

Mothers' Experiences of Factors Affecting Their Sleep in the NICU: A Phenomenological Study

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Abstract

Background: The admission of an infant to the neonatal intensive care unit (NICU) has the potential to increase the mother's anxiety and stress. Mothers spend long hours and sometimes days nonstop at their infant's bedside. The present study aimed to explore the lived experiences of mothers about the factors affecting their sleep in the NICU.

Methods: This qualitative study was conducted using directed content analysis on 16 mothers in the NICU at Fatemeh Hospital affiliated with Hamadan University of Medical Sciences in 2023. The participants were selected using purposive sampling. The data in this study were collected through semi-structured interviews. The content of the interviews was recorded, transcribed, codified, and analyzed using Colaizzi's method of data analysis.

Results: The analysis of the data revealed 168 primary codes, 19 subcategories, and 8 main categories. The main themes extracted from the mothers' sleep experiences were individual factors (physical and psychological factors and adaptation to the conditions), environmental factors (physical, social, and economic factors), and occupation (daily activities and duties).

Conclusion: Individual and environmental factors and employment are effective in the sleep of mothers in the NICU. These findings enhance our understanding of mothers' sleep experiences and highlight the importance of addressing these factors in preventing and treating sleep disorders in mothers of newborns in research and clinical practice.

Keywords: Mother's sleep, Lived experiences, NICU, Qualitative research

Citation: Khademhamzehei E, Seidi M, Nazari Velashjerdi MR, Alimoradian A, Mortazavi SS. Mothers' experiences of factors affecting their sleep in the NICU: a phenomenological study. *J Qual Res Health Sci.* 2024;13(2):71-79. doi:10.34172/jqr.2024.11

Received: May 11, 2023, **Accepted:** January 27, 2024, **ePublished:** June 23, 2024

Introduction

Specialized medical care is provided for infants in the neonatal intensive care unit (NICU) (1), which is a level III/IV specialized care setting for high-risk infants (2). These infants are admitted to the NICU for reasons such as prematurity (gestational age less than 28 weeks), low birth weight (less than 1500 g), medical diseases, and the need for surgery (3). The mothers of infants sometimes stay in the NICU for hours a day and even around the clock (4). Sometimes they spend the whole night in the NICU or stay in a room in the ward called the maternal care room (5). The birth of a high-risk infant is a special experience for mothers. Premature separation of the mother from the infant due to preterm delivery and hospitalization brings many physical and psychological consequences for them and creates major changes in their lives (6).

Mothers commonly experience sleep disturbances when their newborns are admitted to the NICU. Scientific evidence suggests that insomnia symptoms are more commonly found in mothers who prefer to sleep in the hospital than in mothers who stay at home. Besides, the negative impact of light and noise caused by medical equipment and changing nursing shifts (7), time spent in NICU, having other children to care for, and the amount of support received from the healthcare team (7,8) are some factors affecting their sleep quality. Mothers who sleep at home report the stress caused by dividing time between the infant in the NICU and other children as the main reason for their sleep disorders (8). Nevertheless, the intensification of stress in the NICU and anxiety and depression in the early postpartum period are also other significant reasons (9). Moreover, mothers' experiences



of the birth of a premature infant are context-dependent, and mothers' reactions vary depending on their cultural backgrounds, beliefs, and opinions (10), affecting the mothers' sleep experience.

Accordingly, it seems that factors affecting the quality of sleep of mothers of infants admitted to the NICU are beyond the mentioned factors and include interpersonal, social, cultural, and even sensory and cognitive constructs. Thus, the experiences of such mothers can be analyzed to identify needs, formulate plans for the development of facilities and equipment for mothers' rest areas, help to identify methods of preventing maternal sleep disorders in clinical and hospital settings and, if necessary, provide counseling for treatment of sleep disorders in affected mothers. To this end, the present study aimed to explore the lived experiences of mothers in the NICU about the factors affecting the quality of their sleep.

Methods

This study aimed to explore the lived experiences of mothers of infants admitted to the NICU about the quality of their sleep using qualitative content analysis. The participants in the study were all mothers of infants admitted to the NICU of Fatemeh Hospital affiliated with Hamadan University of Medical Sciences in February 2023. The participants were selected using purposive sampling. The inclusion criteria were the infants' admission to the NICU, minimum literacy to read and write, and the ability to speak Persian. The exclusion criteria were the mother's report of pain due to cancer, myopathy, spinal cord injury, or cases of acute pain due to fracture, a history of drug and alcohol use, and drug use leading to decreased or increased sleep, and mental, psychological, and family problems before pregnancy because these factors decrease or increase sleep hours and sleep quality. The inclusion criteria were checked by a specialist to find out if the mothers met the criteria or not.

The data were collected using semi-structured interviews. First, two pilot interviews were conducted to confirm the questions in the interview guide. Then, the interviews were conducted with the participants. The data were saturated after interviewing 16 mothers. To further clarify the statements of 4 mothers, they were interviewed for the second time. The interviews were conducted face-to-face and individually by making the required arrangements to provide psychological security and privacy for the mothers to freely share their experiences. Each interview started with a general question about the mothers' sleep experience during their stay in the NICU. Probing questions were also asked to clarify any ambiguity in the participants' statements. Each interview lasted 30-50 minutes on average. The content of each interview was immediately transcribed. The primary codes were then extracted using MAXQDA software. Data analysis was performed with Colaizzi's

seven-step method (11): First, the text of the interviews was read several times to obtain a general understanding of its content. Second, the statements that represented experiences or key themes related to the phenomenon in question were identified. Third, primary codes were extracted from the statements. Fourth, the extracted codes were divided into subcategories. In the fifth step, the main categories were extracted from several subcategories. In the sixth step, similar categories were clustered into themes. Finally, Guba and Lincoln's four criteria were used to check the trustworthiness of the data. To assess the validity of the data, the primary codes were extracted from the first two interviews by two members of the research team at the same time. Then, the extracted codes were compared and any inconsistency was discussed and resolved by the raters. The credibility of the data was enhanced through the prolonged engagement with the phenomenon in question, recurrent reviews of the data by observing and reviewing the notes taken during the interviews, reviewing and revising the data, maintaining and expanding the relationship with the participants, and allocating adequate time for data collection. To ensure the reliability or trustworthiness of the data, the transcribed interviews were provided to the participants and the findings were revised based on their feedback. Moreover, the transcripts of the interviews and the extracted codes were reviewed by the members of the research team and an expert with a Ph.D. in health education who was familiar with qualitative studies, and their feedback was applied when coding and analyzing the data. Then, the dependability and confirmability of the data were established upon a consensus among the members of the research team. All the procedures taken to collect and analyze the data were described in detail to make it possible for others to review the research procedure and this enhanced the transferability of the findings (12). Before conducting the interviews, the objectives of the study were explained to the participants, and their informed consent was obtained. Besides, the participants' statements were recorded upon their permission. The participants' data were also collected anonymously and confidentially.

Results

The participants were 16 mothers of infants admitted to the NICU. The participants' mean age was 30.81 ± 8.27 years. Table 1 displays the participants' demographic characteristics. Data analysis revealed primary codes that were clustered into 19 subcategories and 8 main categories: Individual factors: physical and psychological factors and adaptation to conditions; environmental factors: welfare facilities, service delivery, concerns about financial matters and equipment; and occupation: daily activities and functions (Table 2).

Table 1. The participants' demographic characteristics

Mother code	Mother's age	Mother's education	Mother's occupation	Type of delivery	Delivery date	NICU stay (days)	Reason for NICU admission	Infant gender	Birth order	Infant weigh	Father's age	Father's education	Father's occupation	Place of residence
1	24	Diploma	Housewife	C-section	22 Jan	2	Premature (32 weeks and 3-4 days)	Twin girls	First	2100	30	Diploma	Self-employed	Hamadan
2	23	Middle school	Housewife	C-section	7 Dec	60	Premature (26 weeks)	Boy	First	1360	Dead	Dead	Dead	Nahavand
3	30	Bachelor's degree	Teacher	C-section	26 Dec	7	Premature (26 weeks)	Girl	Second	1500	36	Master's degree	Public employee	Malayer
4	27	Middle school	Housewife	C-section	28 Jan	2	Premature (32 weeks)	Boy	Second	1800	33	Master's degree	Public employee	Assad Abad
5	24	Diploma	Housewife	C-section	19 Jan	2	Pulmonary hypoplasia	Girl	First	2600	34	Diploma	Self-employed	Abrumand Village
6	34	Diploma	Housewife	C-section	27 Jan	10	Premature (30 weeks)	Boy	First	1280	35	Diploma	Self-employed	Hamadan
7	22	Middle school	Housewife	C-section	20 Jan	2	Preeclampsia	Boy	Second	2300	22	Illiterate	Self-employed	Hamadan
8	25	Diploma	Housewife	C-section	5 Feb	1	Premature (34 weeks and 5 days)	Boy	Second	2300	25	Middle school	Self-employed	A village in Hamadan
9	40	Bachelor's degree	Hairdresser	C-section	26 Jan	7	Respiratory problems	Boy	Second	3000	40	Bachelor's degree	Self-employed	Hamadan
10	32	Bachelor's degree	Housewife	C-section	5 Feb	2	Medical malpractice	Twin girls	First	1600	33	Master's degree	Public employee	Hamadan County
11	38	Middle school	Housewife	C-section	5 Feb	3	Premature (18 days)	Girl	Second	2000	33	Illiterate	Worker	Nahavand
12	30	Middle school	Housewife	C-section	8 Feb	2	Gestational hypertension	Boy	Second	2100	38	Diploma	Self-employed	Around Ali Sadr Cave
13	37	Bachelor's degree	Housewife	Natural childbirth	6 Feb	2	Premature (34 weeks)	Boy	First	2350	41	Diploma	Self-employed	Hamadan
14	19	Middle school	Housewife	C-section	2 Feb	2	Premature (32 weeks) and respiratory problems	Girl	Second	2700	23	Diploma	Self-employed	Kabudarahang
15	50	Diploma	Housewife	C-section	8 Feb	5	Premature (31 weeks) and respiratory problems	Boy	Second	2400	50	Middle school	Self-employed	Qorveh in Sanandaj
16	38	Master's degree	Housewife	C-section	5 Feb	4	Premature	Boy	Second	1480	39	Master's degree	Firefighter	Hamadan

Table 2. The categories, subcategories, and themes extracted in the study

Theme	Main categories	Subcategories	Codes	
Individual factors	Physical factors	Physical changes due to pregnancy	Weight gain and changes in the mother's appearance Premature delivery	
		Postpartum problems	Bleeding Pain caused by stitches and wounds in the C-section site Fatigue (staying in the hospital, commuting, less rest and sleep)	
			The mother's past issues	Stress (the husband's death, risk of miscarriage, and psychological distress) Pregnancy depression
				Concerns about the infant's health
		Concerns about family members' health	Concerns about other children, taking care of them, and being away from them	
	Adaptation to conditions	Infant demands	Alertness, regular visits, paying attention to the infant's current condition, feeding the baby on time, and the infant's sleeplessness	
		The mother's rest	Adaptation to the sleeping place in the hospital, the distance of the NICU from the mother's resting place, and relative comfort	
	Environmental factors	Welfare facilities	Unsuitable resting place	Crowding, noise, light, ventilation, uncomfortable beds, unsuitable cooling and heating systems, a large number of mothers in a single room, and many movements in the room
			Inadequate facilities	Inaccessibility of toilets, dirty and unwashed blankets, harsh chairs for breastfeeding, and inadequate cleaning
			Infant place and conditions	The need to feed the infant in the way preferred by the mother, the right place to breastfeed the infant The urgent need to breastfeed the infant following the doctor's order Quieting the infant and the need to hug him/her
Service delivery		Ignoring the mother by medical staff during their conversations	Not understanding medical staff's conversations about the infant's health	
		Concerns about the quality of services	Admission to a teaching hospital and service delivery by medical students Low confidence in the nursing staff (inadequate treatment, carelessness during service delivery, and inattention to the infant's feeding and cleaning)	
Concerns about financial matters and equipment		Hospital and pregnancy expenses	High costs for re-pregnancy, hospital costs, repayment of IVF installments	
	Optimization of equipment	Repeated ringing of the bell in the maternal care room by the nurse to call the mother Difficulty in displacing the infant from inside the incubator due to the height of the device The use of rough and uncomfortable chairs for breastfeeding		
Occupation	Activities	Daily activities	restrictions in doing daily activities and the disruption of life routines Taking painkillers and sedatives	
		Meaningful activities	Reading books or supplications, praying Working with online messengers and using cell phone Talking with other mothers	
	Duties	Duties toward the infant	Developing a sense of motherhood and paying attention to the infant's condition and changes	
		Duties toward family members	Calling other children and family members and asking about their health and studies	

Individual factors

Individual or person-level factors are related to body functions including physiological, psychological, and cognitive functions. These factors that can affect a person's sleep include physical factors, psychological factors, and adaptation to the conditions as discussed below:

Physical factors

The data showed that physical factors account for physical changes caused by pregnancy and postpartum problems. Physical changes in the body before and after the birth of an infant can create a range of different positive to negative responses in the mother's sleep pattern.

a. Physical changes caused by pregnancy

According to the participants' statements, the physical changes during pregnancy including weight gain and changes in the mother's appearance are caused by physiological and hormonal changes that disrupt the sleep pattern:

"A woman may experience some physical changes during pregnancy because of hormonal disorders. I was one of those people who used to get sleepless...and I've been sleepless since then" (Participant 6).

"You gain a lot of weight during pregnancy, your body shape is such that it becomes difficult for you to sleep at all" (Participant 8).

b. Postpartum discomforts

The participants reported that premature births, bleeding, pain and burning at the site of stitches and wounds in the cesarean section, physical fatigue caused by being in the hospital, and commuting are some of the factors that disrupt sleep:

"I had a cesarean section, I bleed a lot every day. I'm out of shape and that's why I can't sleep well" (Participant 11).

"They used to say that a mother who gives birth should sleep and rest, but immediately after a premature delivery I started caring for the infant" (Participant 9).

"I used to wake up once an hour and go to breastfeed the baby, but as soon as I would go to sleep they called me again" (Participant 4).

Psychological factors

The findings indicated that individual factors also include psychological factors including the mother's past issues, concerns about the infant's health, concerns about other children's health, and fatigue.

a. Mother's past issues

The participants reported that the stress caused by the husband's death, the possibility of miscarriage, and psychological distress and depression during pregnancy caused sleep disorders:

"My husband died. I'm under a lot of pressure and that's why I cannot sleep enough, so I take sleeping pills to calm down and sleep" (Participant 2).

"I had an abortion. So, I underwent IVF [In vitro fertilization]... I was always worried and I couldn't sleep. I was always concerned about what would happen" (Participant 10).

b. Concerns about the infants' health

According to the participants, anxiety caused by the non-recovery of the infant as reported by the doctor and nurses, being far from the infant and the infant's survival, the mother's low knowledge and her failure to understand medical terms, worry about the nurses' incompetence and

the fear of doing the wrong treatment, and following up on the infants' treatment were some of the factors leading to the mother's concerns about the infant's health:

"I don't know anything about medical issues. The doctor comes and says some confusing medical terms that I cannot understand and this makes me feel worse" (Participant 5).

"I felt terrible on the first day. I didn't know if my child would survive or not. I couldn't sleep at all" (Participant 16).

c. Concerns about other children's health

The participants stated that worrying about other children at home and staying away from them made the mothers worry about the health of other family members:

"I am worried about my first child's condition. He has pneumonia and a cold. I couldn't sleep because of the child" (Participant 11).

"My children call me every day, cry, and ask why I don't go home because my children are small" (Participant 12).

Adaptation to the conditions

Adaptation to the conditions was related to individual factors. Adapting to the conditions refers to the strategies that each person adopts to accept the conditions including the infant's demands and the mother's rest.

a. The infant's demands

Alertness, regular visits, paying attention to the infant's current condition, feeding the baby on time, and the infant's sleeplessness were some factors leading to sleep disorders in the mother:

"We get up and express milk because my baby can't drink milk directly. I get up, set the alarm on the phone, get up and express milk and take it to feed the baby" (Participant 5).

"All infants are the same. They sleep during the day and are awake at night. So, I try to sleep during the day and be awake at night" (Participant 7).

b. Mother's rest

Adaptation to the sleeping place in the hospital, the distance of the NICU from the mother's resting place, and relative comfort were the factors that affected the mother's quality of sleep:

"I don't know what to say; hospital officials cannot allocate a single room for every mother. So we have to get along with these problems. We only care about our children" (Participant 10).

"It doesn't matter. It's just good to have a place to rest and we will sleep for a few moments" (Participant 1).

Environmental factors

According to the participants. environmental factors

including physical, social, and economic factors could affect the mother's sleep quality:

Welfare facilities

The data in the present study indicated that inadequate welfare facilities including unsuitable resting places, welfare conditions, and the infant's conditions affected the mother's sleep quality.

a. Unsuitable resting place

Crowding, noise, light, ventilation, uncomfortable beds, unsuitable cooling and heating systems, a large number of mothers in a single room, and many movements in the room were the things that affected the quality of the mother's resting place:

"As the number of mothers increases, there will be less comfort because the comings and goings and noises increase. I could sleep better and it was quieter here" (Participant 16).

"The temperature was not good and I could not open the window" (Participant 9).

"I really can't sleep here at all. The ventilation is not good at all" (Participant 11).

b. Inadequate amenities

Inaccessibility of toilets, dirty and unwashed blankets, harsh chairs for breastfeeding, and inadequate cleaning were the factors that adversely affected the quality of amenities:

"I can't sleep here because the maternal care room is not clean. They don't take the blankets to get washed and they leave them here to be used by another mother. There is no hygiene here" (Participant 16).

"There are two toilets here; one of them is locked and the other one is open. There is no toilet paper. There is no handwashing liquid. So we have to ask for some. The pillows are dirty. So, how can we sleep here comfortably" (Participant 6).

c. The infant's place and conditions

The need to feed the infant in the way preferred by the mother, the right place to breastfeed the infant, the urgent need to breastfeed the infant following the doctor's order, quieting the infant, and the need to hug him/her were some factors that affected the mother's sleep quality:

"My child cries a lot. He is always hungry. I have to breastfeed him because he cannot eat powdered milk and that's why they wake me up a lot at night" (Participant 7).

"I think it would be better if we were with the infant. So we would know when he/she is crying, it takes a while for them to tell us" (Participant 15).

Service delivery

The quality of service delivery as one of the environmental

factors accounted for the ignoring of the mother by medical staff during their conversations and concerns about suitable service delivery:

a. Ignoring the mother by medical staff during their conversations

The conversation between the medical staff and the doctor's and nurse's comments about the infant's health makes the mother worry about the infant's health and the presence of the mother is ignored during medical conversations, inducing anxiety in the mother:

"I got nervous when the doctor asked the nurse to do angiography on the infant's head if she could not find a vein. I won't allow the nurse to do so" (Participant 7).

b. Concerns about the quality of service delivery

The admission to a teaching hospital, students' engagement in providing services to the infant, and low confidence in the nursing staff (inadequate treatment, carelessness during service delivery, and inattention to the infant's feeding and cleaning) made the mother worry about the quality of service delivery:

"They (residents and medical students) injected me with the wrong ampule and the infant was born in the 32nd week. Every day, I come here I see that they have torn a part of my baby's body to take blood. They are practicing on our infants. Then, they give a wrong report to the doctor to cover up their own mistake. These things do not allow me to sleep well" (Participant 9).

"I have seen many times an infant is crying for an hour and then he/she becomes quiet from exhaustion. But the nurse does not do anything to quiet the child" (Participant 14).

Concerns about financial matters and equipment

The participants reported concerns about hospital and pregnancy expenses and the optimization of equipment.

a. Hospital and pregnancy expenses

"I cannot sleep well. They overcharge us for each night staying in the hospital. My husband is a worker and I don't know how to pay hospital expenses. They say they get 300,000 Tomans a night. We are residing in Nahavand [A city in the Central District of Nahavand County, Hamadan province, Iran] and it is far from here" (Participant 11).

"I could not have a natural childbirth because our children were aborted always. So, we had to spend 300-400 million Tomans for this child. We pay our whole salary for the installment of the loan we got for the IVF procedure. We don't have any money" (Participant 10).

b. Optimization of equipment

The difficulty in displacing the infant from inside the incubator due to the height of the device and the need for comfortable seats during breastfeeding highlighted

the need for optimizing the equipment to improve the mother's sleep quality:

"As soon as I start going to sleep, I have to take the child out of the incubator and it's a difficult task for me because of the height of the device and a lot of stitches on my body" (Participant 3).

"Every mother has to spend at least 12 hours a day on these rough plastic chairs. I wish there was a budget to buy more comfortable chairs" (Participant 8).

Occupation

The third theme extracted in this study was occupation. The data showed that occupation is divided into two subthemes: activities and duties:

Activities

According to the participants, activities include daily activities and meaningful activities.

a. Daily activities

The findings indicated that restrictions in doing daily activities, the disruption of life routines, and taking painkillers and sedatives are the things that adversely affect the mother's sleep quality, leading to sleep disorders.

"When I'm stressed and I can't sleep, I sit here by myself or drink tea or make myself busy with things similar to what I do at home. Sometimes I have to wash clothes and then I fall asleep" (Participant 15).

b. Meaningful activities

Reading books or supplications, praying, working with online messengers, using cell phones, and talking with other mothers were considered meaningful activities for mothers.

"When I can't sleep, I say prayers and praise God and the Prophet (PBUH)" (Participant 1).

"We often use smartphones. But when you make yourself busy with the phone you won't sleep and only God knows when you will stop it [laughing]" (Participant 13).

Duties

The second theme was duties including duties towards the infant and the family.

a. Duties towards the infant

Developing a sense of motherhood and paying attention to the infant's condition and changes are part of the mother's duties towards the infant:

"We can't sleep comfortably here until the morning because we have to take care of the infant. This is one of the duties of a mother. I breastfeed the infant several times at night. I wake up two or three times to breastfeed him" (Participant 16).

"The nurses don't do anything to silence the child. They let the child cry. They only change the child's diaper. If the child cries, they should hug him/her like his/her

mother. But they don't do it" (Participant 2).

b. Duties towards the family members

The participants reported that they called other children and family members and inquired about their health and studies:

"I'm very worried about my first child. She goes to school and there is nobody to help her with her homework" (Participant 9).

"My father died ten months ago. I have an old mother and I worry about her" (Participant 11).

Discussion

The findings from this study indicated that individual and environmental factors and occupation affect mothers' sleep in the NICU. According to the participants, these factors affected the quality of their lives by affecting the quality of their sleep and services and care for their infants. According to the recommendation of the National Sleep Foundation, adults need 7-8 hours of sleep (13). The sleep-wake cycle is governed by two major neural mechanisms, including the homeostatic process of sleep (which occurs due to the function of wakefulness and disappears during sleep) and the daily circadian rhythm (14). Pregnancy and childbirth is a special stage in the life of women, which is associated with significant changes in sleep patterns and can lead to sleep disorders such as insomnia, night waking, restless legs syndrome, snoring, and obstructive sleep apnea accompanied by severe anxiety during the day (13,15,16). The data in the present study showed that individual factors including physical and psychological factors, and adaptation to conditions can affect the mother's sleep quality. A woman's ability to sleep, especially during pregnancy and after childbirth, is affected by hormonal and physiological changes that can affect the quality of her sleep (17). A study in 2017 showed that one percent of the general population in North America have mental disorders and this figure varies from 4.2% to 37% in Iran (18). Postpartum psychological disorders range from maternal grief to postpartum psychosis (19). Furthermore, environmental factors, including physical, social, and economic factors can lead to sleep disorders in mothers. The available evidence indicates that factors that can disrupt sleep in the intensive care unit are noise, light (20), the interactions of patient caregivers, mechanical ventilation (21), monitoring, sounds in other departments, ambient temperature, opening and closing of doors and windows (22), repeated interventions by medical staff (23), and economic conditions (24). Hospitals usually provide physical space and health facilities, but they do not provide a place for proper sleep and rest for a mother who has just given birth and needs care and has to stay at the hospital due to the infant's conditions. The participants in this study reported that their activities and tasks affected the quality

of their sleep. Occupation refers to the activities that people are engaged in in their daily lives from childhood to old age. Occupation is purposeful, meaningful, and practical for people and involves many things such as self-care, free time, daily life activities, sleep and rest, education, work, and participation in social activities (25). A combination of daily activities is necessary to achieve a balance in them (26). NICUs provide some facilities for mothers who are capable, enthusiastic, and enjoy taking care of their babies under the supervision of nurses. Moreover, in line with the present study, Lebel et al examined the factors affecting the sleep quality of mothers of infants admitted to the NICU in Canada and acknowledged that symptoms of depression and stress and the amount of breast milk had a positive correlation with the occurrence of sleep disorders in mothers of infants admitted to the NICU. However, the presence of other children at home, the severity of depression in the mother, and the prolongation of their stay in the NICU increased the severity of sleep disorders in mothers (20). It seems that NICUs should be constructed in a calm and quiet place within the hospital, and donors can contribute to constructing places for mothers to rest during their infant's stay in the NICU.

One of the limitations of the present study was the mothers' unwillingness to attend the interviews due to the COVID-19 pandemic and thus the researcher tried to conduct the interviews in full compliance with health protocols.

Conclusion

Overall, the findings showed that individual and environmental factors and occupation affected mothers' sleep in the NICU. The mentioned in the sleep experience of mothers include both negative factors (disrupting sleep) and positive factors (improving sleep quality). Medical professionals and especially occupational therapists working in the NICU should consider these factors as both risk factors and protective factors to improve the quality of sleep in mothers. The mentioned factors should be also taken into account in occupational therapy interventions, including compensatory and adaptive strategies to improve the quality of life, work performance, and playing the motherhood role.

Acknowledgments

The protocol for this study was approved by the research ethics committee of Hamadan University of Medical Sciences (ethics code IR.UMSHA.REC.1401.861). This research project was financed by the Vice-Chancellor for Research of Hamedan University. The researchers would like to express their gratitude to all the medical staff of Fatemeh Hospital and the mothers who contributed to conducting this study.

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Competing Interests

The authors declared no conflict of interest.

Ethical Approval

The ethical approval was obtained from the regional committee of Medical Research Ethics at Hamadan University of Medical Sciences under the code: IR.UMSHA.REC.1401.861.

Funding

This work was supported by the deputy of research at Hamadan University of Medical Sciences [Grant number 140111189918].

References

- Karimi P, Mahmudi L, Azami M, Badfar G. Mortality in neonatal intensive care units in Iran: a systematic review and meta-analysis. *Iran J Neonatol.* 2019;10(3):70-80. doi: [10.22038/ijn.2019.36647.1566](https://doi.org/10.22038/ijn.2019.36647.1566).
- Lean RE, Rogers CE, Paul RA, Gerstein ED. NICU hospitalization: long-term implications on parenting and child behaviors. *Curr Treat Options Pediatr.* 2018;4(1):49-69.
- Sabzehei MK, Basiri B, Shokouhi M, Eghbalian F, Eslamian MH. Causes and risk factors associated to neonatal mortality in neonatal intensive care unit (NICU) in Besat hospital Hamadan-Iran in 2015 to 2016. *Int J Pediatr.* 2018;6(9):8185-94. doi: [10.22038/ijp.2018.31089.2748](https://doi.org/10.22038/ijp.2018.31089.2748).
- Ionio C, Mascheroni E, Colombo C, Castoldi F, Lista G. Stress and feelings in mothers and fathers in NICU: identifying risk factors for early interventions. *Prim Health Care Res Dev.* 2019;20:e81. doi: [10.1017/s1463423619000021](https://doi.org/10.1017/s1463423619000021).
- Hajiaraghi N, Sadeghi N, Motaghi M, Mousavi M. Investigating the strategic elements of family-centered care in the neonatal intensive care unit: a qualitative study. *J Qual Res Health Sci.* 2021;10(2):65-74. doi: [10.22062/jqr.2021.193611.0](https://doi.org/10.22062/jqr.2021.193611.0).
- Haddad S, Dennis CL, Shah PS, Stremler R. Sleep in parents of preterm infants: a systematic review. *Midwifery.* 2019;73:35-48. doi: [10.1016/j.midw.2019.01.009](https://doi.org/10.1016/j.midw.2019.01.009).
- Blomqvist YT, Nyqvist KH, Rubertsson C, Funkquist EL. Parents need support to find ways to optimise their own sleep without seeing their preterm infant's sleeping patterns as a problem. *Acta Paediatr.* 2017;106(2):223-8. doi: [10.1111/apa.13660](https://doi.org/10.1111/apa.13660).
- Pineda R, Bender J, Hall B, Shabosky L, Annecca A, Smith J. Parent participation in the neonatal intensive care unit: predictors and relationships to neurobehavior and developmental outcomes. *Early Hum Dev.* 2018;117:32-8. doi: [10.1016/j.earlhumdev.2017.12.008](https://doi.org/10.1016/j.earlhumdev.2017.12.008).
- Al Maghaireh DF, Abdullah KL, Chong MC, Chua YP, Al Kawafha MM. Stress, anxiety, depression and sleep

- disturbance among Jordanian mothers and fathers of infants admitted to neonatal intensive care unit: a preliminary study. *J Pediatr Nurs.* 2017;36:132-40. doi: [10.1016/j.pedn.2017.06.007](https://doi.org/10.1016/j.pedn.2017.06.007).
10. Brødsgaard A, Pedersen JT, Larsen P, Weis J. Parents' and nurses' experiences of partnership in neonatal intensive care units: a qualitative review and meta-synthesis. *J Clin Nurs.* 2019;28(17-18):3117-39. doi: [10.1111/jocn.14920](https://doi.org/10.1111/jocn.14920).
 11. Araghian-Mojarad F, Sanagoo A, Jouybari L. Nurses' experiences of intimacy with the patient in pediatric wards affiliated to Mazandaran and Golestan Universities of Medical Sciences, Iran, 2016. *J Qual Res Health Sci.* 2020;6(2):147-56. [Persian].
 12. Mirhosieni M, Nouhi E. Families' experiences of maternal death due to pregnancy and childbirth complications: a phenomenological study. *J Qual Res Health Sci.* 2017;6(2):157-69. [Persian].
 13. Gunduz S, Kosger H, Aldemir S, Akcal B, Tevriczi H, Hizli D, et al. Sleep deprivation in the last trimester of pregnancy and inadequate vitamin D: is there a relationship? *J Chin Med Assoc.* 2016;79(1):34-8. doi: [10.1016/j.jcma.2015.06.017](https://doi.org/10.1016/j.jcma.2015.06.017).
 14. Jawabri KH, Raja A. Physiology, sleep patterns. In: StatPearls [Internet]: Treasure Island, FL: StatPearls Publishing; 2022.
 15. Gupta R, Dhyani M, Kendzerska T, Pandi-Perumal SR, BaHammam AS, Srivanitchapoom P, et al. Restless legs syndrome and pregnancy: prevalence, possible pathophysiological mechanisms and treatment. *Acta Neurol Scand.* 2016;133(5):320-9. doi: [10.1111/ane.12520](https://doi.org/10.1111/ane.12520).
 16. Kocsis I, Szilágyi T, Turossi J, Bakó A, Frigy A. Effect of a gymnastics program on sleep characteristics in pregnant women. *Taiwan J Obstet Gynecol.* 2017;56(2):204-9. doi: [10.1016/j.tjog.2017.02.001](https://doi.org/10.1016/j.tjog.2017.02.001).
 17. Okun ML. Sleep disturbances and modulations in inflammation: implications for pregnancy health. *Soc Personal Psychol Compass.* 2019;13(5):e12451. doi: [10.1111/spc3.12451](https://doi.org/10.1111/spc3.12451).
 18. Servatyari K, Valizadeh Ardalan P, Yazdnpanah S, Mardani N, Yazdan Panah H. Frequency of psychological disorders symptoms and their effects on high school students in Divandareh city in 2018. *Shenakht Journal of Psychology and Psychiatry.* 2019;6(3):71-82. doi: [10.29252/shenakht.6.3.71](https://doi.org/10.29252/shenakht.6.3.71). [Persian].
 19. Ezadee M, Rasouli A. Effectiveness of acceptance and commitment psychotherapy in improving depression and quality of sleep in women with postpartum depression. *Iran J Nurs Res.* 2019;14(1):21-8. [Persian].
 20. Lebel V, Feeley N, Robins S, Stremmer R. Factors influencing mothers' quality of sleep during their infants' NICU hospitalization. *Behav Sleep Med.* 2022;20(5):610-21. doi: [10.1080/15402002.2021.1971985](https://doi.org/10.1080/15402002.2021.1971985).
 21. Brusco LI, Cruz P, Cangas A, González Rojas C, Vigo DE, Cardinali DP. Efficacy of melatonin in non-intensive care unit patients with COVID-19 pneumonia and sleep dysregulation. *Melatonin Res.* 2021;4(1):173-88. doi: [10.32794/mr11250089](https://doi.org/10.32794/mr11250089).
 22. Pulak LM, Jensen L. Sleep in the intensive care unit: a review. *J Intensive Care Med.* 2016;31(1):14-23. doi: [10.1177/0885066614538749](https://doi.org/10.1177/0885066614538749).
 23. Sadeghi SE, Esmaeelpour N, Habibzadeh SR, Kalani N, Foroughian M, Raeyat Dost E. Evaluation of sleep disturbance factors in hospitalized patients in Jahrom hospitals. *Med J Mashhad Univ Med Sci.* 2019;62(4):1661-70. doi: [10.22038/mjms.2019.14317](https://doi.org/10.22038/mjms.2019.14317). [Persian].
 24. Essien SK, Feng CX, Sun W, Farag M, Li L, Gao Y. Sleep duration and sleep disturbances in association with falls among the middle-aged and older adults in China: a population-based nationwide study. *BMC Geriatr.* 2018;18(1):196. doi: [10.1186/s12877-018-0889-x](https://doi.org/10.1186/s12877-018-0889-x).
 25. American Occupational Therapy Association (AOTA). Occupational Therapy Practice Framework: Domain et Process. Bethesda, MD: AOTA; 2020.
 26. Mohebbi SZ, Sargeran K, Hejrati T. Dentists' knowledge and perspectives on oral health promotion for disabled individuals. *J Dent Med.* 2017;30(2):120-6. [Persian].