty women were included in the study. The age of more than half of them (54%) ranged between 26 and 35 years while 4% of them aged between 41 and 49 years. Depression was present among more than half (51.6%) of women; it was mild among 34.8%. However, moderate, moderately severe and severe depressions were observed among 10.8%, 14.5% and 0.4% of the women, respectively. Results of multivariate logistic regression analysis showed that women in the age group 36-40 years were more likely to develop PPD compared to those in the age group 18-25 years (Adjusted Odds ratio "aOR"2.20, 95% Confidence interval "CI" 1.01-5.17, p=0.049). Compared to those who had previous history of anti-depressants intake, women without such history were 92% at lower risk for having PPD (aOR 0.08, 95% CI 0.01-0.67, p=0.020). Women whose husbands helped them sometimes during pregnancy were at three folded risk to develop PPD compared to those whose husbands helped them continuously during pregnancy (aOR 3.53, 95% CI 1.88-6.60, p<0.001).

Conclusion: Postpartum depression is a problem affecting a considerable proportion of women attended primary health care centers in Taif within one year after delivery. Risk factors of PPD in the current study are comrable to others reported in studies carried out in various parts of the world.

Keywords: **Postpartum Depression, primary health care centers, physical development.**

ABBREVIATIONS GLOSSARY:

PPD	Postpartum depression
EPDS	Edinburgh Postnatal Depression Scale
PHCCs	Primary health care centers

PHQ	Patient Health Questionnaire
aOR	Adjusted odds ratio
CI	Confidence interval
SPSS	Statistical package for Social Sciences

1. INTRODUCTION

Background/Literature review:

Postpartum depression (PPD) was defined as "a major depressive episode that occurs within four weeks after delivery", according to the Diagnostic and Statistical Manual of Mental Disorders IV.[1]

PPD has a great importance, as a result of its immediate health effects on the woman`s self-confidence as a mother, as well as its impact on baby`s social, cognitive, emotional [2-4] as well as physical development.[5,6]

PPD affecting between 10% and 15% of women in developed countries,[7-9] whereas its prevalence rate ranged between 16% and 37% in developing countries,[10-16] In Saudi Arabia, prevalence of 17.8% and 33.2% have been reported in two different studies,[17, 18] thus considered as the most common psychological health problem among them.[19] It is characterized by despondency, tearfulness emotional lability, loss of appetite, feelings of guilt, suicidal ideation, poor concentration and memory, fatigue, sleep disturbances, and irritability.[20, 21]

Various obstetric and psychosocial factors have been suggested as risk factors for the development of PPD. knowledge of these factors may help identify those who are at higher risk and can benefit from early professional intervention.[22] Pre-pregnancy or postpartum personal history of depression is the major risk factor for PPD.[16,17, 23-28] Family history of psychiatric illness,[17] lack of social support for the pregnancy from husband, family and friends,[16, 17] unemployment of mother or her husband,[22] lack of financial and emotional support from the husband,[23] existence of marital conflict,[26, 29] stressful life events in the previous year,[17, 30] divorcing or widow status, [26] unplanned pregnancy,[17, 27] poor relationship with one's own mother,[30] not breastfeeding,[27-29] a lifetime history of depression in the husband, childcare- related stressors,[31] sick leave during pregnancy related to hyperemesis, uterine irritability, psychiatric disorders, high number of visits to prenatal clinic,[32] having contemplated termination of the current pregnancy,[23] a congenitally malformed infant [33] and dissatisfaction with having a female child[11, 34] were other documented risk factors of PPD.

Despite PPD is highly prevalent and having great importance as aforementioned, it is commonly under-diagnosed by treating physicians.[35]

Numerous studies have been identified through online literature review concerning the PPD prevalence and associated risk factors. In Saudi Arabia (2014), a cross-sectional study was carried out to estimate the prevalence of PPD and identify its correlates in the largest five primary healthcare centers In Dammam where fifty mothers visiting these centers for immunizing their children were recruited. Screening for PPD was done using the Edinburgh Postnatal Depression Scale The prevalence of PPD was17.8%. Multivariate logistic regression analysis revealed that the strongest associated factor with PPD was a family history of depression, followed by lifetime history of depression, non-supportive husband, unplanned pregnancy, and stressful life events.[17]

Another Saudi study (2014) investigated the socio-demographic and obstetric risk factors of PPD among Saudi women 8-12 weeks partpartum. A cut off level of 10 of Edinburgh Postnatal Depression Scale score was used for defining PPD. The prevalence of PPD symptom risk was 33.2%. Early postpartum anemia was a significant risk factor for PPD.[18]

In United Arab Emirates (2006), a study was carried out to identify the prevalence and associated factors of PPD among a sample of Emirati women recruited in a government maternity hospital in Abu Dhabi. The Edinburgh Postnatal Depression Scale at 3 and 6 months postpartum was utilized. No Depression (scores of 0-9), borderline Depression (scores of 10-12) and depression (scores of 13+) categories were identified. At 3 months, the prevalence of depression was 22% and that of borderline depression was 22%. At 6 months, the prevalence of depression and borderline depression were12.5% and 19.6%, respectively. Significant associated risk factors were poor self body image, not breastfeeding, giving birth to the first child, view of weight, older age at marriage and poor relationship with mother-in-law.[29]

In Bahrain (2012), a cross-sectional study was implemented to assess the prevalence and determinants of PPD among a random sample of Bahraini women attending primary health care centers with their infants for the 2-months check-up. The Arabic version of the Edinburgh Postnatal Depression Scale (EPDS) was utilized considering a cut-off score of ≥ 12 for depression. The prevalence of PPD was 37.1%. Only having a history of depressive symptoms and lack of support from the husband were significantly associated with PPD.[16]

In Asfahan, Iran (2009), a study was carried out to identify the risk factors associated with PPD in women living in rural areas of Isfahan Province in Iran. Women were assessed 2 to 12 months after delivery, for depression and its associated risk factors. They revealed that unemployment, mothers' young age, low education, unplanned pregnancy, undesired sex of the child, as well as history of depression were the significant risk factors of postpartum depression. [27]

In Rhode Island, USA (2013), a study was carried out to examine the prevalence of PPD among women with and without disabilities. The study reported that 30% of mothers with disabilities and 10% of those without disabilities reported often feeling depressed after childbirth.[36]

In Chili (2011), a cross-sectional study was done to estimate the prevalence and predictors of PPD among Chilean women. The Postpartum Depression Screening Scale, (Spanish Version) was utilized to assess depression. The prevalence of depression was 45%. The significant predictors were tobacco use, attitudes concerning pregnancy, social support.[37]

In Isreal (2011), a study was performed among Israeli Bedouin women attending public health clinics for postpartum care, to explore the prevalence of PPD among them. The Edinburgh Postnatal Depression Scale (EPDS) with a cut off levels of 10 and 13 was used to assess PPD. The prevalence rates of PPD were 43% and 26% at 10 and 13 cut off levels, respectively. Lower educational level, unplanned pregnancies were significant factors for PPD.[38]

Study rationale:

- PPD is a prevalent psychiatric disorder affecting both mothers and their babies.
- Although, this subject was studied previously in the Kingdom of Saudi Arabia, it was not studied in Taif region. Therefore, we have no clear data on the distinguishing aspects of women in Taif from others regarding prevalence and risk factors of PPD.
- Primary health care settings provide services to women and her infant in postnatal period, thus there is a great chance to screen for this important, relatively common health problem

Aim of the study:

To identify the magnitude of PPD and its associated risk factors that distinguishing Taif women from others in this regard.

Specific objectives:

- To estimate the prevalence of PPD among women attending primary health care centers in Taif within 2 months after delivery.
- To determine socio-demographic and obstetric factors associated with PPD among them.

2. METHODOLOGY

Study Setting:

The study was conducted in Taif governorate, in the western region of Saudi Arabia. It is located in the Makkah Province at an elevation of 1700-2500 meters above sea level. The estimated population is 1,281,613 according to 2011 census.[39] In Taif city, there are 136 primary health care centers (20 inside the city and 116 outside it). This study was conducted in primary health care centers located inside Taif city.

Study design:

This is a cross sectional study.

Study population:

All women in postpartum less than 1 year attending primary health care centers (PHCCs) in Taif governorate throughout the study period (January-February, 2018), for post-natal services or “well-baby” clinic services

Inclusion criteria:

Women attending Primary Health Care Centers in Taif governorate after delivery were eligible for study inclusion

Exclusion criteria:

Any women more than 1 year of delivery

Sample size:

Using EPI info version 7, the study sample size was determined based on the following assumptions:

1) The number of women attending PHCCs in Taif for postnatal services is approximately 20000 (This gives the maximum sample size)

2) The estimated prevalence of PPD is 17.8%[17]

3) Tolerable error 5%.

4) Confidence level = 95%.

Accordingly, a sample size (n) was 223.

This sample was increased to 250 (by adding 10%) in order to compensate for the possible none/incomplete-response of some women.

Sampling Method:

Multistage random sampling technique was adopted. In the first stage Taif was divided into 4 geographical areas (North, South, East and West). In the second stage, one PHC center was selected from each are giving 4 PHC centers. The sample was almost equally distributed between the 4 PHC centers. A consecutive sample of 10 women was chosen from each center daily. Trained nurses helped in data collection in addition to the researcher.

Data collection tool:

A self-administered questionnaire was used for data collection. It consists of three main parts: The first two parts (socio-demographic characteristics and obstetric history) were developed by the researcher and adopted from another similar studied out in Bahrain.[20] The third part included the Arabic version of the Patient Health Questionnaire (PHQ-9):[40] This questionnaire is composed of 9 statements. The PHQ-9 is a multipurpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. The PHQ-9 incorporates DSM-IV depression diagnostic criteria with other leading major depressive symptoms into a brief self report tool. The tool rates the frequency of the symptoms which factors into the scoring severity index. The PHQ-9 is completed by the patient in minutes and is rapidly scored by the clinician. The PHQ-9 can also be administered repeatedly, which can reflect improvement or worsening of depression in response to treatment. [41] Liu et al. [42] reported that the PHQ-9 had a good internal consistency ($\alpha = .80$) and test-retest reliability (intra-class correlation coefficient = 0.87). A PHQ-9 score of 10 or higher had a sensitivity of 0.86 and a specificity of 0.94 for recognizing major depressive disorders.[42]

The PHQ-9 has 9 questions with a score ranging from 0 to 3 for each setting to consider initiating treatment with antidepressants.[43] The following table describes the provisional diagnoses for scoring classes.

PHQ-9 score	Provisional diagnosis
• 0-4	None
• 5-9	Mild depression
• 10-14	Moderate depression
• 15-19	Moderately severe depression
• 20-27	Severe depression

Data collection method:

The researcher and trained nurses distributed the self-administered questionnaire to the women at the involved Primary Health Care Centers while they are waiting for their physicians` appointments. Care was taken to not disturb the clinic`s duty. The researcher and his assistants were available to clarify any issue and the questionnaires were recollected after day of duty. The data were verified by hand then coded and entered to a personal computer.

Variables:

- Independent variables:

- Socio-demographic variables: Age, infant`s gender, current marital status, educational level, job status, paternal education and job and family income.

- Psychiatric variables: Personal history of depression, family history of depression

- Obstetric variables: Number of living children, History of dead children, type of delivery Normal, Assisted, caesarean), Single/multiple children, planned/unplanned pregnancy, gestational age and type of feeding.

- Dependent variable: Depression based on PHQ-9 questionnaire

Pilot study:

The researcher performed a pilot study on 25 volunteer women from one PHCC other than those included in the final study. The purpose was a) to examine the understanding of the women of the instruments' questions (socio-demographic, obstetric and psychiatric variables), b) to select the relevant variables suitable for the statistical methods to be used and c) determine the time needed to answer questionnaire, d) give an actual situation of the main study. As a result, little modifications have been done in the socio-demographic data (i. e categories of income, age chnges from continuous to categorical variable), time needed to complete the questionnaire was 10 minutes in average. These data were excluded from the final study.

Data entry and analysis:

The data were collected and verified by hand then coded before computerized data entry. The statistical Package for Social Sciences (SPSS) software version 22.0 was used for data entry and analysis. Descriptive statistics (e.g. frequency and percentage were applied for qualitative variables and mean, standard deviation for continuous variables) and analytic statistics, using chi-square to test for the association between depression and related factors. Multivariate logistic regression analysis was performed to control for confounders. P-values ≤ 0.05 was considered as statistically significant.

Ethical considerations:

1. Permission of the director of primary health care centers in Taif was obtained.
2. A verbal consent was obtained from each participant prior to study conduction
3. All collected data were kept confidential.

Budget:

Self-funded

3. RESULTS

Socio-demographic characteristics of the participants:

Table 1 presents the socio-demographic characteristics of the participants (n=250). The age of more than half of women (54%) ranged between 26 and 35 years while 4% of them aged between 41 and 49 years. Majority of them (96%) were currently married and 72.8% are Saudis. More than half of them (53.2%) were university or post-graduate whereas 4% were illiterates. Most of the participated women (74%) were house wives. The husbands of 41.2% of women were university or post-graduated and 40.8% of them were governmental employees whereas 25.2% were militaries. The monthly family income ranged between 5001 and 10000 SR/month among 37.2% of women whereas it exceeded 15000 SR/month among 10.8% of them.

Table 1: Socio-demographics of the participants (n=250)

Socio-demographic variables	Frequency	Percentage
Age in years		
• 18-25	57	22.8
• 26-35	135	54.0
• 36-40	48	19.2
• 41-49	10	4.0
Marital status		
• Married	240	96.0
• Divorced	7	2.8
• Widowed	3	1.2
Nationality		
• Saudi	18	72.8
• Non-Saudi	68	27.2
Educational level		
• Illiterate	10	4.0
• Primary school	14	5.6
• Intermediate school	28	11.2
• Secondary school	65	26.0
• University/Above	133	53.2
Occupation		
• House wife	185	74.0
• Working	65	26.0
Husband`s educational level		
• Illiterate	4	1.6
• Primary school	19	7.6
• Intermediate school	34	13.6
• Secondary school	90	36.0
• University/Above	130	41.2
Husband`s occupation		
• Not working	17	6.8
• Governmental employee	102	40.8
• Business/trading	68	27.2
• Military	63	25.2
Family income per month (Riyals)		
• ≤5000	72	28.8
• 5001-10000	93	37.2
• 10001-15000	58	23.2
• >15000	27	10.8

Personal history of the participants:

As seen in figure 1, newborns were almost equally distributed as regards gender where 50.8% of them were females. Antidepressants were taken by 5.6% of the women as shown in figure 2. Family history of depression was mentioned by 9.2% of the participants. Figure 3

Second wife for husband was reported by 19.2% of the women as illustrated in figure 4. Almost half (52%) of women reported husband`s continuous help during pregnancy and 29.2% reported it sometimes. Figure 5

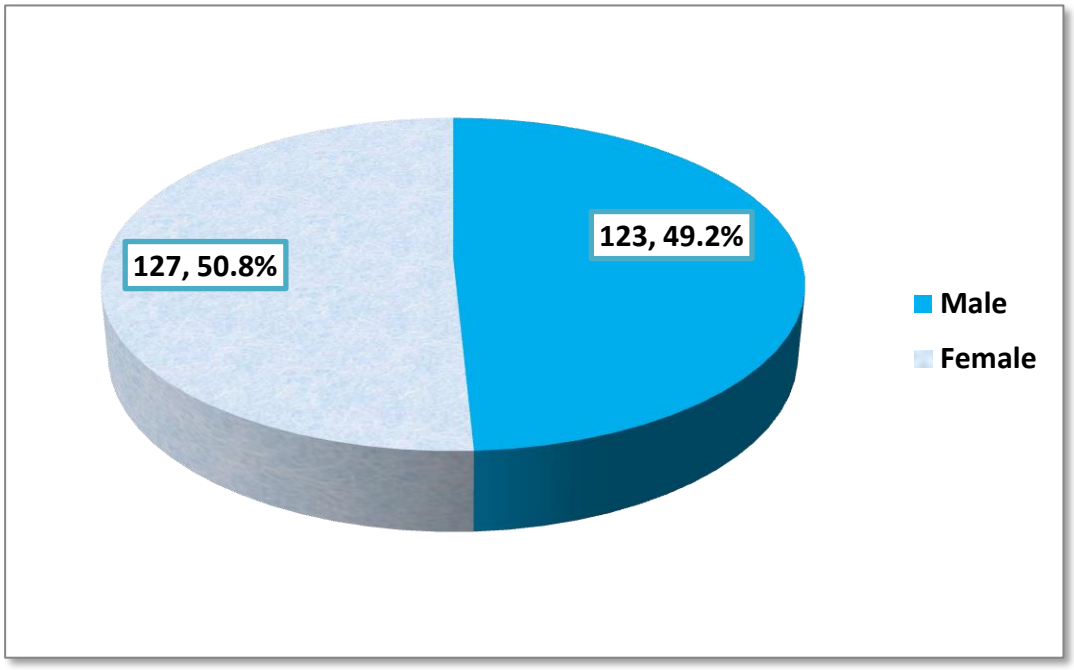

Figure 1: Distribution of newborn gender among the participants

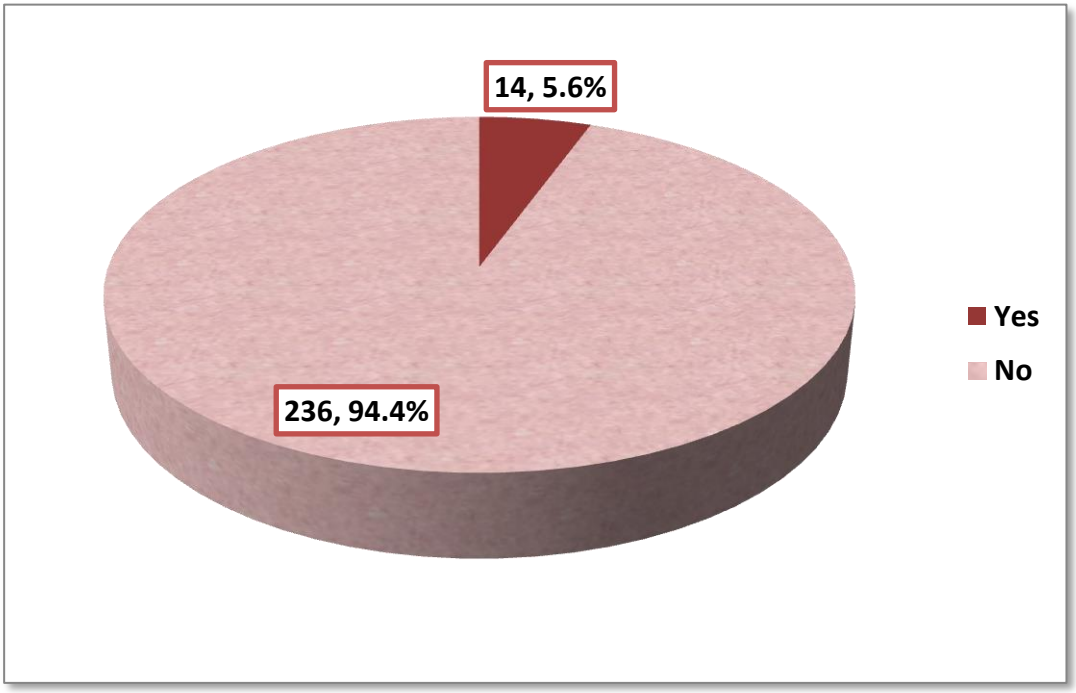

Figure 2: Previous history of antidepressants intake among the participants

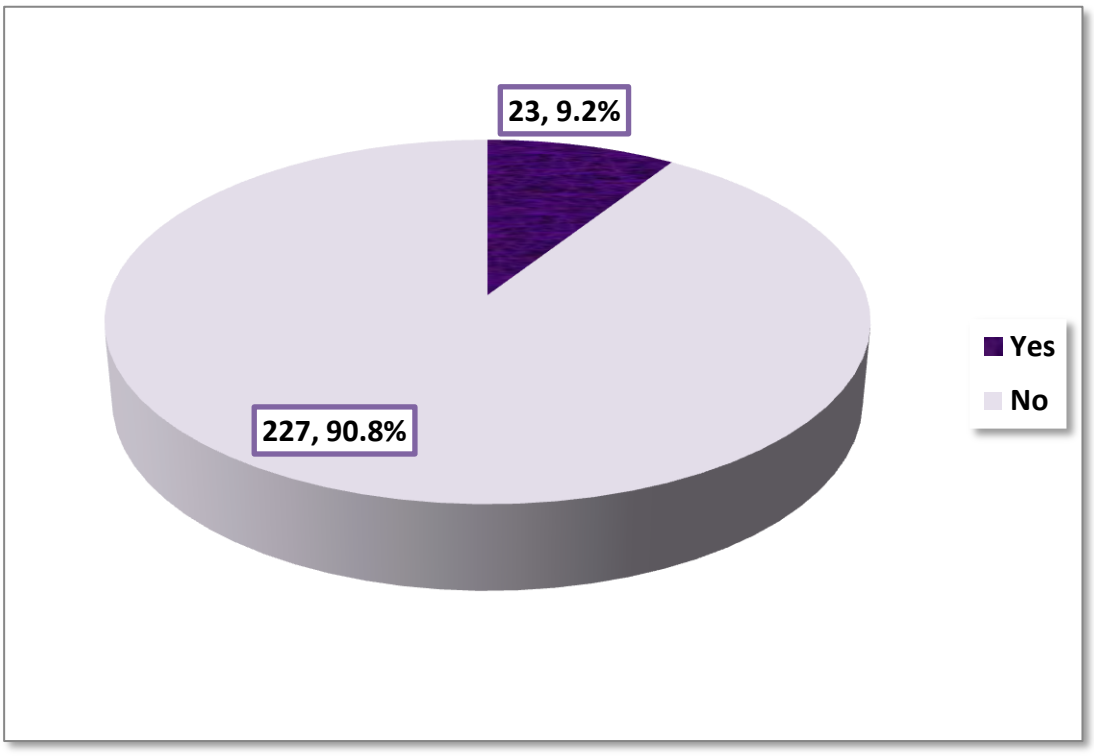

Figure 3: Family history of depression among the participants

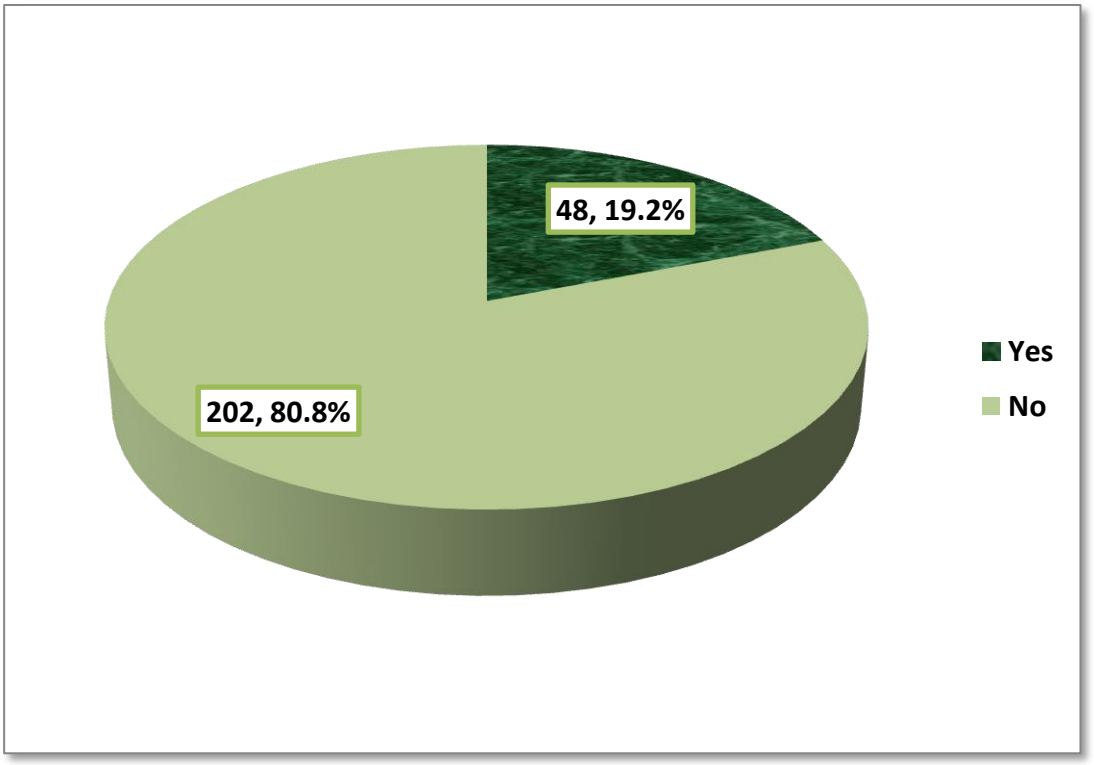

Figure 4: Presence of second wife for husband among the participants

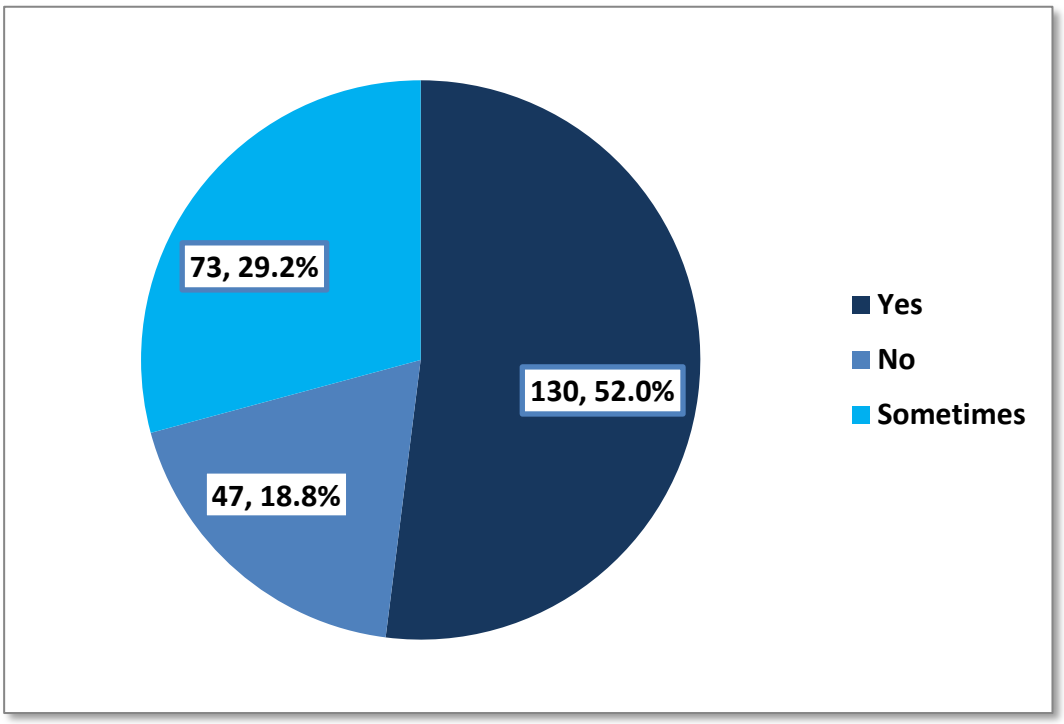

Figure 5: Husband`s help during pregnancy of the participants

Obstetric history of the participants:

Baby`s age at delivery as incomplete (<37 weeks) among 8.8% of women. Among 61.2% delivery was spontaneous vaginal whereas it was cesarean section among 38.4% of them. About half of them (48.8%) had less than three living children while 40% had 3 or 4 living children. Previous history of death a child was mentioned by 19.2% of women. Majority of labors' outcome was singleton (79.6%). First birth order was reported among 28.4% of them. Breast and artificial feeding were reported among 29.6% and 32.8%, respectively. Healthy child was reported by majority of them (96.4%) whereas history of maternal disease during pregnancy was mentioned by 28.4% of the participants. Table 2

Table 2: Obstetric history of the participants (n=250)

Variables	Frequency	Percentage
Baby`s age at delivery		
• Complete (37-42 weeks)	228	91.2
• Incomplete (<37 weeks)	22	8.8
Type of delivery		
• Spontaneous vaginal	153	61.2
• Cesarean	97	38.8
Was the pregnancy planned?		
• Yes	154	61.6
• No	96	38.4
Number of living children		
• 0-2	122	48.8
• 3-4	100	40.0
• 5-7	21	8.4
• >7	7	2.8

Previous history of death of a child		
• Yes	48	19.2
• No	202	80.8
Outcome of labour		
• Singleton	199	79.6
• Multiple	51	20.4
Birth order		
• First	71	28.4
• Second	55	22.0
• Third	56	22.4
• Fourth	32	12.8
• ≥Fifth	36	14.4
Type of lactation		
• Breast feeding	74	29.6
• Artificial	82	32.8
• Mixed	94	37.6
Child`s health status		
• Healthy	241	96.4
• Not healthy	9	3.6
History of diseases during pregnancy		
• Yes	71	28.4
• No	179	71.6

Prevalence of depression among the participants:

Figure 6 shows that depression was present among more than half (51.6%) of women; it was mild among 34.8%. However, moderate, moderately severe and severe depressions were observed among 10.8%, 14.5% and 0.4% of the women, respectively.

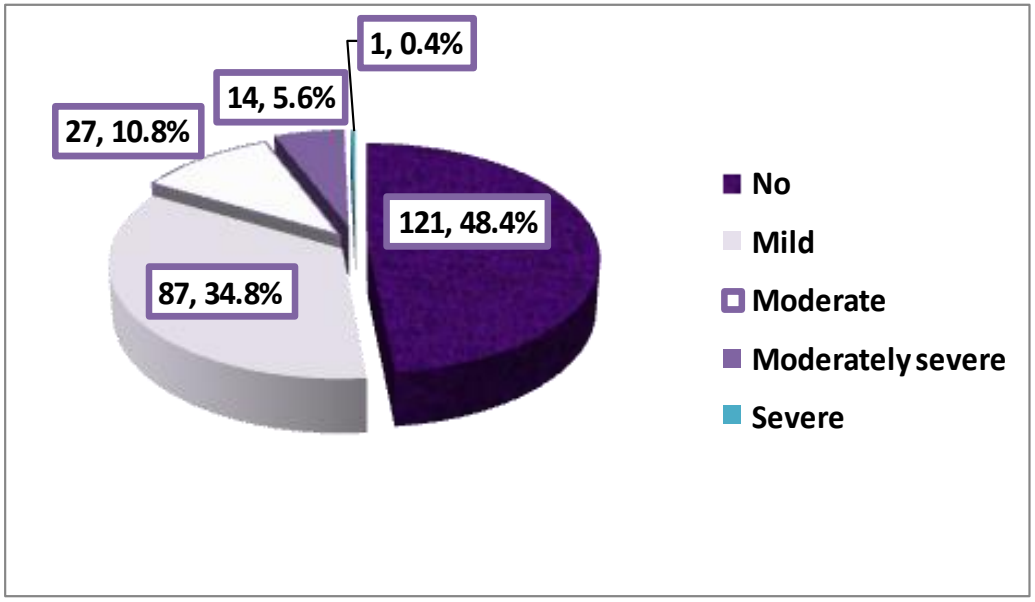

Figure 6: Prevalence of postpartum depression among the participants

Factors associated with severity of post-partum depression:

Socio-demographic factors:

- ***Age***

Table 3 demonstrates that there was no statistically significant association between participant`s age and severity of post-partum depression. However, 70% of women aged between 41 and 49 compared to 43.7% of those aged between 26 and 35 years were depressed, regardless of severity, p=0.015.

Table 3: Association between age of the participants and post-partum depression

Age (years)	**Post-partum depression**			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
18-25 (n=57)	27 (47.4)	23 (40.4)	3 (5.3)	4 (7.0)
26-35 (n=135)	76 (56.3)	38 (28.1)	15 (11.1)	6 (4.4)
36-40 (n=48)	15 (31.3)	21 (43.8)	8 (16.7)	4 (8.3)
41-49 (n=10)	3 (30.0)	5 (50.0)	1 (10.0)	1 (10.0)

χ^2=13.87, p=0.127

χ^2=10.40, p=0.015 (depressed versus not depressed)

- ***Marital status***

Current marital status of the women was not significantly associated with the postpartum depression or its severity. Table 4

Table 4: Association between current marital status of the participants and post-partum depression

Marital status	**Post-partum depression**			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Married (n=240)	117 (48.8)	84 (35.0)	25 (10.4)	14 (5.8)
Divorced/widowed (n=10)	4 (40.0)	3 (30.0)	2 (20.0)	1 (10.0)

χ^2=1.32, p=0.726

p-value of Fischer exact test=0.415 (depressed versus not depressed)

- ***Nationality***

Nationality of the women was not significantly associated with the postpartum depression or its severity as shown in table 5

Table 5: Association between nationality of the participants and post-partum depression

Nationality	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Saudi (n=182)	87 (47.8)	67 (36.8)	19 (10.4)	9 (4.9)
Non-Saudi (n=68)	34 (50.0)	20 (29.4)	8 (11.8)	6 (8.8)

χ^2=2.15, p=0.542

χ^2=0.10, p=0.757 (depressed versus not depressed)

- ***Educational level***

Table 6 illustrates that there was no statistically significant association between educational level of the participants and post-partum depression or its severity.

Table 6: Association between educational level of the participants and post-partum depression

Educational level	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Illiterate (n=10)	4 (40.0)	3 (30.0)	1 (10.0)	2 (20.0)
Primary school (n=14)	8 (57.1)	3 (21.4)	1 (7.1)	2 (14.3)
Intermediate school (n=28)	14 (50.0)	8 (28.6)	3 (10.7)	3 (10.7)
Secondary school (n=65)	31 (47.7)	25 (38.5)	6 (9.2)	3 (4.6)
University/Above (n=133)	64 (48.1)	48 (36.1)	16 (12.0)	5 (3.8)

χ^2=9.54, p=0.656

χ^2=0.76, p=0.944 (depressed versus not depressed)

- ***Occupation***

Table 7 shows that there was no statistically significant association between occupation of the participants and post-partum depression/its severity.

Table 7: Association between occupation of the participants and post-partum depression

Occupation	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
House wife (n=185)	93 (50.3)	64 (34.6)	16 (8.6)	12 (6.5)
Working (n=65)	28 (43.1)	23 (35.4)	11 (16.9)	3 (4.6)

χ^2=3.85, p=0.278

χ^2=1.01, p=0.318 (depressed versus not depressed)

- ***Husband`s educational level***

It is evident from table 8 that half of women whose husbands were illiterate compared to 2.9% of those whose husbands were university graduated or above showed moderately severe to severe depression, p=0.023. However, husband`s education was not significantly associated with post-partum depression as a whole.

Table 8: Association between husband`s educational level of the participants and post-partum depression

Husband`s educational level	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Illiterate (n=4)	1 (25.0)	1 (25.0)	0 (0.0)	2 (50.0)
Primary school (n=19)	10 (52.6)	8 (42.1)	0 (0.0)	1 (5.3)
Intermediate school (n=34)	15 (44.1)	10 (29.4)	4 (11.8)	5 (14.7)
Secondary school (n=90)	45 (50.0)	30 (33.3)	11 (12.2)	4 (4.4)
University/Above (n=103)	50 (48.5)	38 (36.9)	12 (11.7)	3 (2.9)

χ^2=23.54, p=0.023

χ^2=1.36, p=0.852 (depressed versus not depressed)

- ***Husband`s occupation***

It is clear from table 9 that there was no statistically significant association between husband`s occupation and post-partum depression or its severity.

Table 9: Association between husband`s occupation of the participants and post-partum depression

Husband`s occupation	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Not working (n=17)	9 (52.9)	5 (29.4)	1 (5.9)	2 (11.8)
Governmental employee (n=102)	52 (51.0)	35 (34.3)	12 (11.8)	3 (2.9)
Business/trading (n-=68)	34 (50.0)	25 (36.8)	3 (4.4)	6 (8.8)
Military (n=63)	26 (41.3)	22 (34.9)	11 (17.5)	4 (6.3)

χ^2=10.21, p=0.334

χ^2=1.76, p=0.623 (depressed versus not depressed)

- ***Family income***

It is evident from table 10 that there was no statistically significant association between family income and post-partum depression or its severity.

Table 10: Association between family income of the participants and post-partum depression

Family income per month (Riyals)	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
≤5000 (n=72)	35 (48.6)	27 (37.5)	3 (4.2)	7 (9.7)
5001-10000 (n=93)	41 (44.1)	33 (35.5)	15 (16.1)	4 (4.3)
10001-15000 (n=58)	30 (51.7)	18 (31.0)	7 (12.1)	3 (5.2)
>15000 (n=27)	15 (55.6)	9 (33.3)	2 (7.4)	1 (3.7)

χ^2=9.36, p=0.405

χ^2=1.50, p=0.681 (depressed versus not depressed)

Personal factors:

- ***Newborn gender***

It is obvious from table 11 that there was no statistically significant association between newborn gender and post-partum depression or its severity.

Table 11: Association between new born gender and post-partum depression

Newborn gender	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Male (n=123)	59 (48.0)	41 (33.3)	15 (12.2)	8 (6.5)
Female (n=127)	62 (48.8)	46 (36.2)	12 (9.4)	7 (5.5)

χ^2=0.70, p=0.874

χ^2=0.02, p=0.893 (depressed versus not depressed)

- ***Previous history of anti-depressants intake***

It is shown from table 12 that the majority (92.9%) of women who had previous history of anti-depressants intake compared to 49.2% of those who had no such history were depressed, p=0.001. Also severe depression was reported among 42.9% of those who had previous history of anti-depressants intake compared to only 3.8% among those without such history, p<0.001.

Table 12: Association between history of previous anti-depressants intake and post-partum depression

Previous history of antidepressants intake	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Yes (n=14)	1 (7.1)	3 (21.4)	4 (28.6)	6 (42.9)
No (n=236)	120 (50.8)	84 (35.6)	23 (9.7)	9 (3.8)

χ^2=43.89, p<0.001

p-value of Fischer exact test=0.001 (depressed versus not depressed)

- ***Family history of depression***

Table 13 revealed that Most (78.3%) of women who had family history of depression compared to 48.9% of those who had no such history were depressed, p<0.001. In addition, severe depression was reported among 30.4% of those who had family history of depression compared to only 3.5% among those without such history, p=0.007.

Table 13: Association between family history of depression and post-partum depression

Family history of depression	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Yes (n=23)	5 (21.7)	7 (30.5)	4 (17.4)	7 (30.4)
No (n=227)	116 (51.1)	80 (35.3)	23 (10.1)	8 (3.5)

χ^2=30.8, p<0.001

χ^2=7.21, p=0.007 (depressed versus not depressed)

- ***Husband`s second wife***

It is obvious from table 14 that there was no statistically significant association between husband`s second wife and post-partum depression or its severity.

Table 14: Association between husband`s second wife and post-partum depression

Second wife for husband	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Yes (n=48)	22 (45.8)	17 (35.4)	5 (10.4)	4 (8.3)
No (n=202)	99 (49.0)	70 (34.7)	22 (10.9)	11 (5.4)

χ^2=0.63, p=0.888

χ^2=0.16, p=0.692 (depressed versus not depressed)

- ***Husband`s help during pregnancy***

It is clear from table 15 that 38.9% of women whose husbands helped them during pregnancy compared to 59.6% of those whose husbands never helped them were depressed, p<0.001. However, the husband`s help during pregnancy was not significantly associated with severity of depression.

Table 15: Association between husband`s help during pregnancy and post-partum depression

Husband`s help during pregnancy	Post-partum depression			
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)
Yes (n=130)	80 (61.5)	38 (29.2)	9 (6.9)	3 (2.3)

No (n=47)	19 (40.4)	14 (29.8)	7 (14.9)	7 (14.9)
Sometimes (n=73)	22 (30.1)	35 (47.9)	11 (15.1)	5 (6.8)

χ^2=10.21, p=0.334

χ^2=19.93, p<0.001 (depressed versus not depressed)

Obstetric factors:

Among studied obstetric factors, only history of diseases during pregnancy was significantly associated with post-partum depression as 63.7% of women with history of diseases during pregnancy compared to 46.9% of those without such history were depressed, p=0.019. Regarding severity of depression, the following factors were significantly associated with it:

-Birth order of the newborn as moderately severe/severe depression was reported among 11.1% of women whose newborn was the fifth or more compared to 3.1% among those whose newborn was the fourth, p= 0.041.

-History of disease during pregnancy as moderately sever/severe depression was reported among 11.3% of women with history of disease during pregnancy compared to 3.9% of those without such history, p=0.023.

Table 16: Association between obstetric factors and post-partum depression

	Post-partum depression				χ^2 (p-value)	χ^{2*} (p-value)
	No N=121 N (%)	Mild N=87 N (%)	Moderate N=27 N (%)	Moderately severe/severe N=15 N (%)		
Baby`s age at delivery						
• Complete (n=228)	114 (50.0)	80 (35.1)	22 (9.6)	12 (5.3)	6.95	2.66
• Incomplete (n=22)	7 (31.8)	7 (31.8)	5 (22.7)	3 (13.6)	(0.073)	(0.103)
Type of delivery						
• Spontaneous vaginal (n=153)	80 (52.3)	49 (32.0)	14 (9.2)	10 (6.5)	3.29	2.39
• Cesarean (n=97)	41 (42.3)	38 (39.2)	13 (13.4)	5 (5.2)	(0.350)	(0.122)
Was the pregnancy planned?						
• Yes (n=154)	77 (50.0)	55 (35.7)	16 (10.4)	6 (3.9)	3.33	0.41
• No (n=96	44 (45.8)	32 (33.3)	11 (11.5)	9 (9.4)	(0.344)	(0.521)
Number of living children						
• 0-2 (n=122)	63 (51.6)	41 (33.6)	12 (9.8)	6 (4.9)		
• 3-4 (n=100)	50 (50.0)	32 (32.0)	12 (12.0)	6 (6.0)		
• 5-7 (n=21)	7 (33.3)	10 (47.6)	2 (9.5)	2 (9.5)	7.08	5.79
• >7 (n=7)	1 (14.3)	4 (57.1)	1 (14.3)	1 (14.3)	(0.629)	(0.123)
Previous history of death of a child						
• Yes (n=48)	18 (37.5)	18 (37.5)	8 (16.7)	4 (8.3)	4.02	2.83
• No (n=202)	103 (51.0)	69 (34.2)	19 (9.4)	11 (5.4)	(0.260)	(0.093)

Outcome of labour						
• Singleton (n=199)	96 (48.2)	67 (33.7)	22 (11.1)	14 (7.0)	2.17	0.01
• Multiple (n=51)	25 (49.0)	20 (39.2)	5 (9.8)	1 (2.0)	(0.539)	(0.921)
Birth order						
• First (n=71)	42 (59.2)	20 (28.2)	5 (7.0)	4 (5.6)		
• Second (n=55)	24 (43.6)	24 (43.6)	4 (7.3)	3 (5.5)		
• Third (n=56)	28 (50.0)	19 (33.9)	6 (10.7)	3 (5.4)		
• Fourth (n=32)	15 (46.9)	7 (21.9)	9 (28.1)	1 (3.1)	21.71	7.15
• ≥Fifth (n=36)	12 (33.3)	17 (47.2)	3 (8.3)	4 (11.1)	(0.041)	(0.128)
Type of lactation						
• Breast feeding (n=74)	40 (54.1)	25 (33.8)	5 (6.8)	4 (5.4)		
• Artificial (n=82)	39 (47.6)	26 (31.7)	12 (14.6)	5 (6.1)	3.65	1.49
• Mixed (n=94)	42 (44.7)	36 (38.3)	10 (10.6)	6 (6.4)	(0.723)	(0.475)
Child`s health status						
• Healthy (n=241)	116 (48.1)	84 (34.9)	26 (10.8)	15 (6.2)	0.67	0.19
• Not healthy (n=9)	5 (55.6)	3 (33.3)	1 (11.1)	0 (0.0)	(0.881)	(0.662)
History of diseases during pregnancy						
• Yes (n=71)	26 (36.6)	26 (36.6)	11 (15.5)	8 (11.3)	9.54	5.51
• No (n=179)	95 (53.1)	61 (34.1)	16 (8.9)	7 (3.9)	(0.023)	(0.019)

* (depressed versus not depressed)

Determinants of post-partum depression:

Results of multivariate logistic regression analysis in table 17 shows that women in the age group 36-40 years were more likely to develop PPD compared to those in the age group 18-25 years (Adjusted Odds ratio "aOR"2.20, 95% Confidence interval "CI" 1.01-5.17, p=0.049). Compared to those who had previous history of anti-depressants intake, women without such history were 92% at lower risk for having PPD (aOR 0.08, 95% CI 0.01-0.67, p=0.020). Women whose husbands helped them sometimes during pregnancy were at three folded risk to develop PPD compared to those whose husbands helped them continuously during pregnancy (aOR 3.53, 95% CI 1.88-6.60, p<0.001). History of disease during pregnancy and family history of depression were not significantly associated with PPD after controlling for confounding effect.

Table 17: Determinants of post-partum depression: Multivariate logistic regression analysis

	Adjusted Odds Ratio	**95% CI**	**p-value**
Age in years			
• 18-25[a]	**1.0**	---	
• 26-35	**0.85**	**0.44-1.66**	**0.631**
• 36-40	**2.20**	**1.01-5.17**	**0.049**
• 41-49	**1.84**	**0.40-8.44**	**0.434**

Previous history of antidepressants intake			
• Yes[a]	**1.0**	---	
• No	**0.08**	**0.01-0.67**	**0.020**
Husband`s help during pregnancy			
• Yes[a]	**1.0**	---	
• No	**0.17**	**0.80-3.47**	**0.173**
• Sometimes	**3.53**	**1.88-6.60**	**<0.001**

[a] Reference category **CI: Confidence interval**

History of disease during pregnancy and family history of depression were removed from the final model (not significant)

4. DISCUSSION

As post-partum depression of mothers can influence the baby's` social, emotional and cognitive development, [44] affects the marital relationship either as a risk factor or a consequence,[45] in Western countries, health care providers screen for PPD routinely in order to provide adequate care of mother and infant health.[46, 47] Therefore, this study was carried out aimed to explore the magnitude of the PPD in Taif, KSA as well as to determine its potential risk factors.

In the present study, the prevalence of PPD was 51.6%; it was mild among 34.8%. However, severe depressions were observed among 0.4% of the women. Lower figures have been reported from other Saudi studies. Alharbi et al reported that the prevalence of PPD symptoms was 33.2%.[18] Also, in Dammam,[17] even lower figure was reported (17.8%). The difference between the rate of PPD depression in these two studies and ours could be due to using different tools in identifying PPD as they used Edinburgh Postnatal Depression Scale whereas we used PHQ-9 tool which may overestimate the rate of depression.[48]

The rate reported in the present study as well as in other Saudi studies was higher than those reported in a meta-analysis that included various studies from Europe, Australia, North Ameical and Japan.[9] Also different figures has been reported from other countries. In United Arab Emirates, at 3 months, the prevalence of depression was 22% and at 6 months, it was12.5%.[29] In Bahrain, the prevalence of PPD was 37.1%.[16] In Chili (2011), the prevalence of depression was 45%.[37] This difference in figure between various studies could be attributed to the cross-cultural factors and variation in social background as well as in using different tools in studies.

In the present survey, presence of second wife was not significantly associated with PPD. However, other studies have documented higher rate of in depression among wives of polygamous husbands.[49, 50]

In accordance with others,[17, 18, 51, 52] the present study revealed that relatively older women were more likely to develop PPD than younger women. However in Iran, Kheirabadi et al observed higher prevalence of PPD among younger mothers.[27]

In consistent with Alasoom and Koura,[17] this study did not observe a role of job status of women in developing PPD. This could be explained by the fact that in our community, women are usually financially supported by their husbands or families, so not working status would not represent an extra stress on them. However, in another Saudi study,[18] PPD was higher among working women than housewives whereas other studies reported that PPD was higher in house wives than working women.[15, 27, 53, 54]

In agreement with other studies carried out in Saudi Arabia[18] and Egypt,[55] educational level of women in the present study was not associated with the development of PPD. However, this is inconsistent with another report who observed an association between low maternal educational level and PPD.[15, 27, 54]

In line with other studies, the current study reported no role of the newborn gender in PPD. [18, 56, 57] However, in Iran, undesired newborn gender was a significant predictor for PPD.[27]

In this study, family history of depression was a significant predictor for the development of PPD in univariate analysis, however, this role disappeared in multivariate analysis as a result of confounding control. In Another Saudi study,[17] multivariate logistic regression analysis revealed that family history of depression was a significant PPD predictor.

In accordance with another Saudi study,[17] and other studies carried out in Bahrain,[16] and Chili,[37] presence of non or sometimes supportive husbands was a significant predictor for PPD. Receiving adequate social support during stressful events as pregnancy and delivery, particularly from husband and family members is believed to be a protective factor against developing depression.[11] This finding emphasizing the significant role of family therapy for management of PPD in our community.

In agreement with other studies carried out in Saudi Arabia,[17] Bahrain,[16] and Iran,[27] life time depression, manifested in this study by previous history of antidepressants intake was a significant predictor for PPD

Among studied obstetric factors, the only significant factor with PPD was presence of disease during pregnancy, although this factor disappeared in multivariate analysis. In another study carried out in Saudi Arabia,[18] anemia during pregnancy was a strong predictor for PPD.

Unplanned pregnancy was not associated with PPD in the present study. However in another Saudi study,[17] unwanted pregnancy was a significant predictor for PPD. Also, in Iran,[27] unplanned pregnancy was a significant predictor for PPD

In this study, severe depression was more significantly reported among women who gave birth to fifth or more children, In UAE, giving birth to the first child was significantly associated with PPD.[29]

The current study`s design is case-control which may prove an association between postpartum depression and other independent variables, but do not prove causation. We used only the Phq-9 screening test, whereas clinical diagnosis is also needed.

5. CONCLUSION

Postpartum depression is a problem affecting a considerable proportion of women attended primary health care centers in Taif within one year after delivery. Risk factors of PPD in the current study are quite similar to others reported in studies carried out in various parts of the world; namely older age, previous history of depression and absence of continuous support and help from husbands.

6. RECOMMENDATIONS

1. Screening for postpartum depression is highly 4recommended at primary healthcare centers.
2. Referral of detected cases to specialists for proper early management and prevention of psychological adverse consequences on infants and the whole family.
3. Prevention of postpartum depression by applying appropriate intervention measures and conducting health education for pregnant women.
4. Providing support to women at home during pregnancy, particularly from husbands should be encouraged through health education.
5. Psychiatrists and a social worker should have a role at postnatal care unit to help mothers who may be at risk of developing PPD.
6. Further studies, on larger scales are needed in the other Saudi communities to investigate the risk factors that were observed to be associated with PPD.
7. Further study is recommended, based on application of an appropriate diagnostic tool for post-partum depression.

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ANNEXES

Annex 1: The questionnaire:

استبيان عينة رقم :

إن هذا الاستبيان يهدف إلى معرفة مدى انتشار حالات الاكتئاب ما بعد الولادة ونرجو تعبئة هذا الاستبيان لما له من أهمية بالغة للمساعدة في التعامل مع هذه الحالات وعلاجها علماً أن جميع المعلومات الواردة في الاستبيان سوف تعامل معاملة سرية .

وشكراً لتعاونكم ,,,,

اسم الباحث

د / عبد الرحيم علي الغامدي

برنامج الزمالة السعودية لطب الأسرة بصحة الطائف

المستوى الثالث

أولاً: المعلومات الشخصية

1	العمر	أ	18-25 سنة	ب	26-35 سنة	ج	36-40 سنة	د	40-49 سنة
2	الحالة الاجتماعية	أ	متزوج	ب	مطلق	ج	أرملة		
3	الجنسية	أ	سعودية	ب	غير سعودية				
4	المستوى التعليمي	أ	لا تقرأ ولا تكتب	ب	المرحلة الابتدائية	ج	المرحلة المتوسطة	د	المرحلة الثانوية
		هـ	المرحلة الجامعية أو أعلى						
5	الوظيفة	أ	ربة منزل	ب	تعمل				

6	المستوى التعليمي للزوج	أ	لا تقرأ ولا تكتب	ب	المرحلة الابتدائية	ج	المرحلة المتوسطة	د	المرحلة الثانوية
		هـ	المرحلة الجامعية أو أعلى						
7	وظيفة الزوج	أ	لا يعمل	ب	موظف حكومي	ج	أعمال حرة وتجارة	د	عسكري
8	الدخل الشهري للأسرة	أ	5000 ريال أو أقل	ب	5000 – 10000 ريال	ج	10000-150000 ريال	د	15000 أو أكثر
9	جنس المولود	أ	ذكر	ب	أنثى				
10	هل سبق وأن تناولتي علاج للاكتئاب	أ	نعم	ب	لا				
11	هل يوجد في أسرتك (والد /والدت / اخوتك) من هو مصاب بالاكتئاب	أ	نعم	ب	لا				
12	هل يوجد للزوج زوجة أخرى	أ	نعم	ب	لا				
13	هل كان يسعدك زوجك أثناء الحمل	أ	نعم	ب	لا	ج	أحياناً		

ثانياً: معلومات عن الولادة

14	ما عمر الطفل عند الولادة	أ	مكتمل (37-40 أسبوع)	ب	غير مكتمل (< 37 أسبوع)			
15	نوع الولادة	أ	طبيعية	ب	قيصرية			

16	هل كان مخططاً لهذا الحمل	أ	نعم	ب	لا			
17	عدد الأطفال الأحياء	أ	صفر - 2	ب	3 - 4	ج	5 - 7	
		د	7 فما فوق					
18	هل سبق وأن مات لكي طفل	أ	نعم	ب	لا			
19	ناتج الولادة	أ	طفل واحد	ب	متعدد			
20	ترتيب المولود بين اخوته	أ	الأول	ب	الثاني	ج	الثالث	
		د	الرابع	هـ	الخامس فما فوق			
21	نوع الرضاعة	أ	طبيعية	ب	صناعية	ج	الاثنين معاً	
22	صحة الطفل	أ	سليم	ب	غير سليم			
23	هل عانيتي من أي مشاكل صحية أثناء الحمل	أ	نعم	ب	لا			

ثالثاً: معلومات عن الحالة النفسية مابعد الولاده

24	قلة أو فقدان الاهتمام أو الاستمتاع بممارسة الاشياء	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
25	الشعور بالحزن أو ضيق الصدر أو اليأس	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
26	الصعوبة في الركون على النوم أو النوم بانتظام أو النوم أكثر من العادة	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً

27	الشعور بالتعب أو قلة الحيوية	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
28	قلة الشهية أو كثرة الأكل	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
29	الشعور بعدم الرضا عن النفس أو بالفشل أو بالإحباط	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
30	الصعوبة في التركيز على الاشياء مثل قراءة الصحف أو مشاهدة التلفزيون	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
31	بطء في الحركة أو الكلام بدرجة ملحوظة من الأخرين أو على العكس من ذلك كثرة التعامل والتحرك إلى درجة فوق العادة	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً
32	الشعور بتفضيل الموت عن الحياة أو بإيذاء النفس بطريقة ما	أ	أبداً	ب	بعض الأيام	ج	أكثر من نصف الأيام	د	كل يوم تقريباً