

# Depression, sleep quality, and body image disturbances among pregnant women in India: a cross-sectional study

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**Background:** Pregnancy is associated with a number of physical, emotional, and biological changes that can exacerbate maternal psychological disturbances, such as body image concerns and depression. Sleep disturbances during pregnancy can also have adverse impacts. This study aimed to determine the prevalence of depression, sleep disturbances, and body image concerns among pregnant women. The study also examined the relationship between these factors and pregnancy-related variables, such as bad obstetric history and whether the pregnancies were unplanned.

**Methods:** A cross-sectional study of 146 pregnant patients was conducted at a tertiary care center over 15 months. The patients were administered the Beck Depression Inventory, Pittsburgh Sleep Quality Index, and Body Image Concern Inventory questionnaires. Contingency tables, Fisher exact test, and Spearman correlation were used to identify underlying relationships.

**Results:** The prevalence of depression was 22.6%. Although body image disturbance was noted in only 2.7% of patients, 46.6% had poor sleep quality. Poor sleep was associated with primigravida status. Bad obstetric history and unplanned pregnancy were associated with depression. Depression was found to be significantly correlated with body image disturbances and poor sleep quality.

**Conclusion:** Psychiatric disorders were prevalent during pregnancy. This study highlights the importance of screening for depression in pregnant patients. Counselling and caregiver education can be useful for mitigating psychological disturbances. Management of pregnancies by multidisciplinary teams that include psychiatrists could be immensely useful in improving the pregnancy experiences of patients.

**Keywords:** Body image; Depression; Pregnancy; Sleep wake disorders

## Introduction

Pregnancy is a period of extreme physiological stress in the female

body [1]. Besides the hormonal and physical changes that mark each trimester, there is a lot of psychological stress that the woman undergoes in the period leading up to childbirth [2]. The manage-

Received: January 23, 2023 • Revised: March 8, 2023 • Accepted: March 18, 2023 • Published online: May 9, 2023

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ment of disorders in pregnancy becomes greatly challenging because of the added necessity of considering the well-being of the fetus, including drug teratogenicity, while making all therapeutic decisions.

Mood disorders, anxiety disorders, schizophrenia, psychosis, and postpartum blues have all been noted during pregnancy, with the severity of depressive symptoms being a cause for concern [2]. Studies in the Indian setting have reported that the prevalence of maternal depression ranges from 9% to 16% [3,4]. Factors such as abusive and traumatic relationships with a lack of intimate partner support can further exacerbate the risk of antenatal depression [5]. The situation becomes graver when it is considered that antenatal depression not only causes complicated deliveries, including pre-eclampsia, but also leads to premature fetal deliveries, low-birth-weight babies, and alterations in the child's hypothalamic-pituitary-adrenal axis [6-8]. These, in turn, are potent markers of postpartum depression [7].

Although awareness is low even among medical professionals, sleep disorders such as poor sleep quality and insufficient sleep duration are common during pregnancy due to proposed pathophysiological mechanisms including stress system activation, proinflammatory alterations, and the allostatic load hypothesis [9,10]. This predisposition to disordered sleep patterns can result in long-lasting effects in women who are pregnant, with studies indicating that excessive and insufficient sleep quantities are associated with cardiovascular disease and gestational diabetes mellitus [11,12].

Other major concerns during pregnancy are rapidly fluctuating body weight, stretch marks, skin pigmentation, and operative scars, which can greatly affect a woman's perception of herself [13]. Body image concerns can also negatively affect the initiation and maintenance of breastfeeding, which is essential for neonates, necessitating that these concerns must be addressed in a timely fashion [14]. Although previous independent studies have analyzed the importance of these various facets in pregnancy, there is a gap in the available literature on the complex interplay between body image concerns, antenatal depression, sleep disorders, and their impact on pregnancy trimesters, a lacuna that our study aims to address. The primary objective of this study was to determine the prevalence of depression, sleep disturbances, and body image disturbances among pregnant women. The secondary objectives of the study were to identify the underlying associations and correlations between these clinical variables and pregnancy-related variables such as bad obstetric history and whether the pregnancies were planned.

## Methods

**Ethical statements:** Ethical clearance was obtained from the Institutional Ethics Committee of Seth Gordhandas Sunderdas Medical College and King Edward Memorial Hospital before the study commenced (IEC 2 Approval EC/04/2018). Written informed consent was obtained from the patients.

Considering previous studies on antenatal depression in an Indian setting [3,4], which showed a prevalence of antenatal depression ranging between 9% and 16%, the sample size was calculated at a 5% margin of error and 95% confidence level. Based on the universal sampling formula and planned period of data collection for the study (12 months), a sample size of 146 was targeted. Among the patients attending the antenatal outpatient department managed by the Department of Obstetrics and Gynecology in a tertiary care hospital, purposive sampling was employed to recruit patients after discussion with the consultant gynecologist. This was a cross-sectional study requiring no additional commitment on the part of the patient, and all women approached for inclusion agreed to be a part of the study. Women who were pregnant and 18 to 45 years were included. Women with or being treated for any preexisting medical, surgical, or psychiatric illness were excluded from the study to reduce confounding factors.

Written informed consent was obtained from the women, and a semi-structured pro forma was used to document the sociodemographic data of the patients and their ages. Details about their pregnancy, including ongoing trimester, gravida status, whether the pregnancy was planned or unplanned, and bad obstetric history were also noted. The patients were subsequently administered the questionnaires described below. All the women returned fully completed questionnaires and thus, 146 patients were selected for the study.

### 1. Beck Depression Inventory

The Beck Depression Inventory is a self-administered tool used to screen and assess the severity of depression in patients. It has an internal consistency of 0.86, a reliability of 0.93, high sensitivity, and high specificity [15,16]. The scale comprises 21 items, each of which has a list of four statements arranged according to the increasing severity of a particular facet of depression. Individual items are scored from 0 to 3, with a maximum total score of 63. A score of 0 to 10 indicates routine ups and downs and does not suggest depression. Scores between 11 and 16 indicate mild mood disturbance, those between 17 and 20 indicate borderline clinical depression, those between 21 and 30 indicate moderate depression,

and scores higher than 30 suggest a clinical diagnosis of severe depression [17].

## 2. Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index is a self-reported questionnaire that assesses the respondent's sleep quality over the previous month. It includes 19 individual items spread over seven components that measure facets of sleep, including subjective sleep quality, time taken to fall asleep, length of sleep, sleep efficiency measured as the percentage of time in bed that one is asleep, other sleep disturbances, the need for sleeping medications, and any daytime dysfunction. Higher scores are indicative of poorer sleep quality. Items are scored on a scale of 0 to 3, with scores higher than 5 indicating poor sleep [18].

## 3. Body Image Concern Inventory

The Body Image Concern Inventory is a self-reported scale that evaluates a person's attitude about their appearance, any tendencies to camouflage perceived defects, and other behaviors, such as seeking validation and avoidance [19]. It comprises 19 items scored on a scale of 0 to 5, with higher scores indicating higher levels of body image distortion. Clinically, scores higher than 72 are suggestive of high body image concern with a sensitivity of 96% and validity of 82% [20]. The scale has been noted to be internally consistent with its alpha value, supporting homogeneity [21].

## 4. Statistical analysis

The final 3 months of the 15 months study period were used for statistical analysis and interpretation of the study results, including write-up. Statistical analyses were performed using IBM SPSS ver. 24.0 (IBM Corp., Armonk, New York, USA). Continuous variables are expressed as means and standard deviations. The association between depression and variables of pregnancy, such as gravida status, bad obstetric history, and whether the pregnancy was planned, was determined using Fisher exact test. Similar associations were determined for body image and sleep disturbances. Correlations between the assessed clinical variables were determined using Spearman correlation coefficient. A *p*-value of < 0.05 was considered statistically significant.

## Results

The study sample comprised mostly women who were unemployed (58.2%, *n* = 85) (Table 1). Women who were illiterate comprised 21.2% (*n* = 31) of the study population. While most women in our sample were married (79.5%, *n* = 116), only 38.4% (*n* = 56) belonged to joint families. An equal number of primigravi-

da and multigravida made up the study sample, with the ongoing pregnancy being planned in more than half of the cases (58.9%, *n* = 86). Bad obstetric history including abortions and miscarriages was present in 26.0% (*n* = 38) of the women. The mean age of the women in the study sample was 24.60 years (Table 2).

The prevalence of depression was 22.6% (*n* = 33). Another 30.8% (*n* = 45) of the women recorded mild mood disturbances that were not sufficient to meet the diagnosis of 'depression.' Among the 33 women who suffered from depression, 11 (7.5%)

**Table 1.** Sociodemographic characteristics and pregnancy-related variables of the population (*n*=146)

Characteristic	Data
Sociodemographic variable	
Marital status	
Married	116 (79.5)
Unmarried	9 (6.1)
Divorced/separated	21 (14.4)
Educational status	
Illiterate	31 (21.2)
Primary	29 (19.9)
Secondary	33 (22.6)
Higher secondary	31 (21.2)
Graduate and above	22 (15.1)
Occupational status	
Unemployed	85 (58.2)
Unskilled worker	13 (8.9)
Semi-skilled worker	14 (9.6)
Skilled worker	34 (23.3)
Family type	
Joint	56 (38.4)
Nuclear	90 (61.6)
Pregnancy-related variable	
Gravida status	
Primigravida	73 (50.0)
Multigravida	73 (50.0)
Nature of pregnancy	
Planned	86 (58.9)
Unplanned	60 (41.1)
Bad obstetric history	
Present	38 (26.0)
Absent	108 (74.0)

Values are presented as number (%).

**Table 2.** Mean values of the population (*n*=146)

Parameter	Data
Age (yr)	26.40 ± 4.07
BDI score	8.67 ± 14.04
BICI	23.15 ± 10.43
PSQI	5.34 ± 3.44

Values are presented as mean ± standard deviation.

BDI, Beck Depression Inventory; BICI, Body Image Concern Inventory; PSQI, Pittsburgh Sleep Quality Index.

had borderline clinical depression, five (3.4%) had moderate depression, nine (6.2%) had severe depression, and eight (5.5%) were diagnosed with extreme depression. No mood disturbances were noted in 46.6% (n = 68) of the women (Fig. 1).

Nearly half (46.6%, n = 68) of the patients experienced sleep disturbances. This poor sleep quality included insomnia and difficulty in falling and staying asleep with frequent nocturnal awakenings. The sleep disturbances were noted across all trimesters of pregnancy. Only 2.7% of patients (n = 4) had body image disturbances. No significant association was noted between women in specific pregnancy trimesters and psychological disturbances, including depression, poor sleep, and body image distortion (Table 3). Poor sleep was significantly associated (p = 0.03) with primigravida status (Table 4).

While the majority of the women (n = 108) did not have any

previous miscarriages, 26.0% (n = 38) had a bad obstetric history. Bad obstetric history was significantly associated with depression (p < 0.0001). Almost half (41.1%, n = 60) of the pregnancies were unplanned, whereas 86 pregnancies (58.9%) were planned. Unplanned pregnancies were also significantly associated with depression (p < 0.0001) (Table 5). Depression was significantly correlated with the presence of sleep disturbances (p < 0.0001, r = 0.675) and body image disturbances (p = 0.003, r = 0.185) (Table 6).

### Discussion

Almost one-fourth (22.6%) of the pregnant women in our study were diagnosed with depression. This aligns with global studies, where the prevalence of prenatal depression has been found to be

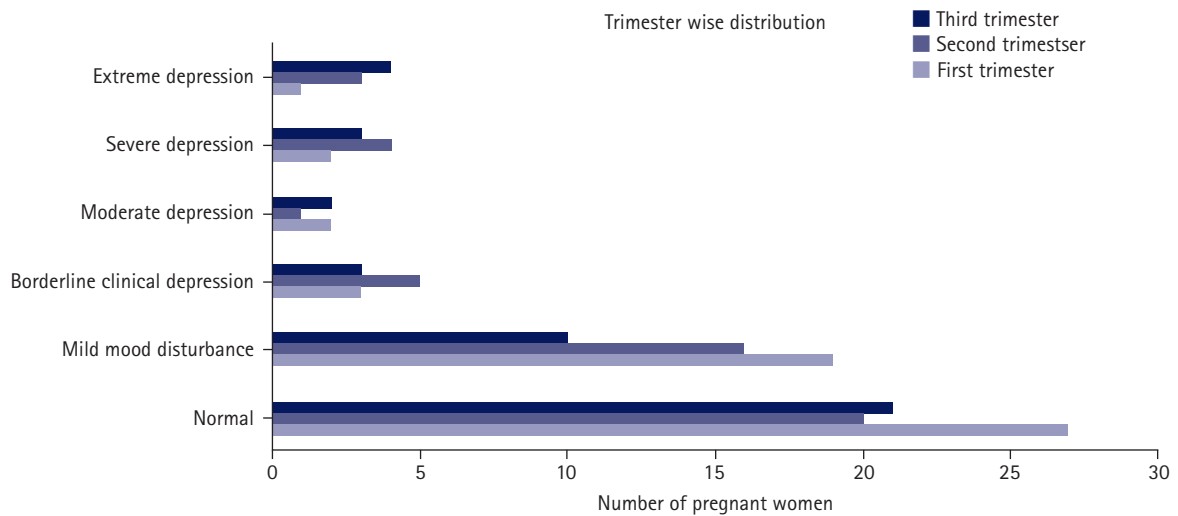


Fig. 1. Prevalence of depression across the trimesters of pregnancy.

Table 3. Distribution of clinical variables based on trimester

Variable	First trimester (n = 49)		Second trimester (n = 49)		Third trimester (n = 48)		p-value <sup>a)</sup>
	Present	Absent	Present	Absent	Present	Absent	
Depression	8 (16.3)	41 (83.7)	13 (26.5)	36 (73.5)	12 (25.0)	36 (75.0)	0.44
Poor sleep	19 (38.8)	30 (61.2)	22 (44.9)	27 (55.1)	27 (56.3)	21 (43.7)	0.22
Body image disturbance	0 (0)	49 (100)	1 (2.0)	48 (98.0)	3 (6.3)	45 (93.7)	0.08

Values are presented as number (%).

<sup>a)</sup>Analyzed by the Freeman-Halton extension of the Fisher exact square test; two-tailed p-value of < 0.05 indicates the statistical significance.

Table 4. Comparison of clinical variables with gravida status

Variable	Primigravida (n = 73)		Multigravida (n = 73)		p-value <sup>a)</sup>
	Present	Absent	Present	Absent	
Depression	13 (17.8)	60 (82.2)	20 (27.4)	53 (72.6)	0.23
Poor sleep	41 (56.2)	32 (43.8)	27 (37.0)	46 (63.0)	0.03*

Values are presented as number (%).

<sup>a)</sup>Analyzed by the Fisher exact square test. \*p < 0.05, statistically significant.

**Table 5.** Association of depression with variables of pregnancy

Variable	No. of subjects	Present	Absent	<i>p</i> -value <sup>a)</sup>
Planned pregnancy				<0.0001*
Yes	86	12 (14.0)	74 (86.0)	
No	60	21 (35.0)	39 (65.0)	
Bad obstetric history				<0.0001*
Yes	38	18 (47.4)	20 (52.6)	
No	108	15 (13.9)	93 (86.1)	

Values are presented as number only or number (%).

<sup>a)</sup>Analyzed by the Fisher exact square test. \**p*<0.05, statistically significant.

**Table 6.** Correlation of depression with other clinical variables

Variable correlated with depression	<i>p</i> -value	<i>r</i> -value
Sleep disturbance	<0.0001*	0.6752
Body image disturbance	0.0025*	0.1854

\**p*<0.05, statistically significant

higher in developing countries. Single-digit prevalence values have been reported in high-income countries [22], in contrast to double-digit prevalence in low-income and low-middle-income countries, which are more likely to be developing countries [23].

Although India is a socially close-knit country [24], a larger number of women were found to live in nuclear families than in joint families, highlighting a shift in household arrangements. With the advent of nuclear families, a couple must now shoulder more responsibilities that were previously distributed among extended family members. This, coupled with the additional demands of pregnancy in the rapidly developing world, naturally results in frequent sleep disturbances. Nearly half of the women in our study (46.6%) reported poor sleep quality.

Only 2.7% of the patients had body image disturbances. This was in contrast to an Asian study where the prevalence of body image disturbances among patients who were pregnant was 34.1% [25]. This can be attributed to the fact that higher social support is observed among Indian families [26]. There is higher acceptance from friends, families, and partners, and this type of perceived social support is helpful in alleviating body image concerns. Higher social support leading to lower levels of body image distress has also been noted in other conditions [27].

The association of these variables (depression, sleep quality, and body image disturbance) with various sociodemographic factors was not found to be significant in our study, indicating that these concerns are not restricted to a specific age group or population subset but rather warrant routine screening among all pregnant patients. Although the literature notes that depression [28], body image disturbances [25], and sleep problems [29] may be associated with age, we did not observe this in our study. Although advanced

maternal age may be associated with higher levels of depression, it can also be hypothesized that women with earlier pregnancies are worried about the impact that childbirth can have on their lives and careers, thus leading to a nonsignificant difference in levels of depression noted between the two groups. In previous studies, although low socioeconomic status was also associated with depression and poor sleep quality [30,31], these findings were not observed in our patients.

In our study, there was no significant association between the pregnancy trimester and psychological disturbances, suggesting the need for monitoring and multidisciplinary management throughout pregnancy to detect and prevent the development of any insidious psychopathology. Primigravida status was significantly associated (*p* = 0.03) with poor sleep quality. Pregnancy, a period of intense changes, has often been associated with anxiety [25]. This anxiety, coupled with stress system activation and proinflammatory alterations previously discussed [9,10], significantly impact sleep quality. It is possible that women who are multiparous, having previously gone through the experience, reported higher scores on the sleep quality questionnaire, as they were accustomed to these changes. Women who are primiparous may consider pregnancy to have a much higher impact on their sleep cycle in terms of increased nocturnal awakening, poor sleep quality, and shorter sleep duration. Overall, this highlights that the management of sleep disorders and poor sleep plays an important role in the well-being of pregnant women. Thus, all women should be screened and treated for sleep disturbances during pregnancy.

Although our study did not show a significant association between parity and depression, previous studies on this topic have generated conflicting results. Certain studies [32] indicated that depression is higher in primigravida while other investigators [33] concluded that multigravida had higher levels of depression. However, our findings were consistent with those of an Italian study [34], which also concluded that depression was not associated with the parity status of the mother. Interestingly, another study noted that husbands of multigravida patients experienced higher levels of perinatal depression [35].

Depression during pregnancy was significantly associated with bad obstetric history (*p* < 0.0001) and unplanned pregnancy (*p* < 0.0001). A systematic review also noted the relationship between bad obstetric history and depression [36]. Studies have also shown that unplanned pregnancies are associated with maternal depressive symptoms [37]. Childbirth can be traumatic in these conditions, and previous unpleasant experiences may push the pregnant mothers to develop depressive symptoms.

In addition, depression was found to be significantly correlated with sleep disturbances (*p* < 0.0001) and body image disturbances



( $p = 0.003$ ). Previous studies have noted that alterations in sleep quality may not only lead to depressive symptoms during pregnancy [38] but may also be responsible for postpartum depression in the few weeks following delivery [39]. Patients who are pregnant and extremely conscious about their physical appearance may experience depressive symptoms due to increased appraisal and self-scrutiny of their bodies [40]. Counseling these patients during pregnancy about the need to adopt healthy coping strategies may be very helpful in reinforcing a positive outlook and overcoming vicious cycles of negative thoughts.

Pregnancy is a life-altering period in a woman's life, and psychiatric counseling for both the patient and her immediate caregivers can play a very important role in alleviating many concerns and fears. Our study highlights the need to screen all pregnant women for depressive symptoms or body image concerns. Early detection of these psychiatric disturbances would ensure prompt management, halting their progression to more severe pathological states that ultimately impact the patient's life and sleep quality. Our study has a few limitations. It was a cross-sectional design, and no causal relationships were established. The classification of depression severity was based on scores obtained from self-reported questionnaires, which inherently have response biases based on the responding individual. There may also be variations in the presentation of psychological symptoms based on the stage of pregnancy; however, our study broadly classified patients based only on their ongoing trimester at the time of their routine visit, without consideration of the month or week of pregnancy. This detail can provide additional insight into the initial and final months; however, this was beyond the scope of the current study. This paper lays the groundwork for the establishment of cross-disciplinary management protocols for pregnancy, and future studies designed with these recommendations in mind will pave the way for the establishment of clearly outlined evidence-based holistic healthcare for pregnant women. Future multicenter interventional studies with larger sample sizes are recommended to collect regular follow-up data.

The pregnant patients commonly had underlying psychiatric disturbances, such as depression and body image disturbances, for which no professional help was made available due to missed diagnoses. Poor sleep quality was significantly associated with primigravida status. Bad obstetric history and unplanned pregnancy were found to be associated with depression. Patients who experienced depressive symptoms were likely to have poor sleep quality and body image concerns during pregnancy. Screening, counseling, and caregiver education could be useful tools to ensure that pregnancy is a better experience for the patients' families. To this end, pregnancies should be managed by multidisciplinary teams

that also include psychiatrists to ensure the provision of holistic care.

## Notes

### Conflicts of interest

No potential conflict of interest relevant to this article was reported.

### Funding

None.

### Author contributions

Conceptualization, Formal analysis, Methodology: KSK, ARA, VBU; Data curation: KSK, VBU; Project administration, Supervision: KSK; Visualization: ARA, VBU; Writing-original draft: ARA, VBU; Writing-review & editing: KSK, ARA, VBU.

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