ARC Journal of Nursing and Healthcare
Volume 5, Issue 2, 2019, PP 33-46
ISSN No. (Online) 2455-4324
DOI: http://dx.doi.org/10.20431/2455-4324.0502005
www.arcjournals.org

Maternal Postpartum Sleep Disturbance and Fatigue: Factors Influencing

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Abstract

Background: *Prevention of postnatal maternal sleep disorders in women is an important component of comprehensive health service delivery because of the substantial potential benefits for population health.*

Aim: *The aim of this study is to assess the prevalence, causes and pattern of sleep disturbance, fatigue, and find out the relation between, socio-economic factors and the pattern of sleep and fatigue among maternal postpartum.*

Subject & Methods: *This cross-sectional analytic study was carried out at Sheikh Zayed Hospital, and Helwan General Hospital, Egypt; on 250 postpartum primiparous women in reproductive age who delivered vaginally. Three tools were used for data collection; an interview questionnaire form, the Global-Sleep-Assessment-Questionnaire (GSAQ), and the Multidimensional-Fatigue-Symptom-Inventory-Short-Form (MFSI-SF).*

Results: *The results revealed that sleep disturbance and fatigue were significantly higher among women who were working, urban living, with high crowding index and among those who didn't receive postnatal instructions. A statistically significant positive relationship between the sleep disturbance and fatigue scores was observed.*

Conclusion: *Sleep disturbance and fatigue are positively and significantly correlated. Receiving postnatal instructions decrease both sleep and fatigue problems.*

Recommendations: *It is recommended nurses to give more importance to instructing women regarding postpartum period, and help women to cope with the problems encountered. The discharge plan must include all details and instructions for the women regarding rest and sleep. Further research is proposed to assess the effect of nursing interventions to help women who have postnatal sleep disturbances and fatigue to cope with these problems.*

Keywords: *Sleep disturbance, Fatigue, Postpartum women*

1. INTRODUCTION

The postpartum period is a critical transitional time for the woman on physiological/ emotional /social levels. It is an important/ integral phase of a woman's reproductive life-cycle. This period is significant for the mother/ baby/family because it is a time of physiological adjustment for both the mother and her baby. It is a period of important social and emotional adjustment for all parties ***(Girault, et al., 2018)***. Sleep deprivation as well as fatigue are impressive features in the 1st year after birth, which may have a negative effect on ones work, family life, as well as social relationships.

Sleep disturbance is defined as the perception of the degree the bulk sleep was disturbed due to fragmentation and sleep latency. They spend 20% more of the day awake than average during the first-six-weeks-postpartum which may affect the overall health, safety, and quality-of-life. Fragmentation refers to the perception of the number of awakenings; time spent awake, movement, sleep depth, and degree of difficulty with disturbance. Latency refers to the perception of the amount of time from settling down to falling asleep and the degree of difficulty in falling to sleep ***(Lee & Lee, 2007).***

Sleep effectiveness is defined by ***Rychnovsky and Hunter, 2009*** as the perception of the degree the bulk sleep period was considered to be effective in terms of length and quality. Quality refers to the perception of how rested ones feel

upon awakening, the adequacy of overall quality and the amount of sleep received. The length refers to the perception of the time spent in actual sleep as well as the time spent in bed attempting to sleep. Sleep supplementation is the perception of the degree to which the bulk sleep period was augmented by additional sleep. Additional sleep times measured as daytime, morning, afternoon and time to wake after final arousal.

Sleep-deprived mothers may unintentionally compromise their infants' sleep quality because infants often adopt their mothers' circadian sleep rhythms. Also, neurotransmitters that influence sleep quality affect mood and raises sleep-deprived mothers' risk for depression ***(Insana etal., 2010).***

Sleep pattern has been linked to obesity, weight gain, and chronic disease as well as mortality in adults. Short or extended sleep has been linked to higher mortality rates in women ***(Patel et al., 2004)***. Persistent sleep deprivation may result in physiological changes, including release of the adipocyte hormones leptin and ghrelin which stimulate appetite, or other stress hormones such as cortisol which may lead to overeating and subsequent obesity ***(Spiegel et al., 2004; Copinschi, 2005)***.

The percentage of mothers reporting fatigue as a concern between three days and five weeks postpartum has been reported in the range of 53.0% to 97.0% ***(Soares and Murray, 2006; Posmontier, 2008)***. Fatigue is a condition characterized by a lessened capacity for work and reduced efficiency of accomplishment, usually accompanied by a feeling of weariness and tiredness. The level of fatigue perceived by women who had normal vaginal childbirth was higher during the second day than during the second and sixth weeks after childbirth ***(Farzaneh et al., 2015)***. Post-partum fatigue is a multidimensional phenomenon that causes a woman to feel negative, uncomfortable, and less efficient than usual. It is a debilitating condition that may have an impact on a new mother's ability to care for her child ***(Salary et al. 2010)***.

Postpartum fatigue has the capacity to adversely affect the woman health as well as her ability to resume former role functions and new role functions associated with the birth of a newborn. It also may delay a woman's return to functional status in the areas of the household, social, employment, and self-care responsibilities ***Giallo et al.,* 2014*).*** It begins immediately after childbirth and becomes more severe over time so that within 36 hours of childbirth, postpartum mothers consider fatigue to be a problem which continues to become more serious through the first 6 weeks ***(Hosseini & Jafari, 2013)***.

Postpartum fatigue results from a very complicated interaction among physical, emotional, environmental as well as physiological factors; it must be distinguished from tiredness. The level of fatigue is higher from the period immediately following childbirth to the 6th week than the 3-month-period following childbirth. Therefore, it should be very important to control fatigue, properly, during the initial period following childbirth, including the period of hospitalization ***(Sung-Hee, 2004)***.

It has been reported that postpartum fatigue is related to stress in the process of metabolism and water shift, sudden changes in the endocrine system, and sleep disturbances during the third week of pregnancy, which is also influenced by pain and exhaustion during labor and delivery. In addition, there are environmental factors also affect fatigue, including economic and social status, employment, sleep, and exercise. Physiological factors also affect, including changes in sleep cycles, episiotomy, adaptation to breastfeeding, and sudden hormone mobility ***(Sung-Hee, 2004).*** Maternity nurse must have active anticipatory preparation for motherhood that begins long before the 1st pregnancy becomes a reality. In the hospital, nurses could maximize sleep quality for all mothers; by timing care-giving and diagnostic measures to minimize interruptions in sleep**.** They also can educate mothers the techniques to improve sleep as progressive relaxation, sleep hygiene measures and deep breathing. To reduce fatigue, nurse should focus on exploring ways to reduce maternal sleep disturbance, and improve maternal sleep effectiveness ***(Kempler et al., 2012)***.

2. Aim of the Study

The aim of this study is to assess the prevalence, causes, and pattern of sleep disturbance and fatigue, as well as find out the relationship between socio-economic, and lifestyle factors and the pattern of sleep among maternal postpartum women.

3. Subjects and Methods

3.1. Research Design

A cross-sectional analytic research design was utilized in this study

3.2. Subjects & Setting

A purposive sample of on 250 postpartum women in reproductive age**,** admitted with postpartum sleep disturbance and fatigue at the postpartum inpatient department and outpatient clinic during follow-up visits at El-Sheikh Zayed,

Cairo, Egypt, and Helwan General Hospital, Helwan, Egypt from 1st July 2018 till the end of April 2019 was included. All parturient or postpartum women attending the study settings were selected during a study period of 10 months depending on the following inclusion criteria; Age (17-45 years) who agreed to participate, primiparous, vaginally delivered, and free from any medical or psychological problems that may cause fatigue or sleep disturbances. Women who not complete the study were excluded from the sample.

3.3. Tools of Data Collection

Data of the current study were collected using the following 3 tools:

Tool (1): Interview questionnaire form that includes 3 subsections

Section (a): Socio-demographic characteristics, those include women's age, education, job, Socio-economic status, and crowding index.

Section (b): Description of labor that includes information about the early postnatal period during hospital stay; it included the mode of delivery and any associated problems and period of hospital stay.

Section (c): Postnatal visit data that include information related to the women postnatal visit such as the timing of the visit, instructions received about postnatal care, and the person who helped a woman at home for the care of a baby.

Tool (2): Global-Sleep-Assessment-Questionnaire(GSAQ) ***(Roth et al., 2002)***

It is used to evaluate sleep pattern and causes of sleep disturbances among maternal postpartum women. It consists of 15 items. Responses are measured on a four-point Likert scale where the highest score indicates the highest level of sleep disturbances. The four categories for the scoring system are: (1) never, (2) sometimes, (3) usually, and (4) always.

Scoring: The items of the scale were classified into its six principal components. These are (6) restlessness, (5) sleep apnea, (4) excessive daytime somnolence, (3) sleep schedule disorder, (2) non-restorative sleep, (1) insomnia/ hypersomnia. For individual item analysis, the scale was dichotomized by grouping never with sometimes, and usually with always. Then, for quantitative analysis, the responses never, sometimes, usually, and always were respectively given scores 1 to 4. The sum score of each component was calculated and its mean and standard deviations were computed by dividing by the number of items. Then, the total of each component and of the scale was dichotomized into low if the mean was less than 2 and high if 2 or higher ***(Unger et al., 2004)***.

Tool (3): Multidimensional-Fatigue-Symptom-Inventory-Short-Form (MFSI-SF) ***(Stein et al., 2004)***

It is used to evaluate fatigue symptoms among postpartum women. It consists of 30 items. Responses are measured on a five-point Likert scale where the highest score indicates the highest level of fatigue symptoms. The 5 categories for the scoring system are: (5) extremely, (4) Quite a bit, (3) moderately, (2) A little and (1) not at all.

Scoring: The items of the scale were classified into its five components; these are (1) emotional, (2) general, (3) mental, (4) physical, and (5) vigor. For individual item analysis, the scale was dichotomized by grouping not at all with a little and moderately, and quite a bit with extremely ***(Reeves et al., 2003)***. Then, for quantitative analysis, the responses not at all, a little, moderately, quite a bit, and extremely were respectively given scores 1 to 5. The sum score of each component was calculated and its mean and standard deviations were computed by dividing by the number of items. Then, the total of each component and of the scale was dichotomized into low if the mean was less than 3 and high if 3 or higher.

3.4. Administrative/Ethical Considerations

Official permission was obtained by submission of an official letter from the Faculty of Nursing, Helwan University, to the responsible authorities of the study settings to obtain their permission for data collection. All ethical issues had been taken into researchers' consideration during all the phases of the study; the researcher maintained the anonymity and confidentiality for each participant woman. The researcher introduced herself and explained the nature of the study to every woman and asked questions in Arabic for all of them. Women were enrolled voluntarily after the oral informed consent.

3.5. Validity/Reliability of the Tools

As for the preparatory phase, the related national and international literature was reviewed. This helped in the preparation of the data collection tools and in writing the review. A panel of 3 experts in the field of maternity, obstetrics and gynecologic nursing reviewed the tools to test their content validity. The modification was done accordingly based on expresses judgment.

3.6. Pilot Study

A pilot study was conducted to test the applicability of the tools, the feasibility of the study and estimate the time needed for data collection. It was conducted on 10.0% of the total number (25 women). Modification, omission, and addition were followed as needed according to the results of the pilot study.

3.7. Statistical Analysis

All collected data were tabulated and analyzed statistically by using SPSS 20.0 for windows. Mean, standard deviation (mean ± SD) and number and percent (N, %), for qualitative data, were used for descriptive statistics. Pearson correlation coefficient test (r), and Chi-Square (x^2) were used for analytical statistics. Level of significance (P-value) was measured at 0.05. Column and Pie chart are used for graphics presentation.

4. RESULTS

Table 1 describes the socio-demographic characteristics of women in the study sample. More than half (51.6%) were below 25 years old, their age ranged between 17 to 36 years and the mean age (mean ± SD) was 24.1±3.9. The highest percentage of women (48.0%) had a secondary/technical school education, while 3.6% were illiterate or read and writes. Moreover, three-quarter of them (71.6%) were housewives, and 65.2% of them, were living in rural areas. In addition, most of them (66.8%) had a low socio-economic status. For the crowding index, 70.8% of them had less than two persons per room.

Table 1. *Socio-demographic characteristics of women in the study sample (n=250)*

Characteristics	Frequency (N)	Percent (%)
Age (years):		
<20	28	11.2
20-	101	40. 4
25+	121	48.4
Range	17 - 36	
Mean ± SD	24.1 ± 3.9	
Education:		
Illiterate	1	0.4
Read/write	8	3.2
Primary	57	22.8
Secondary / Technical	120	48.0
University	64	25.6
Job:		
Housewife	179	71.6
Working	71	28.4
Residence:		
Rural	163	65.2
Urban	87	34.8
Socio economic status		
Low	167	66.8
Moderate	83	33.2
Crowding index:		
< 2	177	70.8
2 +	73	29.2

Figure 1 and **Table 2** describe Prevalence of postpartum problems among women in the study sample. The majority of women's (84.0%) had encountered problems after delivery. Pain from episiotomy was the most common, with the highest percentage problem (79.6%), followed by abdominal pain (28.4 %), whereas insomnia was the least reported (0.4%) problem.

Table 2 shows that more than three-quarters, of the studied women, had a vaginal delivery with episiotomy (78.8%). A considerable parentage of them (66.8%) had only one day of hospital

stay. Only 4.0% had a hospital stay of 3-4 days. Also, the possible sleep risk factors of women describe in the same table it is evident that more than three-quarter of women (78.8%) had a major life event that affected their sleep during the previous month, and (15.6%) of them had shift work that affected their sleep. A small proportion of the enrolled participated woman (5.6 %) was screened for sleep problems.

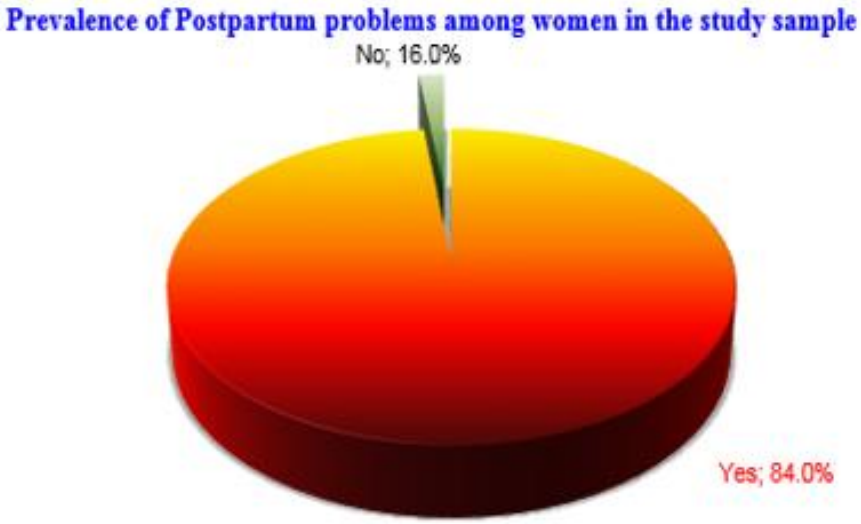

Figure 1. *Prevalence of Postpartum problems among women in the study sample (n=250)*

Table 2. *Mode of delivery, Postpartum problems, duration of hospital stay and sleep risk factors among women in the study sample (n = 250)*

Obstetric history	Frequency (N)	Percent (%)
Mode of delivery:		
Vaginal	39	15.6
Vaginal with episiotomy	197	78.8
Assist vaginal delivery (Instrumental)	14	5.6
Problems encountered after delivery:#	**210**	**84.0**
Pain from episiotomy	199	79.6
Abdominal pain	71	28.4
Piles	16	6.4
Anorexia	4	1.6
Insomnia	1	0.4
Constipation	47	10.8
Hospital stay among women in the study sample		
one day	167	66.8
Two days	73	29.2
3-4 days	10	4.0
Sleep risk factors		
Life event that affected their sleep during the previous month.	197	78.8
Shift work that affected their sleep	39	15.6
Screened for sleep problems	14	5.6

(#) Not mutually exclusive: more than one answer

Figure 2, 3 & 4 illustrate postpartum instructions received about postnatal care among studied women. They showed that only 22.0% of the women had received instructions about postnatal care. The instructions given were mostly related to breast care and breastfeeding & care of umbilical stump (88.8%, and 46.9%), respectively. While only 2.3% received instructions about baby vaccination. The main sources of instructions were the nurse or doctors (42.5% & 39.9%), respectively.

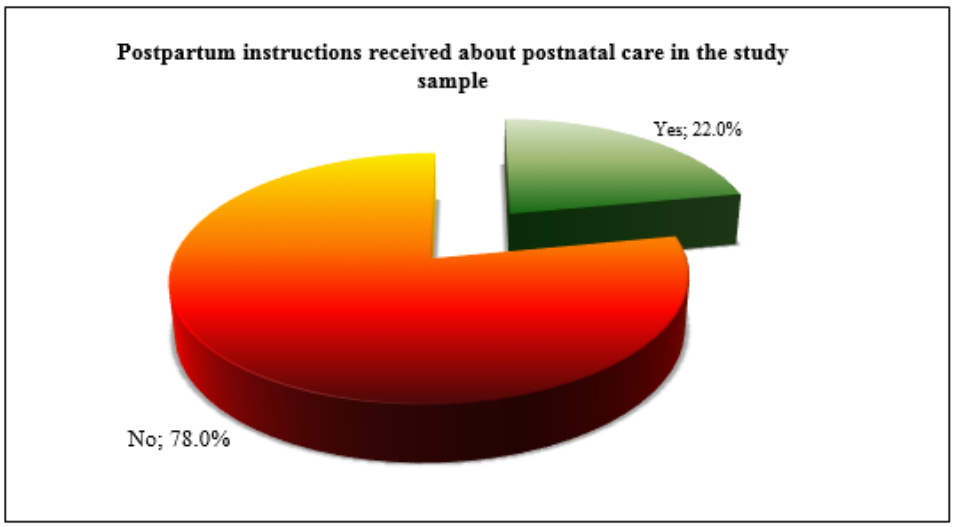

Figure 2. *Postpartum instructions received about postnatal care among women in the study sample (n=250)*

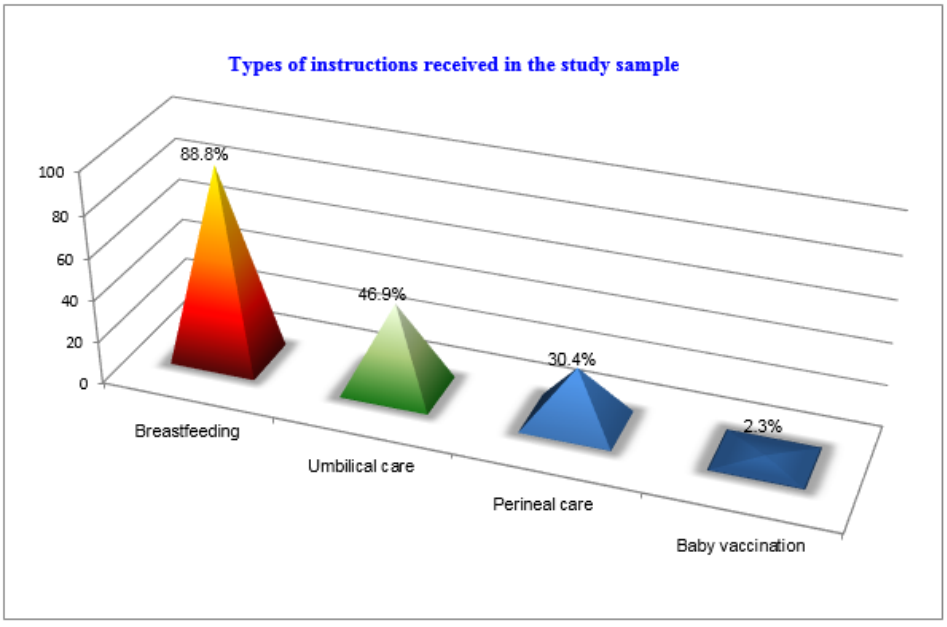

Figure 3. *Types of postpartum instructions received among women in the study sample (n=46)*

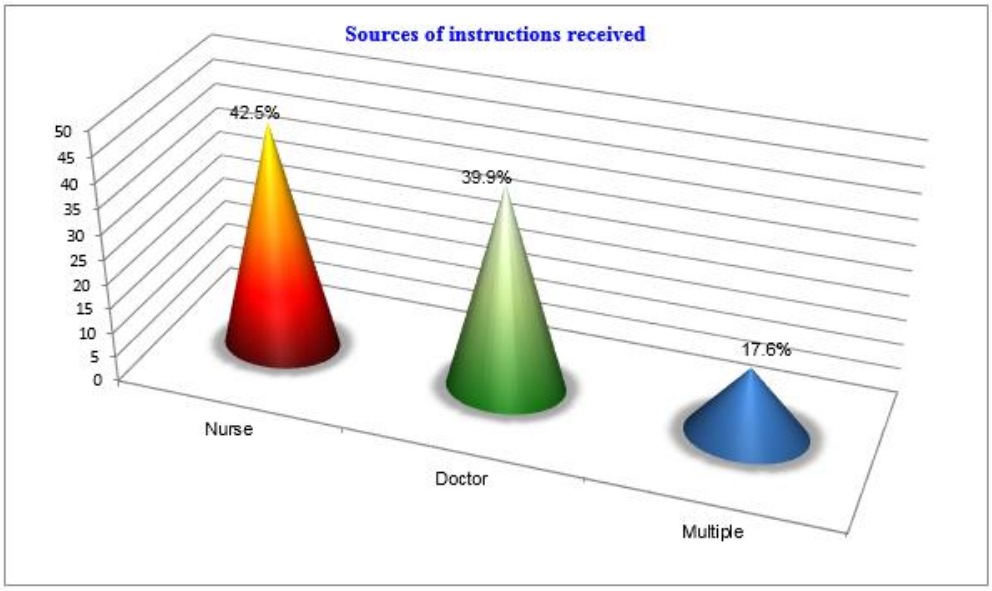

Figure 4. *Sources of instructions received among women in the study sample (n=46)*

Women's sleep disturbance by using the Modified-Global-Sleep-Assessment-Scale (GSA Q) is revealed in **Table 3**. The most common problems were related to sleep schedule disorders. The item of worries interfering with sleep is reported by 70.8% of participant women; having other problems interfering with sleep reported by 53.2% of them in this problem. Other items frequently reported include daytime sleepiness (66.0%) and feeling sad and anxious (34.8%), which lead to non-restorative sleep. In addition, 26.4% of the women having nightmares and screaming during sleep, which leads to restlessness.

Table 3. *Modified Global Sleep Assessment Scale Questionnaire (GSAQ) of women in the study sample (n=250)*

Modified Global Sleep Assessment Scale	Usually / always	
	N	%
Sleep apnea:		
▪ Snore loudly	2	0.8
▪ Hold breath, have breath pause or stops during sleep	8	3.2
Excessive daytime somnolence:		
▪ Fall asleep unintentionally or have to fight sleep during day	75	30.0
Insomnia / hypersomnia:		
▪ Have difficulty falling asleep or feel poorly rested in the morning	69	27.6
Non-restorative-sleep		
▪ Feel sad or anxious	87	34.8
▪ Daytime sleepiness interfere with activities	165	66.0
▪ Work, travel or other activities prevent from getting enough sleep	14	5.6
Restlessness:		
▪ Have nightmares, scream, walk, punch or kick during sleep	66	26.4
▪ Have restlessness or crawling feelings in legs at night that went away after moving legs	14	5.6
▪ Have repeated rhythmic leg jerks or twitches	8	3.2
Sleep schedule disorder:		
▪ Have worried interfering with sleep	177	70.8
▪ Have something else interfering with sleep	6	2.4
▪ Have pain interfering with sleep	41	16.4
▪ Have other problems interfering with sleep	133	53.2
▪ Use medications interfering with sleep	2	0.8

Total scores of Modified-Global-Sleep-Assessment-Scale-Questionnaire (GSAQ) in studied women are displayed in **Figure 5 & Figure 6**. Only less than one-fourth of the women (22.0%) had sleep disturbance. Meanwhile, more than three-quarter (78.0%) hadn't sleep disturbance.

As shown in **Figure 6**, the most frequent sleep disturbance was non-restorative sleep (34.6%) followed by excessive daytime somnolence (26.0%), then Insomnia/ hypersomnia recorded (23.6%). On the other hand, the least sleep disturbance was that of sleep apnea (0.4%).

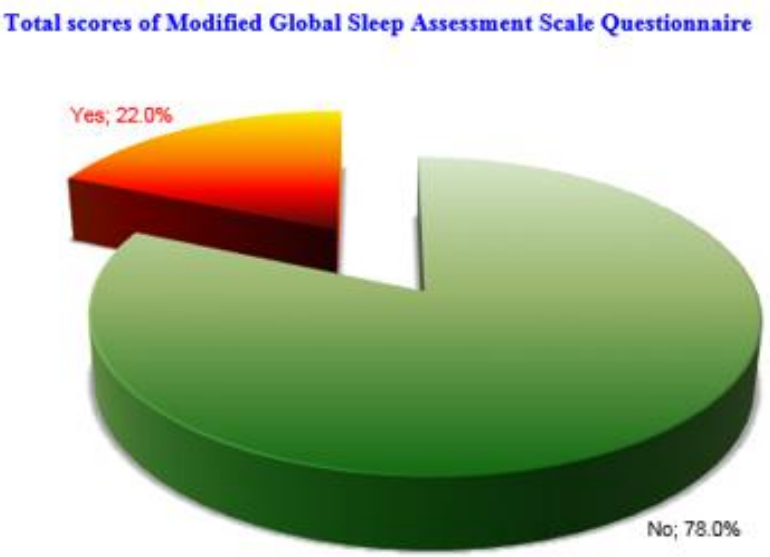

Figure 5. *Total scores of Modified Global Sleep Assessment Scale Questionnaire (GSAQ) of women in the study sample (n = 250)*

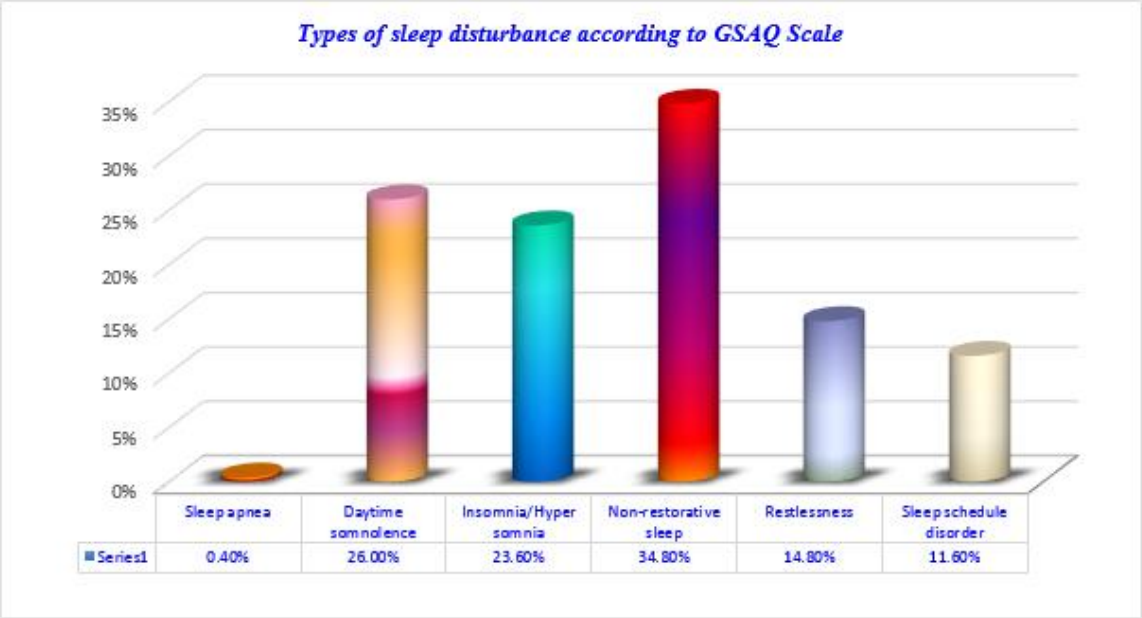

Figure 6. *Types of sleep disturbance according to scores of Modified Global Sleep Assessment Scale (GSAQ)*

Fatigue, as measured by the Multidimensional-Fatigue-Symptom-Inventory-Short-form (MSFI-SF), **Table 4** revealed that one-third of the women (33.2%) had fatigue, with a mean score (mean ± SD) 1.4 ± 0.3. The most common type of fatigue was the general (75.2%), followed by the emotional (58.4%), while, only 2.8% of women had physical fatigue.

Table 4. *Total scores of the Multidimensional Fatigue Symptom Inventory-Short form (MSFI-SF) of women in the study sample (n=250)*

Multidimensional Fatigue Symptom Inventory (MFSI-SF)	**No.**	**%**	**Mean ± SD**
Emotional	146	58.4	1.9 ± 0.6
General	188	75.2	1.4 ± 0.3
Mental	51	20.4	1.8 ± 0.5
Physical	7	2.8	0.4 ± 0.3
Vigor	36	14.4	1.0 ± 0.4
Total scale	**83**	**33.2**	**1.4 ± 0.3**

Table 5 shows statistically significant associations between sleep disturbance and women's job status, residence, crowding index and also between sleep disturbance and women's receiving postnatal instructions. It is evident that the percentages of sleep disturbance were higher among women, who were working, urban living, with high crowding index and among those who did not receive instructions.

Table 5. *Relation between women's sleep disturbance (GSAQ) and their socio-demographic characteristics*

	GSAQ				**X^2 Test**	p-value
	Low (<2)		**High (2+)**			
	No.	**%**	**No.**	**%**		
Age (years):						
<20	23	82.1	5	17.9	0.41	0.02
20-	81	80.2	20	19.8		
25+	100	82.6	21	17.4		
Education:						
Illiterate/read write	6	68.4	3	31.6	7.36	0.06
Primary	44	77.2	13	22.8		
Secondary	98	81.4	22	18.6		
University	56	88.1	8	11.9		
Job:						
Housewife	152	84.9	27	15.1	8.04	0.005*
Working	52	73.2	19	26.8		
Residence:						
Rural	146	89.6	17	10.4	42.05	<0.001*

Urban	58	66.7	29	33.3		
Crowding index:						
<2	160	90.4	17	9.6	58.52	<0.001*
2+	44	60.3	29	39.7		
Received instructions about postnatal care						
Yes	49	89.1	6	10.9	9.41	0.002*
No	150	76.9	45	23.1		

(*) Statistically significant at p<0.05

Concerning the relationship between postpartum fatigue and socio-demographic characteristics, it is evident from **Table 6** that there is a statistically significant relationship with women's education, job status, residence and crowding index and also with receiving postnatal instructions. It is evident that the percentages of fatigue problem were higher among women who were illiterate, working, urban living, with high crowding index and among women who did not receive instructions compared to counterparts ones.

Table 6. *Relation between women's fatigue (MSFI) and their socio-demographic characteristics*

	MFSI				X^2 Test	p-value
	Low (<3)		High (3+)			
	No.	%	No.	%		
Age (years):						
<20	18	64.3	10	35.7	1.49	0.48
20-	70	69.3	31	30.7		
25+	82	67.8	39	32.2		
Education:						
Illiterate/read write	2	22.2	7	77.8	17.50	0.001*
Primary	35	61.4	22	38.6		
Secondary	84	70.0	36	30.0		
University	48	75.0	16	25.0		
Job:						
Housewife	126	70.4	53	29.6	5.77	0.02*
Working	43	60.6	28	39.4		
Residence:						
Rural	134	82.2	29	17.8	93.64	<0.001*
Urban	35	40.2	52	59.8		
Crowding index:						
<2	140	79.1	37	20.9	73.15	<0.001*
2+	29	39.7	44	60.3		
Received instructions about postnatal care						
Yes	48	87.3	7	12.7	12.01	<0.001*
No	120	61.5	75	38.5		

(*) Statistically significant at p<0.05

Table 7 and **Figure 7** show that most women with low fatigue problem had low sleep disturbance. Meanwhile, most women with high fatigue problem had high sleep disturbance. The associations observed between women's sleep disturbance and fatigue problem were statistically significant.

Table 7. *Relation between women's fatigue (MSFI) and sleep disturbance (GSAQ)*

	MFSI				X^2 Test	p-value
	Low (<3)		High (3+)			
	No.	%	No.	%		
GSAQ:						
Low	160	78.4	44	21.6	118.77	<0.001*
High	9	19.6	37	80.4		

(*) Statistically significant at p<0.05

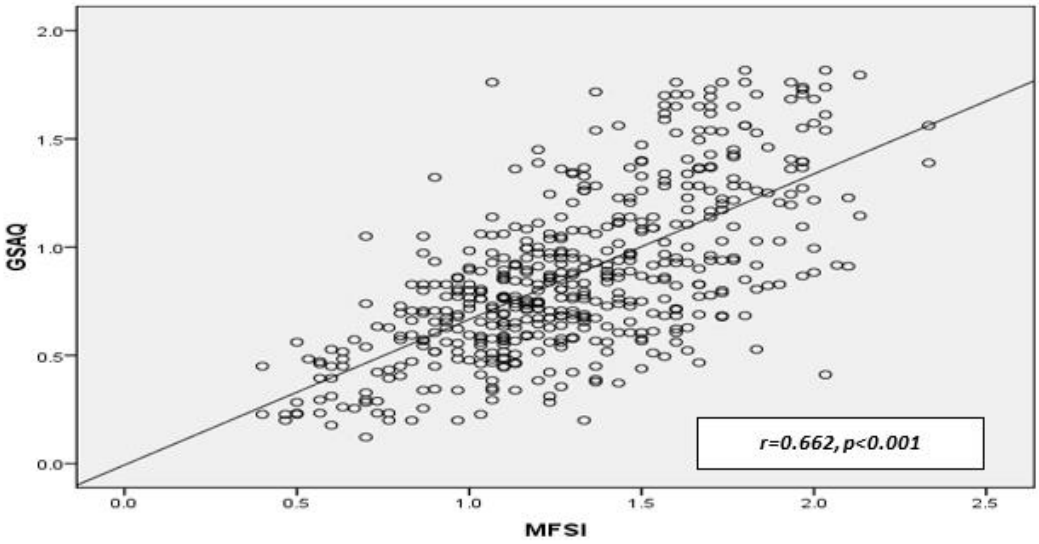

Figure7. *Correlation between women's fatigue and sleep disturbance scores (n=250)*

Table 8 points out that the scores of the fatigue scale (MFSI) and the scores of the sleep disturbance scale (GSAQ) were positively correlated with the crowding index. Meanwhile, there is a statistically significant negative correlation between the scores of the fatigue scale (MFSI) and women's age, education. As for the sleep disturbance scale, it was only negatively and significantly correlated to women's education.

Table 8. *Correlation between women's fatigue (MSFI) and sleep disturbance (GSAQ) scores and their socio-demographic*

	Pearson correlation coefficient	
	GSAQ	**MFSI**
Age	- 0.027	- 0.139**
Education	- 0.182**	- 0.290**
Crowding index	0.503**	0.559**

(*) Statistically significant at p<0.05

5. DISCUSSION

For women, pregnancy represents a condition of intense physical and physiological changes ultimately interfering with their quality of sleep ***(Hassan, 2005)***. Becoming a mother is a crucial aspect of every woman's life and a sensitive period in which women are very vulnerable ***(Gholami et al., 2017; Hassan, 2016)***. In fact, the postpartum period is a crucial stage causing stress associated with fatigue, mood changes, and sleep disturbance ***(Hunter et al., 2009)***. Women in the postpartum period suffer from sleep deprivation, divided sleep, and significant fatigue mainly because of taking care of the infants who do not have regular sleep and wake up frequently during the night. Sleep deprivation can lead to several harmful consequences for the woman and the child, and can potentially undermine the mother-infant and can hamper a mother's ability to care for her infant, as judgment and concentration decline ***(Stremler et al., 2006)***. While poor maternal sleep was a significant predictor of the scale of perceived sadness of the infant, and of weight retention at one year postpartum ***(Tikotzky et al., 2010)***.

The result of the present study reveals that most of participants age below than 25 years old with mean age 24.1±3.9, Secondary/Technical school education, housewives living in rural areas. These characteristics are in the same line with ***Gholami* et al. (2017)** in Iran who conducted that most of the participants were housewives. Meanwhile, our results are incongruence with ***Gholami* et al. (2017)** who find that most of the participants had an education higher than high school diploma.

According to the present, study only primiparous women with vaginal delivery were selected to participate; this was intended to exclude the confounding effects of parity and mode of delivery on fatigue and sleep disturbance problems. In fact, studies have demonstrated significant differences between women with vaginal versus cesarean section deliveries ***(Lee and Lee, 2007)***. Also, differences between primigravidous and multigravidous women regarding these disorders were reported ***(Rowe and Fisher, 2010)***.

According to the present study, more than three-quarter (78.0%) of the women reported that they didn't receive instructions about postnatal care. The finding is quite alarming since such instructions are essential before hospital discharge. The finding is convergent with that reported by ***Gözüm and Kiliç (2005)***. They reported that among Turkish women, where it was found that 66.1% of mothers didn't receive appropriate education about potential postpartum health problems. These findings indicated that the morbidity rate of mothers in the postpartum period was high. Therefore, these authors recommended promoting maternal health education.

Fenwick et al. (2010) drew on the importance of instructions to be given to parturient women by midwives and nurses in the immediate postpartum. Also, Australian researchers found that women were happy with nursing care related to assistance to baby care and practical advice. However, in the present study, the instruction received about vaccination was less positive rating. On the same line ***Troy (2003)*** stressed on the attention of nurses to the related roles nurses can play in practice and, research and the important role fatigue plays in the lives of postpartum women.

The present study revealed that the sleep disturbance was related to having nightmares and screaming during sleep, which leads to restlessness in about one-fourth of the women. This is certainly due to concerns about the newborn. In congruence ***Nielson and Paquette (2007)*** reported about the dream-associated behaviors affecting pregnant and postpartum mothers. They consist of episodes of anxious nightmares and dreams about the new infant that are accompanied by complex behaviors as motor activity, and speaking, Also, more postpartum women reported dreams containing anxiety than did pregnant women.

Furthermore, more than one half the present studied women had sleep disturbances related to the quality of sleep such as non-restorative sleep, which might be the reason underlying excessive daytime somnolence among less than one-third of them. The finding is in agreement with ***Montgomery et al. (2010)*** who reported that the disturbance of the quality of postnatal sleep was more important than the total time of sleep. Though postpartum; mothers' total sleep time was higher than expected during the initial postpartum months. In agreement with the present study findings; ***Huang et al. (2004)*** in Taiwan showed that postpartum mothers experienced poor sleep that is multi-faceted and not simply a matter of insufficient sleep. Additionally, ***Hayama et al. (2008)*** found that the most common mother's sleep problem was poor sleep quality.

On the other hand, the results of the current study revealed that the least sleep disturbance was of sleep apnea. The low frequency of sleep apnea might be explained by the inclusion and exclusion criteria of the sample, where only women with normal labor and uneventful delivery were included. Apnea is more common in women with obesity. Similar findings were reported by ***Louis et al. (2010)***.

According to the total score of the modified - global-sleep – assessment – scale - questionnaire (GSAQ); overall, about one-fourth of the women (22.0%) had sleep disturbance. This finding contradicted with ***Dørheim et al., (2009)*** in Norway who studied the prevalence of and risk factors for postpartum maternal sleep problems and stated that the prevalence of sleep problems was 57.7%. This result is in accordance with ***Hayama et al. (2008)*** who mentioned that in Japanese women about thirty percent of mothers experienced some sleep problems and were suspected of being at high risk of insomnia. These differences in the prevalence of postnatal sleep disorders among various studies might be related to two causes; *the first one*, the present study sample consisted of selected normal primiparous women, while the Nordic study included all women delivered in a general hospital with no inclusion or exclusion criteria. *The second cause* is related to the measuring tool, which was the Pittsburgh-Sleep-Quality-Index (PSQI) in the Nordic study, whereas the present study used the Modified-Global-Sleep-Assessment-Scale (GSAQ).

According to the present study results, one-third of the studied women had postnatal fatigue. However, a considerable percentages (75.2% & 58.4%) of postnatal women in the present study reported general and emotional fatigue rather than other mentioned fatigue symptom (mental; 20.4%, physical; 2.8%, vigor; 14.4%). An important finding was that the frequency of general fatigue was much higher than emotional one; they affected about three-fourths and one-half of the women, respectively. This indicates

that the problem of postnatal fatigue is not primarily a physical one due to tiredness and exhaustion. These findings aren't in congruence with, ***Kammerer et al. (2009)*** who demonstrated that postnatal fatigue was one of the best discriminating symptoms of postnatal depression, which confirms its emotional and mental rather than physical elements.

The present study revealed a significant association between some factors related to sleep disturbance and fatigue. These factors included working status, residence, and crowding index. These factors reflect stressful life states. The home condition with low crowding allowing privacy, and in the presence of could give the postnatal woman the chance to rest and have good sleep. In congruence with the present study findings, ***Kurth et al (2009)*** mentioned that the amount of infant crying during the 1st three-months-postpartum is associated with the experience of fatigue and tiredness in new mothers. Infant crying disrupts new mothers' circadian rhythms, reducing opportunities to rest and exacerbating tiredness. A study conducted by ***McGovern et al. (2007)*** emphasized that postnatal women whose fatigue or postpartum symptoms limit daily role function may need counseling regarding return to work. Also, ***Webb et al. (2008***) found a relationship between employment and emotional wellbeing of postpartum women.

Concerning the relationship between sleep disturbance and fatigue, on one hand, and receiving postnatal instructions, on the other hand, the current study demonstrated higher percentages of these problems among women who didn't receive postnatal instructions. The finding is quite plausible since providing information to the woman helps in preparing her for the expected difficulties she will be faced with after delivery of her baby. Therefore, ***Hunter et al. (2009)*** emphasized that care providers should encourage prenatal education that assists women in developing strategies for decreasing postpartum sleep deprivation. This finding was supported by ***Taylor and Johson (2010)*** in Australia; they showed that preparing women and their partners to manage postnatal fatigue more effectively is important. Midwives should encourage women to identify sources of help and what particular help that individual could provide. Also, ***Stremler et al. (2006)*** mentioned that a nursing maternal-infant sleep intervention for first-time mothers in the early postpartum period promoted maternal and infant sleep.

Furthermore, these present study findings indicate the value of women's education and instructions regarding the postnatal period in preventing postnatal problems. ***Rowe and Fisher (2010)*** emphasized that the prevention of postnatal mental disorders in women is an important component of comprehensive health service delivery. Moreover, ***Bryanton and Beck (2010)***, based on the findings of a systematic review, concluded that education on sleep enhancement appears to increase infant sleep and mothers' knowledge.

The present study revealed a statistically significant positive association between postnatal sleep disturbance and fatigue. This means reciprocally the excess fatigue leads to sleep disturbance and vice-versa fatigue might be increased by sleep deprivation. This finding is in agreement with the foregoing study findings conducted by ***Rychnovsky and Hunter (2009)*** in California. They indicated that fatigue had a positive correlation with sleep disturbance, and a higher level of fatigue may be associated with more disturbed sleep. Moreover, ***Meltzer and Mindell (2007)*** in a USA study found that maternal-sleep-quality was a significant predictor of maternal fatigue.

6. Conclusion

The study findings lead to the conclusion that; the scores of sleep disturbance and fatigue are positively and significantly correlated. Factors that increase these problems include working status, residence, crowding index and receiving postnatal instructions. Receiving postnatal instructions decrease both sleep and fatigue problems.

7. Recommendations

Based on the main study findings, the following recommendations are suggested:

- Nurses caring for women must give more importance to instructing them regarding postpartum period, and help them to cope with the problems encountered. The discharge plan must include all details and instructions for the women regarding rest and sleep.

- These instructions should also involve the husbands of these women as they are partners in this critical period; they should be trained in some basic skills for caring of the newborn so that they can help their wives and give her some chance to rest and sleep.
- Special care must be given to women who are at higher risk of developing postpartum sleep disturbances and, fatigue such as working mothers and urban living, and with high crowding index.
- Nursing services should plan for special outreach programs could be arranged to help those women who do not have home assistance in baby care.
- Further research is proposed to assess the effect of nursing interventions to help women who have postnatal sleep disturbances and fatigue to cope with these problems.

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Citation: *Doaa Shehta Said Farag, Hanan Elzeblawy Hassan, Maternal Postpartum Sleep Disturbance and Fatigue: Factors Influencing. ARC Journal of Nursing and Healthcare. 2019; 5(2):33-46. doi: dx.doi.org/ 10.20431/2455-4324.0502005.*