

## Sleep quality and fatigue levels of mothers in the period of transition to additional food

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### ABSTRACT

**Purpose:** To determine the sleep quality and fatigue levels of mothers in the period of transition additional food.

**Materials and methods:** It was a relation seeking descriptive study which contained 377 mothers who had sixth month babies. The data of the study was collected in Samsun between June and December 2015 with "Personal Information Form", "Pittsburgh Sleep Quality Questionnaire" and "Piper Fatigue Scale". The statistical analysis of the data was made with using percentages, means, t test, Anova, Kruskal Wallis, Man Whitney U and correlation test.

**Results:** It was found that the average age of mothers was 28.1±5.2 years, 44.8% of them high school graduated, 25.2% of them working outside, 78.8% of them lived in a nuclear family. It was determined 69.6% of the babies passed the additional food before sixth month, and 31.5% of them passed with

baby formula. It was appointed that the 65.3% of mothers in period of transition additional food experienced sleep problems and 66.6% of them experienced fatigue. It was found a positive weak and significant correlation between the mothers Pittsburgh Sleep Quality Questionnaire scores and and Piper Fatigue Scale scores ( $p<0,05$ ).

**Conclusion:** It was seen that in the period of transition additional food, the mothers experience problems about the passing time, first foods and feeding method and this situation causes insomnia and fatigue. According to the results it could be recommended to development of training programs for the improvement of mothers' sleep quality and fatigue levels.

**Keywords:** Additional food; fatigue level; sleep quality; mothers.

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## INTRODUCTUION

Nutrition is a key factor in the healthy growth and development of infants and children. The most suitable baby food is breast milk in first six months, because of the milk's rich content and appropriate amount as well as protective features against infections and reducing morbidity and mortality rates. Along with breast milk alone given at sufficient amount and duration, beginning to appropriate nutrients that will provide contribution to the development of infants, at the correct time and continuing with diversification of these nutrients is essential in terms of fundamental child development [1,2]. Beginning to additional food is also a transition period to a new step for mothers.

The most difficult issue for mothers in this period is starting time to additional food. Despite various different information's, the World Health Organization reported the most suitable time is after the sixth month [3]. Mothers may hurry to start to additional food due to many reasons such as the infant do not want to suck, thought of insufficient breast milk, recommendations by family elders or healthcare professionals. However, although its time has come, transition to additional food may also be delayed because of the baby's vomiting or developing allergy [4,5].

The additional foods to be given to babies differ as follows; socio-economic and cultural factors, food habits and traditions. Rice flour because of its low allergic effect, yoghurt which is a nutritious food and seasonal fruit-vegetables juices and purees to meet mineral and vitamin requirements are added to infant's diet. Mothers who prefer to give liquid food with feeding bottle, choose spoon feeding for more consistent foods [6-8]. While trying to cope with all these challenges, mothers have also maintain their routine roles at home and workplaces. Mothers can not have a good sleep quality in this period because of their worries about the infant is hungry, babies' night unrest or other reasons, making them likely to experience fatigue [9-11].

Sleep is defined as a period consisting of repeating stages in some of them the brain is active as if it is awake with reduced response to external stimuli, unconsciousness which can return to the state of consciousness in case of sufficient and a selective non-response state [12]. Sleep quality involves concrete aspects of sleep such as duration of falling asleep, sleep duration and number of waking in the night and abstract aspects such as depth and restful of the sleep [13]. Persons with poor sleep quality may develop physical, emotional and cognitive symptoms such as fatigue, prostration, reduced attention, nervousness, illogical thoughts, hallucination, loss of appetite and predisposition to accidents [14]. Mothers' need for sleep increases especially from the postpartum period, but sleep

problems manifest due to the altered sleeping pattern which in turn causes mothers to experience fatigue [12,15]

Fatigue is a condition defined by individuals who experience continuous and overwhelming emotion of being exhausted which does not resolve with rest with physically and cognitively reduced working capacity [16]. Fatigue is more common in women than in men and may affect all age, gender, racial and socioeconomical groups [17,18]. According to the literature about fatigue, mothers who feed their babies with breast milk alone were compared with those transitioned to additional food and fatigue levels of the mothers who transitioned to additional food were found to be higher [14]. The studies, especially difficulties brought to mothers by transition period such as choice of foods suitable for the infant, cooking special food for the infant, failure of the infant who has been used to breast feeding in get to be used to additional food, time to start to additional food, suitability of the consistency of food to be given, how to give these foods, amount and frequency of meals, useful/harmful food for the six month old baby, the infant to not be full up, constipation or diarrhea, the infant's loss of appetite and food allergy cause these results to emerge [4,5,6,19,20].

Because mothers who have several roles in family to experience fatigue will cause insufficient baby-care, lack of communication with family members and difficulty in fulfilling their other responsibilities, fatigue levels of mothers should be determined and the necessary support should be provided. Nurses should know the causes, duration and development the fatigue seen in mothers and its effects on daily life, those they can help them to cope with fatigue and increase their abilities for coping [21,22].

The great majority of studies in the literature on transition to additional food have been conducted on infants but have not been adequately addressed mothers; but this period would be healthier for the infants only by mothers to spend this period comfortably and successfully. Studies to be conducted about mothers to have the care they needed in this transition period will contribute to planning and organizing this care. The objective of this study was to determine sleep quality and fatigue levels of mothers in the period of transition to additional food.

Research Questions: What is the the sleep quality levels of mothers in the period of transition additional food? What is the the fatigue levels of mothers in the period of transition additional food? Which factors affect sleep quality and fatigue levels of mothers in the period of transition to additional food? Is there a relationship between sleep quality and fatigue levels of mothers in the period of transition additional food?

## MATERIALS AND METHODS

This study was designed as a correlation seeking descriptive study. The study was conducted in Family Health Centers (FHCs) located in Samsun province in Turkey; between June 2015 and December 2015. Universe of the study consisted of the mothers who brought their infants to FHCs in their sixth month for vaccination. Accordingly, based on the last circular letter published by the ministry, infants who completed the sixth month of life are invited to Family Health Centers for administration of Hepatitis B, Diphtheria, Acellular Pertussis, Tetanus, Inactive Polio, Hemophilus influenza type b vaccinations (Five Mixed vaccine) and Oral Polio vaccination.

Power analysis was performed for selection of the study group. The number of children born in Samsun province in 2014 is 17.000; 95% confidence interval, maternal fatigue rate 50% and error margin 5%, the sample size of the study was determined as 376. 392 mothers with a 6-month-old baby registered with the relevant FHCs on the dates of the study, and 377 (96% of the universe) agreed to participate in the study and these mothers were included this study.

In this study, data were collected with the "Personal Information Form" which involves the identification information of mothers, "Pittsburgh Sleep Quality Index(PSQI)" to evaluate sleep quality and "Piper Fatigue Scale(PFS)" to evaluate fatigue levels of mothers.

**Personal Information Form:** The personal information form was created by the author which consists of five sections and 36 questions. The first section contains 13 questions. These questions are; the age, educational status, working status, husband's educational status, husband's working status, family type, place of residence, income status, health security status, age of first marriage, age of first time mother the method of last birth. The second section contains three questions. These questions are about the baby, including the gender of the baby, the status of breastfeeding, and the reason for not breastfeeding. The third chapter contains 14 questions. These questions are; status of transition to additional food, time transition to additional food, the reason for transition to additional food before the sixth month; the need for professional training about this period, the person receiving information about transition to additional food, the difficulty in transition to additional food, the issues being forced, the state of awakening to feed the baby at night, the frequency of awakening. The fourth section contains three questions. These questions are; the status of experiencing sleep related problem, the cause of sleep related problem and the frequency of sleep

related problem. The fifth section contains three questions. These questions are; the status of experiencing fatigue related problem, the cause of fatigue related problem and the frequency of fatigue related problem.

**Pittsburgh Sleep Quality Index (PSQI):** PSQI is a scale developed by Buysse et al. in 1989 for the evaluation of sleep quality of patients in clinical trials. Validity and reliability study of this scale in Turkey was performed by Ağargün et al. in 1996. Cronbach's alpha reliability coefficient of the scale was found as 0.804. PSQI evaluates the sleep quality within the last month. PSQI includes a total of 24 questions with 19 answered by individuals themselves and 5 by their spouses or roommates. Five questions answered by the spouse or a roommate of the individual are used for clinical information and are not included in the scoring. The first 18 questions answered by individuals themselves are used in the calculation of total and component scores of PSQI. The total score of PSQI greater than 5 was considered as a cut-off score indicating poor sleep quality [23].

**Piper Fatigue Scale(PFS):** PFS scale developed by Piper et al. (1998) consists of 22 items and evaluated subjective perception of the patient about fatigue with four subdimensions. There are further 5 questions (1 and 24-27) that are not included in calculation of fatigue score, but recommended to remain in the scale, because they are important in evaluation of the data about fatigue. Scoring of the Scale: Subscale scores are obtained by dividing the scores of all the items in that subscale by the number of items. For every items, the answers are evaluated between 0-10 points. The total fatigue score is obtained by dividing the scores of 22 items by the number of items. A high score obtained from the scale indicates to high level of perceived fatigue. Validity and reliability study of the scale for Turkish population was carried out by Can and Cronbach alpha coefficient was found as 0.94 [10]. Data were collected by the researcher with face-to-face interviews by going to the FHCs. Filling of the each form lasted about 15-20 minutes. Before the data collection forms were applied, pre-application was made with 10 mothers and questions were audited and since any correction was not needed, the forms were applied on entire study group.

Data of the study was evaluated utilizing SPSS 20.0 statistical package software (Statistical Package for Social Sciences). Reliability analysis was performed with Cronbach's alpha coefficient.

Normality of the answers given was tested with Kolmogorov-Smirnov test. Evaluation of the data was performed using percentage calculations, arithmetic mean, *t* test, ANOV, Tukey Test, correlation, Mann-Whitney U test and Kruskal-Wallis Variance analysis.

## RESULTS

The mean age of the mothers in this study was found as  $28.1 \pm 5.2$  (min 18- max 45) years, age of marriage as  $22.1 \pm 3.2$  (min 14-max 34) years and age of becoming a mother for the first time as  $23.9 \pm 3.6$  (min 16-max 40) years. Of the mothers who participated to this study; 44.9% high school graduates and 74.8% of them unemployed. Their spouses; 44.1% high school graduates and 96.6% were employed.

It was found that, 78.8% of the mothers were living in a nuclear family, 54.6% were multiparas, last delivery was carried out via cesarean section in 51.7% of the mothers; 76.9% of the infants were still feeding with breast milk. The reasons for not receiving breast milk were the mother to not have sufficient milk in 55.2% and the infant to reject sucking in 25.3%.

Of the mothers included in this study, 97.6% transitioned to additional food and 69.6% of these mothers transitioned to additional food before six months of age. It was found when the reasons to transition to additional food before the sixth month were analyzed that, 36.8% of the mothers stated that they transitioned to additional food before the sixth month because their milks were insufficient, 18.2% because they want their babies to get to be used to additional food in an early period. Looking at the first additional foods used in the transition period; 31.5% started to additional food with infant formula, 26.6% with vegetable soup, 16.8% with yoghurt, 9.0% with

fruit juice/puree; 60.6% of the mother reported that they were giving the food with spoon.

It was determined that; 89.9% of the mothers believed to that professional training is necessary in transition to additional food; 46.7% had difficulty in the transition; 29.5% did not know how much food to give in which food, 17.1% stated that their infants rejected additional food or were inappetent, 17.0% could not decide to foods that might be useful or harmful for their babies, 15.9% had difficulty when preparing food suitable for their infants, 10.8% reported that their infants developed diarrhea.

It was found that, 65.3% of the mothers included in this study had sleep problems and 66.6% experienced fatigue in the period of transition to additional food. The mean total PSQI score of the mothers was found as  $8.0 \pm 3.4$  and the mean PFS score as  $5.0 \pm 1.9$ .

It was determined that, there was a statistically significant difference between the income level of family, mothers' need for professional training in transition to additional food, the status of having difficulty in the transition period, the status of experiencing sleep related problem, the status of experiencing fatigue related problem and PSQI total score of the mothers ( $p < 0.05$ ) (Table 1). Sleep quality was better in the mothers with a good income status, needing professional training, having difficulties in transition period, having no problems with sleeping and having no problem with fatigue (Table1).

**Table 1:** PSQI total average according to socio-demographic characteristics of mother

	PSQI total average	Statistics	p value
	X $\pm$ SD		
<b>Income level of family</b>		<b>F</b>	
Bad income level	7.72 $\pm$ 3.49	<b>3.529</b>	<b>0.030</b>
Income equal	8.20 $\pm$ 3.22		
Good income level	6.96 $\pm$ 3.73		
<b>Need for professional training</b>		<b>U</b>	
Require	7.80 $\pm$ 3.35	<b>-2.153</b>	<b>0.031</b>
No requirement	9.00 $\pm$ 3.40		
<b>Status of having difficulty in the transition</b>		<b>U</b>	
Have difficulty	8.71 $\pm$ 3.32	<b>13418.0</b>	<b>0.001</b>
Do not have difficulty	7.22 $\pm$ 3.27		
<b>Status of experiencing sleep related problem</b>		<b>t</b>	
Experience problem	8.65 $\pm$ 3.06	<b>6.086</b>	<b>0.001</b>
Do not have problem	6.53 $\pm$ 3.51		
<b>Status of experiencing fatigue related problems</b>		<b>t</b>	
Experience problem	8.44 $\pm$ 3.27	<b>4.329</b>	<b>0.001</b>
Do not have problem	6.88 $\pm$ 3.35		

There were statistically significant differences between the mean total PFS scores of the mothers included in this study and family type, continuing to feed their infants with breast milk, time

to start to additional food, receiving information about the transition period, having difficulty in the transition, experiencing sleep related problems and fatigue ( $p < 0.05$ ).

It was found that, mothers living in an extended family, not continuing to feed their babies with breast milk, those transitioned to additional food before the sixth month, received information about

the transition period, having difficulty in the transition and those experiencing sleep related problems and fatigue related problems were more fatigued (Table 2).

<b>Table 2.</b> PFS total average according to socio-demographic characteristics of mother			
	<b>PFS total average</b>	<b>Statistics</b>	
	<b>X±SD</b>		<b>p value</b>
<b>Family Type</b>		<b>t</b>	
Nuclear family	4.92±1.98		
Extended family	5.11±1.71	<b>-0.890</b>	<b>0.023</b>
<b>Status of feeding with breastfeeding</b>		<b>t</b>	
Yes	4.80±1.95		
No	5.48±1.74	<b>-3.081</b>	<b>0.002</b>
<b>The time to start additional food</b>		<b>U</b>	
Before six month	5.14±1.88		
After sixth month	4.52±1.99	<b>11830.5</b>	<b>0.008</b>
<b>Status of receiving information about the transition process</b>		<b>t</b>	
Receive	5.09±1.86		
Do not receive	4.38±2.10	<b>2.855</b>	<b>0.005</b>
<b>Status of having difficulty in the transition</b>		<b>U</b>	
Have difficulty	5.58±1.74		
Do not have difficulty	4.41±1.92	<b>11292.0</b>	<b>0.001</b>
<b>Status of experiencing sleep related problem</b>		<b>t</b>	
Experience problem	5.39±1.72		
Do not have problem	4.15±2.03	<b>5.925</b>	<b>0.001</b>
<b>Status of experiencing fatigue related problems</b>		<b>t</b>	
Experience problem	5.36±1.69		
Do not have problem	4.15±2.10	<b>5.651</b>	<b>0.001</b>

A statistically positive weak and significant correlation was found between the mean

total PSQI score and the mean PFS score ( $p < 0.05$ ) (Table 3).

<b>Table 3.</b> Relationship between PSQI total point average and sub-dimensions with PFS total point average and sub-dimensions										
<b>PFS sub-dimensions</b>										
<b>PSQI sub-dimensions</b>	Behavioral/severity		Affective		emotional		Cognitive / mental		<b>PFS total points average</b>	
	<b>r</b>	<b>p</b>	<b>r</b>	<b>p</b>	<b>r</b>	<b>p</b>	<b>r</b>	<b>p</b>	<b>r</b>	<b>p</b>
Subjective sleep quality	<b>0.561</b>	<b>0.001</b>	<b>0.404</b>	<b>0.001</b>	<b>0.526</b>	<b>0.001</b>	<b>0.417</b>	<b>0.001</b>	<b>0.546</b>	<b>0.001</b>
Sleep latency	<b>0.120</b>	<b>0.019</b>	<b>0.116</b>	<b>0.024</b>	0.049	0.345	<b>0.110</b>	<b>0.032</b>	<b>0.114</b>	<b>0.027</b>
Sleep duration	<b>0.248</b>	<b>0.001</b>	<b>0.181</b>	<b>0.001</b>	<b>0.279</b>	<b>0.001</b>	<b>0.212</b>	<b>0.001</b>	<b>0.262</b>	<b>0.001</b>
Habitual sleep efficiency	<b>0.166</b>	<b>0.001</b>	0.079	0.128	<b>0.160</b>	<b>0.002</b>	<b>0.128</b>	<b>0.013</b>	<b>0.153</b>	<b>0.003</b>
Sleep disturbances	0.099	0.054	<b>0.156</b>	<b>0.002</b>	<b>0.118</b>	<b>0.022</b>	<b>0.176</b>	<b>0.001</b>	<b>0.155</b>	<b>0.003</b>
Use of sleeping medications	<b>0.180</b>	<b>0.001</b>	<b>0.202</b>	<b>0.001</b>	<b>0.172</b>	<b>0.001</b>	<b>0.283</b>	<b>0.001</b>	<b>0.238</b>	<b>0.001</b>
Daytime sleep dysfunction	<b>0.501</b>	<b>0.001</b>	<b>0.424</b>	<b>0.001</b>	<b>0.504</b>	<b>0.001</b>	<b>0.423</b>	<b>0.001</b>	<b>0.528</b>	<b>0.001</b>
<b>PSQI total points average</b>	<b>0.453</b>	<b>0.001</b>	<b>0.368</b>	<b>0.001</b>	<b>0.438</b>	<b>0.001</b>	<b>0.413</b>	<b>0.001</b>	<b>0.477</b>	<b>0.001</b>

A statistically positive weak and significant correlation was found between the mean total PSQI score and behavioral/severity, affective meaning, emotional and cognitive/mood among the PFS subdimensions ( $p<0.05$ ). A positive moderate and significant correlation was found between subjective sleep quality subdimension of the PSQI and behavioral/severity and sensory subdimensions of the PFS ( $p<0.05$ ). There was a positive moderate and significant correlation between daytime dysfunction subdimension of the PSQI and, behavioral/severity and affective meaning subdimensions of the PFS ( $p<0.05$ ) (Table 3).

## DISCUSSION

In this study, the mean total PSQI score was found as  $8.0\pm3.4$ . The mean total PSQI scores vary between 0-21 and a score higher than 5 indicates to a poor sleep quality [24]. In a study by Pinar et al. with pregnant women, the mean total PSQI score was found as 5.13 [13]. In a study by Ko et al. conducted with women postpartum, the mean total PSQI score was found as 9.37 [24]. In a study by Zahra and Elham (2014), the mean total PSQI score of the women was found as  $7.78\pm3.14$ . This might be caused by the increased requirements related to baby-care with the transition to additional food and daily routines added to the problems that mother experience in the period of transition to motherhood [25].

In this study, a statistically significant difference was found between having difficulty in transition to additional food and the mean total PSQI score. Sleep quality was found to be poorer in the mother who reported a difficult transition to additional food ( $p<0.05$ ). In a study by Hiscock et al., no difference was found between having difficulty in transition to additional food and PSQI [26].

In the period of transition to additional food, the infant may react against additional foods, may develop diarrhea/ constipation and allergy and mothers may try to be more careful when applying the rules that must be followed in this period. Thus, mothers may have experience more stress, causing increase in the problems which in turn negatively affect mothers' sleep quality.

In this study, it was determined that, there was a statistically significant difference between the status of experiencing sleep related problem and PSQI total score of the mothers ( $p<0.05$ ). Similarly, Sari et al. found a statistically significant difference between having sleep problems and the mean total PSQI score [27]. This is an expected result for this study. It could be thought that, sleep quality of the mothers who reported to experience sleep problems might be poor, because of the stress brought by the transition period or interrupted night sleep in order

A positive moderate and significant correlation was found between the mean PFS total score and subjective sleep quality, and daytime sleep dysfunction subdimensions of the PSQI ( $p<0.05$ ). There was a statistically positive weak and significant correlation between the mean PFS total score and sleep latency, habitual sleep efficiency, sleep disturbances and use of sleeping medications subdimensions of the PSQI ( $p<0.05$ ). A statistically positive, very weak and significant correlation was found between the mean total PFS score and sleep duration subdimension of the PSQI ( $p<0.05$ ) (Table 3).

to meet the needs of the infant, shortened duration the mothers spend in sleep, difficulty to sink in a deep sleep and thus, their sleep might be irregular.

In this study, it was found that sleep quality was poorer in the mothers who reported to experience fatigue ( $p<0.05$ ). Similarly, statistically significant differences were found between having fatigue and the mean total PSQI scores in the studies by Gorgulu and Akdemir, Giallo et al. Hunter et al. Mayda et al. and Vargas et al. [15,17,18,28,29]. This is a usual result for this study, women might experience fatigue when caring for their infants because of their involvement in business life, housework, spouse role and mothership role. Especially, this special period of transition to additional food might be an intensive period for mothers in which they have to be more careful and, having fatigue in this intensity may be normal, and this intensity they experience high influence their sleep quality [28-32].

In this study, fatigue levels of the mothers who received information about the period of transition to additional food are higher. Unlike this study, in a study by Bakker et al. (2014), receiving information decreased fatigue levels of mothers. This is not an expected result for this study [16]. The lack of information may cause the mother to be more unconscious and more exhausted as well as it means that the mother who received information can set the things right in a planned and conscious way, knowing why and what to do. This result may suggest that, mothers did not apply the training they have received, did not use it effectively or exhibit more efforts in order to apply the training they have received and become exhausted.

In this study, a significant difference was found between having difficulty in transition to additional food and the mean total PFS score ( $p<0.05$ ). Fatigue levels were found to be higher in mothers who reported to have difficulty when starting to additional foods. Similarly, in the study by Song et al. having difficulty in feeding of infants were found to cause higher fatigue levels of mothers [9]. This is an expected result for this study and it could be thought that, mothers may be more

exhausted in order to cope with a situation that is that is difficult for them.

It was found in this study that, there was a significant correlation between sleep quality and fatigue levels, and fatigue levels were higher in the mothers with a poor sleep quality. Also in the study by Saygılı et al. fatigue levels were found to be higher in the women with a poor sleep quality [30]. Because mothers' need for resting will increase in the period of additional food with their increased work load, a good resting may be expected, but the poor sleep quality may lead to increase in fatigue of the mothers who are already exhausted.

## CONCLUSION

It was found that, 65.3% of the mothers included in this study had sleep problems in the period of transition to additional food and 66.6% had experienced fatigue; sleep quality of the participant mothers was poor; sleep quality was poorer in mothers with an income equal to expenditure, mothers having difficulty in the transition and mothers having sleep problems and fatigue in this period; fatigue levels of the mothers included in this study were moderate; fatigue levels were higher in mothers living in an extended family, mothers of infants who were not receiving breast milk, mothers who received information about to transition to additional food, mothers who stated that they had difficulty in the transition and mothers who reported to have sleep problems and fatigue.

## CONFLICTS OF INTERESTS

There was no commercial, financial or other associations that could pose a conflict of interest.

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