The Prevalence of Snoring in Thai Pregnant women

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Objective: *To determine the prevalence of snoring in Thai, pregnant women.*
Material and Method: *This study was carried out from April 2008 through August 2008 at the antenatal clinic, HRH Princess Maha Chakri Sirindhorn Medical Center, Nakorn Nayok province. Two hundred and thirty-eight pregnant women were enrolled. All subjects answered the Berlin questionnaire; this include information on age, weight, height, gravid health status, gestational age, witnessed incidences of snoring, and symptoms associated with sleep apnea. The description of snoring as frequency, volume, complaints from other people and bouts of sleep apnea were recorded and analyzed.*
Results: *The prevalence of snoring in pregnancy was 35.29%. The snoring volume, recorded as slightly louder than breathing, in this group was 91.67%. One-fourth of the cases presented with snoring approximately 3-4 times a week with complaints of snoring bothering other people. The incidence of sleep apnea was found in 5.95% of this group.*
Conclusion: *The prevalence of snoring was found in approximately one-third of the pregnant women screened.*

Keywords: *Pregnancy, Prevalence of snoring*

J Med Assoc Thai 2010; 93 (Suppl. 2): S102-105
Full text. e-Journal: *http://www.mat.or.th/journal*

Many physiological changes in the respiratory system occur during pregnancy, with a 20% reduction in functional residual capacity (FRC) of respiration, resulting from elevation of the diaphragm to accommodate the enlarging uterus[1,2]. This reduction is significant during sleep because it affects the decrease of FRC associated with sleep itself and increases airway closure that can result in increasing a ventilation/perfusion mismatch[1]. This effect is exacerbated in the supine position. However, compensating for these changes is a right shift in the oxyhemoglobin desaturation curve during normal pregnancy and the delivery of oxygen to the placenta and maternal tissue is enhanced[1].

Estrogen and progesterone levels increase markedly during pregnancy. Progesterone level increases regulate the ventilatory drive at the level of the central chemo receptors that are located on the ventrolateral surface of the medulla. This reduces arterial carbon dioxide pressure to create a respiratory alkalosis[1,2]. While respiratory alkalosis may lead to central apnea during non-rapid eye movement (NREM) sleep in non-pregnant subjects, this has not investigated during pregnancy[1].

Patency of the upper airway is well known, significant predictor of the presence and severity of sleep disordered breathing[1]. Pharyngeal dimensions and nasal patency are reduced from nasal congestion and rhinitis found during pregnancy[1,2].

The incidence of snoring in American pregnant women was 14%, and significantly greater than the incidence recorded at 4% in a matched non-pregnant population[3]. In Sweden, a study of 502 pregnancies found that 23% of the population reported regular snoring during pregnancy, with only 4% of the sample reporting regular snoring before pregnancy[4].

The most widely used questionnaire for determining sleep apnea syndrome is the Berlin questionnaire. This questionnaire is the most accurate for predicting the diagnosis of obstructive sleep apnea[5].

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The reported sensitivity ranges were from 54% to 86% and the specificity ranges were from 43% to 87%[5,6].

The incidence or prevalence of snoring in Thai pregnant women is unknown. For this reason, the aim of this study is to collect data on the prevalence of snoring in pregnancy using the Berlin questionnaire for screening.

Material and Method

This study was a cross-sectional study that was carried out from April 2008 through August 2008 at antenatal clinic at the HRH princess Maha Chakri Sirindhorn Medical Center, Ongkharuk district, Nakhorn Nayok province. Category 1 of the Berlin questionnaire was translated to Thai, considered by Otopharyngologists and pretested by testing ten patients for a control evaluation. The questionnaire was given to pregnant women at the antenatal clinic during April 2008 to August 2008. Two hundred and thirty-eight pregnant women were invited and accepted to participate in the study. All subjects were introduced to and explained the category 1 details of the Berlin questionnaire. Then, they completed the questionnaire with their couples or close relatives. The questionnaire collected information on subject's age, weight, height, gravid health status, gestational age, evidence of snoring and sleep apnea. The description of symptoms related to snoring such as frequency, volume, disruption to other people and observed periods of sleep apnea were answered. The main result recorded was the prevalence of snoring in pregnant women. The secondary outcome was the observed prevalence of sleep apnea. These outcomes were collected and analyzed by using mean and percentage values. Sample size was estimated based on the incidence of snoring, 14%[3] and an incidence of obstructive sleep apnea, as 5%[7] (two-tailed, d = 0.05). The sample was required as at least 185 and 78 measured for the primary and secondary outcomes. The Ethical committee of Faculty of Medicine, Srinakharinwirot University approved this study.

Results

Two hundred and thirty-eight pregnant women were recruited. The characteristics of measured population were shown in age, weight, height gravid health status, and gestational age and snoring. The mean age was 27.61 $\pm$ 6.44 years. The mean height was 158.11 $\pm$ 5.84 centimeters. The mean weight was 61.10 $\pm$ 11.59 kilograms. The modes of gravid were averaged at 2. The mean gestational age was 23.61 $\pm$ 9.78 weeks. The prevalence of snoring was 35.29%. In the snoring cases, we found that the prevalence of cases with "slightly-louder-than-breathing" snoring volume was at 91.67%. The prevalence of cases with "as-loud-as-talking" snoring volume was at 5.95% and prevalence of "louder-than-talking" snoring volume at 2.38%. The prevalence of "nearly-every-day" snoring frequency was 23.81%. The prevalence of "3-4 times-a-week" snoring frequency was 2.38%. The prevalence of "1-2 times-a-week" snoring frequency was measured at 5.95%. The prevalence of "1-2 times-a-month" snoring frequency was 1.19% and prevalence of "never-or-nearly never" snoring frequency was measured at 66.67%. The prevalence of snoring volume interrupting other people was at 25%. The prevalence of "nearly-every day" incidence of sleep apnea was 4.76%. The prevalence of "1-2 times-a-week" sleep apnea was 1.19% and prevalence of "never-or-nearly never" sleep apnea was 60.71%. We found that 17.34% of snoring cases had no answer pertaining to the last question. The response data was arranged in Table 1. The characteristic of snoring and non-snoring subjects were measured in mean values of height, weight, age, gravid health status and gestational duration by weeks as described in Table 2.

Discussion

The incidence of snoring during pregnancy was 14-28%[1,3,8]. The result of this study was measured at 35.29%. This prevalence is high compared with previous non-pregnant studies. In a Chinese population, the prevalence of snoring increased from 30% in the first trimester to 41% in the second trimester and to 46% during the third trimester[9,10]. In Thailand, this is the first study of pregnant women. It is possible that prevalence of snoring in Thai pregnant women is similar to other Asian data but it may differ from previously recorded western data. In the Thai general population, the incidence of snoring was measured at 24.8-39.8 %[11]. We think that pregnancy is a factor that may influence the frequency of snoring. The measured prevalence collected from this screening test has shown that the sensitivity can range from 54-86% and the specificity can range from 43-87%. This is a limitation of the study. But the questionnaire method offers simple, low cost measurement with personal screening as needed. It is appropriate in local, rural areas as an initial evaluation. The characteristics of snoring in pregnant women compared with non-snoring pregnant women showed that the tendency of snoring detected in the pregnant subject who weighed more and were older. This correlates with previous studies in non-pregnant women[11].

Additionally, this study found that sleep apnea occurred in 5.95% of pregnant women. The incidence of obstructive sleep apnea in reproductive women is measured at 5%[7]. It increases in a similar pattern with snoring in pregnancy. If a patient is suspected to have symptoms of obstructive sleep apnea, she should be referred to Otopharyngologist for clinical and special laboratory investigation. A side from the Berlin questionnaire, the clinical methods for diagnosing obstructive sleep apnea are using morphometry (Kushida index), and the combined clinical-cephalometry models (Battagel). Both methods are the most accurate clinical models[12]. However, the false-negative rate of the Berlin questionnaire is 14.5-38.2%[12]. So it is possible that a significant proportion of patients with obstructive sleep apnea may be missed with the Berlin questionnaire and this should be of concern to the clinicians. Obstructive sleep apnea's effects on pregnancy and fetal outcomes, maternal complications that are related to pregnancy induced hypertension, pulmonary hypertension and gestational diabetes[13]. Fetal complications are associated with lower mean Apgar scores and birth weights[14]. So a more appropriate screening tests should be investigated. If the screening test is positive, clinical methods should be followed and polysomnography, the gold standard test used for obstructive sleep apnea, should be confirmed. After that, suggested treatment should be nasal continuous positive airway pressure (nasal CPAP) used to prevent complications[1,2,15].

Table 1. The percentage based on questionnaire answers.

The answers of the questionnaire	
Do you snore?	**Percentage**
Yes	35.29
No	60.08
Unknown	4.63
Your snoring is	
Slightly louder than breathing	91.67
As loud as talking	5.95
Louder than talking	2.38
Very loud	0
How often do you snore?	
Nearly every day	23.81
3-4 times a week	2.38
1-2 times a week	5.95
1-2 times a month	1.19
Never or nearly never	66.67
Has your snoring ever bothered other people?	
Yes	25
No	44.05
Unknown	30.95
Has anyone noticed that you quit breathing during your sleep?	
Nearly every day	4.76
3-4 times a week	1.19
1-2 times a week	0
1-2 times a month	0
Never or nearly never	60.71

Conclusion

The prevalence of snoring was shown to be 35.29% in pregnant women. The prevalence of sleep apnea was 5.95%. This should be investigated further for definitive diagnosing and prevention of maternal and fetal complications.

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Table 2. The characteristics of snoring and non-snoring in pregnant women.

	Number	Mean of				
		Height (cm)	Weight (kg)	Age (year)	Gravid health status	Gestationl age (week)
Snoring pregnant women	84	157.9	63.96	28.44	1.89	23.8
Non-snoring pregnant women	143	158.3	59.83	26.92	1.74	23.31

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ความชุกของการนอนกรนในสตรีตั้งครรภ์

ภาวิน พัวพรพงษ์, ชัยรัตน์ นิรันตรัตน์, วิเชียร มโนเลิศเทวัญ

วัตถุประสงค์*: เพื่อศึกษาความชุกของการนอนกรนในสตรีตั้งครรภ์*

วัสดุและวิธีการ*: ศึกษาโดยการแจกแบบสอบถาม Berlin questionnaire ให้กับสตรีที่ฝากครรภ์ที่ศูนย์การแพทย์สมเด็จพระเทพ รัตนราชสุดา ฯ สยามบรมราชกุมารี อำเภอองครักษ์ จังหวัดนครนายก ในช่วงเวลาตั้งแต่เดือนเมษายน พ.ศ. 2551 ถึงสิงหาคม พ.ศ. 2551 จำนวน 238 ราย โดยเก็บข้อมูลความสูง น้ำหนัก อายุ ลำดับครรภ์ อายุครรภ์ที่ทำการตอบแบบ สอบถาม เรื่องการนอนกรน การนอนกรน และการหยุดหายใจขณะนอนหลับ จากนั้นรวบรวมข้อมูลมาเพื่อวิเคราะห์ผล*

ผลการศึกษา*: พบความชุกของการนอนกรนในสตรีตั้งครรภ์ร้อยละ 35.29 โดยส่วนใหญ่ร้อยละ 91.67 เสียงของการกรนจะค่อยๆ แต่จะพบความถี่ของการนอนกรนอย่างน้อย 3-4 ครั้งต่อสัปดาห์ประมาณหนึ่งในสี่ของกลุ่มตัวอย่าง เช่นเดียวกันกับการพบหนึ่งในสี่ของกลุ่มตัวอย่างมีเสียงของการนอนกรนที่รบกวนคนอื่น สำหรับการหยุดหายใจขณะนอนหลับพบร้อยละ 5.95*

สรุป*: ความชุกของการนอนกรนประมาณหนึ่งในสามของสตรีตั้งครรภ์*