

Sleep Quality among Expectant Mothers in Health Clinics in Malaysia

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ABSTRACT

Objective: This study aimed to determine the prevalence of poor sleep quality among expectant mothers.

Design: A cross-sectional study was conducted on 451 pregnant women from two urban health clinics in Bangi, Malaysia.

Materials and Methods: Sleep quality was assessed by self-administered Pittsburgh Sleep Quality Index (PSQI) questionnaire that has been translated to Malay language and validated.

Results: Poor sleep quality was found in 56.3% of the respondent (mean PSQI score = 6.41 (SD 2.85), ranging from 0 - 18). Three out of seven sleep components were affected with sleep disturbance being the most affected followed by sleep latency and subjective sleep quality.

Conclusion: Poor sleep quality was prevalent among our expectant mothers. It portrays that healthcare practitioners should not disregard any complaints pertaining to sleep problem and sleep hygiene advice should be incorporated in the antenatal care to improve their sleep quality in order to prevent any adverse outcomes.

KEY WORDS

expectant mothers, poor sleep quality, pregnancy, sleep disturbance

INTRODUCTION

Sleep quality is defined as one's satisfaction of the sleep experience, integrating aspects of sleep initiation, sleep maintenance, sleep quantity and refreshment upon awakening. Pregnancy is often associated with significant anatomical, physiological and biochemical changes. This might affect the expectant mothers physically and emotionally by marked sleep changes and sleep disturbance. Sleep disturbances are a recognised problem in pregnancy, and American Sleep Disorder Association had created 'pregnancy associated sleep disorder' in its 2001 guideline^{1,2)}. National Sleep Foundation in 2007 highlighted that 84% of pregnant women experienced sleep problems as compared to non-pregnant women³⁾.

Previous studies had established high prevalence range from 50% to 80% of sleep disturbance in pregnancy^{4,5)}. Lack of sleep quality in pregnancy has direct link with numerous negative impacts to the mother, foetus and labour process. Earlier studies demonstrated strong and consistent association between poor sleep quality with gestational diabetes, gestational hypertension, increase rate of caesarean section and vacuum delivery^{6,7)}. Wu *et al.* (2014)⁸⁾ reported that poor sleep quality occurring in the third trimester was significantly associated with the occurrence of post-partum depression. Interestingly, several researchers also found that poor sleep in pregnancy had significant impact on perception of

pain in either post-normal vaginal delivery or caesarean section^{9,10)}.

Many sleep disorders occurring during pregnancy are related to various physical and hormonal changes. Pregnant mothers at third trimester had poorer sleep quality than in second trimester¹¹⁻¹³⁾. Poor sleep in third trimester was thought to be related to physical changes in which uterine and foetal size increases causing abdominal discomfort, back pain, trouble in comfort sleeping position as well as increase in frequency of urination. Pregnant women were reported to experience later sleep onset, longer sleep latency and reduced total sleep time and sleep efficiency¹⁴⁾. They were also found to have poor overall sleep quality with increased sleep latency, difficulty falling asleep, frequent awakenings per night and too early awakening in late pregnancy¹⁵⁾. Studies had also reported the mean sleep duration in pregnancy is shorter among pregnant compared to non-pregnant women and as pregnancy progressed^{5,11,16)}.

Poor sleep among expectant mothers were also reported to have significant risk to the foetus including risk of preterm birth, low birth weight and intrauterine growth restriction^{6,17)}. Warland *et al.* (2018)¹⁸⁾ in their recent meta-analysis review showed that sleep problems in pregnancy causes unwanted effects to the foetus including altered growth, gestational length and even death.

Sleep is an essential aspect to maintain general health of pregnant mothers. Evidence has revealed high prevalence of sleep disturbance and tremendous negative consequences among pregnant mothers. This poses a great concern among healthcare providers in maternal health discipline. Studies about the sleep quality were largely conducted in

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Table 1: Sociodemographic and obstetric profiles of participants (n = 451)

Variables	n (%)	Mean (SD)
Age (year)		29.60 (4.71)
Ethnicity		
Malay	425 (94.2)	
Chinese	10 (2.2)	
Indian	7 (1.6)	
Others	9 (2.0)	
Educational level		
Primary	7 (1.6)	
Secondary	122 (27.1)	
Tertiary	322 (71.4)	
Marital status		
Married	450 (99.8)	
Single/divorced	1 (0.2)	
Employment status		
Employed	293 (65.1)	
Non-employed	157 (34.9)	
Type of working hours		
Office	250 (55.6)	
Shift	30 (6.7)	
Flexible	13 (2.9)	
Period of gestation		24.12 (8.99)
First trimester (< 13 weeks)	68 (15.1)	
Second trimester (13 – 27 weeks)	193 (42.8)	
Third trimester (> 28 weeks)	190 (42.1)	
Parity		
Primigravida (G1)	170 (37.7)	
Multipara (G2 – G4)	242 (53.7)	
Grand-multipara (> G5)	39 (8.6)	
Presence of co-morbidities		
Yes	91 (20.2)	
No	360 (79.8)	
History of smoking		
Yes	5 (1.1)	
No	446 (98.9)	
Caffeine intake		
Yes	281 (62.3)	
No	170 (37.7)	

China, Taiwan, Korea, Turkey, Iran and United Kingdom. To date, in Malaysia, there is limited local data on the prevalence of poor sleep quality among pregnant mothers.

This study therefore set out to determine the prevalence of poor sleep quality among pregnant mothers and their sleep characteristic during their pregnancy. The study will be one of the first local initiative to explore on sleep quality in pregnancy and hopefully it will become the framework for the healthcare providers to look at sleep problem as a unneglectable issue in pregnancy. Sleep problem should deserve an equal attention in order to identify the pregnant women at risk and early intervention to prevent all unfavourable outcomes.

MATERIALS AND METHODS

Participants

This cross-sectional study was carried out in two urban government health clinics in Bangi, Selangor between July till August 2018. All expectant mothers attending the health clinics for routine antenatal follow up during the data collection who gave consent to participate were included in this study. Mothers with underlying psychiatric illness were excluded. Sample size was calculated using a single population propor-

Table 2: Sleep characteristics among expectant mothers (n = 451)

Sleep component	Mean score (SD)
Component scores (0 – 3 possible)	
Subjective sleep quality	1.12 (0.57)
Sleep latency	1.43 (0.87)
Sleep duration	0.83 (0.99)
Habitual sleep efficiency	0.00 (1.00)*
Sleep disturbances	1.57 (0.60)
Use of sleep medication	0.00 (0.00)*
Daytime dysfunction	0.92 (0.62)

*Data presented as median (IQR)

Table 3: Reasons of sleep disturbance among expectant mothers (n = 451)

Items	Mean score (SD)
Have to get up to use the bathroom	2.21 (0.96)
Wake up in the middle of the night or early morning	2.16 (0.93)
Feel too hot	1.67 (1.11)
Have pain	0.91 (0.99)
Cannot breathe comfortably	0.89 (1.03)
Feel too cold	0.70 (0.96)
Had bad dreams	0.61 (0.88)
Cough or snore loudly	0.60 (0.96)

Each item was rated as follows: 0 = not during the past month, 1 = less than once a week, 2 = once or twice a week, 3 = three or more times a week.

tion, assuming a design effect of two and non-response rate of 20%. By using Kish L formula, with proportion of 52.2%, accepted confidence interval of 0.05 and including 20% drop-out rate, the calculated sample size was 459⁽²⁾.

Research tools

Participants who fulfilled the criteria and consented to this study were given a self-administered questionnaire which consisted of two parts, the sociodemographic particulars and the Pittsburgh Sleep Quality Index (PSQI). Participants required around 10 minutes to complete the questionnaire.

The PSQI is one of the validated self-administered questionnaires to measure the usual sleep habit during the previous one month. It consists of 19 self-rated items with a Likert scale from 0 to 3. Each item was rated as 0 = not during the past month, 1 = less than once a week, 2 = once or twice a week, and 3 = three or more times a week. For question number 9, it was rated as 0 = very good, 1 = fairly good, 2 = fairly bad, and 3 = very bad. Seven sleep components were generated from this questionnaire which include subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Component with score 0 = no difficulty, 1 = mild difficulty, 2 = moderate difficulty, and 3 = severe difficulty. The cumulative score of all components contribute to global PSQI score which ranging from 0 to 21 and score > 5 is categorized as having poor sleep quality⁽⁹⁾.

The Cronbach's alpha of the English version and Malay version of PSQI was 0.83 and 0.74, respectively. The internal consistency of the Malay version, which was translated by Mapi Research Trust was assessed through a pilot study done in 2018 among 27 participants at nearby health clinic⁽²⁰⁾. Permission to use the PSQI was obtained from the author (Professor Buysse) and the copyright holders (Mapi Research Trust and Quality Metric).

Data collection

A total of 464 pregnant women who attended Klinik Kesihatan Bandar Seri Putra and Bandar Baru Bangi for antenatal check-up were approached. One subject was excluded from the study in view of having psychiatric illness. The participants that fulfilled the inclusion criteria (n = 463) were given the patient information sheets and consent was

obtained. However, only 451 questionnaires were completed and returned.

Data was collected approximately 1 month after Eidul Fitri celebration to eliminate any possible sources of bias during the month of Ramadhan. Within this month, most Muslim participants may likely to experience some sleep changes, as they need to get up early for pre-dawn meal or perform prayers in the middle of night.

Ethical approval

This study protocol was approved by the Ethics committee of the Universiti Kebangsaan Malaysia (UKM) (approval number: FF-2016-384) and the National Medical Research Register of Malaysia (NMRR) (approval number: NMRR-16-1448-31782). Permission was also obtained from the local Health District Office and respective Family Medicine Specialists of the participating health clinics.

Statistical analysis

Descriptive analysis of all variables was done and presented as number (n) and percentage (%), mean and standard deviation (SD) for normally distributed data, or median and interquartile range (IQR) for data that is not normally distributed. Statistical analysis was performed using SPSS/Win software (Version 22, SPSS, Inc., Chicago, IL, USA). The limit of significance was set at 0.05.

RESULTS

Participant characteristics

Four hundred and sixty-three pregnant women participated in the study with a response rate of 97.2%. The characteristics of the study participants were as shown in Table 1. The responders age ranged between 17 and 40 years with mean age of 29.60 years (SD 4.71). Majority of the participants were Malays, married, employed and received tertiary level of education. Among those who were employed, mostly work during office hours. Most of the participant were non-pri-migravida and the mean gestational age was 24.12 weeks (SD 8.99). Over 20.2% of participants had associated co-morbidities including diabetes mellitus, hypertension, anaemia and obesity. Majority were non-smokers and none of them were smoked during their current pregnancy. Most of them took caffeine during pregnancy.

Descriptive statistics of Malay Version of the Pittsburgh Sleep Quality Index – PSQI

About 56.3% of participants reported to experience poor sleep quality with mean global PSQI score of 6.41 (SD 2.85). Sleep characteristics (seven components as listed in the PSQI questionnaire) among the study participants are as shown in Table 2. This table illustrates the mean score for each of the seven component of sleep quality. Each component with score of greater than one reflects disturbed sleep¹⁹. The main three components affecting the participants were sleep disturbance, followed by sleep latency and overall sleep quality.

Table 3 depicts various reasons link to sleep disturbance among our participants in which they reported more frequency to get up to use the bathroom and wake up in the middle of the night or early morning. They experienced these 1 to 3 times per week.

DISCUSSION

Our study found that poor sleep quality is vastly common among the expectant mothers, similar to those observed in the earlier studies. This was comparable with other cross-sectional studies in which the prevalence of poor sleep quality among pregnant mothers were up to 73% as compared to 24 to 48% in non-pregnant women^{5,16,21}.

More than half of the participants had poor sleep quality with mean PSQI score of 6.41 (SD 2.85). This result is comparable with other previous studies by Tsai *et al.* (2011)¹⁴ and Kizilirmak *et al.* (2012)¹², which revealed the prevalence of poor sleep quality in pregnant mothers which was 50% and 52%, respectively. On the other hand, Tsai *et al.* (2011)¹⁴ assessed sleep quality using both objective and subjective mea-

surement using wrist actigraphy and PSQI. It was a prospective study that involved smaller sample size with only 30 nulliparous women. Another study with similar design, but using PSQI among 400 pregnant women had prevalence of poor sleep quality of 65%²².

In study by Ko *et al.* (2012)⁴, higher prevalence, 80.7% was concluded. The differences in the reported prevalence may be due to different instruments employed for assessment of the sleep quality and the differences in the sociocultural background of the study subjects. This study uses Epworth Sleepiness Scale (EPS), Women's Health Initiative Insomnia Rating scale (WHIIRS) and Berlin Questionnaire in addition to PSQI tool to assess the participant's sleep quality. Ko *et al.* (2012)⁴ included women in their post-partum period and with underlying psychiatry illness in his study. Whereas, in this study participants were only among expectant mothers without underlying psychiatry illness. Overall women experienced poor sleep during pregnancy and this data shed light on the frequency of sleep deficiency among local pregnant mothers.

Further evaluation of sleep characteristics among the participants revealed that three main sleep components were affected including sleep disturbance followed by sleep latency and subjective sleep quality. These results appeared to be consistent with another cross-sectional study among 400 Taiwanese pregnant women using similar PSQI tool, however, there was another additional component in the Taiwanese study was affected which was daytime dysfunction²³.

A comparative study of sleep quality between pregnant and non-pregnant Taiwanese women reported that pregnant women experienced worse global sleep quality and sleep disturbance similar with our finding except sleep efficiency was also noted to be affected especially in the third trimester⁵.

Similarly, a cohort study involving 78 healthy pregnant women in Finland using both objective and subjective sleep assessment, found that poor overall sleep quality and sleep latency increased in late pregnancy¹⁵.

Among the various reasons reported by our study participants for sleep disturbance were increasing frequency to get up to use the bathroom and waking up in the middle of the night or early morning. These findings were comparable with earlier studies^{5,15,22}. Pregnant women woke up from sleep mainly due to urinary frequency especially during the first and third trimester^{5,23,24}.

The findings of this study were limited by using self-reported questionnaires. Self-reported measurements can overestimate the number of women classified as poor sleeper. We do not have yet assess to objective measures of sleep quality for research purposes such as polysomnography which is often considered as 'gold standard' for examining sleep. Majority of the participants were among Malay ethnicity which does not represents multi-ethnicity in this country, however, it is representative of the attendees in the two health clinics in Bangi area. One of the questions in the PSQI tool is on the usage of sleeping pill in which in our local culture, pregnant women rarely use sleeping pill during pregnancy as they are worried of the adverse effect. Therefore, this might impact on the overall global PSQI score.

Presently, this is the first local data on sleep quality in pregnancy which contribute to the strength of this study. Most of the study findings were comparable with other studies in both Asian and Western countries. This could be the groundwork for future endeavour assessing sleep in pregnancy among our local population.

Future prospective study is recommended to improve the strength of the study and revealed several changes that could occur over the course of pregnancy. Sleep assessment should include both objective and subjective measurement tools to produce more accurate data. Future work is recommended to explore other contributing factors of sleep quality in pregnancy as well as adverse outcomes to mother and foetus.

It is also recommended for all healthcare practitioner to screen for sleep problem to all pregnant mothers as poor sleep is highly prevalent in pregnancy. Apart from early detection, general advice on good sleep hygiene practices is essential to prevent poor sleep and the possible adverse outcome to mother and foetus. Sleep hygiene practices includes limiting daytime nap to 30 minutes, avoiding stimulants such as caffeine and nicotine close to bedtime, exercising during daytime as little as 10 minutes of walking to promote good quality sleep, not eating heavy meal close to bedtime, establishing regular relaxing bedtime routine and making sure that the sleep environment is conducive.

CONCLUSION

In conclusion, this study has shown that pregnant women in Malaysia do experience poor sleep quality in which the sleep compo-

nents affected were sleep disturbance, sleep latency and subjective sleep quality. The findings of this study may offer insight for healthcare providers to be more aware of the importance of good sleep quality and sleep complaint among pregnant mothers. Screening of this problem should be done routinely during antenatal care visit especially to those who are at high risk. In general, all pregnant women should be advised on good sleep hygiene practices while other proposed intervention to help with sleep problem in pregnancy such as acupuncture and massaging are still not clinically proven or safe.

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REFERENCES

- Zihan Y. *A Study on Factors Affecting Sleep during Pregnancy in Clinical Trials*. Vol 1167: Arts & Sciences Electronic Theses and Dissertations; 2017.
- American Academy of Sleep Medicine. *International classification of sleep disorders, revised: Diagnostic and coding manual*. Chicago, Illinois: American Academy of Sleep Medicine; 2001.
- National Sleep Foundation. *2007 Sleep in America Poll Summary of Findings*. Washington 2007.
- Ko H, Shin J, Kim MY, *et al*. Sleep disturbances in Korean pregnant and postpartum women. *J Psychosom Obstet Gynaecol*. 2012; 33: 85-90.
- Ko SH, Chang SC, Chen CH. A comparative study of sleep quality between pregnant and nonpregnant Taiwanese women. *J Nurs Scholarsh*. 2010; 42: 23-30.
- Reutrakul S, Zaidi N, Wroblewski K, *et al*. Sleep disturbances and their relationship to glucose tolerance in pregnancy. *Diabetes Care*. 2011; 34: 2454-2457.
- Sharma SK, Nehra A, Sinha S, *et al*. Sleep disorders in pregnancy and their association with pregnancy outcomes: a prospective observational study. *Sleep Breath*. 2016; 20: 87-93.
- Wu M, Li X, Feng B, *et al*. Correlation Between Sleep Quality of Third-Trimester Pregnancy and Postpartum Depression. *Med Sci Monit*. 2014; 20: 2740-2745.
- Beebe KR, Lee KA. Sleep disturbance in late pregnancy and early labor. *J Perinat Neonatal Nurs*. 2007; 23: 103-108.
- Orbach-Zinger S, Fireman S, Ben-Haroush A, *et al*. Preoperative sleep quality predicts postoperative pain after planned caesarean delivery. *Eur J Pain*. 2017; 21: 787-794.
- Facco FL, Kramer J, Ho KH, *et al*. Sleep disturbances in pregnancy. *Obstet Gynecol*. 2010; 115: 77-83.
- Orbach-Zinger S, Fireman S, Kartal B. Insomnia in pregnancy and factors related to insomnia. *ScientificWorldJournal*. 2012; 2012: 197093.
- Naud K, Ouellet A, Brown C, *et al*. Is sleep disturbed in pregnancy? *J Obstet Gynaecol Can*. 2010; 32: 28-34.
- Tsai SY, Kuo LT, Lai YH, *et al*. Factors associated with sleep quality in pregnant women: a prospective observational study. *Nurs Res*. 2011; 60: 405-412.
- Polo-Kantola P, Aukia L, Karlsson H, *et al*. Sleep quality during pregnancy: associations with depressive and anxiety symptoms. *Acta Obstetrica et Gynecologica Scandinavica*. 2017; 96: 198-206.
- Chirwa S, Nwabuisi CR, Ladson GM, *et al*. Poor Sleep Quality Is Associated with Higher Hemoglobin A1c in Pregnant Women: A Pilot Observational Study. *Int J Environ Res Public Health*. 2018; 15.
- Okun ML, Schetter CD, Glynn LM. Poor sleep quality is associated with preterm birth. *Sleep*. 2011; 34: 1493-1498.
- Warland J, Dorrian J, Morrison JL, *et al*. Maternal sleep during pregnancy and poor fetal outcomes: A scoping review of the literature with meta-analysis. *Sleep Med Rev*. 2018; 41: 197-219.
- Buysse DJ, Reynolds CF, 3rd, Monk TH, *et al*. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989; 28: 193-213.
- Syed Mohamad SN. Nocturnal Leg Cramps Among Expectant Mothers Attending Klinik Kesihatan Batu 9, and its association with Sleep Quality and Quality of Life, Universiti Kebangsaan Malaysia; 2015.
- Sut HK, Ascii O, Topac N. Sleep Quality and Health-Related Quality of Life in Pregnancy. *J Perinat Neonatal Nurs*. 2016; 34: 302-309.
- Hung HM, Tsai PS, Ko SH, *et al*. Patterns and predictors of sleep quality in Taiwanese pregnant women. *MCN Am J Matern Child Nurs*. 2013; 38: 95-101.
- Lee KA. Alterations in sleep during pregnancy and postpartum: a review of 30 years of research. *Sleep Med Rev*. 1998; 2: 231-242.
- Foxcroft KF, Callaway LK, Byrne NM, *et al*. Development and validation of a pregnancy symptoms inventory. *BMC Pregnancy Childbirth*. 2013; 13: 3.