

ORIGINAL ARTICLE:

Antenatal depression and its associated risk factors among males: evidence from an urban setting in a lower-middle income country

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ABSTRACT

OBJECTIVE

To estimate the frequency and associated risk factors of paternal antenatal depression among men attending urban healthcare settings in Karachi, Pakistan.

STUDY DESIGN

Cross sectional study

PLACE & DURATION OF STUDY

This study was conducted at the Department of Obstetrics and Gynaecology, Dow University of Health Sciences and the Modern Sindh Government Hospital from November 2023 to April 2024.

SUBJECTS AND METHODS

The study population comprised adult males with pregnant wives attending the selected healthcare facilities for antenatal examinations. Participants' information statements and consent forms were shared with eligible males, accompanying their pregnant wives for antenatal check-ups during the research period. Edinburgh Postnatal Depression Scale was utilized to assess antenatal depression among the participants.

RESULTS

A total of 312 males participated in this study. The frequency of antenatal depression among expectant fathers was found to be 52%. This study found a very high frequency of paternal antenatal depression among the sample, with the advanced paternal age, lower income levels, experiencing sleep disturbance and being a smoker among the significant risk factors of depression among expectant fathers. The results of the study help to explain why fathers should also be engaged in perinatal mental health interventions.

CONCLUSION

This study identified frequency of paternal antenatal depression among expectant fathers in Karachi. Significant risk factors included advanced paternal age, lower socioeconomic status, sleep disturbances, and smoking habits, indicating an urgent need for involving fathers in perinatal mental health programs, vital for promoting overall family well-being.

KEYWORDS

Paternal, Depression, Antenatal, Pakistan

INTRODUCTION

Depression is expected to surpass all the other causes of disease in the world by the year 2030, as estimated by the World Health Organization; highlighting a looming crisis that needs to be addressed holistically¹. The antenatal period, a transitioning to parenthood, is accompanied by physical, psychological and emotional changes that render both females and males susceptible to mental health problems, especially depression². Antenatal depression had been studied extensively among women, however, emerging literature suggests that paternal depression can occur in about 10% of men at all stages of pregnancy³.

The expecting fathers may go through mood swings, anxiety, and multiple behavioral changes due to concerns about the progress of pregnancy, affecting not only their own mental health but also negatively influencing family functioning⁴. In 2019, a cross-sectional descriptive study was conducted in Nigeria to assess the risk factors associated with paternal perinatal depression among fathers of newborn infants⁵. The study found that the prevalence of depression in fathers was 10% during the first six weeks of the postpartum period, while the overall prevalence was estimated to be 8.8%. Additionally, the same study found that the prevalence of depression was higher in unemployed males than in employed ones, but did not report a discernible link between maternal and paternal depression⁵.

Another cross-sectional study conducted in 2022; it examined 116 expectant couples and determined the factors that were associated with antenatal depression in these couples⁶. This study found that among men, having a wife suffering from antenatal depression was a significant predictor of their antenatal depression, suggesting a relationship between antenatal depression in mothers and fathers. A longitudinal study examining 352 expecting couples reported that marital satisfaction may be related to paternal depression, and there may be an association between male antenatal and postnatal depression⁷.

Information regarding parental depression in Pakistani men is scarce. Pregnancy and birth are generally considered a female domain in Pakistani patriarchal society. A previous Pakistani study reported that only 23% of husbands from lower socioeconomic groups went to the hospital with their wives for obstetric care, whereas 70% of spouses from better socioeconomic groups did the same⁸. Among the 56% of spouses who were interviewed for 82 consecutive obstetric instances, 13% of those whose wives had normal vaginal delivery had anxiety and depression, whereas 25% of those whose wives had Cesarean Section had these symptoms. Stress was reported by 50% of those in lower socioeconomic groups on the Life Events Scale, compared to 10% of those in higher socioeconomic groups⁸.

The frequency of parental postpartum depression in Pakistani men has also been documented previously by two cross-sectional studies^{9,10}. Both of these studies used the Urdu-translated version of the Edinburgh Postnatal Depression Scale (EPDS) to calculate the prevalence of depression among Pakistani fathers. The prevalence was found to be between 23-28%, with mild depression symptoms being experienced by 25.8% of participants and severe symptoms experienced by 2.5% of the participants. It was found that having a partner with depressed symptoms and experiencing sleep disturbances following the birth of their child were risk factors for paternal depression in Pakistani men^{9,10}. However, the small sample sizes in these two investigations presented limitations. To the best of our knowledge, research on paternal antenatal depression is limited in Pakistan and warrants further investigation to fill this knowledge gap.

SUBJECTS AND METHODS

Participants

A total of 312 males participated in this study. The study population comprised adult males with pregnant wives attending the selected healthcare facilities for antenatal examinations. Participants' information statements and consent forms were shared with eligible males, accompanying their pregnant wives for antenatal check-ups during the research period. Edinburgh Postnatal Depression Scale was utilized to assess antenatal depression among the participants.

Instruments

The Urdu translated version of Edinburgh Postnatal Depression Scale (EPDS) was used to measure depression after the permission was sought from the respective authors. For depression, a cut-off value of more than ten was used to define individuals who screened positive for depression¹¹. The Edinburgh Postnatal Depression Scale (EPDS) has been validated for the Pakistani population. Demographic data and risk factors were gathered through a self-structured questionnaire.

Procedure

This cross sectional study was conducted with adult Pakistani males with pregnant wives attending the selected healthcare facilities for their antenatal examinations. All procedures involving human subjects were approved by Institutional Review Board of Dow University of Health Sciences, Karachi [approval number: IRB 3244/DUHS/Approval/2023/118, dated: 24/4/24]. This study complied with the Declaration of Helsinki. Participants' information statements and consent forms were shared with eligible males and written consent was sought. Those consenting to participate were requested to complete the Urdu-translated and validated version of the Edinburgh Postnatal Depression Scale (EPDS). The data collected were sorted with the aid of IBM SPSS Base Licenced version 21. Data were described using descriptive statistics namely; means, standard deviations, frequencies, and percentages. The obtained EPDS scores were used to estimate the frequency of antenatal depression. In multivariate analysis, binary logistic regression models were employed to test the relationship between antenatal depression (screen positive/negative) and numerous antenatal risk factors. The models included antenatal risk factors such as perceived stress, social support, and exposure to stressful life events etc.

RESULTS

The study sample comprised a total of 312 participants, with the age range spanning from 21 to 48 years. The majority of participants were between the ages of 29 and 40 years. A vast

majority of participants identified as Muslim (94.4%). Educational attainment among participants was relatively high, with 60.4% holding a bachelor's degree and 23.9% having completed a master's degree. The majority of participants were employed (93.9%), with more than half of the sample reported earning over 100,000 Pakistani Rupees per month (58.9%).

The frequency of antenatal depressive symptoms was found to be 52%. When compared the participants with an EPDS score of ≤ 10 to those with an EPDS score > 10 , and examined various demographic and behavioral characteristics in relation to depressive symptoms. Both univariate and multivariate analyses were used to assess risk factors, with relative risk (RR) and adjusted odds ratios (Exp. B) presented in Table 1

Table 1: Risk factors for depression during antenatal period

Characteristics	EPDS score ≤ 10 (N = 205)	EPDS > 10 (N = 107)	Univariate Analysis RR (95% CI)	Multivariate Analysis Exp. B (95% CI)
Age				
≤ 26	58 (28.1%)	0 (0.0%)	1.00 (0.63, 1.59)	1.02 (0.73, 1.43)
27-30	79 (38.5%)	44 (41.1%)	0.85 (0.54, 1.34)	0.88 (0.59, 1.32)
31-35	47 (22.9%)	23 (21.5%)	1.15 (0.77, 1.71)	1.12 (0.76, 1.65)
36-40	15 (7.3%)	30 (28.0%)	2.53 (1.43, 4.47)	2.35 (1.32, 4.17)
41+	6 (2.9%)	10 (9.3%)	7.14(2.33, 21.88)	6.51 (2.14, 19.81)
Religion				
Islam	197 (96.3%)	98 (91.7%)	0.95 (0.63, 1.43)	0.93 (0.62, 1.40)

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Christian	4 (1.9%)	7 (6.0%)	3.15(0.73, 13.57)	2.93 (0.69, 12.48)
Hindu	2 (0.9%)	1 (1.2%)	1.33 (0.08, 21.88)	1.25 (0.08, 20.00)
Other	2 (0.9%)	1 (1.2%)	1.33 (0.08, 21.88)	1.25 (0.08, 20.00)
Education				
Masters	46 (22.4%)	24 (22.6%)	1.01 (0.63, 1.63)	1.00 (0.62, 1.60)
Bachelors	132 (64.5%)	62 (58.3%)	0.90 (0.63, 1.29)	0.89 (0.62, 1.27)
PhD./Doctorate	2 (0.9%)	3 (2.4%)	2.67 (0.24, 29.51)	2.50 (0.23, 27.14)
Intermediate	23 (11.2%)	14 (13.1%)	1.17 (0.57, 2.41)	1.14 (0.55, 2.34)
Matriculation or Below	2 (0.9%)	4 (3.6%)	4.00 (0.43, 37.14)	3.75 (0.41, 34.29)
Employment Status				
Employed	194 (94.4%)	102 (95.2%)	1.01 (0.63, 1.63)	1.00 (0.62, 1.60)
Unemployed	11 (5.6%)	5 (4.8%)	0.86 (0.28, 2.65)	0.84 (0.27, 2.58)
Monthly Income				
< 10,000	3 (1.9%)	2 (2.4%)	1.27 (1.23, 7.04)	1.23 (1.21, 6.89)
10,000-50,000	12 (6.0%)	9 (8.4%)	0.71 (0.26, 1.93)	0.69 (0.25, 1.87)
50,000-100,000	55 (26.6 %)	37 (34.1%)	1.76 (1.46, 1.95)	1.74 (1.44, 1.93)

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100,000+	135 (65.5%)	59 (55.1%)	1.18 (0.83, 1.69)	1.15 (0.81, 1.65)
Sleep Disturbances				
No	41 (19.6%)	14 (13.1%)	0.67 (0.36, 1.25)	0.65 (0.35, 1.22)
Sometimes	107 (52.3%)	50 (46.4%)	0.89 (0.59, 1.33)	0.87 (0.57, 1.31)
Yes	57 (28.0%)	43 (40.5%)	1.44 (1.11, 2.29)	1.39 (1.08, 2.20)
Family History of Depression				
No	105 (49.5%)	41 (38.1%)	0.77 (0.53, 1.12)	0.75 (0.51, 1.09)
Yes	100 (48.6%)	66 (61.9%)	1.27 (0.88, 1.84)	1.24 (0.86, 1.79)
Tobacco use				
None	73 (35.5%)	24 (22.6%)	0.64 (0.39, 0.84)	0.62 (0.38, 0.82)
Smoking	96 (46.7%)	59 (54.8%)	1.17 (1.08, 1.65)	1.14 (1.06, 1.62)
Betel Nut	10 (4.7%)	9 (8.3%)	1.77 (0.62, 5.08)	1.69 (0.59, 4.86)
Pan/Gutka	15 (7.5%)	12 (10.7%)	1.43 (0.63, 3.24)	1.36 (0.61, 3.04)
Other	11 (5.6%)	3 (3.6%)	0.64 (0.18, 2.29)	0.61 (0.17, 2.18)

Participants aged 36 and above were significantly more likely to have EPDS scores > 10 compared to younger participants (Exp. B: 2.35 (1.32, 4.17)). This risk was even higher in participants over 41 years of age (Exp. B: 6.51 (2.14, 19.81)), indicating that advancing age is strongly associated with higher depression scores in expectant fathers. Religion or education level showed no significant association with depression scores. Participants with a master's degree or those with

bachelor's degrees did not have a notably different risk of high EPDS scores compared to those with lower level of education.

Employment status was also not significantly associated with higher depression scores. Both employed and unemployed participants showed similar risks for having depression scores > 10 (Exp(B): 0.84 (0.27, 2.58)). In contrast, income levels were found to be significantly associated with higher EPDS scores, with those earning between 50,000 to 100,000 PKR showing significant relationship between their income and their depressive symptoms (Exp(B): 1.74 (1.44, 1.93)).

Participants who experienced sleep disturbances were more likely to have EPDS scores > 10, and this association remained significant in multivariate analysis (Exp(B): 1.39 (1.08, 2.20)). Smoking was notably more common among those with higher EPDS scores (1.14 (1.06, 1.62)), suggesting that smoking may be associated with elevated depressive symptoms. Results did not find any significant association between family history of depression and paternal depressive symptoms.

DISCUSSION

The results of the current study reported a particularly high frequency of prenatal depression among expectant fathers, highlighting the importance of addressing paternal mental health issues during the perinatal period. Identifying risk factors such as older paternal age, lower income, sleep disorders and smoking can help us better understand the complex interactions between socioeconomic and lifestyle factors that may affect mental health during this critical time.

Paternal postnatal depression is well-researched, however, research on paternal antenatal depression is still in its nascent stage. A recent meta-analysis of 47 observational studies reported a pooled prevalence of antenatal paternal depression to be 9.76% in all three trimesters¹². The same meta-analysis also reported segregated prevalence of paternal antenatal depression to be 13.59%, 11.31% and 10.12% in the first, second and third trimesters of pregnancy. However, majority of the studies included in this meta-analysis were conducted in western high-income countries, leaving a gap behind for actual estimates of paternal antenatal depression from the developing countries like Pakistan. However, a recent study conducted in Saudi Arabia estimated the prevalence of paternal antenatal depression to be 26%, and considering the income group of Saudi Arabia, a cultural impact may be a potential factor in affecting mental health of fathers, besides income levels¹³.

The association between paternal age and increased risk of paternal depression among Pakistani men has been reported in earlier studies, which were mostly conducted during the postnatal period, and data on association between paternal age and risk of paternal antenatal depression is scarce^{9, 14}. Our finding of a potential association between advanced paternal ages with antenatal depressive symptoms is consistent with previous research suggesting that older fathers may experience more stress and anxiety related to parenthood due to increased responsibilities for child rearing and concerns about aging¹². These findings highlight the need for mental health interventions targeted at older fathers, which may include counselling services and peer/social support groups to address their specific concerns and challenges during this critical period.

Lower income was another significant risk factor for paternal antenatal depression, suggesting that financial stress may play a critical role in mental health outcomes during the transition to parenthood. This is consistent with existing literature indicating that economic strain can exacerbate mental health problems, as financial instability can increase feelings of inability or anxiety about providing for the family¹⁵. Addressing these financial stressors through support services and financial counseling may help reduce the risk of depression among low-income expectant fathers.

The study also found that sleep problems were a significant predictor of prenatal depression in fathers, consistent with the established relationship between sleep quality and mental health^{9,14}. Expectant fathers may experience sleep disruption due to anxiety, worry about the impending birth, or changes in their partner's sleep patterns during pregnancy. These findings suggested that interventions aimed at improving sleep hygiene and managing stress could be beneficial for reducing depression risk among expectant fathers¹⁶.

Smoking was identified as a significant risk factor for paternal prenatal depression. Smoking works as a mechanism for some people to overcome, but can also show the main problems of stress and mental health. The results are consistent with previous studies linking smoking behavior and depression and highlight the need for an integrated approach that addresses both smoking cessation and mental health of expectant fathers¹³.

We acknowledge certain limitations of this study. Since the sample was collected from urban healthcare settings, therefore, caution is advised for interpreting the results of this study for the general population of Pakistan. Moreover, a small sample size may also limit our ability to generalize the results of this study.

CONCLUSION

Current study provided evidence for the importance of involving fathers in perinatal mental health interventions. Addressing fathers' mental health issues will not only promote fathers' well-being, but will also contribute positively for improving maternal mental health and healthy child development. Future longitudinal studies investigating the development of antenatal depression among men should be conducted and effectiveness of specific interventions designed specifically for expectant fathers should be assessed to ensure that fathers' mental health needs are adequately met during this critical time.

Declaration of Interest: None

Funding: None

Acknowledgements: we would like to acknowledge all the research participants who contributed to this study.

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1.	Javeria Khan	School of Public Health, Dow University of Health Sciences	Conception and design of the study, supervision of the research process, and critical revision of the manuscript for important intellectual content.
2.	Mubasshir Saleem	University of Alberta Hospital, Canada	Data entry, data analysis and interpretation, and drafting the initial manuscript.
3.	Samra Azam	General Practitioner, Karachi	Literature review, assistance in data analysis, and contributed to manuscript writing and formatting.
4.	Samra Azhar	Misericordia Community Hospital, Canada	Methodology, quality assurance, and administrative support throughout the research process.
5.	Maria Atif	School of Public Health, Dow University of Health sciences	Methodology development, results interpretation, final editing of the manuscript, and submission coordination.