

Nursing Counseling about Sleep Hygiene Behaviors for Snoring and Sleeping Disorders among Pregnant Women

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Received August 24, 2018; Revised October 11, 2018; Accepted October 28, 2018

Abstract Background: Sleeping disorder is prevalent in pregnancy compared with non-pregnant population. Currently, strategies that intervene during gestation primarily focus on improving sleeping practices to optimize health. **The study aimed** to determine the frequency and risk factors of snoring and breathing disorders during pregnancy and to counsel these women about sleep hygiene behaviors for improving their sleep quality. **Setting,** The study was conducted at antenatal outpatient clinic, woman's Health Hospital, Assiut University, Egypt. **Methods:** Quasi experimental research design and simple random sample were used in collecting and applying the data. A total of 205 pregnant women. Three tools were used for this study included, structure interview questionnaire, Pittsburgh sleep quality index (PSQI) questionnaire and Counseling assessment checklist. **Results:** Nearly half of women have developed snoring related to pregnancy and more than half of them develop sleeping disorder. There is a significant relation between age, body mass index and maternal diseases as, anemia, RHD, rhinitis and respiratory disease act as risk factors to develop snoring and breathing disorder during pregnancy. **Conclusion:** Snoring and sleeping disorder can develop and worth related pregnancy, many maternal factors play as a predictor to develop snoring and nursing counseling is important role to improve women behaviors. **Recommendations:** Continuation nursing counseling on sleep hygiene and lifestyle changes because it safe and effective treatment options.

Keywords: snoring, sleeping disorder, Sleep hygiene behaviors, nursing counseling

Cite This Article: GHadah A. Mahmood, and Heba M. Mohamed, "Nursing Counseling about Sleep Hygiene Behaviors for Snoring and Sleeping Disorders among Pregnant Women." *American Journal of Nursing Research*, vol. 6, no. 6 (2018): 533-540. doi: 10.12691/ajnr-6-6-22.

1. Introduction

Sleep disturbance is a substantial health problem defined as either short or long sleep duration associated with poor sleep quality or continuity, which may be linked to a sleep disorder [1]. Disturbed sleep is associated with neuroendocrine, metabolic, and inflammatory changes and results in alterations in mental functioning, diminished daytime functioning, depression and has newly received greater attention because of its association with adverse maternal and neonatal outcomes when occurring during pregnancy [2].

The sleeping disturbance incidence is higher during pregnancy compared with the non-pregnant people due to anatomic and physiological changes occur during pregnancy but may also regarding to pathological reasons. Up to 97% of pregnant women record sleeping disturbance, especially in the last three months of pregnancy [3].

Sleep disordered breathing (SDB) is more prevailing through pregnancy related the numerous of changes. This disorder or problem is describe by irregularities of respiratory manner (stop in breathing) and/or the quality of ventilation through the sleep time. These involve

snoring; upper airway stiffness, which end to irregular breathing during sleep with increased effort to breathe in the absence of hypoxia [4].

Sleep breathing disordered is a highly predominant during pregnancy as consequences of pregnancy alteration and increasing women's age and high pre-pregnancy body mass index is a predisposing for increase rate of it disorder. Sleep breathing disordered is many times correlating with loud or recurrent snoring, increase value of airway stiffness or resistance and temporary cessation of breathing, particularly during sleep times who effect women's sleep quality [5,6].

Over 50% of pregnant women complain of insomnia at the end of pregnancy and the incidence of habitual snoring increases in pregnancy, affecting 10-35% of pregnant women during the third trimester [7,8,9].

Sleep hygiene behaviors define as a routinely behaviors interventions that are required to help in improved sleep quality and day active. So All human need to rest and sleep as a physiographic or basic part in their lifetime. The optimum sleeping time in adult age per 24 hours was recommended is about 7-8hrs [10,11].

Sleep hygiene refer to many usual interventions that help to improve sleep as the sleep environment should be quiet sleep, dim light, comfortable bedding [12,13].

Also When women lying on side more than back or left sidelong lying down position with head placed higher position which enhance respiration and relaxation, watch television, or walk if women incapable to sleep within thirty minutes, try to decrease nervousness, maintain balance diet rich by calcium and magnesium daily and drinking a calyx of sweaty warm milk improve muscle relaxation, avoid eating food or drinking a large volume of water prior get into bed night, rest and wake up schedule, away of passive smoking, avoid evening caffeine and specific behaviors that help sleep as simple exercise as walking [14,15]. The commitment with this lifestyle modifications in pregnancy may low hazard of breathing disorders and related complications [16].

Nurses play a vital role in evaluation of pregnant women's sleep needs, sleep habits and physical complaints which can affect sleep quality, according to trimester's, sleeping environment, general health situation, medical background, general life changes that occurred during pregnancy and try to keeping pregnant women relaxed with a view to solve the pregnant women's sleeping problem and increase the sleep quality, non-pharmacological treatment methods which nurses can put in practice independently, must be used through sleep hygiene behaviors and relaxation exercise are suggested [17,18,19].

Significance of the study:

Sleep disturbance is characterized as difficulty initiating or maintaining sleep, early-morning awakening, non-restful sleep, or a combination of these complaints which linked with medical and psychiatric conditions. Insomnia affected up to 80% of women at some point in their pregnancy, with the highest prevalence in the latest three months of pregnancy [2].

Snoring arises is an estimated 9% of non-pregnant women; however, the rates among pregnant women are 11% to 35% and up to 49% in the third trimester in another cross-sectional studies and sleep apnea is elevated from 2% and 0.6% to 10% to 25% due to Physiologic changes of pregnancy such as weight gain and displacement of the diaphragm by an enlarging uterus contribute to breathing-related sleep disorders [2].

Sleep counseling on sleep hygiene, dietary modifications and sleep positioning is the main part of management strategies which can be helpful, Non-pharmaceutical management options, such as counseling on sleep hygiene and lifestyle changes, are safe and effective treatment options during pregnancy because pharmacological managements during pregnancy provide a potential harmful effect to the foetus [20,21].

Aims of the study:

- To determine the frequency and development of snoring and breathing disorder during pregnancy.
- To determine risk factors for snoring and breathing disorder.
- To counsel these women about sleep hygiene behaviors for improving their sleep quality.

Research Hypothesis:

- Pregnant women who receive nursing counseling about sleep hygiene behaviors, they improve their sleep quality.

2. Materials and Methods

2.1. Research Design

Quasi experimental research design was used for the current study (pre and posttest).

2.1.1. Study Setting

The study was conducted at antenatal outpatient clinic, woman's Health Hospital, Assiut University, Egypt. The clinic works five days per week. It serves all cases from rural and urban areas.

2.1.2. Sample Size

It was calculated by Epi-Info Statistical Package, version 7.2.0.1 using the sample size equation for estimation of single proportion. The total number of pregnant women who were studied in the selected courses during data collection were 205 women. With precision levels 5% where confidence level is 95% and $p < 0.05$. Simple random sample was used in this study.

2.1.3. Study Subjects

The study subjects included a total of 205 pregnant women in their third trimester, which chosen by a simple random sample. The researcher select the first five women in their third trimester attending to antenatal outpatient clinic for three days per week. The inclusion criteria included women in third trimester, singleton pregnancy and accepting to participate in the study.

2.1.4. Tools of the Study

Three tools were used for this study:

Tool I: A Structured interview questionnaire. It had two parts:

Part 1: This part was designed and used by the researcher to collect data about the participant's general characteristics such as age, level of education, occupation, resident as well as their obstetric history.

Part 2: Participants were asked to answer the questions pertaining snoring history as onset and frequency and also asked about symptoms affect sleep experienced in the last three months of pregnancy as breathing disorders and leg pain.

Tool II: Pittsburgh sleep quality index (PSQI) interview questionnaire

This tool was originally developed by Buysse, et al [22] and modified by Jennings, J. R., et al. [23] to measure the quality and patterns of sleep in adults. It consists of 19 statements about the nature of sleep during the past month. PSQI yielded six domains related to sleep habits, including: First domain: (1statement) related to subjective sleep quality (SSQ), the pregnant women are ranked as poor SSQ (zero), fair SSQ (1) or good SSQ (2). Second domain: (2 statements) related to sleep latency, which is the duration of time from 'lights out' or bed time to the onset of sleep. Women respond were ranked as short SL<10 minute (zero), average SL 10-15 minute (1) and long SL <15 minutes (2). Third domain: (1statement) related to sleep duration measured by calculating the number of hours the women spent in bed. Response answer ranked as

short duration is < 7 hours (2), average duration 7-9 hours (1) and long duration 9 hours (zero). Fourth domain: (2statements) habitual sleep efficiency (SE), which equals the ratio of total sleep time to time in bed. Women responded with lower SE < 85% (2), average SE \geq 85-95% (1) and higher SE <95% (zero). Fifth domain: (10 statements) sleep disturbance. Sixth domain: (2 statements) lack of sleep as daytime dysfunction. The participant' response to each item in 5th and 6th domains varied between none (0), once or twice a week (1), three or more times a week (2), in the past month. Participant' responses to each item varied between not during the three or more times a week (2).The total score were ranged between 0-3. Participant' pattern of responses were ranked as follows: Good sleep quality (<13). Moderate sleep quality (13-25). Poor sleep quality (> 25).

Tool III: Counseling assessment checklist

This tool included counseling items that help women to improve symptoms affect sleep quality as positions, sleep environment, diet and exercise through pre and posttest. The response for each of the items is on a 5-point scale "never", "seldom", "sometimes", "often" and "always", scoring was accordingly from 1 to 5 for each item respectively. A score type is determined by calculating the average value of all responses for the items in pre and post counseling.

Scoring system was made using two points of rating scale for measuring the level of knowledge achievement:

Satisfactory (> 60%).

Unsatisfactory (< 60%).

Validity and reliability of the study tools:

The validity and reliability of the study tools was assessed in a pilot study by measuring their internal Consistency using Cronbach's alpha method. This turned to be ($\alpha=0.89$) to study tool.

2.2. Operational Design

This included the pilot study, and data collection phase.

Pilot study: A pilot study was conducted on a sample of 10 % of participant women to test the applicability of the tools and test the clarity of the designated questionnaire as well as to estimate the time needed to answer it. It also helped to test the feasibility and suitability of the study settings. Data obtained from the pilot were analyzed and no modifications were done.

2.2.1. Data Collection Phase

Data were collected from the participant women in the study setting mentioned above. The researchers met the pregnant women from 28wks to 37wks through three days in week from 8 am to 11am, great women, introduce self and explain purpose and benefits of the study. The researcher informed the participant that their participation is voluntary. Confidentiality and anonymity of participant were assured by the researchers. The data collection took about 30 minutes for each participant. In counseling part the women in pretest asked the questions about sleep hygiene behaviors that women done according the scoring system then the women counseled about scientific sleep hygiene behaviors and guided by Arabic brochure was designed by the researcher guided by national and international review and included

pictures for illiterate women. After two weeks, the researcher called the participant women to complete the posttest intervention. The whole duration of data collection took about eight months, started from May to December 2017.

Limitation of the study: Difficulty to accomplish posttest part through telephone because many of women don't come for follow up which ended to 40 cases dropout due to wrong number or delivered before expected date.

2.3. Administrative Design

Before implementation of the study; the necessary approval was obtained from the director of woman's Health Hospital. The researchers explained the aims of the study and requesting permission to use the premise for data collection.

2.3.1. Ethical Consideration

The study proposal took agreement from the ethical committee of the faculty of nursing at Assiut University. An official permission to carry out the study was obtained from the responsible authorities. Informed consent was obtained from the study participants after explaining the purpose and nature of the study. Also, assure them that their participation would not be used against them in any way and they have the right to refuse or to decide to terminate their participation at any time.

2.4. Statistical Design

Data entry and analysis were done using SPSS version 20 Program statistical software package for social sciences. Data were presented using descriptive statistics in the form of frequencies and percentages. Also, Mean and standard deviations were calculated. Correlation between variables were used statistical significance was considered at P-value \leq 0.05.

3. Results

Table 1: Illustrates personal data of participating women, their age ranged from 16 to 42 years. Most of them (66.8%) in age group (20-30) years followed by women aged more than 30 years (25.4%) with mean age of 27.3 ± 5.7 years. The majority of women (88.8%) were housewives and were rural resident (72.7%). Those having illiterate, basic education and Secondary education constituted (30.2%, 27.8% &24.9 respectively) of studied women.

Table 2: Demonstrates the maternal risk factors predisposing for snoring and sleeping disorder, about one third of women (32.7%) free from any health problems while other two third of women associated with various problems, about one third of them exposure to passive smoking (29.0%) followed with multiple factors or more than one disease (16.5%), and obesity represent (16.1%) from the risk factors of studied women. Concerning to body weight around two third of women (83.9%) with normal weight while only one third (16.1%) having obese women. Approximately half of women (48.3%) had multigravida followed by (25.4%) grandmulti women.

Table 1. Distribution of studied women according to their personal data

Personal data	Female N = 205	
	No.	%
1.-Age/Years (Mean ± SD)	27.3±5.7(16-42)	
Less than 20	16	7.8
* 20-30	137	66.8
* > 30	52	25.4
2.-Level of education		
* Illiterate & read and write	62	30.2%
* Basic education	57	27.8%
* Secondary education	51	24.9%
* University	35	17.1%
3.-Occupation		
* House wife	182	88.8%
* Employee	23	11.2%
4.-Residence		
* Rural area	149	72.7%
* Urban	56	27.3%
* Total	205	100%

Table 2. Distribution of studied women according to their maternal history for disease (Risk factors) for sleeping and snoring disorders

Risk factors for sleeping and snoring	Female N = 205	
	No.	%
Maternal problems		
None	67	32.7
If yes	138	67.3
1. Diabetes mellitus	5	3.6
2. Chronic hypertension	3	2.17
3. Respiratory disease	8	5.8
5. Obesity	33	16.1
6. Allergies	3	2.17
7. Heart disease	3	2.17
8. Passive smoking	40	29.0
9. Others	34	16.5
Body weight		
Normal weight	172	83.9
Obese	33	16.1
Obstetric history		
1. Primigavida	54	26.3%
2. Multigravida	99	48.3%
3. Grandmulti	52	25.4%
Total	205	100%

Others=women with multiple factors as anemia, RHD, rhinitis, epileptic attack, hydrocephalus, respiratory disease.

Nearly half of women (43.9%) complain of snoring, most of them (50%) snore sometimes and more than half of snored women (58.9%) have develop snoring with advanced pregnancy due to the pressure of pregnancy, showed in [Table 3](#).

Many factors affecting quality of sleep in pregnant women, the results demonstrated that around half of women (42.6%) complain of sometimes unable to breath well at night, also nearly half of them (45.4%) awaken during the night due to choking or gasping in breath and

about two third of women (66.9%) suffer from legs kick, twitch, move, or jerk and more than one third of them (35.2) sometimes suffer from grind their teeth during sleep times showed in [Table 4](#).

Table 3. Distribution of studied women according to their Snoring disorders during pregnancy

Snoring disorders during pregnancy	Female N = 205	
	No.	%
Do you snore, or have you been told you snore?		
1. Don't know	21	10.2
2. No, don't snore at all	94	45.9
3.Yes	90	43.9
* Total	205	100%
How often do you snore if yes?		
1. Always	9	10
2. Often	14	15.5
3. Sometimes	45	50
4. Seldom	22	24.5
* Total	90	100%
How many years or time have you been snoring if yes?		
1.Habitual snorer's = often" or "always" already in the 1st trimester	12	13.3
2. Pregnancy onset snorer's = women who's habitual snoring started during pregnancy. (2nd-3 rd)	53	58.9
3. Chronic snorers = were women who snored both before and during pregnancy.	25	27.8
* Total	90	100%

Table 4. Factors affecting sleeping disorders during pregnancy

Factors affecting sleeping	Female N = 205	
	No.	%
Are there times when you stop breathing during your sleep?		
1.No	3	1.4
2. Rarely-less than one night a week	46	22.4
3. Sometimes-1 or 2 nights a week	87	42.6
4. Frequently-3 to 5 nights a week	37	18.0
5. Always or almost always-6 or 7 nights a week	32	15.6
Do you ever awaken during the night choking/gasping for breath?		
1.No	20	9.8
2. Rarely-less than one night a week	53	25.8
3. Sometimes-1 or 2 nights a week	93	45.4
4. Frequently-3 to 5 nights a week	28	13.7
5. Always or almost always-6 or 7 nights a week	11	5.3
Do your legs kick, twitch, move, or jerk around during your sleep?		
1. No	68	33.1
2. Yes	137	66.9
How often do you grind your teeth in your sleep?		
1. Don't know	3	1.4
2. No, don't happen at all	43	20.9
3 Rarely-less than one night a week	65	31.8
4. Sometimes-1 or 2 nights a week	72	35.2
5. Frequently-3 to 5 nights a week	16	7.9
6. Always or almost always-6 or 7 nights a week	6	2.8
* Total	205	100%

Table 5. Pittsburgh sleep quality index (PSQI)

Various sleep disturbances	Never Not during the past month (0)		Sometimes (1+2)		Always (3)	
	No	%	No	%	No	%
Difficulty to sleep in the first half hour	29	14.1	97	47.4	79	38.5
Waking up in the midnight or in the early morning	6	2.9	101	49.3	98	47.8
Waking up to go to the bathroom	1	0.5	61	29.8	143	69.8
Breathing difficulty causes problem during sleep	9	4.4	135	65.9	61	29.8
Snoring during sleep observed by husband	120	58.5	65	31.7	20	9.8
Feeling too cold causes problem during sleep	197	96.1	8	3.9	0	0.0
Feeling too hot causes problem during sleep	50	24.4	94	45.9	61	29.8
Bad dreams cause problem during sleep	92	44.9	74	36.1	39	19.0
Pain causes problem during sleep (pregnancy symptoms cause problem during sleep)	16	7.8	85	41.5	104	50.7
Excessive shaking of legs during sleep observed by husband	81	39.5	97	47.3	27	13.2
Confusion or irritable during sleep	15	7.3	78	38.0	112	54.6
Subjective sleep quality	First trimester		Second trimester		Third trimester	
	No	%	No	%	No	%
Poor	17	8.3	11	5.4	102	49.8
Average	78	38.0	73	35.6	87	42.4
Good	110	53.7	121	59.0	16	7.8
* Total	205	100%	205	100%	205	100%

Table 5: Display the sleep quality assessment by Pittsburgh sleep quality index (PSQI). The results found that many reasons decrease quality of sleep during pregnancy which most of causes presenting in consequence of waking up go to the bathroom, Confusion or irritable during sleep, Pain causes problem during sleep as leg pain, back pain, heartburn...etc., waking up in the midnight or in the early morning and difficulty to sleep in the first half hour (69.8%, 54.6%, 50.7%, 47.8% and 38.5% respectively). Also the table illustrate that the subjective sleep quality decrease during third trimester about half of women (49.8%) have poor sleep quality during third trimester and only (7.8%) have good sleeping.

As regarding of various sleep disturbances about one third of women have poor sleep latency and short sleep duration (33.7% & 33.2% respectively) while more than half of women have low sleep efficiency, sleeping disturbance and daytime dysfunction occur once or twice weekly (59.0, 59.5 and 61.0 respectively) illustrated in Table 6.

Table 7: Demonstrate that there is a significant relation between age, body mass index, multigravida and maternal disease as risk factor for develop snoring disorders.

Table 8: Reveals that there a statistically significant difference between pre and post program related to change of position, diet and exercise that affect sleeping pattern during pregnancy.

Table 6. Pittsburgh sleep quality index (PSQI)

Various sleep disturbances	No.	%
Sleep latency/minute*		
Good(Short<15)	96	46.8
Average(Average15-30)	40	19.5
Poor (Long>30)	69	33.7
Sleep duration (hours)		
Short < 7	68	33.2
Average 7-9	121	59.0
Long>9	16	7.8
Sleep efficiency (percent)**		
Low <85%	116	59.0
Average 85-95%	73	33.2
High>95%	16	7.8
Sleep disturbance		
Not during the past month	57	27.8
Once or twice a week	122	59.5
3 times or more per week	26	12.7
Daytime dysfunction due to sleepiness		
Not during the past month	45	22.0
Once or twice a week	125	61.0
3 times or more per week	35	17.1

** Sleep efficiency = the ration of total sleep time to time in bed.

* Sleep latency: The duration of time from, lights out, or bedtime, to the onset of sleep.

Table 7. Relationship between snoring and maternal factors

Maternal factors		Snore	Not snore	Total	P-value
Age	Less than 20 years	13	3	16	.0001
	20-30 years	89	49	138	
	>30 years	13	38	51	
Total		90	115	205	
BMI	Normal weight	60	112	172	.0001
	obese	30	3	33	
Total		90	115	205	
Obstetric history	1. Primigavida	16	39	55	.0001
	2. Multigravida	38	60	98	
	3. Grandmulti	36	16	52	
Total		90	115	205	
Maternal disease	No	14	53	67	.0001
	Yes	83	55	138	
Total		90	118	205	

Table 8. Counseling for sleeping disorders during pregnancy pre and post program

Items	pre	Post	P. value
Position	10.31±2.41	14.85±2.28	<0.001**
Comfortable	14.57±2.32	14.6±2.29	0.898
Diet	13.25±2.29	11.03±1.83	<0.001**
Exercise	9.42±1.8	11.69±1.63	<0.001**
Counseling for Sleeping disorders during pregnancy	48.55±5.33	51.17±5.82	<0.001**

Table 9. Total Counseling for sleeping disorders during pregnancy (pre and post program)

Items	Highest possible score (%)	Pre		Post	
		Achieved points	Level of Practice	Achieved points	Level of Practice
Position	25	10.31(45.24%)	Unsatisfactory	14.85(60.4%)	Satisfactory
Comfortable	20	14.57(72.85%)	Satisfactory	14.6(73%)	Satisfactory
Diet	25	13.25(53%)	Unsatisfactory	11.03(44.12%)	Unsatisfactory
Exercise	15	9.42(62.8%)	Satisfactory	11.69(77.93%)	Satisfactory
Counseling for Sleeping disorders during pregnancy	85	48.55(57.12%)	Unsatisfactory	51.17(60.2%)	Satisfactory

Table 9 & Table 10: Provides an insight about total satisfaction counseling items between pre and post program which demonstrated that there change women’s practices of position and exercise and total change from unsatisfactory to satisfactory between pre and post program that help women to improve their time sleeping during pregnancy.

Table 10. Overall Counseling for sleeping disorders during pregnancy (pre and post program)

	Pre		Post		P. value
	No.	%	No.	%	
Counseling for Sleeping disorders during pregnancy					
Unsatisfactory	150	73.2	117	57.1	0.001**
Satisfactory	55	26.8	88	42.9	
Mean ±SD	48.55±5.33		51.17±5.82		<0.001**

Chi-square test ** Significant difference at P. value <0.01.
Independent t-test ** Significant difference at P. value <0.01.

Table 11. Univariate and Multivariate regression

	Univariate		Multivariate	
	ORR (95%CI)	P. value	ORR (95%CI)	P. value
Age group				
20-30 years	0.077 (0.019-0.313)	<0.001**	0.143 (0.027-0.769)	0.023*
More than 30 years	0.18 (0.088-0.369)	<0.001**	0.257 (0.112-0.593)	0.001**
Gravidity				
Primigavida	0.173 (0.076-0.395)	<0.001**	0.404 (0.146-1.114)	0.080
Multigravida	0.271 (0.133-0.555)	<0.001**	0.42 (0.177-0.995)	0.049*
Maternal outcomes (Yes)	4.274 (2.199-8.308)	<0.001**	0.336 (0.156-0.725)	0.005**
BMI level (Obese)	46.312 (6.14-349.337)	<0.001**	0.031 (0.004-0.242)	0.001**

Table 11: Illustrated factors affect snoring disorder during pregnancy through univariate and multivariate regression analysis, shown that the group age more than 30 years, maternal disease and body mass index is the main factors affecting snoring in multivariate regression analysis.

Incidence of snoring disorder and Subjective sleep quality among pregnant women according to “Assiut, Woman’s Health Hospital based rates”.

4. Discussion

Sleeping disorders during pregnancy ranged from just snoring to "Obstructive Sleep Apnea" [24], so the researcher investigated the rate, risk factors and degrees of snoring and breathing difficulties among pregnant women all over their pregnancy.

Recent studies reported that the prevalence of snoring ranged from 14-45% of pregnant women and it is more common in pregnant women with high body mass index than women with lower body mass index [25,26].

The present study revealed that more than half and nearly half of pregnant women at woman's Health Hospital has low sleep efficacy and snoring, while more than half of them start snoring at late pregnancy.

These finding are being in harmony with these study findings, Jong-Ling Fuh, [27] who conducted the research on 248 pregnant women in southern Taiwan reported that the prevalence of poor sleepers according to Pittsburgh Sleep Quality Index score was significantly higher prevalence in third-trimester than second and first trimester which more than half of women have poor sleeper.

These findings are inconsistent with Pien and colleagues, [28] who noted in his study about sleep disorders during pregnancy that only one fourth of women reported snoring during third trimester. At the same line, Abrams and colleagues, [29] who mentioned in his study about factors associated with maternal weight gain during pregnancy that only one tenth of women had snoring during second or third trimester of pregnancy.

Some cross-sectional studies reported that the prevalence of habitual snoring in preg-nant women represented from 11.9% to 49% in laste trimester. Other longitudinal studies noted that snoring rate ranged from 7-11% at the 1st trimester to 16-25% in late pregnancy [30].

Facco and colleagues, [31] who recorded in his study about developing screening tool for sleep apnea during pregnancy that there are main four predictors for sleep disorders breathing during pregnancy, one of them was the frequency of snoring. Another study was designed by Okun and O'Brien, [32] about insomnia, snoring and their effects of pregnancy outcomes noted that one fourth of women suffered from snoring during the 3rd trimester of pregnancy.

Of particular interest the present findings showed that the most prevalent risk factors for sleeping and snoring disorders are passive smoking and obesity respectively. These findings are congruent with ATS, [24] which noted in their study about sleep breathing disorders in pregnancy that obesity and smoking are the most important causes of sleeping disorders during pregnancy.

At the opposite line, Louis and Colleagues, [33] who reported in his study about the main predictors of sleep disorders during pregnancy that chronic hypertension, age and obesity are the most frequent risk factors of sleeping disorders in pregnancy. The most important risk factors of sleeping disorders during pregnancy were Diabetes Mellitus and hypertension. These findings noted by Facco and colleagues, [34] who investigated the implications of sleep breathing disorders during pregnancy.

At the same side, Reicher, [35] noted in his study about insomnia and lack of sleep associated with pregnancy that gestational diabetes and hypertension were the most frequent risk factors. The variations of risk factors associated with sleep disorders during pregnancy may refer to the different frequencies of chronic diseases associated with pregnancy from country to another.

A recent study investigated the prevalence of sleeping disorders in women had gestational hypertension. the outcomes included that obese women with gestational hypertension had a significantly high rate of sleeping disorders from 53% and 12% [36].

The present study noted that the quality of sleeping became poor at the 3rd trimester of pregnancy. These findings are consistent with Mindell & Jacobson, [37] who mentioned in their study about breathing sleep problems in pregnancy that there are major alterations of sleep levels during the third trimester of pregnancy due to back and leg pain, increase urination at night, dyspnea and others. At the same line, Okun and Brien, [32] who recorded in their study about insomnia and snoring disorders that poor quality of sleeping disorders are more frequent during pregnancy. At late pregnancy, there are many causes of alterations of sleep quality such as frequency of micturition, backache, heartburn and general fatigue at late pregnancy. In my opinion This problems is common in all pregnant women that interfere with sleeping quality, so the educational program work on reduce the acquired risk factors through sleeping hygiene behaviors.

The present study revealed also that there are significant relations among age, body mass index, medical diseases and sleeping disorders. These outcomes are congruent with Louis and colleagues, [33] who mentioned in his study about predictors of sleep disorders during pregnancy that there are positive relationship between maternal age, body mass index and snoring and sleeping disorders. From my point of view the frequencies of obesity increase in Egyptian women especially in rural areas at Assiut and Many women still pregnant after the age of 35 years, especially in Upper Egypt to have boys. At the opposite line, Okun and Brien, [32] who noted that there are no significant relationships among maternal age, body mass index, maternal morbidities and snoring, and sleeping disorders.

This study revealed that there is positive effect of nursing counseling program for pregnant women about sleep hygiene to overcome snoring and sleeping disorders. Unfortunately, there is no articles reported the effect of nursing counseling about snoring and sleeping disorders during pregnancy to compare the recent findings with them.

Finally, this study has rich information about the prevalence of snoring and sleeping disorders during pregnancy. It also has an interventional part by counseling program about sleep hygiene to overcome sleeping disorders during pregnancy.

5. Conclusions

The study can be concluded that, the complaint from sleep disorders and snoring commonly occurs during pregnancy because there are more than half and nearly half

of pregnant women had poor sleep quality and snoring especially at late pregnancy. Also, there is positive effect of nursing counseling program about sleep hygiene behaviors among these pregnant women.

6. Recommendations

- Continuous educational programs at antenatal clinics about management of sleeping disorders during pregnancy.
- Further researches should be done to assess the effect of counseling programs about sleeping disorders among pregnant women on improving their sleep quality.
- Future studies should be done to investigate the relationships between sleep disorders and maternal and fetal health status.
- Policy should be developed for improving health educational communication to raise awareness and promote women's health during pregnancy pertaining to sleep disturbances during pregnancy and its adverse outcomes on mothers and fetuses.

Acknowledgments

The researcher acknowledge pregnant women for their active participations in this study. Another appreciation will be sent for nurses for facilitating the role of researcher in data collections.

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