A cross-sectional study of risk factors for postpartum depression

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Background
Postpartum depression (PPD) is found across the globe, with rates varying from 11 to 42%. Several key risk factors have been identified as major contributors to the development of PPD.

Objective
The aim of the present study was to assess the sociodemographic and clinical characteristics of PPD and to delineate risk factors for PPD to guard against recurrence and to get a hope for prophylaxis.

Patients and methods
In this cross-sectional study, 60 PPD females were diagnosed from among 230 Arabic-speaking consenting consecutive postpartum females who were referred from Department of Obstetrics and Gynecology at the Maternity and Child Hospital at Al Medina Al Monawara (Kingdom Saudi Arabia), from January 2015 to June 2015 and underwent complete psychiatric examination with stress upon demographic data and clinical characteristics of the patient using the Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text revision classification. Obstetric case sheets were prepared and psychometric studies were carried out using an Arabic version of the Edinburgh postnatal depression scale, life event questionnaire, and social class study.

Results
In the current study PPD was diagnosed in 60 out of 230 (26%) postpartum females with a mean score of Edinburgh postnatal depression scale of 13.4±2.3 between the first and second months postpartum in 53.3%, was more common in the young age group, with a past history of psychiatric illness, was more prevalent in rural areas with low social class and social support, more in those with unwanted pregnancies and difficult labor and puerperium. PPD was precipitated by various stressors.

Conclusion
The current study revealed many risk factors contributing to PPD among females at Al medina Al Monawara, Kingdom Saudi Arabia.

Recommendation
Encouraging the liaison link between the psychiatric and obstetrics and gynecology doctors together with social workers could help in guarding against recurrence and to get a hope for prophylaxis.

Introduction
Postpartum period is expected to be a happy time, characterized by the joyful arrival of a new baby. Unfortunately, pregnancy and postpartum period are periods of increased vulnerability to psychiatric disorders such as postpartum blues, depression, and psychosis (Regmi *et al.*, 2002; Munk-Olsen *et al.*, 2006).

Postpartum blues refers to a transient condition characterized by irritability, anxiety, decreased concentration, insomnia, tearfulness, and mild, often rapid, mood swings from elation to sadness. Previous studies reported that 30–70% of women develop mood changes within 2–3 days of delivery (Regmi *et al.*, 2002), with its peak on the fifth day postpartum, and improve within 2 weeks (O'Hara *et al.*, 1990).

Postpartum depression (PPD) is defined as depression that occurs within 4 weeks of childbirth according to the Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text revision (2000), but most studies conducted previously reveal that PPD may occur at any time during the first year after labor;

however, it peaks in the first 4 months after delivery (O'Hara et al., 1991).

PPD is found across the globe, with rates varying from 11 to 42% (Ali et al., 2009). Halbreich and Karkun (2006) reviewed 143 studies in 40 countries focusing on PPD prevalence and demonstrated the variability in reported PPD, which ranged from almost 0 to 60%. The diverse incidence of PPD might be due to distinct time point, assessment tools, diagnostic criteria, biological vulnerability, and differences in socioeconomic environment and cultural background (Klainin and Arthur, 2009). Though the etiology of PPD is unclear, the development of PPD is closely linked with biological, psychological, socioeconomic, and cultural factors.

Many risk factors have been found to be responsible for PPD: family history of depression, especially with postpartum onset, past history of depression before conception, as well as past history of PPD (Kumar and Robson, 1984; Gaudet et al., 2013). Other risk factors include chronic prenatal pain (Giannandrea et al., 2013), pregnancy loss (Klainin and Arthur, 2009), living in urban areas (Vigod et al., 2013), low self-esteem, lack of social support (Ferretti et al., 2013), unplanned birth, low socioeconomic status, part-time employment (Ho et al., 2013), and being left alone during labor (Redshaw and Henderson, 2013).

Preterm infant, responsible for 70% of neonatal mortality and morbidity, can cause significantly greater maternal stress. PPD has detrimental effects on mothers and their partners, on the interaction between mother and her baby, and can affect the child's mental development (Arteche et al., 2011).

A research carried out on a sample of women from the USA armed forces found that PPD was a strong predictor of suicidality in the postpartum period (Do et al., 2013). Ali et al. (2013) has found that a significant relationship between PPD and children's delayed mental development and the child was six times more at risk for emotional development delay compared with when the mother was not depressed.

Therefore, the purpose of this study was to assess the sociodemographic and clinical characteristics of PPD and to delineate the risk factors for PPD to guard against recurrence and to get a hope for prophylaxis.

Patients and methods
Patients
After obtaining the approval from the Institutional Ethics Committee, the study was conducted on 230 Arabic-speaking postpartum females who were referred to the outpatient psychiatric clinic from obstetrics and gynecology clinic at the Maternity and Children Hospital at Al Medina Al Monawara, Kingdom Saudi Arabia, from January 2015 to June 2015.

The purpose of the study was explained to the participants and were reassured that their identities would be kept confidential. After this, participants were asked to sign an informed consent before participation in the study. Illiterate mothers were helped by trained nurses. Women with mental retardation, organic mental disorders, and severe comorbid medical disorders were excluded from the study.

Control group
It consisted of 20 postpartum females from those who passed the postpartum with no past history of psychiatric disorders or any psychological insult.

Methods
The two groups have been subjected to the following.

Complete psychiatric examination
A complete psychiatric examination was carried out with stress upon demographic data and clinical characteristics of the patient using the Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text revision classification.

The demographic data included age, marital status, residence, education, and occupation of the patient and that of her husband.

The clinical data included the following:

(1) Past history of psychiatric illness, whether puerperal or not.
(2) Family history of psychiatric illness.
(3) Symptom profile and the clinical characteristics of the episode and the number of previous episodes.
(4) History of blues.
(5) The onset of the disorder after labor.
(6) Stressors, which included childhood stressors, relationship with parents, relationship with husband, and baby variables.

Obstetric case sheet
An obstetric case sheet was prepared with the help of a consultant obstetrics and gynecology with stress upon the following:

(1) Menstrual history with stress upon premenstrual tension syndrome.
(2) Labor (course of delivery – normal or complicated).
(3) Puerperium (normal or complicated).

Psychometric studies

(1) An Arabic version of the Edinburgh postnatal depression scale (EPDS) for screening and detecting postnatal depression was used (Cox*et al.*, 1987). EPDS is the most widely used and culturally validated instrument (Do*et al.*, 2013). It is a self-administered questionnaire and consists of 10 questions on the mother's feelings over the last 7 days.
EPDS scores of greater than or equal to 13 were the optimum cut-off scores for probable depression as validated in Arabic-speaking cultures (Munk-Olsen*et al.*, 2006; Ali*et al.*, 2013). To fully describe the studied sample, scores of 0–9 indicates no risk for experiencing symptoms of postnatal depression (PND), scores of 10–12 indicates minor/major risk for experiencing symptoms of PND (possible depression), and scores of 13 or above indicates a major risk for experiencing symptoms of PND (probable depression).
(2) Life event before the study by life event questionnaire (Horowitz et al., 1977).
(3) Social class study, which was carried out according to Egyptian classification as proposed by Fahmy and El-Sherbini (1988).

Statistical analysis
The statistical analyses were performed using SPSS, version 18 (SPSS Inc. Chicago, IL) 17, was used to conduct the analysis. We used descriptive tools for prevalence analysis, the χ^2 test for comparing qualitative variables. Differences in means between groups were analyzed by using Student's *t*-test and Mann–Whitney test when appropriate. *P*-values less than 0.05 were considered statistically significant.

Results
Table 1 shows that PPD was diagnosed in 60 out of 230 (26%) postpartum females referred to the outpatient psychiatric clinic at the Maternity and Child Hospital at Al Medina Al Monawara, Kingdom Saudi Arabia, from January 2015 to June 2015. The mean score of EPDS among PPD was 13.4 ±2.3.

Table 1 Results of the Edinburgh postnatal depression scale

EPDS scores	Postpartum females [*n* (%)] (*N*=230)
2–6	102 (44.3)
7–11	54 (23.5)
12	14 (6.1)
13–18	60 (26.1)
Mean±SD	11.8±2.3

EPDS, Edinburgh postnatal depression scale.

Table 2 Onset of postpartum depression after labor

	n (%)
First week	3 (5)
Second week	5 (8.3)
+2 week to 1 month	15 (25)
+1 to 2 months	32 (53.3)
+2 to 6 months	5 (8.3)

Table 2 shows that the age of the PPD group ranged from 18 to 40 years (mean±SD age was 27.4±3.7 years). The peak frequency was in the range between 20 and 30 years, which represents 63.4% of the total number of patients.

As regards residence, 63.3% of the PPD group were from rural areas whereas 36.7% were from urban areas, with a statistically significant difference between the two groups.

About 70% of the PPD group had a past history of psychiatric illness with a statistically significant difference between the PPD and control groups. The majority of PPD patients were found to be within the social classes III and IV (36.7 and 46.6%, respectively). In addition,78.4% of PPD had inadequate social support. A significant difference was seen between the PPD and control groups regarding the social class and social support.

Overall, 30% of the PPD patients had negative attitude toward the current pregnancy with significant difference when compared with the control group. Moreover, 26.7% of the PPD patients were primipara whereas 73.3% of them were multipara with significant difference when compared with the control group. The delivery of PPD patients was assisted in 55% (21.7% using forceps whereas 33.3% were delivered through cesarean section). Complicated puerperium had been reported in more than half of the patient (56.7%). Female babies constituted 61.7%. Normal babies were 70%, whereas babies with complications were 26.6%, and stillbirth was 3.4% (Table 3).

Table 3 Sociodemographic data and past history of psychiatric illness

	PPD [n (%)] (N=60)	Control [n (%)] (N=20)	Total [n (%)]	χ^2	P
Age (mean±SD) (years)	27.4±3.7	28.4±2.8	–	5.91	0.53
<20	12 (20)	2 (10)	14 (17.5)		
21–25	25 (41.7)	4 (20)	29 (36.25)		
26–30	13 (21.7)	10 (50)	23 (28.75)		
36–40	10 (16.6)	4 (20)	14 (17.5)		
Residence					
Urban	22 (36.7)	10 (50)	32 (40)	0.64	0.32
Rural	38 (63.3)	10 (50)	48 (60)		
Past history of psychiatric illness					
Yes	41 (68.3)	0 (0)	41 (51.3)	16.494	0.002
No past history of psychiatric illness	19 (31.7)	20 (100)	39 (48.7)		
Social class					
Class I	4 (4.7)	5 (25)	9 (11.25)	4.613	0.005
Class II	6 (10)	8 (40)	14 (17.5)		
Class III	22 (36.7)	4 (15)	26 (32.5)		
Class IV	28 (46.6)	3 (20)	31 (38.75)		
Social support					
Adequate	13 (21.6)	18 (90)	31 (38.75)	4.038	0.04
Inadequate	47 (78.4)	2 (10)	49 (41.25)		

PPD, postpartum depression.

Table 4 Obstetric and baby variables

	PPD [n (%)] (N=60)	Control [n (%)] (N=20)	Total [n (%)]	χ^2	P
Attitude toward pregnancy					
Wanted	42 (70)	20 (100)	62 (77.5)	4.038	0.04
Unwanted	18 (30)	0 (0)	18 (22.5)		
Parity					
Primipara	16 (26.7)	2 (10)	18 (22.5)	4.038	0.04
Multiparity	44 (73.3)	18 (90)	62 (77.5)		
Course of delivery and puerperium					
Unassisted delivery	27 (45)	16 (80)	43 (53.7)	4.239	0.120
Assisted (forceps, cesarean section)	33 (55)	4 (20)	37 (46.2)		
Normal puerperium	26 (43.3)	16 (80)	42 (52.5)	4.613	0.03
Complicated puerperium	34 (56.7)	4 (20)	38 (47.5)		
Baby variables					
Male	23 (38.3)	12 (60)	35 (43.7)	1.658	0.198
Female	37 (61.7)	8 (40)	45 (56.2)		
Normal baby	42 (70)	16 (80)	58 (72.5)	7.008	0.320
Abnormal baby[a]	16 (26.6)	4 (20)	20 (24.9)		
Still birth	2 (3.4)	0 (0)	2 (2.5)		

PPD, postpartum depression. [a]Abnormal baby includes: premature baby, congenital anomalies, IU FD and baby complication – for example, cord around the neck or neonatal jaundice.

PPD began between the first and second months postpartum in the majority of the cases (53.3%) (Table 4).

PPD was precipitated by various stressors: childhood stressors (loss of mother, loss of father, or unhappy childhood) in 36.7%, poor relationship with parents in 51.7%, poor relationship with spouse in 61.7%, and poor attitude of spouse toward the baby in 58.3%. All of these stressors had a significant difference between the PPD and control groups (Table 5).

Life event questionnaire in the two groups reported more stressful life events in the PPD groups compared with the control group. The presumptive stress score for the PPD patients was statistically significantly higher than that for the control group (106.97±60.3 and 66.1±43.4, respectively) (Table 6).

Discussion

The current study revealed that PPD was diagnosed in 60 out of 230 (26%) postpartum females referred to the outpatient psychiatric clinic at the Maternity and Child Hospital at Al Medina Al Monawara, Kingdom Saudi Arabia, from January 2015 to June 2015. The mean score of the EPDS in the PPD group was 13.4±2.3 and

Table 5 Stressful events before postpartum depression

	PPD [n (%)] (N=60)	Control [n (%)] (N=20)	Total [n (%)]	χ^2	P
Childhood stressors					
Loss of mother	4 (6.7)	2 (10)	6 (7.5)	4.038	0.04
Loss of father	3 (5)	1 (5)	4 (5)		
Unhappy childhood	15 (25)	1 (5)	16 (20)		
No stressors	38 (63.3)	16 (80)	54 (67.5)		
Relationship with parents					
Positive	29 (48.3)	18 (90)	47 (58.75)	9.6	0.05
Negative	31 (51.7)	2 (10)	33 (41.25)		
Relationship with spouse					
Positive	23 (38.3)	17 (85)	40 (50)	2.62	<0.01
Negative	37 (61.7)	3 (15)	40 (50)		
Spouse attitude toward the baby					
Positive	25 (41.7)	18 (90)	43 (53.75)	8.016	0.005
Negative	35 (58.3)	2 (10)	37 (46.25)		

PPD, postpartum depression.

Table 6 Life event questionnaire in both postpartum depression and control groups

Life events	Puerperal group		Control group		T	P
	Mean	SD	Mean	SD		
Death of loved one	29.69	32.9	13.24	17.92	3.59	<0.001
Change in relationship	22	25.08	11.3	10.03	2.7	<0.001
Other changes	7.6	10.6	5.9	10.3	0.82	>0.05
Work changes	12.25	18.2	10.13	17.1	0.62	>0.05
Illness or injuries	13.18	17.8	10.88	18.1	0.65	>0.05
Legal or financial troubles	11.51	16.52	9.88	13.86	0.52	>0.05
Moves	10.67	15.31	4.94	8.76	2.62	<0.01

this was in agreement with Kumar *et al.* (2016). Ghubash and Abou-Saleh (1997) in Dubai found that 39.7% of their study participants had endogenous depression. The diverse incidence of PPD might be due to distinct time point, assessment tools, diagnostic criteria (earlier studies have followed the same traditional view of assessment according to International Classification of Disease-9), biological vulnerability, and differences in socioeconomic environment and cultural background (Klainin and Arthur, 2009; Arteche *et al.*, 2011; Ferretti *et al.*, 2013; Redshaw and Henderson, 2013).

In this study, it was found that PPD began between the first and second months postpartum in 53.3%. This is in agreement with a previous report by Kendell *et al.* (1984), whereas Hannah *et al.* (1992) found that the 42% of their depressed sample began in the first week postpartum, and Kumar *et al.* (2016) explained the slightly higher rate of depression in his study to be due to early assessment during the first week of delivery wherein some cases of blues were identified that recovered spontaneously after 2 weeks.

The possible explanation for that difference comes from the fact that we still have rituals allowing for 40-day rest periods for the mother after the birth of a baby, whereas in western countries, the mother usually goes home a day after delivery and often without an extended family or neighbors to help with infant care. During that time period, the focus is on allowing the mother time to rest, eat, and sleep. Female relatives come to the home to prepare meals, do housework, and care for the infant. Thus, social support, education, child care services, and social recognition of the new motherhood status is ensured. This social fabric may delay the onset of major depression and ameliorate mood disturbance to a subthreshold level. After the first postnatal month, as families and relatives gradually decrease their intense emotional and practical support, depression may ultimately set in.

The current study observed that PPD was more prevalent among the age range 20–30 (63.4%) years. This result was in agreement with that obtained by the study by Wolff *et al.* (2002). They found that young age is a recognized risk factor for PPD. Increased risk for depression among mothers less than 25 years of age has also been reported in many previous studies (Reid and

Meadows-Oliver, 2007). On the other hand, Vandenbergh (1980) found that illness was more common in older women.

The increased risk for PPD may be due to the young age of marriage, especially in rural areas, which may result in pregnancy for a young female, which means interruption of schooling and of personal growth. These young females had grown up lacking in knowledge about their own anatomy and physiology even after childbirth, had difficulties relating to their children, and may suffered not only from depression but also from post-traumatic stress disorder.

In the current study, it was observed that about two-thirds of PPD patients were from rural areas, which could be attributed to the presence of more social and family troubles in rural areas, as marriage in young age, immaturity of these young mothers (stressful factor), demands of household work in rural areas, limited education, and fewer employment opportunities. Ghubash and Abou-Saleh (1997) did not found any significant relation between residence and psychiatric disorders during the postpartum period.

The current study revealed that about 70% of the group of PPD patients had a past history of psychiatric illness, with a statistically significant difference between cases and controls. These findings were consistent with those of Paykel *et al.* (1980) and O'Hara *et al.* (1990), who found that two-thirds of women with PPD had a previous history of the same illness. No association between past psychiatric history and postnatal depression was shown by Kumar and Robson (1984).

The majority of PPD patients lie within social classes III and IV (36.7 and 46.6%, respectively). A significant difference was seen between the PPD and control groups regarding social class. This finding reflects the impact of exposure to chronic stressors as financial and housing problems that are more prevalent in poor classes, and it was consistent with Klainin and Arthur (2009), who highlighted on the importance of social factors, especially poverty as a risk factor for antenatal and postnatal depression. On the other hand, no association was reported by O'Hara (1986).

The current study revealed decreased social support introduced by the family and husband in patients with PPD (78.4%), with a significant difference between the PPD and control groups. This was in agreement with O'Hara (1986) who reported that deficient social support was found to be of more value in postpartum patients who migrate to big cities away from their families, which gives them help and social support after delivery.

An unplanned pregnancy may be associated with ambivalence toward the fetus or decreased commitment to the infant, which may result in depression. Lack of adjustment to the mother's role is prominent in postpartum depressed women and is more common in cases of unwanted pregnancy (Kumar and Robson, 1984). These results were in agreement with those of our study, where about 30% of women with PPD had unplanned pregnancy. These findings are augmented by the study of Wolff *et al.* (2002) according to which mothers with unplanned pregnancies are more exposed to emotional disturbances than those with accepted pregnancy.

The current study revealed a significant relation between PPD and complication during labor and postpartum period, where 55% of cases in our study were delivered by cesarean section or forceps. These findings were in agreement with the study of Hannah *et al.* (1992) where they concluded that surgical interventions during labor increases susceptibility to post-traumatic distress and depression.

Female babies in the current study constituted 60% of the whole sample and we cannot deny the cultural belief in our society that a male child is superior and has more advantages than does a female child. Moreover, in rural areas giving birth to a female baby may put the mother to face criticism from the husband's family and may threaten her marital life. On the other hand, Kendell *et al.* (1984) and Hannah *et al.* (1992) stated that there was no evidence to believe that baby's sex increased the risk for puerperal mental disorder.

The current study revealed that 26.6% of PPD patients had baby problems (premature baby, congenital anomalies, intrauterine fetal death (IU FD), and baby complications, e.g. cord around the neck or neonatal jaundice) and 3.4% were stillbirths; this was in line with the study by Paradiso (1997) who stated that mothers were scared if their babies were suffering from deformity.

In our study PPD was precipitated by various stressors: childhood stressors (loss of mother, loss of father, or unhappy childhood) in 36.7%, poor relationship with parents in 51.7%, poor relationship with spouse in 61.7%, and poor attitude of spouse toward the baby in 58.3%. All of these stressors had significant difference between the PPD and control groups.

Life event questionnaire in both PPD and control groups reported more stressful life events compared with the control group. The presumptive stress score for the PPD patients was statistically significantly higher than that for the control group (106.97±60.3 and 66.1±43.4, respectively). Finally, it was reported that exposure to stress during pregnancy and from the time of labor may predispose to PPD (Hannah *et al.*, 1992).

In conclusion, the current study revealed that the prevalence of PPD in Al Medina Al Monawara was 26% (EPDS scores of ≥13). PPD began between the first and second months postpartum in (53.3%), was more prevalent among the young (63.4%), more from rural areas, with past history of psychiatric illness, more among those from the poor social class, with poor social support, and was precipitated by various stressors. EPDS can be used as a screening tool for PPD along with clinical diagnosis.

Recommendations
The following steps should be taken to spread awareness among healthcare professionals about PPD to develop health promotion programs:

(1) Encouraging the Liaison link between the psychiatric and obstetrics and gynecology doctors.
(2) There must be a psychiatrist and a social worker for each antenatal and postnatal care unit to pick up and advise the mother who is at risk for developing PPD.
(3) Social support (by intimacy and enriched emotional and material support) strengthens a mother's self-esteem and provides a buffer against the stress and hardship encountered in early motherhood.
Further studies are needed on a large scale to study other postpartum psychiatric disorders.

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Conflicts of interest
There is no competing interests. Statement of financial support: there was no external funding received for this study.

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