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Evaluation of Sleep Quality in Third Trimester of Pregnancy and Its Relation to Birth Characteristics in Women Referred to Gynecology Clinic of Tamin Ejtemaee Hospital of Zahedan

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ABSTRACT

Introduction: Pregnancy has special conditions that can affect sleep pattern. About 2/3 of pregnant women have abnormal sleep pattern which can cause disorders during pregnancy and after delivery for the mother and fetus. This study aimed to evaluate the quality and disorders of sleep in the last trimester of pregnancy and women referred to gynecology clinic of Tamin Ejtemaee Hospital of Zahedan city.

Materials and Methods: In this cross-sectional study, 400 pregnant women (28-40 of pregnancy) referred to the Tamin Ejtemaee Hospital in the spring and summer of 1395, were selected randomly and studied. Data were collected from demographic questionnaire and Pittsburgh Sleep Quality Index (PSQI) and by the continuous sampling method and were analyzed by using descriptive and inferential statistical tests.

Findings: The findings demonstrated that the daily sleep average was 8.7 ± 1.7 hours per week. The highest amount of sleep was among student pregnant women (10 hours) and the lowest amount of sleep was among employee pregnant women (8.3 ± 0.9 hours per day). The percentage of sleep disorders in self-employed and worker mothers was more than mothers which had other jobs but it was not significant. Also, there was no significant difference between the variables of education level, income, weight before pregnancy, mother body mass index, delivery type

and sleep disorders. Besides, a significant relation between sleep disorders of the pregnant mother and birth weight of infant was observed and the percentage of low birth weight in mothers which have sleep disorders in the last 3 months, was higher ($p = 0.00$).

Result: Due to the high prevalence of sleep disorders in pregnant women, the need for sleep hygiene in fertility and safe strategies to improve sleep quality in pregnant women is emphasized.

Key words: Sleep Quality, Third Trimester, Pregnancy, Birth Characteristics

INTRODUCTION

Pregnancy is one of the most important periods in a woman's life [1]. Significant changes happen in hormonal level during pregnancy, which affects the function of different systems of mothers [2]. Hormonal changes not only directly affect sleep-wake cycle and sleeping structure, but it also causes certain physical and mental changes that may lead to sleep disorder [2, 3]. Getting comfortable and enough sleep is one of the main pillars of human health [1].

The first trimester is commonly associated with increased daytime sleepiness, as well as total sleep time [4]. Rising hormone levels during this period may partially account for these changes. Progesterone is known to exert soporific effects [5]. And administration of exogenous progesterone has been shown to reduce time to sleep onset and modify sleep architecture, such that more time is spent in non-rapid eye movement sleep [6].

Other changes, such as organogenesis, place an additional burden on maternal energy stores and increasing in sleep time may reflect a potential mechanism to conserve energy. Nausea, vomiting, frequent urination [7] and insomnia [8] may further disrupt sleep increasing the likelihood of daytime somnolence. During the second trimester, sleep architecture is modified such that less time is spent in stage 3 and 4 non-rapid eye movement sleep and there is a concomitant decrease in rapid eye movement sleep [4]. Nocturia accounts for the majority of nighttime awakenings during the second trimester. Compression of the bladder, as a result of increasing uterine size, means more frequent urination [9]. Other factors such as heartburn and increasing fetal movements may further fragment sleep. By the third trimester, physical changes cause significant discomfort and can impair the ability to fall asleep, as well as maintain sleep. Backache and itching are common complaints during advanced gestation and the shortest sleep durations are commonly reported during the final trimester, despite more time spent in bed [10].

In a recent poll from the National Sleep Foundation, over 79% of women reported that their sleep was different during pregnancy than at any other time; however, no distinction was made as to which aspect of sleep the women were describing [11]. Empirical studies suggest that up to 25% of pregnant women report significant sleep disturbance in the first trimester, with rates climbing to nearly 75% by the third trimester [4, 10]. While it is accepted that sleep progressively worsens across the gestational period [10-13].

By causing changes in the immune system such as changes in the level of cytokine and C-reactive protein, sleep disorder can be associated with undesirable consequences [14] such as anxiety, reduced tolerance against pain, premature delivery, low birth weight, blood pressure disorders, disorder in glucose tolerance and depression during and after pregnancy [15-18]. Moreover, loss of mental peace derived from insomnia leads to anxiety and fear of taking care of the baby and accepting motherhood in the families [19].

Accordingly, it is very important to maintain the physical and mental health of pregnant women in prenatal care. Given the importance of proper sleep for the mother and the fetus, in pregnancy care it is normal to observe pregnant women complain about the poor quality of their sleep. While the quality and quantity of sleep is especially important in this period. It is hoped that this research is a step toward attracting the attention of the health system to finding and implementing effective strategies for this disorder with the goal of improving sleep quality in women. To fulfill this goal, we decided to check the quality of sleep as well as the related risk factors in the third trimester of pregnancy.

MATERIALS AND METHODS

This study is a cross-sectional study carried out in Zahedan in the spring and summer of 2016. The research population included women with gestational age of 28-40 weeks, who referred to Tamin Ejtemai Hospital in Zahedan to have routine follow-ups during pregnancy. The inclusion criteria included not having chronic diseases such as diabetes, hypertension, and heart and kidney disease. They were addicts, and they did not use drugs, folic acid, and iron supplements during pregnancy. A sample size was determined by sample size formula in order to estimate the proportion of a trait in the community, using the results of previous studies [20] and based on the $0.05 = \alpha$ and $P = 0.89$. Finally, the sample size was determined 400.

There are several methods for measuring sleep duration. Objective assessments include polysomnography (PSG) and wrist actigraphy. PSG is considered the “gold standard,” providing measures of both sleep and wake time, along with the classification of sleep stages [21]. However, PSG evaluations are labor and cost intensive, often requiring participants to sleep in a laboratory.

In epidemiological studies, the most common method of assessing the amount of sleep in pregnant women is Pittsburgh Sleep Quality Index (PSQI Instrument), which uses a number of questions and surveys on sleep time and sleep disorders [22]. This questionnaire included 9 questions, in seven different dimensions. Each dimension rate ranges between 0 and 3, where 3 show the minimum in Likert scale. The sensitivity of the instrument is 89% and the specificity is 86.5% [23]. The reliability of the questionnaire was estimated (0.73) by calculating Cronbach's alpha coefficient [24]. In Iran, Hossein Abadi, et al (1387), estimated the reliability (0.88 = r) and reliability of the questionnaire via retest ($r = 0.84$) [25]. This instrument is also useful for assessing the quality of sleep during pregnancy [24].

After completing the questionnaires, the pregnant women were divided into 4 groups based on sleep disorder intensity: The first group included women with severe sleep disorders; the second group consisted of women with moderate sleep disorders; the third group included women with mild sleep disorders, and the fourth group had women with no sleep disorders. Due to the low number of people who did not have sleep disorders, mild disorder group merged with the group without the disorder. This group was titled as no disorder group. The group with moderate disorder was merged with the first group. This group was considered as disorder group.

In order to gather the data, the researcher referred to Social Security Clinic every day between 8 and 12 in the morning. After obtaining the pregnant mothers' consent, who met the study inclusion criteria, an information form sheet (consisting of two parts, the first part addresses demographic and anthropometric information before pregnancy, and the second part was the Petersburg's sleep questionnaire) was used to measure the amount of daily sleep and sleep disorders. Anthropometric data of newborn infants were gathered by trained experts, using standard methods. The height of the babies was estimated in lying position and by a graded board used for measuring baby height. The babies' weight was measured by floating scales with an accuracy of 10^{-2} kg, and head circumference was also measured by conventional tape measure. The data were entered into SPSS version 18, and

analyzed. The descriptive statistics, independent t-test and Pearson correlation test were used. The significant level was considered 0.5 .

Findings

The mean age of study subjects was 6.8 ± 30.07 years. Illiterate subjects were 22 patients (5.5%); 113 (28.3%) had finished guidance school; 133 patients (33.3%) had diploma, and 132 (33%) had university education. 332 patients (83%) were housewives; 52 patients (13%) were employees; 10 (2.5%) were self-employed, and 6 patients (1.5%) of the mothers were college students. The mean total sleep of the mothers was 1.7 ± 8.7 hours per day. College students had the most hours of sleep (10 hours), and the lowest was in employed mothers (0.9 ± 8.3). The relationship between total sleep hours and job was not significant in this study. Table 1 shows some physical complaints that waked the pregnant women during nights.

The results showed that the mean age of the disorder group was 6.8 ± 29.88 . The means age in the group with no disorder was 6.6 ± 29.97 years, which was not statistically significant. The percentage of sleep disorder in worker and self-employed mothers were more than other jobs, yet it was not significant. There was no significant difference between education level, income, pre-pregnancy weight and body mass index, and sleep disorders. From the 400 subjects in this study, two patients (0.5%) did not have any sleep disorder; 272 patients (68%) had mild sleep disorder; 94 (23.5%) had moderate sleep disorder, and 32 patients (8%) have severe sleep disorder. In this study, a significant relationship was observed between sleep disorder of pregnant mother and birth weight of the babies. The percentage of babies born with low weight was higher in mothers who had sleep disorder during the last 3 months of their pregnancy (Table 3).

Table-1: Frequency of physical complaints regarding sleep disorders by pregnant women who referred to gynecology clinic in Zahedan

Physical complaint	Frequency
Frequent urination	272 (68%)
Feeling heat	236 (59%)
Thirst	201 (50.1%)
Shortness of breath	199 (49.7%)
Digestive problems	170 (42.5)
Noise	49 (12.2%)
Nausea and vomiting	40 (10%)

Frequency of physical complaints regarding sleep disorders by pregnant women have shown in table (1).

Table-2: Distribution of absolute and relative frequency of pregnant women based on the mode of delivery in groups with and without sleep disorders

<div>Mode of delivery</div> <div>Group</div>	Cesarean delivery		Non-cesarean delivery		Total	
	Number	Percentage	Number	Percentage		
Without disorder	103	37.5	171	62.4	274	100
With disorder	55	43.6	71	56.3	126	100
Chi-square test result	NS					

Chi-square test revealed that there was no significant difference between mode of delivery and sleep disorders (Table 2).

Table 3: Comparison of the mean and standard deviation of anthropometric indexes of mothers and infants in groups with and without sleep disorders, who referred to gynecology clinic in Zahedan

Anthropometric indices		Pregnant woman with sleep disorder	Pregnant women without sleep disorders	Total	P-value
Age and anthropometric indicators of mothers	Age (years)	29.97±6.6	29.88±6.8	29.91±6.7	0.63
	Pre-pregnancy weight (kg)	62.8±10.9	62.80±11.3	62.88±11.1	0.65
	Pre-pregnancy body mass index (kilograms per square meter)	23.32±3.9	23.14±3.5	23.20±3.6	0.09
Anthropometric indices at the beginning of birth	Weight (kg)	3.02±0.6	3.06±0.3	3.05±0.4	0.000
	Height (cm)	49.11±2.2	49.82±2.05	49.60±2.1	0.42
	Head circumference (cm)	34.12±1.3	34.30±1.30	34.27±1.3	0.69

Independent sample t-test:

In this study, a significant relationship was observed between sleep disorder of pregnant mother and birth weight of the babies. The percentage of babies born with low weight was higher in mothers who had sleep disorder during the last 3 months of their pregnancy (Table 3).

DISCUSSION

This study aimed to investigate sleep quality and factors that influence it in pregnant women in third trimester. The mean sleep time in these women was 8.7 ± 1.7 hours, and 126 (31%) suffered from sleep disorders. Waking caused by frequent urination (68%) and feeling heat (59%) were respectively the most frequent physical complaints.

Sleep often becomes increasingly disturbed as pregnancy progresses, characterized by more restless sleep, frequent nocturnal awakenings, and a decline in total sleep time that promotes intractable fatigue and sleepiness [4,22]. Thus, pregnant women may be more prone to misreport actual time spent sleeping. Data in fact reveal that those individuals with disturbed sleep (e.g., patients with insomnia) have little agreement between objective and subjective reports of total sleep time [26].

In a study by Sharon (2013), sleep duration reported by Pittsburgh questionnaire (PSQ1) was more than the actual amount of sleep each night, thus the study did not objectively report sleep [27].

It was found that 15% of the mothers snored (2 nights or more per one week) in this study. The prevalence of habitual snoring among pregnant women has been estimated to be between 11.9% and 49% in the third trimester in cross-sectional studies [28-30]. Some studies indicate that sleep disorder increases with age [1, 31]. Jahdi et al. showed that the relationship between maternal age and sleep disorder and quality was not significant. However, Taskran's study showed a significant relationship between age and sleep disorders of the research unit [32], which is not in agreement with our findings. This can be due to the bigger size of our sample.

Bandad et al. found that physical symptoms such as frequent urination and back pain were the most common causes of sleep disorder in the third quarter of pregnancy [3]. Frequent urination and feeling heat were the two most frequent cause of waking at night in the pregnant women in this study. In our study, no significant relationship was observed between sleep disorder and mode of delivery, and sleep disorder had no effect on increase of cesarean operation incidence. In a study by Lee et al, it was found that sleep disorder increases the risk of cesarean 5 times [33]. However, two studies by Ivan and Amir Ali Akbari showed a significant relationship between mode of delivery and sleep disorders [34-35], which is consistent with our study.

A study by Basan et al. proved that birth weight had no significant relationship with disorders and poor quality of sleep [36]. However, in this study, a significant relationship was observed between sleep disorder of pregnant mother and birth weight of the babies during the third 3 months of pregnancy ($p < 0.00$). The percentage of babies born with low birth weight (less than 2,700 grams) was higher in women who suffered from sleep disorders, which is in line with the results of Michelli, [37] and Owusu [38]. Networks are Medias which apply toward teaching of courses, and for improvement of educational performances of students [39]. One objective of educational planner is to assess the learner specific issues, successful education and assurance of physical and intellectual health [35]. Patients, their families and significant others are important for collaborating with physicians, health care providers, health educators [40]. One of the possible causes is inflammatory reactions involved in sleep disorder, which can affect pregnancy outcomes. It is recommended that inflammatory reactions be considered in future studies.

CONCLUSION

Given the high prevalence of sleep disorder during pregnancy and its negative effects on the health of the mother and the unborn children, it is necessary to investigate and diagnose sleep disorders in prenatal care for all pregnant women. It is hoped that this research is a step towards attracting the attention of health professionals to this issue. Providing early instruction and training manuals to all pregnant women in order to reduce common complaints during pregnancy could prevent sleep disorder and its unpleasant physical and mental consequences. Giving guidance and providing care are also two other important factors.

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