THE ASSOCIATION BETWEEN SLEEP DISORDERS AND PREGNANCY OUTCOME IN A PUBLIC TERTIARY HOSPITAL

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Abstract

BACKGROUND: Sleep is commonly disturbed in pregnancy; evidence has shown that sleep disorders through an inflammatory response mechanism may result in chronic diseases and adverse pregnancy outcomes.

OBJECTIVE: To explore relationships between sleep disorders and pregnancy outcomes.

METHODS: A prospective study of pregnant nulliparous women attending the antenatal clinic was conducted. Participants sleep experience in early pregnancy [12 – 20weeks] and again in late pregnancy [28 to 36 weeks gestation] were explored using a questionnaire that assessed information on patterns of sleep disorders during pregnancy, sociodemographic and clinical characteristics of the patients. The participants were followed up throughout pregnancy and information on pregnancy and delivery outcome were retrieved from the patient's medical records. The relationship between sleep disorder and adverse pregnancy outcome was then tested using a nested case control design comparing pregnancy outcome of those with sleep disorder and those without sleep disorder in the cohort.

RESULT: The prevalence of sleep disorder was 32%(48/150). The categories of sleep disorders experienced were insomnia 72(48%), sleep breathing disorder 23(15.3%), excessive daytime sleep 68(45.3%), mild sleepiness 125 (83.3%) and significant specific awakenings 42(28%). Overall, 28.7%(43/150) respondents had adverse pregnancy outcome. Majority of

study participants had hypertensive disorder in pregnancy (14%) as the most common problem in pregnancy. Analysis of the association between sleep disorder and the occurrence of adverse pregnancy outcome showed no significant difference amongst those that developed problems in pregnancy and those that didn't (15 v 33; p=0.0631

CONCLUSION: Although sleep is significantly disturbed in pregnancy, a significant association between sleep disorder and occurrence of adverse pregnancy outcome was not demonstrated.

Key Words: sleep, sleep disorder, pregnancy, antenatal care, hypertension

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Introduction

Sleep is an active physiologic process in which general homeostatic balance and metabolism is maintained as well as tissue restoration and memory consolidation. [1-2]. Sleep is often disturbed in pregnancy. An increasing body of literature has reported sleep disorders to be prevalent in pregnancy [3-6]. Sleep disorders are typically classified as: dyssomnias (insomnia), hypersomnia (disorders of excessive sleepiness) and parasomnias (abnormal behaviors during sleep including sleep breathing disorders and specific awakenings).[7-8]

Disturbed sleep have been associated with increased inflammatory response and this relationship is linked with poor health outcomes.[9-10]. Associated adverse pregnancy outcomes of sleep disorders include; pregnancy induced hypertension, gestational diabetes, preterm labour and intrauterine growth restriction[11-14] . Franklin et al. [15] reported that pregnant women who snore, a common symptom of sleep breathing disorders, had increased rates of hypertension, pre-eclampsia, intra-uterine growth restriction and lower neonatal Apgar scores. Previous studies also observed that women with preeclampsia have poorer sleep quality and continuity compared to women without preeclampsia, whereas shorter sleep duration in late pregnancy is associated with prolonged labour and increased cesarean section rates [16,17].

Sleep disturbances are frequent complaints in pregnancy, yet often dismissed as irrelevant. We previously reported a 35% prevalence of Sleep disorders in pregnancy[6]; Consequent on this relatively high prevalence we sought to determine if sleep disorders in pregnancy could represent potential adverse effects on maternal and fetal health.

Methodology

This was a prospective study conducted over a 2 year period (July 2013 to June 2015). The study population comprised a cohort of [150] pregnant nulliparous women attending the antenatal clinic of the Obstetrics Department of the University of Benin Teaching Hospital, Benin city Nigeria. Participants were recruited in the third trimester of pregnancy by convienience sampling and each pregnant woman was asked to complete a self-administered questionnaire after the study and its aims were explained and informed consent obtained. Approval for the study was obtained from the Hospitals' Ethical Research Committee. Women with multiple pregnancy and coexisting medical conditions like hypertension, diabetes, cardiac disease and asthma were excluded.

The questionnaire assessed information on patterns of sleep disorders during pregnancy, sociodemographic and clinical characteristics of the patients. The questionnaire reviewed participants sleep experience in early pregnany [12 – 20weeks] and again in late pregnancy [28 to 36 weeks gestation]. The patients were followed up throughout pregnancy and finally information on pregnancy and delivery outcome were retrieved from the patient's medical records. The relationship between sleep disorder and adverse pregnancy outcome was then tested in this cohort using a nested case control design comparing pregnancy outcome of those with sleep disorder and those without sleep disorder in the cohort.

The dependent variables for sleep disorders were insomnia, excessive daytime sleepiness (EDS), sleep breathing disorders(SBD), mild sleepiness(MS), and specific awakenings(SAW).[6]

Insomnia was considered when the pregnant woman informed of having difficulty in initiating sleep, or difficulty to get back to sleep in case they woke up in the middle of the night.

EDS when they feel asleep suddenly during some activity or in inappropriate places or occasions (i.e.: bus, church, classroom, driving).

SBD, was determined when she informed to snore or was aware of stopping breathing when sleeping.

MS when they informed to feel sleepier during the day or that they have been taking naps.

SAW was classified as those associated to the baby movements, dreams or nightmares related to pregnancy, periodic leg movements, abdominal contractions and heartburn

For cumulative analysis a participant was adjudged to have sleep disorder/disturbance if two or more of the aforementioned variables exist.

Pregnancy outcome variables included medical conditions in pregnancy (like hypertensive disorders, diabetes mellitus), intrauterine growth restriction (IUGR), preterm or prelabour rupture of membranes (PROM), preterm labour/birth, antepartum haemorrhage. For analysis occurrence of one or more of these pregnancy variables was termed adverse pregnancy outcome

Other variables were labour outcome(spontaneous or induced labour, vaginal delivery or caesarean section) and fetal outcome (gender, birth weight and APGAR scores(birth asphyxia).

Statistical analysis was performed using the Statistical Packages of Social Sciences for Windows (SPSS version 20.0; SPSS IBM.Corp, Armonk, NY). Data are presented as number (percentage) or mean (+ SD). Statistical significance was set at $p < 0.05$. The continuous variables were analysed using Student's t test and analysis of variance (ANOVA), and the categorical data were analysed using chi square test.

Results

The age of respondents ranged from 20 to 41 with a mean age of 29.5 ± 0.35. They were all nulliparas and married. Fifty-nine (39.3%) booked in the first trimester, 85(56.7%) in the second trimester and 6(4.0%) booked in the third trimester.

The prevalence of sleep disorder was 32%(48/150). The categories of sleep disorders experienced were insomnia 72(48%), sleep breathing disorder 23(15.3%), excessive daytime sleep 68(45.3%), mild sleepiness 125 (83.3%) and significant specific awakenings 42(28%); see table 1.

Table 1: prevalence of sleep disorder and the various types

Variable	N(150)	%
Sleep disorder		
Yes	48	32
No	102	68
Specific type		
Insomnia	72	48
SBD	23	15.3
EDS	68	45.3
MS	125	18.3
SAW	42	22.8

Overall 43 respondents (28.7%) had adverse pregnancy outcome. Majority of study participants had hypertensive disorder in pregnancy (14%) as the most common problem in pregnancy, others were intrauterine growth restriction(4.7%), prom/pprom(4%), preterm delivery(2.7%), antepartum haemorrhage(2%), diabetes mellitus(0.7%).

In table 2, analysis of the association between sleep disorder and the occurrence of adverse pregnancy outcome showed no significant difference amongst those that developed problems in pregnancy and those that didn't (15 v 33; p=0.0631). Further analysis also showed no significant association between specific types of sleep disturbance with occurrence of adverse pregnancy outcome.(table 3) Sub-analysis of hypertensive disorders in pregnancy with the specific types of sleep disorders showed no statistically significant difference.

Table 2: Association of sleep disorder and adverse pregnancy outcome

Adverse pregnancy outcome	**yes**	**no**	**P value**
Sleep disorder			
yes	15	33	0.631
No	28	74	

Table 3: Association between specific types of sleep disturbance and adverse pregnancy outcome

Adverse pregnancy outcome	Yes	no	P value
Insomnia	22	50	0.625
SBD	8	15	0.481
EDS	16	52	0.205
MS	38	87	0.294
SAW	12	30	0.987

In table 4, analysis of association of specific pregnancy variables (viz: type of labour, mode of delivery, gender, birth weight, apgar scores/birth asphyxia) with sleep disorders showed no statistically significant difference in outcome amongst those with and without sleep disorder.

Table 4: association between sleep disorder and pregnancy outcome variables

	Sleep disorder		
Pregnancy outcome	Yes	no	P value
Labour			
Sapl	29	66	
IOL	11	28	0.225
Mode of delivery			
Svd	31	74	
Elcs	9	10	
Emcs	8	18	0.305
Gender			
Male	26	40	
Female	22	62	0.085
Birth asphyxia			
None	45	96	
Mild	2	5	
Moderate	1	1	0.845
Birth weight (mean±SD)	3.3±0.7	3.4±0.4	0.349

Discussion

Sleep is significantly disturbed in pregnancy; a 32% prevalence of sleep disorder observed in this study lends credence to this assertion. However this study could not demonstrate any significant association between sleep disorder and occurrence of adverse pregnancy outcome.

Adverse pregnancy conditions as hypertension, diabetes, preterm delivery, growth restriction, neonatal asphyxia and others are significant contributors to maternal and perinatal morbidity and mortality. The need to make pregnancy safer has influenced the search for newer risk factors to

identify women at greatest risk of developing an adverse outcome in pregnancy. A growing body of literature identified sleep disturbance as one of the emerging contributors to poor health outcomes in pregnancy. Types of sleep disorders observed in this study viz insomnia, sleep breathing disorder, mild sleepiness, excessive daytime sleepiness and specific awakenings were in keeping with previous documentation. Disturbed sleep is linked to adverse pregnancy outcome and chronic disease via a pathway of increased inflammatory response. Other proposed underlying mechanisms include altered uteroplacental blood flow, increased levels of oxidative stress, proinflammatory cytokines, increased sympathetic activation, peripheral vasoconstriction, and endothelial dysfunction (24,25).

Although we observed that specific sleep disturbances like insomnia and mild sleepiness were associated more with poor pregnancy outcome these findings were not significantly different from those without sleep disorders. Our results were in discordance with studies that associated unfavorable pregnancy outcomes, including intrauterine growth restriction, preterm delivery and SCBU admissions of the newborns to sleep disorders[13,14,22,24]. Some researchers have linked specific sleep disorders like poor sleep quality, sleep breathing disorders(snoring) and short sleep duration to increased rates of caesarean section, prolonged labour, hypertension, intra-uterine growth restriction and birth asphyxia.[16,17]. In this study specific type of sleep disorders like insomnia, sleep breathing disorder, mild sleepiness, excessive daytime sleepiness and specific awakenings did not significantly influence any of the identified pregnancy and labour outcome.

The study cohort being a nulliparous population had hypertensive disorders in pregnancy as the commonest adverse pregnancy outcome. This is in line with previous literature, additionally various works have identified sleep disturbance in pregnancy as a significant contributor to development of hypertension in pregnancy. This study could not demonstrate a significant independent association between sleep disorders and pregnancy induced hypertension. Researchers have also reported associations of sleep disturbances and increased diabetes risk in nonpregnant populations in addition to documentation of association between sleep disturbances during pregnancy and abnormal glucose tolerance
(14–16,22).

It is pertinent to note that the findings from this study are limited owing to the small sample size of the population surveyed. The need for a larger multicenter study is emphasized. In addition further studies are needed to illustrate the impact of sleep disorders on specific pregnancy conditions and outcomes and to explore the potential benefits of optimizing sleep quality during pregnancy as a tool for improving pregnancy outcome

In conclusion sleep disorder is common in pregnancy but not significantly associated with adverse pregnancy outcome.

Conflict of interest: There is none

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