

Effectiveness of Instructional Tips of Sleep Hygiene in Improving Sleeping Disorders of Pregnant Women and their Effect on the Outcome of Pregnancy

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Abstract:

Background: Good maternal health, and fetal development require sufficient and good quality of sleep during pregnancy. **Aim of the study** was to investigate the effectiveness of instructional tips of sleep hygiene in improving sleeping disorders of pregnant women and their effect on the outcome of pregnancy. **Design:** A quasi-experimental study design. **Setting:** The study was conducted at Obstetrics and Gynecological department affiliated to the Benha University Hospital. **Sampling:** A purposive sample included (120) pregnant women divided into two groups control group (60) and study group (60). **Tools:** Five tools were used, **tool I):** A structured self-administrated questionnaire sheet which included three parts: general characteristics of pregnant women, obstetrical history and Jenkins sleep scale, **tool II:** Pittsburg sleep quality index, **tool III:** An assessment sheet of maternal and fetal outcome, **tool IV:** Numeric rating scale and **tool V:** Apgar score. **Results:** There was a highly statistically significant improvement of sleep disorders and positive pregnancy outcome after applying instructional tips of sleep hygiene among study group compared to control group. Moreover, there was a highly statistically significant positive correlation between studied women's quality of sleep and the duration of the three stages of labor as well as, the women pain score during the three stages of labor. **Conclusion:** Applying of instructional tips of sleep hygiene had positive effect on improving sleep disorders and outcome of pregnancy. **Recommendations:** Instructional tips of sleep hygiene are recommended as an alternative non-pharmacological method, which can be applied at antenatal clinics.

Key words: Instructional tips, pregnancy outcome, sleeping disorders, sleep hygiene.

Introduction

Women's sleep is frequently compromised during pregnancy by considerable changes in hormone secretion, respiration, cardiovascular function, fetal movement, and frequent awakenings to urinate caused by a growing uterus. Additionally, pregnant women are more likely to suffer from multiple sleep disturbances compared with the general population including poor sleep quality, insomnia, sleep-disordered breathing, and restless legs

syndrome. Sleep disorders may manifest at any point during pregnancy; some may result in adverse maternal or fetal outcomes (Lu et al., 2021).

Adverse pregnancy outcomes associated with significant maternal and infant morbidity. Sleep disturbances are implicated in both increased morbidity and mortality. Poor sleep quality is associated with increased risk for depression, whereas short sleep duration is associated with increased incidence of diabetes, obesity, gestational

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hypertension, increased labor duration and caesarian sections. of many disease outcomes associated with poor sleep, cardiovascular disease is relevance to several pregnancy complications, such as preeclampsia, intrauterine growth retardation, and preterm birth. Bad sleep quality's neonatal health effects are low neonatal Apgar score and neonatal birth weight (**Wang et al., 2022**).

As non-pharmacological treatment approaches to sleep disorders during pregnancy, sleep hygiene, stimulus control therapy, sleep restriction therapy and relaxation exercise are suggested. The most effective intervention for sleep problems related to pregnancy was basic sleep hygiene practice. Sleep hygiene aims to increase the knowledge and awareness about healthy sleep habits and environmental factors and intended to develop new healthy sleep hygiene habits. With this aim, pregnant women informed about lifestyles and environmental factors and for a better sleep, nurses make suggestion (**Bacaro et al., 2020**).

Nurses play an important role in evaluation of pregnant women's sleep needs, determination of the sleep quality, definition of the issues which cause sleeping problems, and keeping pregnant women relaxed. To approach pregnant women with holistic view, nurses must be able to define the factors which cause sleeping problems in pregnant women, must determine the attempts to raise sleep quality and it has been expected that, they must put in practice these attempts according to the situation (**Poeira and Zangão, 2023**).

Significance of the study:

According to the National Sleep Foundation in 2017, 78% of women reported more disturbed sleep during pregnancy than at any other time in lives (**National Sleep Foundation, 2022**). Sleep is essential for our

wellbeing affecting our daily functioning and overall health. Un fortunately, sleep disorders are common throughout pregnancy. Most women (66% to 97%) report sleep problems during pregnancy resulting from hormonal, anatomic, and physiologic changes necessary to maintain pregnancy. Sleep complaints are specific to each trimester, often increasing in frequency and severity as the pregnancy progresses (**Erwin., 2017**).

Furthermore, numerous studies have shown a connection between abnormal sleep patterns and a broad spectrum of adverse pregnancy outcomes, including low birthweight, preterm birth, intrauterine growth retardation, caesarean delivery, gestational hypertension, and gestational diabetes, along with a decreased quality of life and higher levels of depressive symptoms (**Lu and Liu., 2021, Tong et al., 2023**).

Sleep problems in pregnancy might cause obstetric complications, preterm birth, abortion, and developmental problems in the baby, which might result in adverse effects on birth and on the newborn. Thus, it is recommended to raise awareness on sleep and sleep disorders in pregnant women and improve behaviors related to sleep hygiene in pregnancy (**Pinar et al., 2015**).

It is important to reduce sleep disorders and increase sleep quality for enabling a healthy pregnancy process. Therefor this study was conducted to investigate the effect of instructional tips of sleep hygiene in improving sleeping disorders of pregnant women and their effect on the outcome of pregnancy.

Aim of the Study:

The aim of this study was to investigate the effectiveness of instructional tips of sleep hygiene in improving sleeping disorders of pregnant women and their effect on the outcome of pregnancy through:

- Assessing the pregnant women for sleeping disorders.
- Designing and implementing instructional tips of sleep hygiene for pregnant women, according to sleeping disorders.
- Evaluating the effect of instructional tips of sleep hygiene on sleeping disorders and outcome of pregnancy.

Research Hypotheses:

H1: Pregnant women who utilized instructional tips of sleep hygiene would have a significant improvement of sleeping disorders than those who don't.

H2: Pregnant women who utilized instructional tips of sleep hygiene would have a positive pregnancy outcome than those who don't.

Subjects and method

Research design:

A quasi-experimental design was utilized to fulfill the aim of the study.

Study Setting:

The study was conducted at Obstetrics and Gynecological department affiliated to the Benha University Hospital. It is a large hospital in Benha city and attracts clients from AL-Qualubia Governorate and other Neighboring Governorates. This setting provides obstetrics and gynecology healthcare services that include antenatal care, counseling, care for high-risk pregnancy, delivery care and follow up services.

Sample:

Sample type and size:

A Purposive sample of 120 women was included in the study sample who was attained to the previous mentioned setting

with inclusion criteria. The study sample was selected according to the following: **inclusion criteria:**

- Primigravida women suffering from sleep disorders.
- Can read and write.
- At third trimester (28-30week).
- Free from any medical and obstetric complications.
- Agree to participate in the study.
- Free from any physical and psychiatric illnesses or taking sedative drugs.

Sample technique:

The sample was divided into two groups
Control group: (n= 60 pregnant women) who received the routine care at outpatient clinic. Study group: (n =60 pregnant women) who received instructional tips of sleep hygiene in addition to routine care.

Tools for data collection: five main tools were used for data collection.

Tool (I): A structured self-administered questionnaire: This tool was developed by researchers after reviewing the related literature it was designed in Arabic language in the form of closed and open-ended questions. It consisted of three parts: -

Part (1): General characteristics of pregnant women, it was consisted of (age, residence, educational level, occupation, nature of work, weight, height, and BMI).

Part (2): Obstetrical history as gestational age.

Part 3: Jenkins sleep scale (JSS): adopted from Jenkins, (1988) to select pregnant women with sleeping disorders. It is self-report scale with four questions (Have trouble falling asleep, wake up several times per night but did not have trouble falling asleep again, wake up one or more times per night and have trouble falling asleep again, wake up after

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usual amount of sleep feeling tired or worn out) to follow common sleep problems in clinical areas.

Tool (II): the Pittsburgh sleep quality index (PSQI):

PSQI was adopted from Carole, (2007) to measure the quality and patterns of sleep during previous month and after giving sleep hygiene instructional tips. It was translated into simple Arabic language. **It consisted of 19 statements** about nature of sleep during past month. PSQI yielded seven domains related to sleep habits **including: First domain: Subjective sleep quality (SSQ)** (1 Statement), **Second domain: Sleep latency (SL)**, (2 Statement), **Third domain: Sleep duration**, (1 Statement), **Fourth domain: Sleep efficiency (SE)**, (3 Statement), **Fifth domain: Sleep disturbance**, (9 statements), **Six domains: Use of sleeping medication** (1 Statement), **Seventh domain: Daytime dysfunction** (2 statements)

Scoring system:

Each domain scored from zero to three, which results in a global score which range from zero to 21. Higher scores indicate worse sleep quality. The PSQI was interpreted into 4 levels of sleep quality.

- Good sleep quality (PSQI \leq 5).
- Mild sleep quality disturbance (PSQI: 6 - 10).
- Moderate sleep quality disturbance (PSQI: 11 - 15)
- Severe sleep quality disturbance (PSQI \geq 16).

Tool (III): An assessment sheet of maternal and fetal outcome:

This tool was designed by researchers to collect data related to labor progress. This

tool included questions about Fetal heart rate during first stage of labor, premature rupture of membrane, duration of three stages of labor, vital signs during stages of labor, outcome of second stage of labor, onset of labor, mode of delivery.

Tool (IV): Numeric Rating Scale (NRS):

The NRS was adopted from McCaffery, and Beebe, (1989). It was used to assess the pain intensity experienced by the woman during labor. It contained a blank line anchored at each end of the line by adjectives that describe the extremes of pain. For ease of measurement a 10 cm line usually is used. The anchoring adjectives commonly used are "no pain" and "severe pain". The woman was asked to place a mark on the line that best indicates the pain being experienced. Measuring from the end of the line to the mark made by the woman gives a numeric rating of the intensity of the pain.

Scoring system:

The score zero (0) indicates no pain and the top score (10) indicates the severe pain. The NRS total scoring was divided into four main parts: the first part graded 0 which indicated no pain, the second part graded from 1-3 cm that reflects mild pain, the third part graded from 4-6 cm for moderate pain and the fourth part from 7-10 cm for severe pain.

Tool (V). APGAR score:

It was adopted from Apgar, (1953) to measure physical condition of the newborn. It is obtained by adding points (2, 1, or 0) for five indicators (heart rate, respiratory rate, muscle tone, reflex irritability, and skin coloration). Evaluated at the first and fifth minutes after delivery and total score ranging from 0 to 10 based on the following assessment criteria:

Scoring system:

Apgar score of 7 to 10 indicates no asphyxia; Apgar score of 4 to 6 indicates moderate asphyxia and Apgar score of 0 to 3 indicates severe asphyxia.

Tools validity:

Tools of data collection were investigated for content validity by panel of three experts in Obstetrics & Gynecological Nursing specialty from the Faculty of Nursing Benha University, who are selected to test content validity, clarity, relevance, comprehensiveness, understanding and applicability. The opinion was elicited regarding the layout, format, and sequence of the questions and all of remarks were taken into consideration.

Tools Reliability:

Reliability was calculated by Cronbach's alpha coefficient test, and the internal consistency of Pittsburgh sleep quality index (Tool II) was $\alpha=0.91$. Tool III was 0.89. Numeric Rating Scale (Tool IV) was $\alpha=0.94$. and APGAR score (Tool V) was 0.93.

Ethical considerations:

- An official permission from the selected study settings was obtained for the fulfillment of the study.

- The aim of the study was explained to each woman before applying the tools to gain their confidence and trust.

-The researcher was obtained oral consent from each woman to participate in the study and confidentiality were assured.

- The data were collected and treated confidentially.

- All pregnant women were freedom to withdrawal from the study at any time.

- The researcher emphasized that the participant is voluntary for participating in the study.

- The study didn't harm dignity and traditional, religious aspects of the women.

Pilot study:

A pilot study was carried out on 10 % of the total sample (15 pregnant women) to test the clarity and applicability of the study tools as well as estimation of the time needed to fill the tools. The pilot was excluded from the main sample to avoid contamination.

Field work:

The study was conducted from beginning of November 2021 to the end of April 2022 covering 6 months. The researcher was visited the previously mentioned setting three days/weeks (Saturday, Sunday, and Tuesday) from 9.00 Am to 12.00 Pm. The study was conducted through five phases: preparatory phases, interviewing and assessment phase, planning phase, implementation, and evaluation phase.

I) Preparatory phase:

The researcher reviewed the local and international related literature and theoretical knowledge of various aspects of the study, using textbooks, evidence-based articles, internet, periodicals and journals to develop tools of data collection. Finally, the researcher was conducted pilot study to test content validity of tools used.

II) Interviewing and assessment phase:

This phase encompassed interviewing both control group and study group. Interviewing begins first with control group to avoid bias then with study group. At the beginning of the interview the researcher greeted the women, introduced herself, explained the purpose of the study and provided the women with all information about the study (purpose, duration, and activities) and took oral consent to participate

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in the study. Data was collected by the researcher through the distribution of (Tool I: A structured self-administered questionnaire). Firstly, the researcher used (Tool I – Part 1,2) to collect pregnant women' general characteristics and obstetrical history then (Tool I – Part3) was used to select pregnant women with sleeping disorders. The Pittsburgh sleep quality index (Tool II pre-posttest) distributed to measure the quality and patterns of sleep during previous month. Average time for the completion of each woman interview was around (20-30 minutes). A number of interviewed women / days ranged from 2-3 women. The data obtained during this phase constituted the baseline for further comparison to evaluate the effect of instructional tips.

III) Planning phase:

Based on results obtained from pretest assessment phase of studied women and review of relevant literature, the researcher designed the instructional tips of sleep hygiene in the form of printed Arabic brochure supported by figures for improving sleeping disorders. the sessions numbers and its content were determined.

Objectives of instructional tips of sleep hygiene were constructed included the following:

General objectives: By the end of the instructional sessions, each pregnant women would be able to acquire the essential instructional tips regarding sleep disorders and would have positive pregnancy outcome.

Specific objectives: By the end of the instructional sessions, each woman would be able to:

- Define sleeping disorders.
- Enumerate causes of sleeping disorders.

- Illustrate types of sleeping disorders.
- Discuss effect of sleeping disorders on maternal and fetal outcome.
- Perform instructional tips of sleep hygiene.

IV) Implementation phase:

The researcher designed the instructional tips of sleep hygiene for study group to overcome sleep disorders during pregnancy. The instructional tips of sleep hygiene were implemented through 2 sessions. It was conducted in the waiting room of the outpatient clinic immediately after completion of the assessment phase. Each session took about 30-45 minutes. At the beginning of the first session women were oriented with the instructional tips' contents. The subsequent session started by feedback about the previous session and the objectives of the new session, simple Arabic language were used to suit women' level of understanding. At the end of each session, five minutes were devoted to permit women to ask questions to clarify the session contents and to correct any misunderstanding. Each woman was informed about the time of the next sessions.

The first session included (definition, causes and types of sleeping disorders, effect of sleeping disorders on maternal and fetal outcome), **The second session** after one week from first session included (how to resolve sleeping disorders through instructional tips of sleep hygiene). These sessions were repeated to each subgroup of (2-3) women until the predetermined sample size was completed.

Different methods of teaching were used such as discussion, demonstration, re-demonstration, and brainstorming. Instructional media included video contain all content of the sessions and instructional tips

about sleep disorders during pregnancy which constructed by the researcher in a form of printed Arabic brochure after reviewing the related literatures were distributed to all recruited women in the study from the first session to achieve its objectives.

V) Follow up and evaluation phase:

The effect of instructional tips of sleep hygiene on sleeping disorders was evaluated with tool II (PSQI) after 3 weeks of instructions implementation. Posttest tools (tool III, tool IV, tool V) for both groups was utilized to evaluate outcomes of pregnancy during delivery through continuous follow up of pregnant women at last weeks of pregnancy until time of labor. At almost time the researcher followed the women via telephone.

Administrative design:

An official approval letter to conduct this study was obtained from Dean of Faculty of Nursing to director of Benha University Hospital, then the researcher interviewed each study participant and obtained an informed consent before starting the data collection.

Statistical Analysis:

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 22.0) was used for that purpose, followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency, and percentages). Test of significance (independent t test, chi-square), Pearson correlation coefficients were used. Statistically significant difference was considered at $p\text{-value} \leq .05$, and a highly statistically significant difference was considered at $p\text{-value} \leq .001$, while the $p\text{-value} > .05$ indicates non-significant results.

Strength points of the study

The study considered the first study about the effect of instructional tips of sleep hygiene

in improving sleep disorders of pregnant women and outcome of pregnancy at Benha University Hospital.

The pregnant women and nurses in department were cooperative.

Limitation of the study:

- Sometimes the sessions were protracted due to noise and other individuals' interruption.
- Double the researcher's effort to complete the sample size to increase the number of visits instead of two visits per weeks, as was in the protocol to three visits per week.
- There is some of studied women withdrawal from the study which led to take another sample to complete the study sample.
- There were a little of studies that investigate the effectiveness of instructional tips of sleep hygiene on pregnant women with sleeping disorders and outcome of pregnancy.

Results:

Table (1) clarifies that more than two fifth (43.3%) of control group and less than two fifth (38.3%) of the study group in age group from (25<30 years) with a mean age of 27.84 ± 5.53 and 27.24 ± 5.66 years respectively. More than half (61.7% and 55.0%) of both control and study groups respectively were lived in rural area. Concerning level of education, it was clear that about half (51.7% and 48.3%) of both control and study groups respectively had secondary education. As regards occupational status, more than two third (66.7% and 71.7%) of both control and study groups respectively were housewife. Finally, about two thirds (65.0% and 70.0%) of both control and study groups respectively had low work

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nature. Generally, there was no statistically significant difference between control and study groups regarding demographic characteristics. That is the two groups under study homogenous.

Figure (1) illustrates that, 70.0% and 65.0% of both control and study groups were overweight.

Table (2) clarifies that, there was no a statistically significant difference between both control and study groups regarding quality and pattern of sleep at pre intervention phase ($P>0.05$). Meanwhile, at post intervention phase there was a highly statistically significant difference between both control and study groups regarding quality and pattern of sleep-in favor of study group ($P\leq 0.001$). As, 66.7%, 73.3%, 65.0%, 56.7%, 58.3%, 63.3% and 63.3% of study group showed moderate sleep disorders compared to 36.7%, 35.0%, 46.7%, 18.3%, 18.3%, 30.0% and 41.7% of control group at post intervention phase.

Figure (2) shows that, 41.7% of control and 6.7% of study group had premature rupture of membrane.

Figure (3) clarifies that, 58.3% and 85.0% of both control and study groups respectively had full term labor. On the other hand, 40.0% and 11.7% of both control and study groups respectively had pre-term labor.

Figure (4) shows that, 35.0% and 60.0% of both control and study groups respectively had vaginal delivery. On the other hand, 65.0% and 40.0% of both control and study groups respectively had cesarean section delivery.

Table (3): illustrates mean labor pain scores among study and control groups during the three stages of labor. The results indicated

that, there was a reduction on labor pain scores during the first stage of labor (at cervical dilatation 6cm and at cervical dilatation 8cm) with a highly statistical significant difference between study and control groups ($P<0.001$). On the other hand, there was no statistically significant difference between study and control groups related to labor pain during the second and the third stage of labor($P>0.05$).

Table (4): reveals that, there was a highly statistically significant difference between mean of Apgar scoring among both study and control groups ($P<0.001$). The Apgar score at 1st and 5th minute was better among study group than control groups (the mean of Apgar scoring of the neonates at the 1st and the 5th minutes in the study group was 8.30 ± 1.30 and 9.45 ± 0.76 respectively as compared with 6.80 ± 0.40 and 7.35 ± 1.10 in the control group).

Figure (5) shows that, 18.30% and 3.30% of both control and study groups' neonates respectively needs for Neonatal Intensive Care Unit.

Table (5) indicates that there was a highly statistical significant positive correlation between sleep disturbances and the duration of the three stages of labor. That means decrease sleep disturbances of studied women is associated with decrease the duration of the three stages of labor.

Table (6): indicates that there was a highly statistical significant positive correlation between studied women pain score during all stages of labor and sleep disturbances. That means decrease sleep disturbances of studied women is associated with decreased pain score during the three stages of labor.

Table (1): Distribution of the studied women (control and study groups) according to their general characteristics (n= 120)

General characteristics	Control group n= 60		Study group n=60		X ²	p-value
	No	%	No	%		
Age (years)						
20 < 25	15	25.0	17	28.4	0.33	0.84
25 < 30	26	43.3	23	38.3		
30- 35	19	31.7	20	33.3		
Mean ± SD	27.84 ± 5.53		27.24 ± 5.66			
Residence						
Rural	37	61.7	33	55.0	0.54	0.45
Urban	23	38.3	27	45.0		
Educational level						
Read and write	4	6.7	2	3.3	1.16	0.76
Basic education	5	8.3	7	11.7		
Secondary education	31	51.7	29	48.3		
University education	20	33.3	22	36.7		
Occupation						
Housewife	40	66.7	43	71.7	0.35	0.55
Working	20	33.3	17	28.3		
Nature of work						
Heavy work	21	35.0	18	30.0	0.34	0.55
Low work	39	65.0	42	70.0		

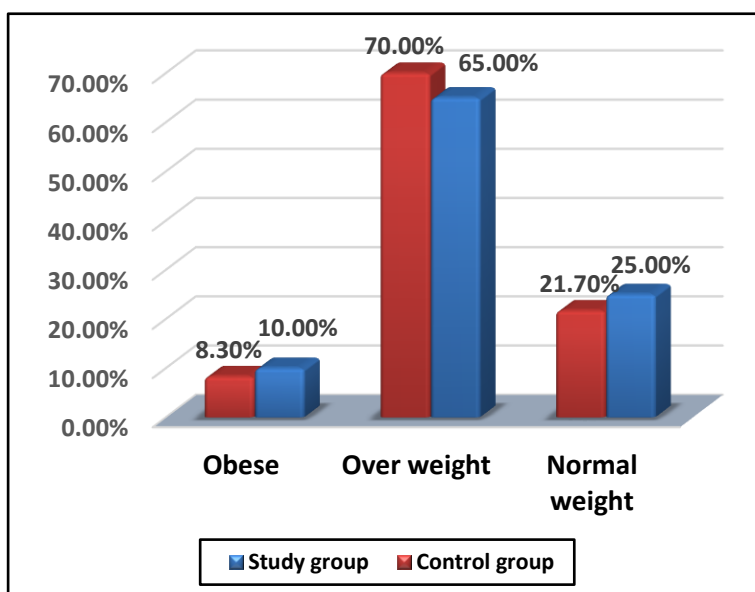


Figure (1) Distribution of the studied women (control and study groups) regarding to Body mass index (n=120)

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Table (2): Distribution of the studied women (control and study groups) according to their quality and patterns of sleep (n= 120).

Subjective sleep quality	Pre-Intervention				X ² P value	Post-Intervention				X ² P value
	Control group		Study group			Control group		Study group		
	No	%	No	%		No	%	No	%	
Subjective sleep quality										
Without sleep disorders	6	10.0	5	8.3	0.49 0.92	5	23.3	9	15.0	21.9 0.000**
Moderate sleep disorders	24	40.0	27	45.0		19	36.7	40	66.6	
Sever sleep disorders	20	33.3	20	33.3		22	31.7	7	11.7	
Very sever sleep disorders	10	16.7	8	13.4		14	8.3	4	6.7	
Sleep latency										
Without sleep disorders	3	5.0	1	1.6	2.2 0.52	2	3.3	0	0.0	18.4 0.000**
Moderate sleep disorders	27	45.0	25	41.7		21	35.0	44	73.3	
Sever sleep disorders	25	41.7	25	41.7		27	45.0	12	20.0	
Very sever sleep disorders	5	8.3	9	15.0		10	16.7	4	6.7	
Sleep duration										
Without sleep disorders	8	13.3	10	16.7	0.45 0.92	6	10.0	14	23.3	15.9 0.001**
Moderate sleep disorders	30	50.0	31	51.7		28	46.7	39	65.0	
Sever sleep disorders	15	25.0	13	21.6		18	30.0	5	8.4	
Very sever sleep disorders	7	11.7	6	10.0		8	13.3	2	3.3	
Sleep efficiency										
Without sleep disorders	5	8.4	7	11.7	1.6 0.65	3	5.0	12	20.0	34.4 0.000**
Moderate sleep disorders	15	25.0	10	16.7		11	18.3	34	56.7	
Sever sleep disorders	29	48.3	33	55.0		33	55.0	9	15.0	
Very sever sleep disorders	11	18.3	10	16.6		13	21.7	5	8.3	
Sleep disturbance										
Without sleep disorders	2	3.3	3	5.0	0.98 0.80	1	1.7	15	25.0	50.0 0.000**
Moderate sleep disorders	13	21.7	10	16.7		11	18.3	35	58.3	
Sever sleep disorders	17	28.3	15	25.0		13	21.7	4	6.7	
Very sever sleep disorders	28	46.7	32	53.3		35	58.3	6	10.0	
Use of sleep medication										
Without sleep disorders	4	6.7	6	10.0	0.79 0.85	2	3.3	14	23.4	38.0 0.000**
Moderate sleep disorders	21	35.0	20	33.3		18	30.0	38	63.3	
Sever sleep disorders	20	33.3	17	28.4		17	28.4	5	8.3	
Very sever sleep disorders	15	25.0	17	28.3		23	38.3	3	5.0	
Daytime dysfunction										
Without sleep disorders	1	1.7	3	5.0	2.3 0.50	0	0.0	17	28.4	42.1 0.000**
Moderate sleep disorders	29	48.3	26	43.3		25	41.7	38	63.3	
Sever sleep disorders	24	40.0	21	35.0		20	33.3	3	5.0	
Very sever sleep disorders	6	10.0	10	16.7		15	25.0	2	3.3	

****A highly statistical significant (P≤0.001)**

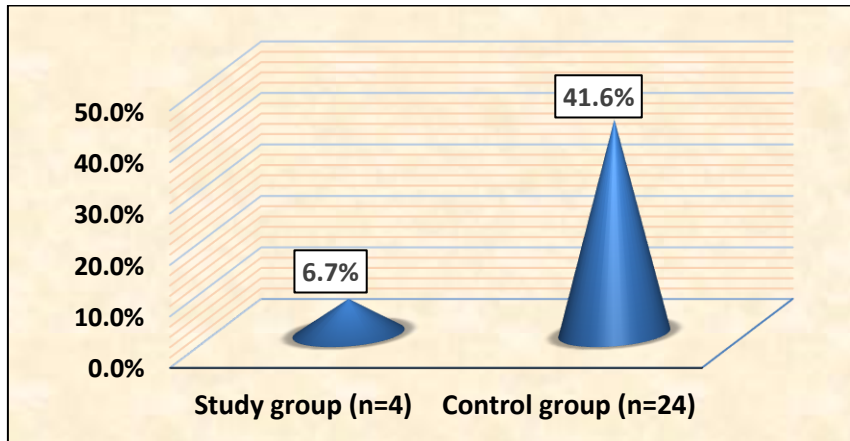


Figure (2): Distribution of the studied women (control and study groups) according to premature rupture of membrane (n=120)

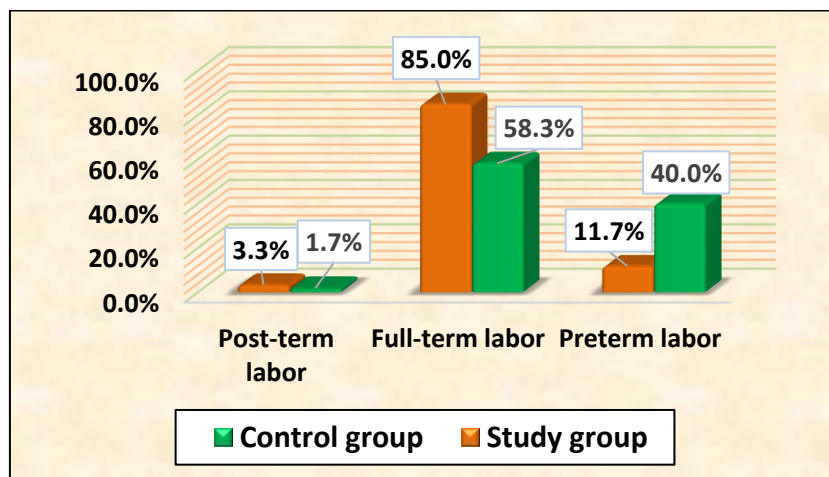


Figure (3) Distribution of the studied women (control and study groups) regarding onset of labor (n=120)

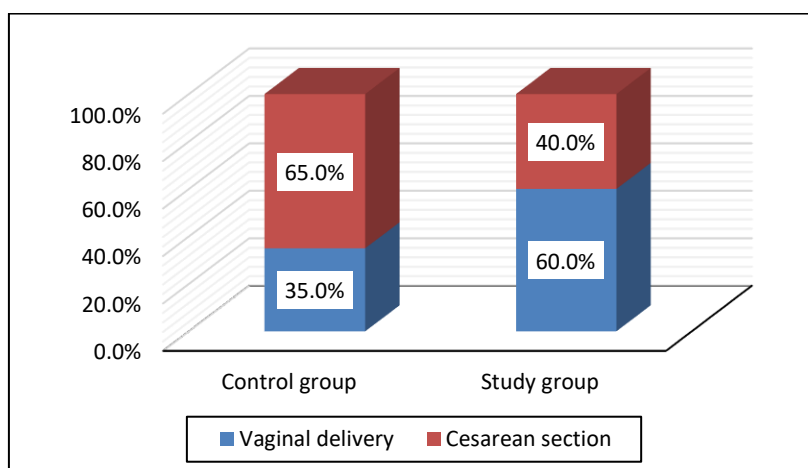


Figure (4) Distribution of the studied women (control and study groups) regarding mode of delivery (n=120)

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Table (3): Mean labor pain scores among studied women during the three stages of labor (n=120)

Labor pain assessment	Control group n=60	Study group n=60	Independent t test	P value
	Mean ±SD	Mean ±SD		
First stage of labor				
At cervical dilatation (6cm)	7.53±1.89	6.35±1.32	3.97	0.000**
At cervical dilatation (8cm)	8.81±1.80	7.53±1.64	4.07	0.000**
Second stage of labor				
At cervical dilatation (10cm)	9.38±1.19	9.05±1.41	1.39	0.16
At crowning	9.63±.99	9.53±1.19	0.49	0.62
Third stage of labor				
	8.65±1.11	8.46±1.52	0.75	0.45

In significant (P>0.05)

**A highly statistical significant (P≤0.001)

Table (4): Mean Apgar scoring of neonates among studied women at first and fifth minute (n=120)

Apgar Scoring	Control group n=60	Study group n=60	Independent t test	P value
	Mean ±SD	Mean ±SD		
Apgar Score (1 st minute)	6.80±0.40	8.30±1.30	8.50	0.000**
Apgar Score (5 th minute)	7.35±1.10	9.45±0.76	12.10	0.000**

**A highly statistical significant (P≤0.001)

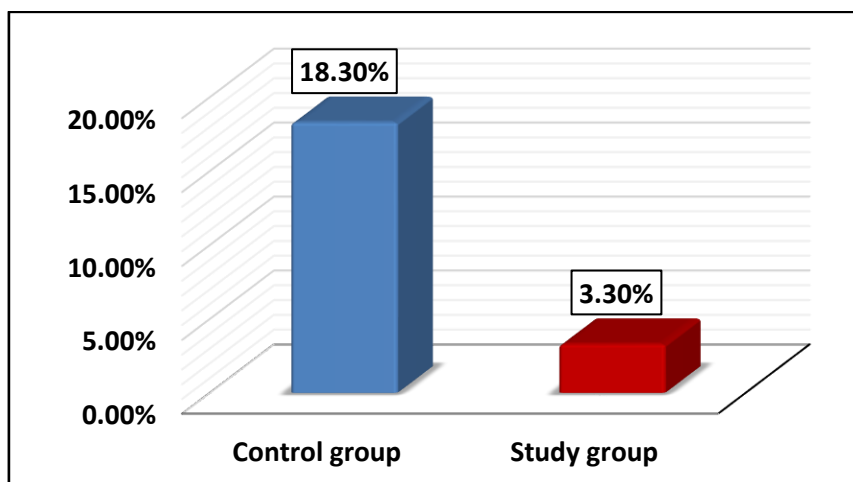


Figure (5): Distribution of studied women' neonate according needs to Intensive Care Unit (n=120)

Table (5) Correlation coefficients between sleep disturbances and duration of the three stages of labor among control and study groups women (n=120)

Duration of the 3 stages of labor	Sleep Disturbances			
	Control group		Study group	
	r	P value	r	P value
1 st stage of labor	.480	0.000**	.466	0.000**
2 nd stage of labor	.849	0.000**	.420	0.000**
3 rd stage of labor	.735	0.000**	.449	0.000**

****A Highly statistical Significant (P≤0.001)**

Table (6) Correlation coefficients between sleep disturbances and pain score among control and study groups women (n=120)

Pain during the 3 stages of labor	Sleep Disturbance			
	Control group		Study group	
	r	P value	r	P value
At cervical dilatation (6cm)	.855	0.000**	.797	0.000**
At cervical dilatation (8cm)	.778	0.000**	.763	0.000**
At cervical dilatation (10cm)	.699	0.000**	.348	0.000**
At crowning	.543	0.000**	.224	0.000**
During third stage of labor	.887	0.000**	.808	0.000**

****A Highly statistical Significant (P≤0.001)**

Discussion

The aim of the current study was to investigate the effectiveness of instructional tips of sleep hygiene in improving sleeping disorder of pregnant women and their effect on the outcome of pregnancy. The present study results represented that there was a significant improvement of quality and pattern of sleep among study group following application of instructional tips. Also, there was a positive pregnancy outcome among study group than control group. The results of the present study were significantly supported the study hypotheses.

As regards general characteristics of studied women, the results of the current study clarified that, more than two fifth of control group and less than two fifth of the study group were in age group from 25-30 years with a mean age of 27.84 ± 5.53 and

27.24± 5.66 years respectively. The findings of the current study were in accordance with **Effati-Daryani et al. (2019)** who studied "sleep quality and its demographic predictors regarding three trimesters of pregnancy " and reported that, the mean age of the participants was 27.08±5.18 years.

Also, these findings agreed with **Abdelaty Goniem et al., (2018)** who studied "sleep disturbance during pregnancy" and reported that, more than three quarters of the studied women's age ranged from 20 - 30 years old.

As regards residence, more than half of both control and study groups were lived in rural area. These findings agreed with **Abd El-Razek et al., (2016)** who studied that "The relationship between sleep disturbance in late pregnancy and labor outcomes" reported that,

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the largest percentage (54%) were rural residents.

Concerning level of education, it was clear that about half of both control and study groups had secondary education. These results of the current study were consistent with **Mohamed, et al., (2018)** who studied "Relationship between Quality of Sleep and Pregnancy Outcomes among Primipara" revealed that, more than one half were holding secondary certificate. On the other hand, the results of the current study were in difference with **Effati-Daryani et al., (2019)** who reported that, about half of the participants were under diploma and the other half had a diploma and academic degree.

As regards occupational status, more than two third of both control and study groups were housewives. This may be due to the fact that a high percentage of studied women have a secondary level of education and live in rural areas, which reduce their job opportunities. These findings were consistent with **Osman et al., (2020)** who assessed "the effect of sleep disturbance during pregnancy on maternal and fetal outcomes and its related nursing management" revealed that, the majority of the studied pregnant women were housewives. Also, the current findings were in accordance with **Effati-Daryani et al., (2019)**, who reported that, about most of the respondents were housewives. On other hand the results of the current study were in difference with **Abd El-Razek et al., (2016)** who reported that, more than half three quarters were working women while the lowest percentage were housewives.

Generally, there was no statistically significant difference between control and study groups.

Regarding general characteristics. That is the two groups under study were homogenous.

The results of the current study showed that, less than three quarters of control group and less than two thirds of study group were overweight. This may be due to physiological changes occur during pregnancy as weigh gain regarding to enlargement of uterus. As well as, this may be explained by the fact that women due to cultural or personal reasons generally don't practice physical activity.

These findings were agreed with **Louis et al., (2018)**, who studied "Predictors of sleep-disordered breathing in pregnancy" and reported that chronic hypertension, age, and obesity are the most frequent risk factors of sleeping disorders in pregnancy.

On the other hand, the findings of the current study differed with **Mahmoed & Mohamed (2018)** who studied "Nursing counseling about sleep hygiene behaviors for snoring and sleeping disorders among pregnant women", and reported that, around two third of women with normal weight while only one third having obese women.

Regarding quality and patterns of sleep among studied women. The findings of the current study showed that, there was no statistically significant difference between both control and study groups regarding quality and pattern of sleep at pre intervention phase. this may be due to, the studied women were primigravida so, they have low of experience to deal with signs and symptoms of pregnancy. As well as fear from delivery and responsibility of a baby are also factors that can affect on quality of sleep of pregnant women. Other reasons might be improper sleep hygiene behaviors like performing dynamic physical activity, flexible bedtime, going to bed without sleep sensation, and highly demanding activities before bedtime (like watching exciting movies) that disturb sleep patterns and lead to poor sleep quality.

The current findings agreed with **Tasisa et al. (2022)** who studied " Poor sleep quality and associated factors among pregnant women on antenatal care follow up at Nekemte Referral Hospital and Wollega University Hospital" the results reported that, the odds of having poor sleep quality among participants with poor sleep hygiene was nearly three times higher compared to those with good sleep hygiene.

As regards of post intervention phase the findings of the current study revealed that, there was a highly statistically significant difference between both control and study groups regarding quality and pattern of sleep- in favor of study group. This improvement on pattern of sleep due to educate pregnant women about instructional tips of sleep hygiene may be improved sleep quality and how to deal with sleep problem during pregnancy through organized sessions and following applying these instructions with study group.

The results of the current study were supported by **Osman et al. (2020)** who revealed that there was a highly significant improvement in the management of sleep disturbance during pregnancy after nursing management. Also, the results were in accordance with **Huong et al. (2019)** who studied "the quality of sleep and explore factors especially Sleep Hygiene Practices associated with sleep quality among pregnant women". They showed positive correlations between sleep quality and sleep hygiene practices.

The results of the current study showed that, about two fifth of control group compared to less than one tenth of study group had premature rupture of membrane. this may be due to, the controlled group had shorter sleep duration and insufficient lifestyle as physical activity led to poor sleep

quality that may affect on pregnancy outcome.

Also, the findings of current study agreed with **Zaky, (2015)** who studied "The Relationship between Quality of Sleep during Pregnancy and Birth Outcome among Primiparae" revealed that, premature rupture of membranes was observed among 65.4% of the poor sleep quality group and the mature one was observed among 82.4% of the good sleep quality group.

As regards, onset of labor the results of current study showed that, more than four fifth of study group compared to more than half of control group had full term labor. On the other hand, two fifth of the control group compared to one tenth of the study group had pre-term labor. The reduction on preterm labor percentage among study group may be due to following instructional tips of sleep hygiene during pregnancy that effect in improving maternal outcome.

The findings of the current study agreed with **Lu et al., (2021)** who found that, there was significant associations between sleep disturbances in pregnancy and a variety of maternal complications and adverse fetal outcomes as preterm birth.

Also, the results of current study was in accordance with **Wang and Jin., (2020)** who studied " Association between maternal sleep duration and quality, and the risk of preterm birth: a systematic review and meta-analysis of observational studies" found that, Women with the shortest sleep duration were 1.23 times more likely to have a preterm birth than those with the longest sleep duration (summarized RR=1.23;95%CI=1.01– 1.5o).

According to mode of delivery, the findings of the current study showed that, more than one third of control group compared to three fifth of study group had vaginal delivery. On the other hand, more than three fifth of the control group and two

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fifth of the study group had cesarean section delivery. The reduction of cesarean section percentage among study group may be due to exercise and walking help to improve labor outcome. Pregnant women who had performed physical activity will lead to improve circulation of heart and blood vessels that will provide a stimulus to the posterior pituitary to secrete oxytocin, Oxytocin its main function in labor is to bring on contractions that help to facilitate normal vaginal delivery.

The finding of current study agreed with **Veisy et al., (2021)** who studied " Effect of Prenatal Aerobic Exercise on Maternal and Neonatal Outcomes" and revealed that, women in exercise group had a significantly lower incidence of caesarean. Also, the findings of current study agreed with **Rajeswari et al., (2020)** who studied " Efficacy of progressive muscle relaxation on pregnancy outcome among anxious Indian primi mothers" revealed that less than two thirds of the control group (49.6%) and less than three quarters (74.2%) of study group had normal vaginal delivery.

In relation to labor pain among control and study groups during the three stages of labor, the results of the current study indicated that, there was a reduction on labor pain scores during the first stage of labor (at cervical dilatation 6cm and at cervical dilatation 8cm) with a highly statistically significant difference between study and control groups. On the other hand, there was no statistically significant difference between study and control groups related to labor pain during the second and the third stage of labor. This may be due to prenatal nursing intervention of sleep hygiene instructional tips was effective in promoting pregnant women's self-efficacy for childbirth and reducing their

perceived pain and anxiety in the first two stages of labor.

The findings of the current study were in the same line with **Bolanthakodi et al., (2018)** who revealed that, the tolerance of pain was better in the study group as shown by numerical pain intensity scale ($p < 0.001$) and pain behavioral observational scale scores ($p < 0.0001$).

On the other hand, these findings were in difference with **Firouzbakht et al., (2015)** who studied " The effectiveness of prenatal intervention on pain and anxiety during the process of childbirth-Northern Iran" showed the difference between the two groups were insignificant in a latent phase (3–4 cm in cervical dilatation), and in the second stage. However, in a transitional phase (8–10 cm in cervical dilatation), pain intensity was significantly less in the study group.

In relation to Apgar scoring of neonates among control and study groups at first and fifth minute, the results of the current study revealed that, there was a highly statistically significant difference between mean of Apgar scoring among both control and study groups. The Apgar score at 1st and 5th minute was better among study group than control groups (the mean of Apgar scoring of the neonates at the 1st and the 5th minutes in the control group was 6.80 ± 0.40 and 7.35 ± 1.10 respectively as compared with 8.30 ± 1.30 and 9.45 ± 0.76 in the study group). The lower Apgar score among control group can be explained as sleep duration and quality affecting the type, mode of delivery and length of labor that can affect fetal outcome and the newborn's wellbeing. The results of the current study agreed with **Mohamed, et al., (2018)** who revealed that, there was significantly low Apgar scores among who had mild sleep difficulty.

The findings of better neonatal outcome included high Apgar score among study group might be due to those mothers who followed instructional tips had higher dopamine and serotonin levels and lower levels of cortisol and nor-epinephrine. These changes might have contributed to the improved fetal activity and the better neonatal outcome in terms of high Apgar score, lesser incidence of prematurity, low birth weight and better performance on neonatal behavior assessment.

These findings of current study agreed with **Shojaei et al., (2021)** who showed that the 1st and 5th-min Apgar scores of the intervention group were higher than the control group without a statistically significant difference (the mean of Apgar scoring of the neonates at the 1st and the 5th minutes in the control group was 8.61 ± 1.34 and 8.82 ± 0.53 respectively as compared with 9.73 ± 1.42 and 9.94 ± 0.24 in intervention group).

On the other hand, these findings of current study disagreed with **Li et al. (2018)** who studied "Association between sleep-disordered breathing during pregnancy and maternal and fetal outcomes" and showed that prenatal sleep disorder breathing didn't significantly relate to Apgar score and birth weight.

According to neonatal needs for Neonatal Intensive Care Unit, the results of current study showed that, less than one fifth and less than one tenth of both control and study group neonates respectively needs Neonatal Intensive Care Unit. These findings of current study were supported by **Osman et al., (2020)** who found that approximately about more than a quarter of the studied subject have neonatal jaundice as fetal outcome.

The findings of the current study showed that, there was a highly statistical

significant positive correlation between sleep disturbances and the duration of the three stages of labor. That means decrease sleep disturbances of studied women is associated with decrease the duration of the three stages of labor. The finding of current study agreed with **Zaky, (2015)** who reported poor sleep quality had a highly significant correlation with prolonged first, second and third stage of labor, and significantly higher prevalence of maternal distress.

The finding of the current study indicates that there was a highly statistical significant positive correlation between studied women pain score during all stages of labor and sleep disturbances. That means decrease sleep disturbances of studied women is associated with decreased pain score during the three stages of labor. This may be due to breathing technique, relaxation and massage during labor that help mother to cope with the stress during labor and to produce Beta-endorphins hormone to reduce pain and suppress the immune system, if pregnant women stressed during labor, that could make release excessive beta-endorphins, which may inhibit oxytocin and slow things down, and keeping things as calm as possible.

The findings of the current study agreed with **Wadhwa et al.,(2020)** who studied "Effect of antenatal exercises, including yoga, on the course of labor, delivery and pregnancy: A retrospective study" who found that, the subjects who followed regular antenatal exercises, including yoga, had significantly lower rates of cesarean section, lower weight gain, higher newborn infant weight, lower pain and overall discomfort during labor, lower back pain throughout pregnancy, and earlier post-partum recovery compared to those who did no specific exercises or only walked during pregnancy.

Also, these findings of the current study agreed with **Yuksel et al., (2017)** Who

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studied " Effectiveness of breathing exercises during the second stage of labor-on-labor pain and duration: a randomized controlled trial" and evident that, breathing exercises with deep inhalation and exhalation in pregnant women are effective in reducing the perception of labor pain and shortening the duration of the second stage of delivery.

As well as, the findings of the current study agreed with **Firouzbakht et al., (2015)** who reported that, the prenatal education reduced level of hospital anxiety and intensity of pain in trained women.

Conclusion

Applying instructional tips of sleep hygiene had a significant improvement of sleeping disorders and positive pregnancy outcome among women of study group. Moreover, there was a highly statistical significant positive correlation between pregnant women' quality of sleep and the duration of the three stages of labor as well as, pain score during the three stages of labor. Good quality of sleep reflected on outcome of pregnancy as better APGAR score, neonatal weight and needs to intensive care unit. Hence the aim of the study was achieved, and study hypotheses were accepted.

Recommendations

- Instructional tips of sleep hygiene are recommended as an alternative non-pharmacological method, which can be applied in antenatal clinics.
- Disseminate brochure covering instructions related to improving sleep pattern of pregnant women regarding promoting women's health during pregnancy.

Further research:

- Further researches are needed on a larger probability sample at different settings to generalize the results.

- Health care providers should allocate more time to educate pregnant women who had sleep disturbances about different modalities to improve sleep quality.

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فاعلية النصائح الإرشادية بنظافة النوم في تحسين اضطرابات النوم لدى السيدات الحوامل وأثرها على نتائج الحمل

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من المرجح أن تواجه السيدات الحوامل مشاكل في النوم خلال أشهر الحمل، حيث تستمر مشاكل الحمل والنوم معا فتجد بعض السيدات صعوبة في النوم. قد ينزعج البعض من الكوابيس أو الأحلام غير السارة. هذه المشاكل التي تحدث أثناء الحمل قد تكون بسبب الحالة البدنية والعقلية والتغيرات التي يمر بها الجسم. لذا هدفت الدراسة إلى التحقق من فاعلية النصائح الإرشادية لنظافة النوم في تحسين اضطرابات النوم لدى السيدات الحوامل وتأثيرها على نتائج الحمل. وتم استخدام تصميم شبه تجريبي. وقد أجريت الدراسة في العيادة الخارجية لأمراض النساء والتوليد التابعة لمستشفى بنها الجامعي بمدينة بنها. حيث تم اختيار عينة غرضية لعدد 120 سيدة حامل تعاني من اضطرابات النوم. وأظهرت نتائج الدراسة الحالية أن تطبيق النصائح الإرشادية لنظافة النوم كان ذات تأثير إيجابي على اضطرابات النوم بالإضافة الي نتائج الحمل بين السيدات في مجموعة الدراسة. علاوة على ذلك كان هناك ارتباط إيجابي ذو دلالة إحصائية عالية بين جودة نوم السيدات الحوامل ومدة الثلاث مراحل للولادة وكذلك درجة الألم خلال المراحل الثلاثة للولادة. نوعية النوم الجيدة انعكست على نتائج حديثي الولادة كدرجة أفضل لمقياس أبحار ووزن حديثي الولادة والحاجة إلى قسم الرعاية المركزة بين مجموعة الدراسة من المجموعة الضابطة. ومن هنا تحقق الهدف من الدراسة وقبول فرضيات البحث. وأوصت الدراسة بأنه يجب استخدام النصائح الإرشادية لنظافة النوم كطريقة بديلة غير دوائية، والتي يمكن تطبيقها في عيادات متابعة الحمل ونشر بروشور يغطي التعليمات المتعلقة بتحسين نمط النوم لدى السيدات الحوامل فيما يتعلق بتعزيز صحة السيدات أثناء الحمل.