REVIEW ARTICLE

IMPORTANCE OF SLEEP IN PREGNANCY: THE NEGLECTED IMPORTANT FACTOR

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ABSTRACT:
Pregnancy is a time of great change in a woman's life. Likewise, sleep is altered and may not return to pre-pregnancy quality for several years after the birth of the child. Some sleep disturbances are a harbinger of sleep disorders. If they are not recognized and treated, there can be significant negative effects for the patient and her unborn child. Sleep apnea syndrome occurs in about 4% of women, and the obese pregnant woman should be screened for snoring severity, nocturnal awakening, and daytime fatigue. Longitudinal studies are required to fully evaluate the effect of sleep deprivation on maternal and foetal outcome. Better methods to measure sleep disturbances in pregnancy are required along with evaluation of the underlying cause so that appropriate and effect treatment can be administered.
Keywords: Pregnancy, Sleep, Mechanism, Treatment.

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This article may be cited as: Bhadarka N, Mistri S. Importance of Sleep in Pregnancy: The Neglected Important Factor. J Adv Med Dent Scie Res 2015;3(4):74-78.

INTRODUCTION

On average, one third of a person's life is spent asleep. Sleep is vital, allowing the body to rest, replenish resources in the brain and body, and consolidate new information. Since the 1960s, sleep duration has declined, complaints about sleep problems have almost doubled and many individuals report poor sleep quality or consistently insufficient sleep at night. For example, approximately 30% of the Australian population report sleeping for less than 6.5 hours per night.[1] Partial sleep deprivation (consistent short sleep) in humans is associated with hypertension, impairment of glucose control, weight gain, reduced concentration, irritability and depression. The various consequences become apparent at different stages of partial sleep deprivation, with reduced cognitive performance and poor mood appearing after just one night of less than 5 hours of sleep. Further, untreated sleep disturbance is known to lead to depression while depression can also precipitate sleep disturbance.[2] It is currently unclear whether disturbances to sleep most often precede mood disturbance or whether depression typically precedes sleep disturbance. There is consistent evidence to indicate that irrespective of the order of onset, sleep disturbance and depression are highly associated.

There are many factors that can influence an individual's sleep pattern and quantity and quality of sleep. These factors can be cultural, social, psychological, behavioural, pathophysiological and environmental. Sleep patterns can also be influenced by society and by changes within society. In recent times we have seen the introduction of longer working hours, more shift-work and 24-7 availability of commodities. At the same time secular trends of curtailed duration of sleep to fewer hours per day across westernized populations (Akerstedt & Nilsson 2003) has led to increased reporting of fatigue, tiredness and excessive daytime sleepiness (Bliwise, 1996).[3] It is of interest that whilst some studies indicate that women may have better sleep than men in general (Lindberg et al, 1997; Goel et al, 2005), they also report a larger difference in the estimated time of sleep that they

believe they require and the actual sleep time they achieve than men. This might indicate that their sleep debt (amount of sleep deprivation) is higher in women than in men (Lindberg et al, 1997).[4]

Pregnancy is a time when you need to pay particular attention to your health. During pregnancy, the mother's body changes rapidly. Any health issues may impact on the development and growth of the baby. Most people know that you need a balanced diet and enough exercise, but having enough sleep is vital as well. Many pregnant women feel tired. This is most common in the first few months of pregnancy and again towards the end of pregnancy. This means that women will often need to spend more time resting or sleeping.[4]

By their third trimester of pregnancy, 97% of women report sleep disturbance. Sleep can be altered during pregnancy due to several reasons, including mechanical and hormonal. The importance of quality sleep and the negative impact of sleep disturbances in pregnancy are under-recognized by both patients and physicians. This is in part due to limited literature on this topic. The true incidence of sleep disorders in pregnancy is not known; however, due to growing awareness of the importance of sleep and sleep disorders in pregnancy, "Pregnancy Associated Sleep Disorders" is now recognized as a distinct clinical entity in the international classification of sleep disorders.[5]

REASON FOR LESS SLEEP IN PREGNANCY

Emotional states are frequent and important during pregnancy, being defined by organic changes, by the expectation created due to the new condition as mother, by the fear of professional life changes as consequence of maternity and by the apprehension connected to the new roles that she will be performing in the familiar context.[6] About 2/3 of the pregnant women consider their sleep pattern abnormal and the complaints are connected to the anatomical and physiological changes associated with pregnancy and the size of the uterus.

It gets harder to find a comfortable position during sleep and the pressure caused by the size of the fetus increases the number of bathroom visits during the night. Expectation concerning the childbirth, the baby and others fears during this period can potentialize anxiety. During normal pregnancy, symptoms in multi gravidas and primi gravidas were studied, and the five more significant ones were: frequent urination, fatigue, pelvic pressure, insomnia and back pain, and they have appeared more frequently than mentioned in obstetric texts. The third trimester of pregnancy is associated to the great number of symptoms that disappear after childbirth, mainly maintenance insomnia.[7]

SNORING AND PREGNANCY:

Changes in breathing physiology during pregnancy due to hormonal and mechanical factors, predispose the woman to sleep-breathing disorders and any condition that causes maternal hypoxemia will affect sleep negatively, particularly the supine position in the final period of pregnancy. Snoring by the end of pregnancy is associated with hypertension, clinical condition related to the reduction of fetal growth and low birth weight.8 However, the subject "sleep-pregnancy" remains unfamiliar, polisomnographic studies or specific clinical evaluations are limited over this period and, pre natal physicians not aware of sleep disorders may not provide pregnant women appropriate care to the presence of such occurrences in each trimester of pregnancy.

Small population survey studies have revealed a more than 4-6 times increase in the incidence of snoring inpregnancy (14%-23%) as compared to nonpregnantwomen (4%). The true incidence is suspected to be higher as women tend to under-report snoring. In special circumstances the incidence is much higher and the relevance more important. Edwards et al documented 100% incidence of upper airway flow limitation in preeclamptic women. They also reported an increase in blood pressure during sleep (nondippers), which improved with nasal continuous positive airway pressure (CPAP).[9] Douglas et al used acoustic reflection to measure upper airway dimensions and documented that pre-eclamptic women had upper airway narrowing in both upright and supine position, characteristics that are consistently seen in obstructive sleep apnea sufferers.[10]

ADVERSE SLEEP CHANGES IN PREGNANCY

Due to the lack of good longitudinal studies there is still little information on what constitutes normal sleep quality and quantity both during pregnancy and in the period following delivery. In a recent study however Signal et al quantified the change and variability in sleep duration and quality across pregnancy and post-partum in 8 healthy nulliparous and 11 healthy multiparous women (Signal et al, 2007).[3] The women wore an actigraph and

completed a sleep diary for seven nights during the second trimester, one week prior to delivery, and at one and six weeks post-partum. They observed that compared to multiparous women, nulliparous women generally had less efficient sleep, spent more time in bed and had greater wake after sleep onset in the second trimester, and spent less time in bed and had fewer sleep episodes a day at one week post-partum. The largest change in sleep however occurred during the first week after delivery with the women obtaining 1.5h less sleep than during pregnancy.[11]

SLEEP DISORDERS IN PREGNANCY

Sleep-Disordered breathing (SDB) is the term used to describe a group of disorders which are characterized by abnormalities of respiratory pattern (pauses in breathing) or thequantity of ventilation during sleep. A recent study evaluated the frequency of sleep disordered breathing in women with gestational hypertension compared to healthy women with uncomplicated pregnancies. They observed that women with gestational hypertension may have a significantly higher frequency of sleep disordered breathing than do healthy women with uncomplicated pregnancies of similar gestational age. The frequencies of sleep disordered breathing in the more obese gestational hypertension group and the healthy group were 53% and 12% ($p<0.001$) (Reid et al, 2011).[12]

Obstructive sleep apnoea (OSA) is the most common of these sleep disorders and is characterized by the complete or partial collapse of the pharyngeal airway during sleep. To resume ventilation, feedback mechanisms arouse the individual, which leads to sleep disruption. OSA is associated with an increased CVD risk. Although, men are twice as likely to develop OSA as women, the risk is increased in women if they are overweight. Moreover, data from recent studies indicates that snoring and OSA increase during pregnancy. The prevalence of OSA is very low in normotensive women low-risk pregnancies but is increased among normotensive pregnant women with high risk pregnancies and, in those with gestational hypertension (pregnancy-induced hypertension (PIH)/pre-eclampsia) during pregnancy, the prevalence is even higher.[3]

Insomnia is a sleep disorder which is characterised by a difficulty in initiating or maintaining sleep in combination with adverse daytime consequences. The daytime effects may include excessive fatigue, impairment of performance or emotional changes. Data from self-reported questionnaires suggests that sleep complaints are more frequent in pregnancy and that sleep disturbances increases as the pregnancy progresses.13 In a recent study of 300 women (100 women in each trimester of pregnancy) it was observed that there was a significant increase in insomnia in the 2nd trimester, excessive daytime sleepiness (EDS) was also increased in pregnancy and the rate for specific awakenings increased by 63% in the first trimester, by 80% in the second trimester and by 84% in the third trimester ($p<0.001$) (Lopes et al, 2004).[3]

SLEEP DISTURBANCES AND ADVERSE MATERNAL AND FOETAL OUTCOMES

In Western societies adverse pregnancy outcomes have been on the increase and in the United States over 1 million pregnancies are associated with adverse outcomes including increased maternal and infant morbidity. The current known risk factors however are insufficient for early detection of at risk individuals and attention has focused on sleep as an emerging new risk factor (Okun et al, 2009).14 A recent prospective cohort study of low-risk pregnant women suggested that there may be no differences in sleep parameters between pregnancies with adverse outcome and without adverse outcome (Naud et al, 2010).15 Other studies however have indicated that sleep deprivation in pregnancy may be associated with adverse maternal outcomes including gestational hypertension, pre-eclampsia and diabetes and difficulties with labour and delivery, depression and adverse effects on the foetus. Data suggests that women who snore or suffer from obstructive sleep apnea during pregnancy are more likely to suffer from gestational hypertension and pre-eclampsia. There is evidence to suggest that sleep deprivation during pregnancy increases the risk of preterm delivery and postpartum depression, and that systematic inflammation may be an important underlying mechanism in the association.

MECHANISMS

Sleep disturbances may affect maternal and foetal morbidity and mortality through a number of potential mechanisms. For example, increased nocturia (due to decreased bladder capacity and increased overnight sodium excretion) disrupts sleep. Gastrooesophageal reflux also leads to

awakening and disruption of sleep; first due to a relaxed lower oesophageal sphincter (progesterone working as a muscle relaxant); and then due to pressure on the stomach and reduced gastric emptying (Bourjeily & Rosene-Montella, 2009).[16] Restless legs, leg cramps and increasing frequency of contractions all also contribute to disturbed sleep (Bourjeily & Rosene-Montella, 2009). Furthermore, sleep disordered breathing can be magnified or occur in pregnancy as a result of poor sleep and decreased functional reserve capacity, increased weight from gestation and pregnancy related nasopharyngeal oedema (Izci-Balserak, 2008; Pien & Schwab, 2004).[17] Sleep is not a passive state but is an active process in which memory consolidation, tissue restoration, metabolic and haemostatic processes occur (Adam,1980; Alvarez & Ayas, 2004; Ancoli-Israel, 2006; Benca & Quintas, 1997 as cited in Okun, 2011). Sleep disturbances are known to have effects on oxidation, glucose metabolism and the sympathetic nervous system and there is strong evidence to support an association with cardiovascular outcomes (Cappuccio et al, 2011b).

DIAGNOSIS AND MANAGEMENT OF SLEEP DISORDERS IN PREGNANCY

There are many different ways in which sleep data can be collected, the gold standard, however, is to measure sleep using polysomnography (PSG) as this provides an objective assessment of the sleep-wake cycle over the entire sleep period (Baker et al, 1999).18 Much of the data regarding sleep in pregnancy is limited to self-administered questionnaires and to diaries: very few recent studies have used PSG. However, it is recognised that undertaking multiple sleep studies at different time points during pregnancy is difficult. Despite this there is evidence to suggest that sleep disorders in pregnancy can in certain individuals have adverse outcomes for the mother or baby and therefore it would be useful to develop a screening tool that could be administered quickly by health professionals during routinepregnancy consultations. A simple and cost-effective alternative to PSG is to use actigraphy and sleep diaries. There are now many wrist-watch style actigraphs available. They are activated by movement and can differentiate when a person is awake or asleep, many also now have light monitors incorporated in them as well. They are useful in identifying night time awakenings and for determining their subsequent duration. When used in conjunction with self-recorded sleep diaries, actigraphs can help to establish a very detailed sleep pattern. Questionnaires administered to a bed partner can also help to establish a diagnosis of sleepdisordered breathing. OSA is a common but often unrecognised condition in women of childbearing age. The likelihood is increased however in women with a past or current history of polycystic ovary syndrome, depression, hypertension, diabetes, hypothyroidism, metabolic syndrome, obesity (Champagne et al, 2010).19 The diagnostic test of choice would be a PSG, and referral to a sleep specialist to confirm and treat primary sleep disorders may be required. Further research is also required to establish if the management thresholds for treatment of OSA in non-pregnant women are applicable to pregnant women.

CONCLUSION

There is a high association between disturbed (poor quality) sleep and depression, which has lead to a consensus that there is a bidirectional relationship between sleep and mood. One time in a woman's life when sleep is commonly disturbed is during pregnancy and following childbirth. It has been suggested that sleep disturbance is another factor that may contribute to the propensity for women to become depressed in the postpartum period compared to other periods in their life. Post Natal Depression (PND) is common (15.5%) and associated with sleep disturbance, A lack of sleep is known to affect both our physical and mental health. The few studies that have investigated sleep in pregnancy have found both an increase in total sleep time and an increase in daytime sleepiness in the first trimester whereas the third trimester appears to be associated with a decrease in sleep time and an increase in the number of awakenings. Sleep has an important impact on maternal and foetal health. It has been associated with an increased duration and pain perception in labour, with a higher rate of caesarean delivery and with preterm labour. Longitudinal studies arerequired to fully evaluate the effect of sleep deprivation on maternal and foetal outcome. Better methods to measure sleep disturbances in pregnancy are required along with evaluation of the underlying cause so that appropriate and effect treatment can be administered.

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