

## Evaluation of sleep quality and prevalence of depression in pregnant women

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### Abstract

**Objective:** Poor sleep quality and depression during the pregnancy period leads to maternal complications and adverse fetal effects. There are various etiological factors that may cause sleep deprivation and depression during gestation. Our study aims to evaluate sleep quality and prevalence of depression in pregnant women.

**Methods:** This is a Prospective Observational study carried out in pregnant women. Sleep Quality. PSQI and BDI scales were used to assess sleep and depression respectively.

**Results:** In our study there is significant decrease in sleep quality and higher prevalence of depression in pregnancy. A significant correlation existed between sleep deprivation and depression with Trimesters of Pregnancy.

**Conclusion:** There is a need for development of effective methods of detecting and management of depression and sleep quality during pregnancy individualized to each patient.

**Keywords:** Sleep Deprivation; Gestational Diabetes; Maternal Complications; Fetal Adverse Effects; Pittsburgh Sleep Quality Index; Beck Depression Inventory

## 1. Introduction

### 1.1. Sleep

Short Sleep Duration is often defined as sleeping less than seven hours each night. Sleep quality is compromised during pregnancy due to changes in hormone secretion, fetal movement, frequent urination, respiration and cardiovascular functioning compared to general population [1, 2]. Poor sleep quality and sleep disorders are associated with maternal complications and adverse fetal outcomes. Preeclampsia, Gestational hypertension, Gestational Diabetes, Cesarean section, preterm birth is associated with sleep disorders including restless leg syndrome, subjective sleep disordered breathing and obstructive sleep apnea [3-13].

#### 1.1.1. Mechanisms of the cause

Circadian desynchronization, abnormal sympathetic activation due to sleep fragmentation may lead to insulin resistance and diabetes during Pregnancy [14-16]. Oxidative stress, Intermittent hypoxia and inflammatory responses caused by sleep disturbance leads to endothelial injury, atherosclerosis, thrombus formation leading to increased blood

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pressure in pregnant women due to changes in microvascular diameter and cardiac output. Abnormal fetal development, preterm birth is caused if the changes occur in placenta and umbilical cord resulting in hypoperfusion and placental dysfunction. Greater pre-pregnancy BMI, Older age along with sleep disturbance may increase the risks of adverse events in maternal and fetal outcome [17-22].

### 1.2. Depression

Depressive disorder is defined as a period of at least 2 weeks of loss of interest, or pleasure or low mood associated with change in weight, appetite, insomnia or hypersomnia, recurrent thoughts of death, sense of hopelessness, fatigue, any psychomotor symptoms [23,24].

#### 1.2.1. Mechanisms of Cause

Depression is also a major concern during pregnancy which may cause postnatal complications, fetal growth restriction, premature birth, low birth weight, poor compliance with obstetric care, daily functions impairment, increased use of drugs, medication, herbal remedies, alcohol, tobacco, reduced maternal response to the baby. Predictors of depression during the pregnancy may include past history of psychiatric illness, perinatal anxiety, life stressors, low self-esteem, perceived social isolation, physical abuse. Untreated depression causes preterm birth, intrauterine growth retardation, placental hypoperfusion due to release of catecholamines, cortisol promoted by dysregulated hypothalamic-pituitary adrenocortical axis, glucocorticoid receptor gene [25-27]. Our study aims to evaluate sleep quality and prevalence of depression in pregnant women.

## 2. Material and methods

This is a Prospective Observational study carried out in pregnant women from OP departments of various hospitals for 6 months in 2022. The study subjects were included after obtaining verbal informed consent. All 523 Pregnant women were approached for the study, out of which data of 100 subjects each for sleep quality and depression have been screened. PSQI and BDI scales were used to assess sleep and depression respectively. Pittsburgh Sleep Quality Index (PSQI) measures subjective sleep quality which includes 10 questions relating to sleep disturbances, daytime-dysfunction, sleep latency, duration. Beck depression Inventory is a 21-question inventory for measuring the intensity and severity of depression from a psychodynamic perspective using factor analysis. Both the questionnaires were prepared into three local languages along with English for data collection. Subjective sleep quality was assigned into very good, fairly good, fairly bad and very bad. Depression was graded into Normal, Mild, Borderline, Moderate, Severe, and Extreme. Obtained data was analysed using descriptive statistics and a Spearman Correlation was used to correlate trimesters of the pregnancy with sleep and depression and respective R-value for significance using SPSS version 1.0.0.1406.

## 3. Results

The average age of the pregnant women included is 25.75±5.9 years.

### 3.1. Evaluation of Sleep Quality using Pittsburgh Sleep Quality (PSQI)

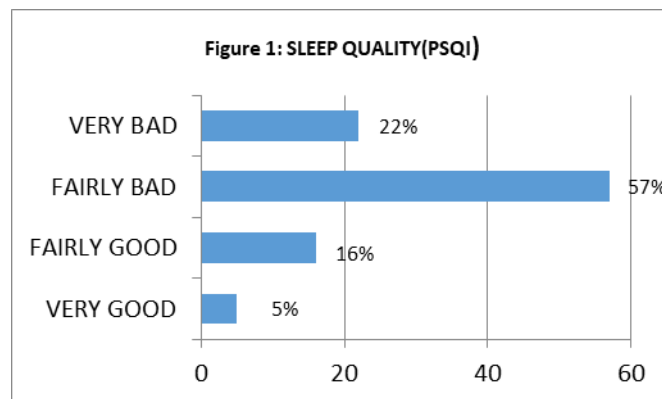


Figure 1 Sleep quality (PSQI)

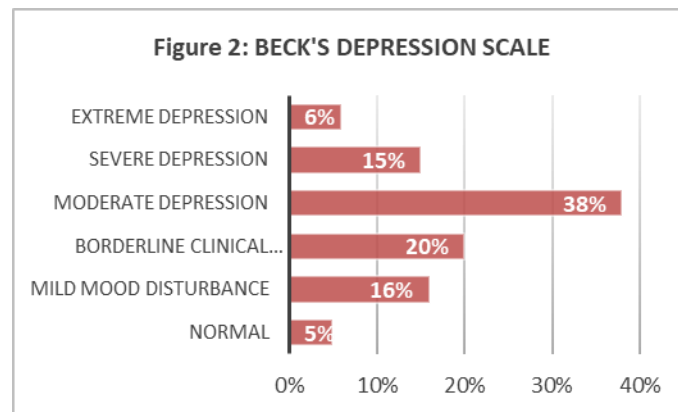
Pittsburgh Sleep Quality assessed in pregnancy revealed that high number of subjects are having Fairly Bad sleep-57%, Very Bad Sleep-22%, Fairly Good Sleep-16% and few subjects reported Very Good Sleep-5% (Figure 1 & Table 1).

**Table 1** Sleep Quality

Sleep Quality	Percentage
Very Good	5%
Fairly Good	16%
Fairly Bad	57%
Very Bad	22%

**3.2. Evaluation of Depression using Beck Depression Inventory (BDI)**

Depression in pregnancy using Beck Depression Inventory estimated that 38% of the subjects were assessed to have Moderate depression, 20% with Borderline clinical depression, 16% with Mild mood disturbance, 15% with severe Depression were as 6% with Extreme depression and 5% are Normal (Figure 2 & Table 2).



**Figure 2** Beck's depression scale

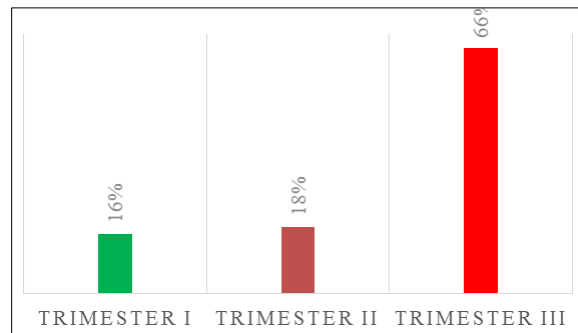
**Table 2** Depression

Depression Intensity	Percentage
Normal	5%
Mild Mood Disturbance	16%
Borderline Clinical Depression	20%
Moderate Depression	38%
Severe Depression	15%
Extreme Depression	6%

**3.3. Correlation of Sleep Quality and Depression with Trimesters of Pregnancy**

*3.3.1. Prevalence of Depression*

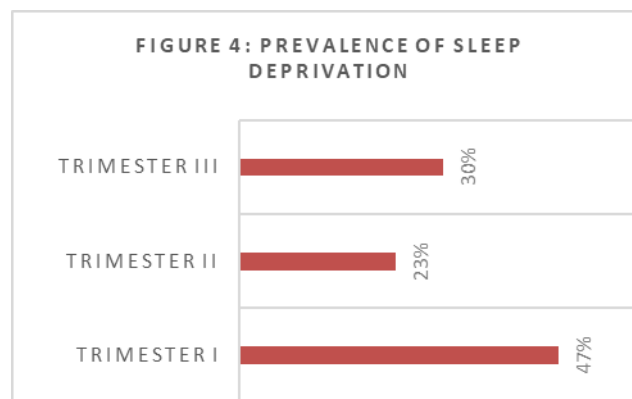
The Prevalence of Depression in Pregnancy in the present study indicates that Higher number of subjects during Trimester III reported depression (66%) when compared to Trimester I and II which was almost equal (16% and 18%) (Figure 3).



**Figure 3** Depression Prevalence

**3.3.2. Sleep Deprivation**

In our study, higher number of Subjects belonging to Trimester III reported sleep deprivation (47%) when compared to Trimester I & II (23% & 30%) (Figure 4).



**Figure 4** Prevalence of sleep depression

**3.3.3. Correlation of Sleep and Depression with Trimesters of Pregnancy**

Correlation Coefficient of Sleep and Depression in Pregnancy in relation to Trimester is High-0.62 in Trimester I, Medium-0.59 in Trimester II and Very high-0.84 in Trimester III (Table 3).

**Table 3** Spearman Correlation and Significance

Pregnancy	Sleep	Depression	R-Value
Trimester I	23%	16%	0.62
Trimester II	30%	18%	0.59
Trimester III	47%	66%	0.84

**4. Discussion**

In our study there is significant decrease in sleep quality and higher prevalence of depression in pregnancy. A study concluded that there is increased prevalence of poor sleep quality, decreases sleep efficiency and deep sleep due to increased symptoms of sleep disordered breathing, restless leg syndrome [28].

Inferences of a research showed significantly decreased sleep quality associated with depression and anxiety [29]. Another study indicated a relation between poor sleep quality and antenatal stress, postnatal depression [30]. Menstrual transitions, pregnancy, menopause precipitate sleep continuity disturbance and the extent of interference with pregnancy related complications needs to be determined reports a study [31].

The findings of a study found significant association between sleep disturbance and maternal complications and adverse fetal outcomes. Preeclampsia, gestational hypertension, gestational diabetes mellitus, cesarean section, still birth, preterm birth was identified [32]. Sleep characteristics are to be considered during pregnancy care due risk of gestational diabetes due to poor quality sleep [33].

The lowest dose of medication is to be used to achieve euthymic mood to avoid maternal depression associated adverse outcomes [34]. Various risk factors for anxiety, depression, stress during gestation is low to moderate social support, no suggestion from husband and parents, unemployment, smoking, physical inactivity which needs to be intervened and supported [35].

Antidepressants exposure during pregnancy may have possibility of abnormal motor development in children, congenital cardiac manifestations, miscarriage, PTB, PPHN which limit their usage. Optimal treatment course with individualized treatment decisions involving partner, multispecialty clinicians monitoring both pregnant women and fetal development may currently work in relapsing women but mostly tapered and discontinued increasing the non-pharmacological strategies [36].

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## 5. Conclusion

Sleep and depression have high prevalence during gestation. Both pharmacologically treated and untreated sleep and depression have potential adverse effects to mother and fetus. There is a need of improvement in screening, identification of sleep and depression during pregnancy care visits with effective clinical services. Non-pharmacological strategies are to be individualized involving mother, husband, family members and social support as well, which decrease the reproductive success interference.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors of this manuscript declare no conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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