

# Relationship between fatigue and sleepiness with general health of mothers in the postpartum period

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## ABSTRACT

**Background:** Fatigue and changes in sleep patterns are one of the impressive features in the first year after birth, which have negative effects on work, family life, and social relationships. Therefore, the objective of this research was to investigate the relationship between fatigue and Stanford sleepiness with the general health of mothers in the postpartum period.

**Materials and Methods:** The current research is a descriptive correlational study which was performed on 190 mothers between 2 and 24 postpartum weeks, referring to the health centers of Isfahan in 2014. All mothers meeting the inclusion criteria were selected through cluster purposive sampling. Data were collected by use of four questionnaires including profile and fertility, fatigue, Stanford sleepiness, and general health. Data were analyzed by statistical tests at a significance level of  $\leq 0.05$ .

**Results:** The results showed that 5.3%, 59.5%, and 35.3% of subjects had mild, moderate, and severe fatigue, respectively. In addition, 26.3% of women showed a public health disorder, and according to Stanford sleepiness, 20.5% of subjects had sleepiness. The statistical results indicated that there were significant relationships between fatigue ( $P \leq 0.001$ ,  $r = 0.52$ ) and Stanford sleepiness ( $P = 0.04$ ,  $r = 0.14$ ), and mothers' general health.

**Conclusions:** According to prevalence of fatigue and sleepiness in the postpartum period and its relationship with maternal health, application of sleep health education and appropriate counseling during pregnancy and after delivery is recommended to prevent mothers' mental complications in order to achieve a safe pregnancy.

**Key words:** Fatigue, Iran, postpartum, public health, Stanford sleepiness

## INTRODUCTION

Fatigue is an unknown feeling and a mental complaint against boredom, which is different from feeling of lack of energy, resulting from loss of motivation and sleepiness.<sup>[1,2]</sup> Weakness, desperation, and tiredness are alternatively used, while chronic weakness is defined as

fatigue.<sup>[3,4]</sup> Among the general signs of fatigue are physical and mental weakness, including shortage of energy, and lack of understanding the problems, attention, and cognitive function.<sup>[4,31]</sup> It is also a multidimensional feeling including physical, cognitive, and emotional dimensions.<sup>[1]</sup> Fatigue can be categorized into secondary, physiologic, and chronic fatigue. Secondary fatigue results from background medial conditions, and physiologic fatigue is due to sports-sleep imbalance, diet, or other activities that are not rooted from a background disease, and finally, chronic fatigue lasts for more than 6 months.<sup>[5]</sup> Sleep is one of the vital needs and a general health-related issue that involves 40 million people in US every year.<sup>[6]</sup> About 30% of the adult population in US experience at least one of the sleep disorders.<sup>[7]</sup> Postpartum period is a sensitive and stressful period that is accompanied with fatigue, mood changes, and sleep disorders.<sup>[8]</sup> From two decades ago on, fatigue has been considered as the fifth cause

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for postpartum concerns among women in industrialized countries<sup>[9]</sup> (52% of women experience fatigue within 18 postpartum months).<sup>[10]</sup> Fatigue is common during the first postpartum days and, at times, lasts for months.<sup>[11,12]</sup> Its rate increases from 20% in ante-partum period to 50–64% in postpartum period.<sup>[13]</sup> Research shows that high levels of fatigue among infants' mothers bring about stress in parents, feeling of incapability and dissatisfaction, high irritability, and hopelessness, as well as impaired parents–infant communication.<sup>[14]</sup> Fatigue is also associated with depression and stress and signs of anxiety among the mothers.<sup>[15]</sup> In previous studies, some factors including cesarean section, signs of depression, shorter sleep, and less social support that are effective on high fatigue have been suggested.<sup>[16-18]</sup> Some studies report that delayed fetal growth, delay in mothers' return to normal function, stopping breastfeeding early, and progression of depression resulted from fatigue among the mothers.<sup>[15]</sup> Sleep pattern changes are among the notable characteristics of postpartum period 1 year after delivery.<sup>[19]</sup> Insomnia increases by 20% in mothers during this period.<sup>[20]</sup> Based on the report of National Sleep Institute in 2007, 68% of women experience insomnia in this period.<sup>[21]</sup> Also, reports show that 57.7% of women experience sleep disorder in Norway.<sup>[22]</sup> Postpartum period is accompanied with an improvement in the fourth stage of non-REM sleep and a reduction in REM sleep.<sup>[23]</sup> Hormonal changes and existence of an infant with an irregular sleep pattern lead to mother's shortage of sleep.<sup>[25]</sup> Among the most important outcomes of inappropriate sleep quality during the postpartum period are severe anxiety and mental disorders,<sup>[26]</sup> stopping of breastfeeding and lowered mother–infant attachment,<sup>[27,28]</sup> weight gain, irritability, mood disorder, changes in immune system function, mood, and efficiency,<sup>[29]</sup> obesity, and stress.<sup>[19]</sup> Kurth *et al.* found that amount of infants' cry during the first 3 months is associated with young mothers' fatigue.<sup>[9]</sup> Elek *et al.* reported that parents' fatigue notably increased after delivery.<sup>[30]</sup> Early fatigue during 7 days after delivery is a predictor for depression on the 24<sup>th</sup> postpartum day.<sup>[13]</sup> Studies showed that sleep changes in the first postpartum week manifest as a 90-min decrease in sleep time compared to that in pregnancy period, three or more episodes of sleep during 24 h, 70% of napping, and increased changes in sleep.<sup>[29]</sup> Abbott *et al.* showed that most of the sleep disorders in the perinatal period are in the form of insomnia and sleepiness.<sup>[32]</sup> Insana and Montgomery-Downs showed that incidence of nervous behaviors 12 weeks after delivery is influenced by sleep-related problems.<sup>[21]</sup> Dennis and Ross reported an association between sleep disorders and fatigue.<sup>[33]</sup> Huang *et al.* showed an association between depression and mood disorders.<sup>[34]</sup> They showed that sleep quality of the mothers who had undergone CS was lower than that of those who underwent natural delivery.<sup>[35]</sup> Health is a multidimensional issue. Its various dimensions are physical,

mental, social, and spiritual dimensions that interact with one another.<sup>[36]</sup> The present study investigates the four groups of physical problems, anxiety, social function, and depression that affect general health. Problems such as fatigue and sleep problems can influence all the dimensions of health. With regard to prevalence of sleep disorders and fatigue in menstruation period and shortage of studies on postpartum sleep condition and fatigue in Isfahan University of Medical Sciences, the investigation in this field is essential. On the other hand, health providers of health care centers pay less attention to these two variables, while they can prevent the outcomes of such disorders through awareness of its risk factors and their detection, as well as administration of timely and appropriate interventions. The present study aimed to investigate the relationship between fatigue and Stanford sleepiness with the general health of mothers in the postpartum period.

## MATERIALS AND METHODS

This descriptive and correlational study was conducted on the mothers undergoing delivery and referring to Isfahan health care centers from Oct 2014 to Jan 2015.

After obtaining permission from the ethics committee and an informed consent, 190 mothers were recruited through cluster purposive sampling. Inclusion criteria were being married, having Iranian nationality, having undergone term delivery, having delivered a live, healthy, and singleton infant, involved in exclusive breastfeeding or combined by formula, no bleeding during and after delivery (asked from the mothers), at most postpartum hospitalization of 3 days, no baseline diseases such as asthma, renal diseases, chronic heart failure (CHF) reflux, Rheumatoid disorders, musculoskeletal pain causing sleep disorder and fatigue, as well as no addiction to drugs or sleep medications or their cessation at the time of research, and finally, no involvement in depression during the study (checked by brief postpartum depression measurement Edinburgh scale). Firstly, Edinburgh questionnaire was filled by the subjects.

If the subjects' depression score was lower than 13, with preservation of the mentioned conditions, the interview was continued and the questionnaire completed. Measurement tool adopted in the present study contained three sections. The first section included personal and fertility information (mother's age, education of the mother and the spouse, mother's and spouse's occupations, the number of the pregnancies, deliveries, abortions, delivery intervals, the number of live children, the number of dead children, type of pregnancy, type of delivery, infant's gender, the number of night wake-ups, bed condition, family's and spouse's support in postpartum period, level of relations' support, physical activity level, number of sexual activities, infant's

age (weeks), infant’s night sleep condition, and mother’s–infant’s sleep coordination. The second section included fatigue severity scale (FSS) that was scored between 1 and 6.<sup>[37]</sup> This questionnaire contains nine questions, scored in Likert’s scale (absolutely agree, somehow agree, agree, disagree, somehow disagree, absolutely disagree).

Score 1 showed absolute agreement and score 6 showed absolute disagreement. Total score was divided by 9 and the mothers were categorized into three groups of minor fatigue (score less than 3), moderate fatigue (scores 3–4), and severe fatigue (scores  $\geq 4$ ). The third section of the questionnaire included standard sleepiness scale. Stanford sleep scale is a seven-point scale (from absolutely conscientious = 0 to try to keep awake = 7). The level of individuals’ conscientious in different hours is categorized by this scale. The time a person should have concentration and conscientiousness in a day (scores  $\geq 3$ ) reveals his/her serious shortage of sleep. In the present study, with respect to research ethics, the subjects’ sleepiness was investigated by Stanford scale in time schedule of 9 AM and 9 PM. To evaluate general health, general health scale (28 four-choice items) was adopted. This questionnaire includes four sections of physical problems, anxiety and sleep disorder are in one section, social function and depression. If the total score of the subjects was 23 or more, it showed their impaired general health.

Validity of postpartum depression questionnaire was confirmed in Montazeri’s study.<sup>[38]</sup> Reliability of general health questionnaire was confirmed by Taghavi through test re-test, bisection, and Cronbach alpha calculation as 0.7, 0.93, and 0.9, respectively. Validity of this questionnaire was confirmed by concurrent administration of Midlex hospital questionnaire ( $r = 0.55$ ). Its reliability and validity were also confirmed by Nourbala *et al.* Reliability of Persian version of fatigue severity questionnaire was confirmed by Rasouli and Zakeri Moghadam with Cronbach alphas of 0.88 and 0.91, respectively. Its content validity was also confirmed by Schneider and Zakeri Moghadam. Data were analyzed by Pearson and Spearman correlation coefficients, independent *t*-test, and one-way analysis of variance (ANOVA) through SPSS 18 (IBM Inc. New York).

RESULTS

Results of demographic characteristics and fertility of the subjects have been presented in Tables 1 and 2. The results show that the highest level of education was over high school diploma (51.05%), and most of the mothers were homemakers (84.7%). Based on Stanford scale, 20.5% of the mothers had sleepiness. Mean (SD) score of Stanford sleepiness was 1.74 (1.55).

Table 1: Statistical description of fertility characteristics of the subjects

|                               | Mild<br>fatigue<br>number (%) | Medium<br>fatigue<br>number (%) | Severe<br>fatigue<br>number (%) |
|-------------------------------|-------------------------------|---------------------------------|---------------------------------|
| Type of pregnancy             |                               |                                 |                                 |
| Wanted                        | 10(6.3)                       | 100 (63.3)                      | 48 (30.4)                       |
| Unwanted                      | 0                             | 13 (40.6)                       | 19 (59.4)                       |
| Form of previous delivery     |                               |                                 |                                 |
| Less than 24 months           | 0                             | 3 (60)                          | 2 (40)                          |
| More than 24 months           | 4 (4)                         | 60 (60)                         | 36 (36)                         |
| Type of delivery              |                               |                                 |                                 |
| Natural delivery              | 5 (8.2)                       | 37 (60.7)                       | 19 (31.1)                       |
| Vaginal delivery device       | 0                             | 3 (100)                         | 0                               |
| Cesarean section              | 5 (4)                         | 73 (57.9)                       | 48 (38.1)                       |
| Newborn’s gender              |                               |                                 |                                 |
| Girl                          | 5 (4.9)                       | 63 (61.8)                       | 34 (33.3)                       |
| Boy                           | 5 (5.7)                       | 49 (56.3)                       | 33 (37.9)                       |
| Mother and baby’s type of bed |                               |                                 |                                 |
| Mother and baby in one room   | 9 (4.9)                       | 112 (60.5)                      | 64 (34.6)                       |
| Separate rooms                | 1 (20)                        | 1 (20)                          | 3 (60)                          |
| Mother’s wake-ups at night    |                               |                                 |                                 |
| Ever                          | 0                             | 5 (50)                          | 5 (50)                          |
| 1-2 times                     | 4 (6.2)                       | 36 (55.4)                       | 25 (38.5)                       |
| 3-4 times                     | 5 (5.4)                       | 65 (69.9)                       | 23 (24.7)                       |
| More than 4 times             | 1 (4.8)                       | 6 (28.6)                        | 14 (66.7)                       |
| Family support                |                               |                                 |                                 |
| Have                          | 10 (5.5)                      | 109 (59.6)                      | 64 (35)                         |
| Do not have                   | 0                             | 4 (57.1)                        | 3 (42.9)                        |
| Family support time           |                               |                                 |                                 |
| First 10 days                 | 4 (6)                         | 34 (50.7)                       | 29 (43.3)                       |
| First 14 days                 | 1 (2.5)                       | 25 (62.5)                       | 14 (35)                         |
| First 40 days                 | 1 (4.2)                       | 16 (66.7)                       | 7 (29.2)                        |
| More than 40 days             | 4 (7.7)                       | 34 (65.4)                       | 14 (26.9)                       |
| Partner’s support             |                               |                                 |                                 |
| Yes                           | 10 (5.6)                      | 108 (60.7)                      | 60 (33.7)                       |
| No                            | 0                             | 5 (41.7)                        | 7 (58.3)                        |
| Partner’s support level       |                               |                                 |                                 |
| Low                           | 1 (2.4)                       | 23 (54.8)                       | 18 (42.9)                       |
| Appropriate                   | 9 (6.4)                       | 87 (61.7)                       | 45 (31.9)                       |
| Level of daily activity       |                               |                                 |                                 |
| Less than daily activities    | 3 (4.5)                       | 34 (51.5)                       | 29 (43.9)                       |
| daily activities              | 6 (10.7)                      | 35 (62.5)                       | 15 (26.8)                       |
| More than daily activities    | 1 (1.5)                       | 44 (64.7)                       | 23 (33.8)                       |
| Sexual activity               |                               |                                 |                                 |
| Yes                           | 0                             | 16 (66.7)                       | 8 (33.3)                        |
| No                            | 10 (6)                        | 97 (58.4)                       | 59 (35.5)                       |
| Frequency of sexual activity  |                               |                                 |                                 |

Contd...

Table 1: Contd...

|  | Mild<br>fatigue<br>number (%) | Medium<br>fatigue<br>number (%) | Severe<br>fatigue<br>number (%) |
|--|-------------------------------|---------------------------------|---------------------------------|
| 1 time or less                                   | 6 (5.1)                       | 70 (59.3)                       | 42 (35.6)                       |
| 2 times  | 3 (7.3)                       | 24 (58.5)                       | 14 (34.1)                       |
| More than 2 times                                | 1 (11.1)                      | 6 (66.7)                        | 2 (22.2)                        |
| Infant's sleep time                              |                               |                                 |                                 |
| Less than 3 h                                    | 0                             | 6 (42.9)                        | 8 (57.1)                        |
| 3-5 h  | 6 (7.1)                       | 45 (53.6)                       | 33 (39.3)                       |
| More than 5 h                                    | 4 (4.3)                       | 62 (67.4)                       | 26 (28.3)                       |
| Coordination of infant's<br>sleeping with mother |                               |                                 |                                 |
| Never  | 0                             | 7 (41.2)                        | 10 (58.8)                       |
| Sometimes  | 3 (4)                         | 43 (57.3)                       | 29 (38.7)                       |
| Often  | 4 (5.9)                       | 46 (67.6)                       | 18 (26.5)                       |
| Always   | 3 (10)                        | 17 (56.7)                       | 10 (33.3)                       |

Table 2: Statistical description of demographic characteristics of the subjects

| Profile mother              | Average | Standard<br>deviation | Minimum | Maximum |
|-----------------------------|---------|-----------------------|---------|---------|
| Age (years)                 | 29.42   | 5.05                  | 17      | 43      |
| The number of gravity       | 1.86    | 0.86                  | 1       | 5       |
| The number of parity        | 1.66    | 0.69                  | 1       | 4       |
| The number of dead children | 0.03    | 0.21                  | 0       | 2       |
| The number of live children | 1.62    | 0.69                  | 1       | 4       |
| The number of abortions     | 0.18    | 0.46                  | 0       | 3       |
| Baby's age (weeks)          | 12.36   | 7.07                  | 2       | 24      |

Investigation of the mothers concerning general health showed that 50 subjects out of 190 had impaired general health. Pearson correlation coefficient showed a positive and significant association between general health and fatigue ( $P < 0.001$ ,  $r = 0.52$ ) and Stanford sleepiness ( $P = 0.04$ ,  $r = 0.14$ ). There was also a significant association between fatigue and score of impaired general health, anxiety, social health, depression, and general health ( $P < 0.001$ ) [Table 3]. Pearson correlation coefficient showed a significant association between mothers' age ( $P = 0.02$ ), the number of deliveries ( $P = 0.01$ ), the number of pregnancies ( $P < 0.001$ ), and fatigue. Spearman correlation coefficient showed an inverse significant association between family support level ( $P = 0.01$ ), infants' sleep hours at night ( $P = 0.02$ ), mother–infant sleep coordination ( $P < 0.001$ ), and fatigue. Independent  $t$ -test showed an association between type of pregnancy ( $P < 0.001$ ), spouse's education ( $P = 0.05$ ), and fatigue. Spearman correlation coefficient showed a significant association between sexual activity before the 40<sup>th</sup> postpartum day and Stanford sleepiness ( $P = 0.01$ ) and infants' age (weeks) ( $P = 0.03$ ). Other personal and

fertility factors had no association with fatigue and Stanford sleepiness.

DISCUSSION

Findings showed that most of the mothers had moderate to acute fatigue. Salary *et al.* showed a significant correlation between fatigue at 37<sup>th</sup> week of gestational age and postpartum depression on the 5<sup>th</sup>, 14<sup>th</sup>, and 28<sup>th</sup> postpartum days. There was also a significant correlation between fatigue at 36<sup>th</sup> week of gestational age and depression on the 5<sup>th</sup> postpartum day and between fatigue at the 14<sup>th</sup> postpartum day and depression on 28<sup>th</sup> postpartum day. The reason for consistent results of these two studies is the similarity in their inclusion criteria. In their study, modified fatigue signs questionnaire was adopted, while in the present study, fatigue severity scale was used.<sup>[39]</sup> Insana and Montgomery-Downs reported a higher mean (SD) of fatigue score, compared to the present study. It seems that mothers' difference concerning parity in these two studies is the reason. In the study of Insana and Montgomery-Downs, only primiparous mothers attended, while in the present study, both primiparous and multiparous mothers attended. Primiparous women usually adapt to new postpartum conditions and accept the parental role and its related problems later, while in multiparous women, adaptation occurs more conveniently. The study of Insana and Montgomery-Downs was conducted on 79 mothers at the 11<sup>th</sup> postpartum week and the study adopted mood status scale that is partly related to fatigue. Organizational support toward mothers and cultural differences might have caused the controversial results.<sup>[21]</sup>

Nabavi and Mohammadi stated that level of fatigue varies from mild to moderate among multiple sclerosis (MS) patients. Their results showed that mean fatigue was higher compared to that in the present study, possibly due to the difference in cut-off points of fatigue diagnosis in their study and the present study. Despite the similarity between two studies concerning the measurement tool of fatigue and the subjects' mean age, the reason for low mean score of fatigue in the present study is selection of healthy mothers, while in Nabavi and Mohammadi's study, the subjects were selected from MS patients among whom physical and mental fatigue is more.<sup>[40]</sup> Giallo *et al.* investigated the mean fatigue score 6 months and 4 years after delivery. Their study was similar to the present study concerning the inclusion criteria and the study time, and despite using SF-36, their study yielded results consistent with the present study.<sup>[4]</sup> In a study conducted by Molaie *et al.* on renal diseases and hemodialysis patients, the obtained mean (SD) of fatigue score revealed high fatigue in these patients. In both studies, FSS was adopted, but the cut-off points of fatigue were different.



Table 3: Relationship between fatigue and general health

| Variable       | Percentage | Number | Pearson correlation coefficient | General health   |              |                |               |
|----------------|------------|--------|---------------------------------|------------------|--------------|----------------|---------------|
|                |            |        |                                 | Depression score | Social score | Physical score | Anxiety score |
| Fatigue        |            |        |                                 |                  |              |                |               |
| Mild           | 5.3        | 10     | 0.52                            | 0.3              | 0.28         | 0.51           | 0.46          |
| Medium         | 59.5       | 113    | 00.00                           | $P<0.001$        | $P<0.001$    | 0              | $P<0.001$     |
| Severe         | 35.3       | 67     | $P<0.001$                       |                  |              | $P<0.001$      |               |
| General health |            |        |                                 |                  |              |                |               |
| Disorder       | 26.3       | 50     |                                 |                  |              |                |               |
| No disorder    | 73.7       | 140    |                                 |                  |              |                |               |

Molaie *et al.* reported a direct and significant association between fatigue and anxiety ( $P = 0.006$ ,  $r = 0.353$ ) and Edinburgh depression ( $P = 0.001$ ,  $r = 0.525$ ), which is consistent with the present study.<sup>[41]</sup> The findings of the present study showed that most of the mothers had no sleepiness problem. Shamsaei and Cheraghi reported a level of sleepiness consistent with the present study.<sup>[42]</sup> Insana and Montgomery-Downs, in a study on postpartum sleep and fatigue, reported a higher mean Stanford sleepiness, compared to the present study. In these two studies, mothers were different concerning parity. In Insana and Montgomery-Downs’s study, only primiparous women between 1 and 16 postpartum weeks participated, but in the present study, mothers were multiparous and at 2–24 postpartum weeks. In the present study, mothers had a better chance to adapt to new condition and claimed to have less sleepiness.<sup>[21]</sup>

The findings concerning the association between Stanford sleepiness and general health showed that higher score of sleepiness led to a higher score of general health (impaired general health). One of the factors influencing health is daily sleep that helps mental and physiologic power refreshment and is needed to accept duties and new roles. Those who have no adequate sleep are predisposed to depression and anxiety and have impaired health.

Shamsaei and Cheraghi reported a significant association between general health and sleep disorders and severe sleepiness during daytime ( $P < 0.01$ ), which is consistent with the present study.<sup>[42]</sup>

CONCLUSION

Our findings showed that most of the mothers suffer from moderate to severe fatigue. The present study results show that postpartum education and sleep health counseling are of great importance. Prevention of mothers’ fatigue, as a relevant factor, probably is effective on reduction of depression. Therefore, one important principle in caring of mothers concerning their mental health is to educate all midwifery health care providers with regard to

natural emotional changes, usual anxiety, and adaptive reactions. Since fatigue and Stanford sleepiness had a significant association with general health, care providers should try to reduce the effects of fatigue and sleepiness on quality of life through recognition of their relevant factors. Mothers can be suggested to have daily naps or short sleep during day time, share the infant’s care time with their spouse or relatives, and do postpartum relaxation techniques to reduce their fatigue.

Mothers’ relatives can be educated concerning giving a hand to the mother in household work and infant’s care on a schedule, so that the spouse and relatives take care of the infant in shifts during night to provide the mother with adequate rest. Mothers can milk their breast to facilitate for taking care of infant by their spouse and relatives. As in Iran postpartum care lasts for 40 days, it is essential for the families to give support even after this period of time.

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Conflicts of interest

There are no conflicts of interest.

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