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CLINICAL & BASIC RESEARCH

Prevalence and Risk Factors of Antenatal Depression among Omani Women in a Primary Care Setting

Cross-sectional study

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الاكتئاب في فترة الحمل معدل انتشاره وأسبابه في النساء العمانيات في مجال الرعاية الصحية الأولية

دراسة مستعرضة

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ABSTRACT: ***Objectives:*** This study aimed to identify the prevalence of antenatal depression and the risk factors associated with its development among Omani women. No previous studies on antenatal depression have been conducted in Oman. ***Methods:*** This descriptive cross-sectional study was carried out between January and November 2014 in Muscat, Oman. Pregnant Omani women ≥32 gestational weeks who were attending one of 12 local primary care health centres in Muscat for routine antenatal care were invited to participate in the study (n = 986). An Arabic version of the validated self-administered Edinburgh Postnatal Depression Scale questionnaire was used to measure antenatal depression. A cut-off score of ≥13 was considered to indicate probable depression. ***Results:*** A total of 959 women participated in the study (response rate: 97.3%). Of these, 233 were found to have antenatal depression (24.3%). A bivariate analysis showed that antenatal depression was associated with unplanned pregnancies (P = 0.010), marital conflict (P = 0.001) and a family history of depression (P = 0.019). The adjusted odds ratio (OR) after logistic multivariate regression analysis showed that antenatal depression was significantly associated with unplanned pregnancies (OR: 1.37; 95% confidence interval [CI]: 1.02–1.86) and marital conflict (OR: 13.83; 95% CI: 2.99–63.93). ***Conclusion:*** The prevalence of antenatal depression among the studied Omani women was high, particularly in comparison to findings from other Arab countries. Thus, antenatal screening for depression should be considered in routine primary antenatal care. Couples should also be encouraged to seek psychological support should marital conflicts develop during pregnancy.

Keywords: Pregnancy; Depression; Prevalence; Risk Factors; Women; Primary Health Care; Oman.

الملخص: الهدف: تهدف هذه الدراسة إلى التعرف على مدى انتشار الإكتئاب في فترة الحمل وعلى العوامل المرتبطة بتطوره عند النساء العمانيات حيث لم تجرى دراسات سابقة عن الاكتئاب في فترة الحمل في سلطنة عمان. **الطريقة:** أجريت هذه الدراسة المقطعية الوصفية بين يناير و نوفمبر 2014 في محافظة مسقط، عمان. تمت دعوة النساء الحوامل لأكثر من 32 أسبوعا واللواتي حضرن لفحص ما قبل الولادة في واحدة من 12 مركز صحي للرعاية الصحية الأولية في مسقط للمشاركة في هذا البحث (n = 986). تم ا ستخدام النسخة العربية للاستبيان المعبأ ذاتيا لمقياس أدنبره لاكتئاب ما بعد الحمل (EPDS) لجمع البيانات. كذالك تم استخدام درجة قطع 13≥ نقطه لتحديد احتمال وجود الاكتئاب في فترة الحمل. **النتائج:** شاركت مجموعة من 959 إمرأة حامل دعيت للدراسة (معدل الاستجابة = 97.3%). ومن بين هؤلاء، تم العثور على 233 إمراه حامل يعانين من الاكتئاب قبل الولادة (24.3%). وأظهر التحليل الثنائي المتغير أن الاكتئاب قبل الولادة مرتبط مع الحمل غير المخطط له (P = 0.010)، المشاكل العائلية بين الزوجين (P = 0.001) وتاريخ العائلة لمرض الاكتئاب (P = 0.019). أظهرت نسبة الأرجحية المعدلة (OR) بعد تحليل الانحدار اللوجستي المتعدد أن الاكتئاب قبل الولادة يرتبط بشكل كبير مع الحمل غير المخطط له (OR: 1.37، 95%، الثقة الفاصلة [CI]: 1.02–1.86) المشاكل العائلية بين الزوجين (OR: 13.83، 95%: CI: 2.99–63.93). **الخلاصة:** كانت نسبة معدل الاكتئاب قبل الولادة بين النساء العمانيات مرتفعة لا سيما بالمقارنة مع النتائج في الدول العربية الأخرى لهذا ينبغي النظر في تطبيق عمل فحص بشكل دائم في الرعاية الصحية الأولية في فترة الحمل لمعرفة وجود الاكتئاب وتوفير العلاج اللازم. كما ينبغي أيضا تشجيع الأزواج على التماس الدعم والعلاج النفسي عند ظهور مشاكل زوجية أثناء فترة الحمل.

مفتاح الكلمات: الحمل؛ الاكتئاب؛ المعدل؛ عوامل الخطر؛ النساء؛ الرعاية الصحية الأولية؛ عمان.

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Advances in Knowledge

- *This study is the first in Oman to investigate the prevalence and risk factors of antenatal depression.*
- *The rate of antenatal depression among the studied Omani women was high in comparison to rates observed in other countries in the Middle Eastern region.*
- *Among the cohort of Omani pregnant women, antenatal depression was significantly associated with unplanned pregnancies, marital conflict and a family history of depression.*

Application to Patient Care

- *Due to the high rate of antenatal depression found in this study, depression screening should be considered as part of routine antenatal care. This will allow women with antenatal depression to be identified earlier and provided with adequate treatment and support.*
- *Considering that marital conflict was a significant risk factor for antenatal depression, Omani couples should be encouraged to seek psychological support if this type of conflict arises during pregnancy.*

Depression is a common although often misdiagnosed disorder that can affect women during the antenatal period.[1] While the prevalence of antenatal depression varies between countries, it is generally more common than postnatal depression.[2,3] Antenatal depression is often associated with considerable medical and psychological morbidities which affect both the mother and baby. Research has shown that antenatal depression increases the risk of pre-eclampsia, operative deliveries (e.g. Caesarean sections or instrumental vaginal deliveries), use of epidural analgaesics during delivery, spontaneous preterm births, postnatal depression and suicidal ideation.[4–6] For the baby, antenatal depression is known to increase the risk of slower fetal activity, low birth weight, subsequent admission to the neonatal care unit and sudden death.[6] In addition, the infants of women with antenatal depression may receive suboptimal physical and psychological care after birth and older children and/or spouses can also suffer from the secondary effects of maternal depression.[7,8] Consequently, increased awareness and early identification of antenatal depression with appropriate psychotherapeutic interventions could reduce the risk of adverse effects for the mother, child and family.[1,7,8]

Several sociodemographic, psychiatric and medical factors have been associated with an increased risk of developing antenatal depression. Low socioeconomic and educational status, low levels of social support, unplanned pregnancies and spousal violence have been associated with the condition.[9–11] Psychological and psychiatric factors include the existence of psychosocial problems such as depression, stress, anxiety, low self-esteem, poor partner relationships, forced sexual relations and a history of traumatic abuse; these factors may either affect the woman herself or other family members.[3,11,12] Finally, excessive consumption of alcohol and iron deficiency anaemia have been linked to the development of antenatal depression.[11]

Oman is a developing country located on the southeastern tip of the Arabian Peninsula. In 2010, the national census recorded a total population of 2.7 million, of which 1.9 million were Omani.[13] Approximately 35% of Omanis were aged below 15 years and only 3.5% were aged above 65 years (median age: 22 years).[13] In 2010, approximately 21% of the total population resided in the capital city, Muscat, which is the most populated city in Oman.[13] Primary healthcare is considered the first port of entry to all levels of healthcare in Oman. By means of the Ministry of Health (MOH), the Omani government funds and provides free healthcare services to all Omanis, as well as non-Omanis working in the government sector. In Muscat, standard antenatal services are available in the antenatal clinics of 27 local primary care health centres, each of which provides care to the population in their specific catchment area.[14] In general, a total of six visits are required during a normal low-risk pregnancy while higher-risk pregnancies are referred to antenatal clinics in secondary or tertiary hospitals depending on the severity of the condition.[15] However, no screening measures currently exist within MOH antenatal care protocols to identify women with antenatal depression.[15] To the best of the authors' knowledge, no studies have yet been conducted in Oman to identify the prevalence of antenatal depression and its potential sociodemographic correlates. The aim of this study, therefore, was to assess the prevalence of antenatal depression among Omani women and explore associated clinical and demographic risk factors.

Methods

This descriptive cross-sectional study was carried out between January and November 2014 in Muscat, Oman. The required sample size for the current study was estimated to be approximately 1,600, based on an assumed 20% prevalence of antenatal depression, a 95% confidence interval (CI) and a 10% error in estimating the prevalence of depression. Of the 27 local primary care health centres in Muscat, 12 centres were randomly selected for inclusion in the study. A

Table 1: Sociodemographic and clinical characteristics of pregnant Omani women receiving antenatal care in local primary care health centres (N = 959).

Characteristic*	n (%)
Age in years	**957 (100.0)**
<24	261 (27.3)
25–30	451 (47.1)
>30	245 (25.6)
Occupation	**959 (100.0)**
Housewife	609 (63.5)
Employed	350 (36.5)
Education level	**957 (100.0)**
Primary and secondary	519 (54.2)
University	438 (45.8)
Monthly income in Omani *riyals*	**957 (100.0)**
<500	298 (31.1)
500–1,000	488 (51.0)
>1,000	171 (17.9)
Gravidity	**959 (100.0)**
Primigravida	373 (38.9)
Multigravida	465 (48.5)
Grand *multigravida*	121 (12.6)
Gestational age in weeks	**959 (100.0)**
32–34	399 (41.6)
35–37	376 (39.2)
>37	184 (19.2)
Anaemia status†	**958 (100.0)**
Normal	255 (26.6)
Mild anaemia	488 (50.9)
Moderate-to-severe anaemia	215 (22.4)
History of miscarriage	**959 (100.0)**
Yes	170 (17.7)
No	789 (82.3)
History of depression	**959 (100.0)**
Yes	10 (1.0)
No	949 (99.0)
Family history of depression	**959 (100.0)**
Yes	19 (2.0)
No	940 (98.0)
Planned pregnancy	**958 (100.0)**
Yes	560 (58.5)
No	398 (41.5)
Marital conflict	**958 (100.0)**
Yes	13 (1.4)
No	945 (98.6)

**The total of each characteristic corresponds to the number of respondents for each question. †Haemoglobin levels of <11.0 gm/dL.*

total of 986 pregnant Omani women ≥32 gestational weeks attending one of these 12 centres for routine antenatal care during the study period were invited to participate in the study. Women who were non-Omani, currently receiving treatment for depression, or diagnosed with gestational diabetes, hypertension or pregnancy-induced hypertension were excluded.

The Arabic version of the self-administered Edinburgh Postnatal Depression Scale (EPDS) questionnaire was used to measure antenatal depression.[3,16] Mohammad *et al.* first translated into Arabic, validated and successfully used the EPDS questionnaire in a study conducted in Jordan, an Arab country with similar cultural and sociodemographic characteristics to Oman.[3] The EPDS is a widely validated questionnaire used to identify and measure depression in the antenatal and postnatal periods.[3,5,17] The first part of the questionnaire included 12 items designed to determine the sociodemographic and medical characteristics of the participants, including age, occupation, education level, monthly income, gravidity, gestational age, anaemia status (haemoglobin levels <11.0 gm/dL), history of miscarriage, history of depression, family history of depression, whether the pregnancy was planned or spontaneous and marital conflict. The second part constituted 10 questions to determine the presence of antenatal depression. Each question was scored from 0–3 with a total score ranging from 0–30. A cut-off score of ≥13 was considered to indicate probable antenatal depression.[3,5] Three nurses in each of the primary care health centres included in the study were trained to distribute and collect the questionnaires from the study subjects, although the questionnaires were completed solely by the participants. The reliability of the items was tested on a sample of 30 women, which indicated a Cronbach's alpha value of 0.75. These women were subsequently included in the study.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 20 (IBM Corp., Chicago, Illinois, USA). All variables were subjected to univariate analysis using Pearson's Chi-squared test to determine associations between antenatal depression and sociodemographic characteristics. A *P* value of ≤0.050 was considered statistically significant. To adjust for possible confounding factors, a second analysis

Table 2: Associations between antenatal depression* and sociodemographic variables among pregnant Omani women receiving antenatal care in local primary care health centres (N = 959).

Variable†	n (%)		*P* value
	Depressed (n = 233)	Not depressed (n = 726)	
Age in years (n = 957)			**0.917**
<24	66 (25.3)	195 (74.7)	
25–30	108 (23.9)	343 (76.1)	
>30	59 (24.1)	186 (75.9)	
Occupation (n = 959)			**0.399**
Housewife	154 (25.3)	455 (74.7)	
Employed	80 (22.9)	270 (77.1)	
Education level (n = 957)			**0.127**
Primary and secondary	137 (26.4)	382 (73.6)	
University	97 (22.1)	341 (77.9)	
Monthly income in Omani *riyals* (n = 957)			**0.078**
<500	86 (28.9)	212 (71.1)	
500–1,000	106 (21.7)	382 (78.3)	
>1,000	42 (24.6)	129 (75.4)	
Gravidity (n = 959)			**0.923**
Primigravida	89 (23.9)	284 (76.1)	
Multigravida	114 (24.5)	351 (75.5)	
Grand *multigravida*	31 (25.6)	90 (74.4)	
Gestational age in weeks (n = 959)			**0.338**
32–34	107 (26.8)	292 (73.2)	
35–37	85 (22.6)	291 (77.4)	
>38	42 (22.8)	142 (77.2)	
Anaemia status‡ (n = 958)			**0.941**
Normal	64 (25.1)	191 (74.9)	
Mild anaemia	117 (24.0)	371 (76.0)	
Moderate-to-severe anaemia	53 (24.7)	162 (75.3)	
History of miscarriage (n = 959)			**0.765**
Yes	43 (25.3)	127 (74.7)	
No	191 (24.2)	598 (75.8)	
History of depression (n = 959)			**0.058**
Yes	5 (50.0)	5 (50.0)	
No	229 (24.1)	720 (75.9)	
Family history of depression (n = 959)			**0.019§**
Yes	9 (47.4)	10 (52.6)	
No	225 (23.9)	715 (76.1)	
Planned pregnancy (n = 958)			**0.010§**
Yes	120 (21.4)	440 (78.6)	
No	114 (28.6)	284 (71.4)	
Marital conflict (n = 958)			**0.001§**
Yes	11 (84.6)	2 (15.4)	
No	223 (23.6)	722 (76.4)	

**Antenatal depression was self-assessed by respondents using the Arabic version of the 22-item Edinburgh Postnatal Depression Scale questionnaire.[3,16] A score of ≥13 was considered to indicate probable antenatal depression.[3,5] †The total of each variable corresponds to the number of respondents for each question ‡Haemoglobin levels of <11.0 gm/dL. §Statistically significant at P ≤0.050.*

was conducted using multivariate logistic regression for variables that showed significant associations with antenatal depression at the *P* ≤0.050 level.

This study was approved by the Medical Research & Ethics Committee of the College of Medicine & Health Sciences at Sultan Qaboos University (MREC #572). Written consent was obtained from each of the subjects before their participation in the study.

Results

A total of 959 pregnant Omani women participated in the study (response rate: 97.3%). The mean age of the participants was 27 ± 4.8 years (range: 17–43 years old). The majority of participants were housewives (63.5%). More than half of the participants (54.2%) had only completed primary and secondary education while 45.8% had a university qualification. In terms of gravidity, 48.5% were *multigravidae,* 12.6% were grand *multigravidae* and 38.9% were *primigravidae*. A total of

Table 3: Logistic regression analysis of risk factors for antenatal depression* among pregnant Omani women receiving antenatal care in local primary care health centres (N = 959)

Variable	Adjusted OR	95% CI	*P* value
Family history of depression	2.04	0.76–5.47	0.159
Unplanned pregnancy	1.37	1.02–1.86	0.040†
Marital conflict	13.83	2.99–63.93	0.000†

OR = odds ratio; CI = confidence interval.

**Antenatal depression was self-assessed by respondents using the Arabic version of the 22-item Edinburgh Postnatal Depression Scale questionnaire.[3,16] A score of ≥13 was considered to indicate probable antenatal depression.[3,5] †Statistically significant at P ≤0.050.*

41.6% of the women were between 32–34 gestational weeks while 58.4% were ≥35 gestational weeks. A history of miscarriage was reported by 17.7% of the participants. More than half the women (58.5%) stated that their pregnancies were planned. A previous history or family history of depression was reported by 1.0% and 2.0% of the participants, respectively. The majority of the participants (98.6%) reported no marital conflict. Mean haemoglobin levels were 10.9 gm/dL. The majority of the participants were anaemic (73.3%) [Table 1].

The EPDS scores ranged from 0–23 (mean: 9 ± 4.8). A total of 233 women had antenatal depression (24.3%). A bivariate analysis showed that antenatal depression was significantly associated with unplanned pregnancies (P = 0.010), marital conflict (P = 0.001) and a family history of depression (P = 0.019) [Table 2]. Logistic multivariate regression analysis revealed that antenatal depression was significantly associated with unplanned pregnancies (OR: 1.37; 95% CI: 1.02–1.86) and marital conflict (OR: 13.83; 95% CI: 2.99–63.93) [Table 3]. The model fit 77.0% of cases correctly.

Discussion

The prevalence of antenatal depression in the studied group of Omani pregnant women was similar to that of a cohort in Brazil (24.3%), but higher than findings from other countries with similar cultural and sociodemographic characteristics, such as Jordan (19.0%) and Morocco (19.2%).[3,18] Additionally, the prevalence was higher than results reported from Bangladesh, Turkey, Australia and the UK, but lower than the rate observed in South Africa (39.0%).[14,19–22] The high antenatal depression rate in South Africa has been attributed to a lack of partner support, high rates of intimate partner violence, low household incomes and the younger age of women during their pregnancies.[23] Screening for antenatal depression has been recommended for developed countries by the American College of Obstetricians and Gynecologists.[24] Considering the relatively high rate of antenatal depression observed in the current study, the MOH in Oman should consider implementing routine screening for the presence of antenatal depression as part of regular antenatal care services. Identifying women with antenatal depression would enable healthcare professionals to provide psychological support to those affected and hence potentially reduce the rate of antenatal depression and its related complications in Oman.[3,17]

Rich-Edwards *et al*. found that young maternal age was the strongest predictor of antenatal depression, as it was associated with financial hardship, unwanted pregnancies and a lack of partner support.[25] In Oman, most women marry at a younger age, some as young as 16 years old, which may explain the higher prevalence of antenatal depression noted in the current study.[26] Also, Oman, like many other developing countries, has a high fertility rate.[27] Previous research shows that the more children in a family, the greater the prevalence of depression, as a result of increased psychosocial and financial demands.[28] Nevertheless, neither maternal age nor gravidity were identified as factors significantly associated with antenatal depression in the current study.

Unplanned pregnancy was a significant risk factor for antenatal depression in the present cohort of Omani women. A planned pregnancy ensures that the woman is more prepared for the realities of pregnancy and childbearing whereas unplanned or unintended pregnancies may increase the risk of antenatal depression because of difficulties in balancing maternal needs and other responsibilities at home or work.[29] Women experiencing unplanned pregnancies are more likely to have an unstable psychosocial environment or feel a lack of security and attachment with their spouse.[30] A previous study also indicated that couples with unplanned pregnancies experienced higher levels of marital conflict following delivery than couples with planned pregnancies.[31] Women experiencing unplanned pregnancies are often unaware of their condition; as a result they do not initiate early prenatal care and may be more likely to engage in risky behaviours, such as drinking, smoking or illicit drug use. Kuroki *et al*. found that women with unplanned pregnancies had a lower vitamin intake during early pregnancy, which increased the risk of premature birth, low birth weight babies, infant abuse and neonatal death.[32] Furthermore, one unplanned pregnancy was identified as a risk factor for subsequent unplanned pregnancies, particularly among young women with low education levels.[33] Increased education about appropriate methods of contraception and approaches towards pregnancy planning are recommended in Oman.

The other significant risk factor for antenatal depression observed in the current study was marital conflict. The physiological and psychological changes that occur during pregnancy often influence women to seek out intimate partner support; consequently, the lack of such support may increase the likelihood of antenatal depression.[34] Indeed, difficult or strained marital relationships marked by violence and disharmony have been shown to increase rates of antenatal depression.[35,36] Likewise, greater marital distress has been reported by couples where the wife is depressed; these couples also resort to less constructive tactics to resolve their conflicts.[35] Further exploration is needed

regarding the nature of such conflicts and their role in the development of antenatal depression. In addition, future research is recommended to identify anxiety and depression among Omani women in the antenatal or postnatal periods, perhaps through the use of structured clinical interviews to validate the reliability of the EPDS questionnaire as a screening tool.

Although a previous history of depression was initially found to represent a risk factor for antenatal depression in the current study, this association was not significant after multivariate analysis. This may perhaps be due to the low reported rates of past or family history of depression; as is the case in several other Arab countries, many women in Oman believe that psychiatric illness is a social stigma.[37] They may feel ashamed to be known to have a psychiatric illness and may hide their condition and refuse to seek medical help. Some women prefer to rely on their faith or turn to religious leaders for help.[38] Al-Adawi *et al*. noted that Omanis tend to express their psychological problems in terms of physical symptoms in order to avoid the stigma attached to a psychiatric diagnosis.[37]

The current study is subject to certain limitations. First, as data were gathered from responses to a self-reported questionnaire, the true prevalence of antenatal depression may have been over- or underestimated. Additionally, the choice of cut-off value for EPDS scores was based on Jordanian research; although Oman has a similar culture, there may have been other differences between cohorts which could have affected the results.[3] Indeed, it is not clear if the EPDS questionnaire has yet been established to have cross-cultural construct and criterion validity. Second, this study was descriptive and did not use objective criteria to diagnose antenatal depression; while the EPDS screens for antenatal depression, it is not intended as a diagnostic tool.[16] Third, the cross-sectional design of this study may have resulted in the inclusion of patients with pre-existing undiagnosed depression unrelated to pregnancy, although those with a known history of depression were excluded as far as possible. Conclusions about causative factors for depressive symptoms cannot be formulated based on the findings of this cross-sectional study; carefully designed prospective studies are recommended to identify possible causal relationships. Fourth, although the sample was large, the study was not designed to be truly epidemiological and the results reflect only women who presented to primary care centres. Fifth, women with previous diagnoses of depression, diabetes and hypertension were excluded; however, the presence of a pre-existing condition does not diminish the possibility that such women may develop antenatal depression. Finally, the required sample size calculated to estimate the prevalence of antenatal depression was not achieved due to a number of constraints.

Conclusion

This study was the first to assess the prevalence of antenatal depression and associated risk factors among a group of pregnant women in Oman. Findings indicated that antenatal depression was higher in Oman compared to other countries in the Middle Eastern region. Screening for the presence of antenatal depression should be included as a routine part of antenatal care. This will ensure that sufficient support can be provided to those affected. Antenatal depression was also significantly associated with unplanned pregnancies and marital conflict. As such, Omani women should be educated regarding appropriate methods of contraception and psychological support is recommended for couples experiencing marital conflict. Further large-scale research is required to determine the true rate of antenatal depression among Omani women.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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