



## Original article

## Meta-analysis of the predictive factors of postpartum fatigue

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## ARTICLE INFO

## Article history:

Received 16 December 2016

Revised 29 April 2017

Accepted 19 June 2017

## Keywords:

Postnatal fatigue  
 Postpartum fatigue  
 Predictive factors  
 Postpartum  
 Postnatal  
 Fatigue

## ABSTRACT

**Purpose:** Nearly 64% of new mothers are affected by fatigue during the postpartum period, making it the most common problem that a woman faces as she adapts to motherhood. Postpartum fatigue can lead to serious negative effects on the mother's health and the newborn's development and interfere with mother-infant interaction. The aim of this meta-analysis was to identify predictive factors of postpartum fatigue and to document the magnitude of their effects using effect sizes.

**Method:** We used two search engines, PubMed and Google Scholar, to identify studies that met three inclusion criteria: (a) the article was written in English, (b) the article studied the predictive factors of postpartum fatigue, and (c) the article included information about the validity and reliability of the instruments used in the research. Nine articles met these inclusion criteria. The direction and strength of correlation coefficients between predictive factors and postpartum fatigue were examined across the studies to determine their effect sizes.

**Results:** Measurement of predictor variables occurred from 3 days to 6 months postpartum. Correlations reported between predictive factors and postpartum fatigue were as follows: small effect size ( $r_{\text{range}} = 0.10$  to  $0.29$ ) for education level, age, postpartum hemorrhage, infection, and child care difficulties; medium effect size ( $r_{\text{range}} = 0.30$  to  $0.49$ ) for physiological illness, low ferritin level, low hemoglobin level, sleeping problems, stress and anxiety, and breastfeeding problems; and large effect size ( $r_{\text{range}} = 0.50 +$ ) for depression.

**Conclusion:** Postpartum fatigue is a common condition that can lead to serious health problems for a new mother and her newborn. Therefore, increased knowledge concerning factors that influence the onset of postpartum fatigue is needed for early identification of new mothers who may be at risk. Appropriate treatments, interventions, information, and support can then be initiated to prevent or minimize the postpartum fatigue.

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About 63.8% of new mothers are affected by fatigue during the postpartum period, making this is the most common problem affecting women during that period (Schytt, Lindmark, & Waldenström, 2005). According to Kurth, Kennedy, Spichiger, Hösli, and Zemp Stutz (2011), fatigue is defined as an imbalance between activity and rest that cannot be relieved by a single period of sleep. Another definition of fatigue is "the awareness of decreased capacity for physical and/or mental activity due to an imbalance in the availability, utilization, and/or restoration of resources needed to perform activity" (Aaronsen et al., 1999, p. 46). Specifically, postpartum fatigue is defined as exhaustion and a feeling of being overwhelmed combined with a decrease in mental and physical capacity, all of which can lead to a negative impact on maternal-infant health (Doering & Durfor, 2011).

Considering that postpartum fatigue is a dynamic phenomenon, it might remain stable during the postpartum period or worsen up to four weeks postpartum (Troy & Dalgas-Pelish, 2003). Postpartum fatigue has been found to have a negative impact on the mother's health and the newborn's development. According to Kurth et al. (2011), fatigue during the postpartum period can decrease a mother's ability to concentrate, increase the incidence of postpartum depression, thereby increasing the risk of a mother doing harm to her newborn, interfere with healthy mother-infant interaction, and cause early weaning from breastfeeding, and that found to be related to delaying infant development (Parks, Elizabeth, Renee, & Hae-Ra, 1999; Tulman & Fawcett, 1988; Tulman, Fawcett, Groblewski, & Silverman, 1990).

Even though fatigue is a very common occurrence among new mothers during the first few weeks of the postpartum period, it garners very little attention from health care providers during postpartum follow-up appointments (Troy, 2003). The existing meta-analyses also show limited research on the predictive factors of postpartum fatigue. In addition, there are few studies of interventions that might help a mother to recover during this transitional period. The purpose of this

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meta-analysis was to identify the predictive factors of postpartum fatigue and the degree to which these factors are predictive of postpartum fatigue in terms of their effect sizes. Two research engines were used in order to (1) find studies that examined predictive factors of postpartum fatigue and (2) to compare the reported effect sizes of those predictive factors.

## 1. Methods

To identify articles that examined predictive factors of postpartum fatigue (PPF), two search engines were used: Google Scholar and PubMed. The phrases that were used in the search were “postpartum fatigue” and “predictive factors of postpartum fatigue.” In Google Scholar, 19,700 articles were found, and in PubMed, 290 articles were found, but not all of these articles were related to postpartum fatigue. Most of the articles were about postpartum depression. In PubMed, the results were narrowed to 248 articles by choosing only human studies.

Through the primary search, we found 36 articles that were related to postpartum fatigue. Next, we applied the study's inclusion criteria to further narrow the search results for this meta-analysis. The inclusion criteria were (a) the article was written in English; (b) the article studied the predictive factors of postpartum fatigue; and (c) the article included information about the validity and reliability of the instruments used in the research. Twelve articles studied the predictive factors of postpartum fatigue. Three articles were excluded because the researcher did not provide any information about instrument reliability or validity. Based on all of these considerations, this meta-analysis includes nine articles (Fig. 1).

## 2. Results

To compare the results from the nine studies, Cohen's ranges for effect sizes were used. Based on Cohen (1992), the effect sizes for the correlation coefficient  $r$  are: small (0.10), medium (0.30), and large (0.50). The articles included in this analysis were published from 1999 to 2016. Measurement of predictor variables occurred from 3 days to 6 months postpartum. The Cronbach's  $\alpha$  of the instruments used within the articles ranged from 0.78 to 0.97. The studies measured factors that included sleeping problems, stress and anxiety, breastfeeding problems, child care problems, demographic variables, maternal health, and depression. Table 3 includes the sample size and demographic information for the participants in each study.

### 2.1. Sleeping problems

The nature of women's sleep during the postpartum period is less total sleep and more waking hours during the night. Due to the infant's care most of the mothers experience fragmented sleep patterns, especially during the first postpartum month. Sleeping problems during the postpartum period include poor sleep quality and quantity and sleepiness during the daytime (Groer et al., 2005; Lee & Lee, 2007; Wambach, 1998).

Groer et al. (2005) found that sleepiness had a large effect size due to the fatigue experienced by mothers at 4 and 6 weeks postpartum ( $r = 0.6, p = 0.000$ ). Groer et al. (2005) also found a medium correlation between mothers' sleepiness, fatigue, and melatonin levels in their breast milk, based on the Epworth Sleepiness Scale (EPS) and the Profile of Mood States–Fatigue scale (POMS-F), the effect sizes were  $r = 0.388, p = 0.02$  and  $r = 0.48, p = 0.004$ , respectively. Wambach (1998) found that maternal sleep disturbance had a moderate to large effect on postpartum fatigue ( $r = 0.40–0.54, p < 0.05$ ). Rychnovsky (2007) found similar results and also found that sleep disturbance was moderately correlated with PPF at three time points (before discharge, 2 weeks postpartum, and 6 weeks postpartum). The correlations were ( $r = 0.35, 0.28, 0.34, p < 0.05$ ).

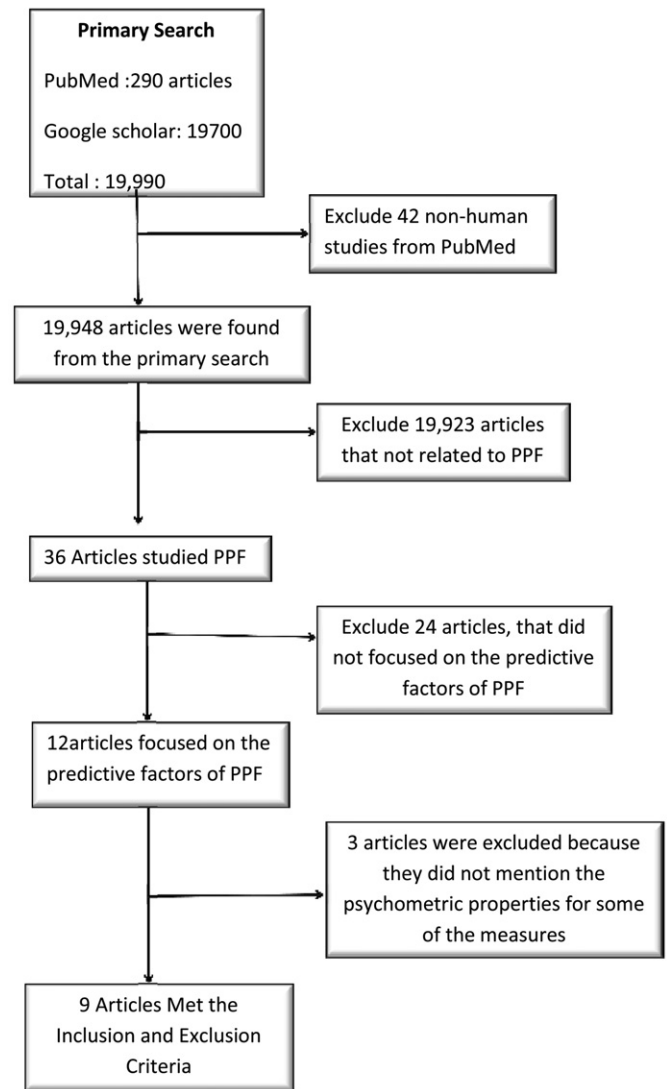


Fig. 1. Articles selection method.

Lee and Lee (2007) studied postpartum fatigue and sleep from different perspectives. The two researchers found that mothers who experienced sleep disturbance during the night experienced higher fatigue ( $r = 0.44, p = 0.04$ ). They also found that mothers with lower sleep quality in general experienced greater fatigue ( $r = 0.34, p = 0.04$ ) (Lee & Lee, 2007). Lee (1999) measured the relationship between fragmented sleep and fatigue at 1 and 3 months postpartum. They found that fragmented sleep was associated with greater fatigue, and that fatigue

Table 1

The strength and the effect sizes of the predictors.

Strength	Factors	Effect size
Small	Education level	$r = 0.11–0.20, p < 0.01$
	Age	$r = 0.13, p < 0.01$
	Postpartum hemorrhage	$r = 0.12–0.14, p < 0.05$
Medium	Infection	$r = 0.215, p = 0.02$
	Child care difficulties	$r = 0.18–0.43, p = 0.01–0.05$
	Physiologic illness	$r = 0.39, p = 0.02$
	Low ferritin level	$r = (-0.27)–(-0.38), p < 0.05$
	Low hemoglobin level	$r = -0.44, p = 0.01$
	Sleeping problems	$r = 0.34–0.6, p = 0.000–0.04$
	Stress and anxiety	$r = 0.36–0.6, p = 0.000–0.05$
Large	Breastfeeding problems	$r = 0.36–0.6, p = 0.003–0.02$
	Depression	$r = 0.52–0.74, p = 0.000–0.05$

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