The Relationship Between Alarm Fatigue and Clinical Competence among Neonatal Intensive Care Nurses in Kermanshah-Iran: A Correlational study

ABSTRACT

Aims: Inadequate qualifications of nurses are one of the predisposing factors for the occurrence of clinical errors in care units. Furthermore, false alarms reduce the response time and nurses' trust in alarms, which can cause them to suffer from alarm fatigue in the long run**.** Therefore, this study was undertaken to assess the relationship between alarm fatigue and clinical competence among neonatal intensive care nurses in Kermanshah-Iran.

Methods: In this descriptive correlational study, 140 nurses working in the neonatal intensive care unit of Kermanshah city in 2023-2024 were included in the study by census method. The data collection tools included a demographic questionnaire, the "Nurse Competence Scale" and an "Alarm fatigue questionnaire". Data were analyzed by SPSS 16 using descriptive and analytical statistics with significant level of P<0.05.

Results: The average alarm fatigue score was 21.61 ± 7.45 and above average. Most of the researched nurses, that means 75% of them, had very good clinical qualifications. The average score of clinical competence in nurses was 174.76± 26.74 and was evaluated at a very good level. This study shows the relationship between alarm fatigue and clinical competence in the teaching–coaching subscale among nurses (p=0/019). However, in total, there was no significant difference.

Conclusion: This study shows the relationship between alarm fatigue and clinical competence in the teaching–coaching subscale among neonatal intensive care nurses. Therefore, it should be planned to improve training and solutions based on standard guidelines to reduce alarms and monitor physiological monitoring systems in hospitals.

Keywords: Nurses, Alert Fatigue, Health Personnel, Clinical Competence, Intensive Care Units, Neonatal

Introduction

Healthcare is one of the most important areas of sustainable development in human societies and is responsible for the important task of maintaining health. Among them, nurses are the largest group in treatment departments, especially special care departments[1]. Every year, 15 million premature newborns are born worldwide, of which half a million premature newborns are born in the United States of America. Iran is also one of the regions with a high prevalence of premature birth, where approximately 10% of them are premature and have a low birth weight[2]. The nursing of sick and hospitalised newborns requires paying attention to the complex, special, critical and changing needs of newborns and having clinical competence, which is the main factor in providing quality care[3] and can increase the quality of nursing care and the survival rate of newborns along with the development of advanced equipment in neonatal intensive care units (NICUs)[3, 4].

Competency was introduced as a concept in nursing by Johnson in the late 1960s, and Benner was the first to develop the concept of competency and its use in clinical nursing[5, 6]. The WHO has defined clinical competence as a level of performance that represents the effective application of knowledge, skills, and judgment[7]. Clinical competence consists of seven dimensions, which include helping role, teaching–coaching, diagnostic functions, managing situations, therapeutic interventions, ensuring quality and work role[8, 9]. In newborn nursing, clinical competence is defined as having the knowledge, ability and skill to effectively and professionally perform all the care needed by newborns[10].

Inadequate competence of nurses is one of the predisposing factors for the occurrence of clinical errors in care units[11]. The results of some reports indicate that more than 80% of errors leading to secondary injuries of patients were due to negligence or insufficient clinical competence of nurses[12]. In Iran, the results of a study by Bahreini et al. showed that the level of clinical competence of nurses in some subscales, including teaching–coaching and ensuring quality, was unfavourable [13].

On the other hand, in the conditions of the intensive care unit, where patients are under care in a critical condition, alarms are everywhere[14, 15]. The majority of patients in the neonatal intensive care unit are preterm newborns with physiologically immature functions who are at risk of serious complications[16]. Responding to alarms accounts for 35% of an intensive care nurse's working time[14]. In previous studies, it was estimated that more than 70% of clinical alarms do not require clinical intervention[16]. However, many alarms are considered false or clinically irrelevant[16, 17], and they even account for 85-99% of all alarms[14, 15, 18]. False alarms reduce response time and nurses' trust in alarms[15, 16], and they also cause disruptions in the planning and efficient performance of nurses and their distraction[19, 20]. They deactivate the alarm, cause staff, especially nurses, to not handle the alarm according to the patient's condition, or reduce the volume of the alarm by staff, especially nurses[21]. Nurses consider these alarms as noisy alarms, causing discomfort and headaches for themselves and disrupting patient care, and this situation can cause them to suffer from alarm fatigue in the long run[21, 22]. Alarm fatigue occurs when caregivers are exposed to too many alarms, causing alarm desensitisation[23] and delayed or even nonresponse to alarms, which can lead to serious patient harm and unsafe solutions. It is known as an important issue of patient safety[15, 16, 24, 25], which was ranked by the Emergency Care Research Institute (ECRI) as one of the 10 most important technological threats to health (2016-2020)[21]. No similar study was found regarding the relationship between the Alarm Fatigue and Clinical Competence among Neonatal Intensive Care Nurses.

Considering the importance of improving the quality of nursing care in neonatal intensive care units and the necessity of conducting a study considering that limited studies have investigated clinical competence in neonatal intensive care units and, with several years of experience in NICU wards, I have witnessed many problems of monitoring alarms and devices, as well as the fact that alarms are considered useless by nurses and even their anger, headaches and irritability, the research team decided to conduct the present study with the aim of assessing the relationship between alarm fatigue and clinical competence among neonatal intensive care nurses in Kermanshah-Iran, 2022-2023.

Methods

Design and Participants

This research is a, correlational study that was conducted on nurses working in neonatal intensive care units in Kermanshah hospitals, including Imam Reza, Dr. Mohammad Kermanshahi, Motazedi, Imam Hossein, Hazrat Masoumeh, Hazrat Abulfazl al-Abbas, Bisetun and Hakim hospitals in 2022-2023 In Iran. The Census sampling method was used and all nurses entered the study (n=153). Of these, 140 people entered the study.

The inclusion criteria were a bachelor's degree in nursing and above, had at least 6 months of experience in the neonatal intensive care unit, physical and mental health (based on the employment file)[3] and no hearing impairment[21].

The exclusion criteria for the study included unwillingness to continue participating in the study, Failure to complete the questionnaire ,failure to answer more than 20% of the questions in the questionnaires[8].

Instruments

Data collection in this study was performed using three demographic information tools, the Nurse Clinical Competency Scale by Meretoja et al.[9] and the Nurses' Alarm Fatigue questionnaire by Torabizadeh et al.[19].

The demographic information questionnaire included age, gender, marital status, education level, employment status, general work history, work experience in the NICU wards, type of work shift, participation in specialised clinical training courses related to newborn care[3], personal and family problems history, history of sedative drug use, history of background problems (effective in fatigue), and participation in clinical competence tests.

To investigate the alarm fatigue of the nurses, Nurses' Alarm Fatigue questionnaire by Torabizadeh et al. 2017, which was prepared in Iran in the special care department, was used. This questionnaire contains 13 items. The 5-point Likert scale for scoring each item includes always (4), mostly (3), sometimes (2), rarely (1) and never (0), which are scored from 0 to 4. Two items of this questionnaire have a reverse

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score (items 1 and 9), and the range of scores is between 8 and 44. A score of 8 indicates the lowest level of alarm fatigue, and a score of 44 indicates the highest level of alarm fatigue. Torabizadeh et al reported the reliability of this tool to be 91%[19]. In the present study, the reliability coefficient was determined using Cronbach's alpha method of 0.813.

Nurse clinical competency scale based on the theory from novice to expert Benner, prepared by Meretoja et al. in 2004[9, 19] and translated and validated into Persian by Bahreini et al. in 2010[13]. In the study by Meretoja et al. (2004), the internal consistency of the tool ranges was reported as favorable (minimum 0.79 and maximum 0.91).

This scale consists of 73 items and 7 subscales, including helping role (7 items, 0-21), teaching–coaching (16 items, 0-48), diagnostic functions (7 items, 0-21), managing situations (8 items, 0-24), therapeutic interventions (10 items, 0-30), ensuring quality (6 items, 0-18) and work role (19 items, 0-57). Nurses rate the use of each skill on a 4-point Likert scale that is scored from 0 to 3 (0 means no use, 1 means very little use, 2 means occasional use, and 3 means frequent use of that skill). The overall score of the tool is between 0-219.

To rank the level of clinical competence, the scores of applying skills, which range from 0-219, were placed on a scale of zero to 100 using linear transformation, in which zero indicates the lowest level of clinical competence and 100 indicates the highest level of clinical competence. Finally, the total score of the instrument was classified into four levels of low (0-25), relatively good (26-50), good (51-75) and very good (76-100). In the present study, the reliability coefficient using Cronbach's alpha coefficient of the whole tool was 0/962, and its ranges (minimum 0.7 and maximum 0.9) were estimated.

Data gathering

After obtaining permission and obtaining the code of ethics, the researcher proceeded to the validity and reliability of three questionnaires. After completing the validity and reliability process, by making the necessary arrangements with the Research Vice-Chancellor of Kermanshah University of Medical Sciences as well as the relevant authorities, permission to enter the research environment was obtained. Demographic information tools, Nurses' Alarm Fatigue questionnaire, and the Nurse Clinical Competency Scale completed by nurses in form of self-report.

Data Analysis

After data extraction, data analysis was performed using SPSS 16 software in two parts: descriptive statistics (frequency distribution tables, minimum, maximum, mean and standard deviation) and inferential statistics (Independent T-test, ANOVA test and Pearson correlation coefficient).

Results

The number of nurses participating in this study was 140. The findings of the study showed that most of the nurses in the study were married (62.9%) and had a bachelor's degree (83.6%). Formally employed (67.1%), and most of the nurses had rotating shifts (79.3%). Most of the nurses had participated in training courses related to neonates (92.1%). A total of 42.1% of nurses had participated in the clinical competency test. Nurses with personal and family problems (19.3%), a history of taking sedatives (8.6%) and background problems (11.4%) were reported. All the nurses were female. The mean age was 35.1± 7.56 years old, the average clinical work experience was 11.14± 7.30 years, the range was 6 months to 29 years, and the average work experience in the NICU was 7.55± 6.34 years, with a range of 6 months to 26 years. Clinical competence had a statistically significant difference with the type of work shift ($p=0.008$), work experience in the NICU department ($p<0.001$) and participation in the clinical competence test ($p=0.009$). Therefore, clinical competence was higher in nurses with a fixed work shift as well as nurses who had a history of participating in the clinical competence test. Tukey's two-by-two comparison also showed that clinical competence was higher in nurses with ten years of work experience and above than nurses with work experience of 5 to 10 years ($p<0.001$) and this difference was not significant in other levels. Alarm fatigue also had a statistically significant difference with employment status ($p=0.04$) and personal and family problems ($p=0.03$). Additionally, Tukey's two-by-two comparison also showed that

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alarm fatigue in nurses with contract employment status was significantly lower than nurses with official employment (p=0.034) (Table 1).

Alarm fatigue was generally obtained with an average of 21.61 ± 7.45 among the nurses studied. Considering that the alarm fatigue score according to the questionnaire used in this study is between 8 and 44, it can be said that the nurses had a fatigue score higher than the average score on the questionnaire, which is equal to 19.

Table 1. Comparison of clinical competence and alarm fatigue scores of nurses based on demographic data

Demographic Variables		Frequency (%)	Clinical Competence			Alarm Fatigue		
			Mean	SD	Statistical indicator	Mean	SD	Statistical indicator
*Age (year)	<۳۰	۳۵(۲۵/۰)	۱۶۷/۸۸	۲۵/۵۸	F=۲/۶۴۳ P=۰/۰۷۵	۲۱/۸۵	۶/۹۰	F=۰/۰۳ P=۰/۹۷۱
	۳۹-۳۰	۶۰(۴۲/۹)	۱۷۳/۷۹	۲۸/۳۴		۲۱/۶۰	۸/۱۱	
	≥ ۴۰	۴۵(۳۲/۱)	۱۸۱/۴۰	۲۴/۳۳		۲۱/۴۴	۷/۱۰	
**Marital status	Single	۵۲(۳۷/۱)	۱۷۶/۶۵	۲۴/۳۴	t=۰/۶۴۱ df=۱۳۸ P=۰/۵۲۲	۲۱/۸۲	۶/۸۷	t=۰/۲۵۸ df=۱۳۸ P=۰/۷۹۶
	Married	۸۸(۶۲/۹)	۱۷۳/۶۴	۲۸/۱۳		۲۱/۴۸	۷/۸۱	
**Educational status	Bachelor of Nursing	۱۱۷(۸۳/۶)	۱۷۳/۳۵	۲۷/۹۱	t=۱/۳۷۷ df=۱۳۸ P=۰/۱۷۱	۲۱/۳۴	۷/۵۲	t=۰/۶۷۱ df=۱۳۸ P=۰/۵۰۳
	MS Nursing	۲۳ (۱۶/۴)	۱۸۱/۹۰	۱۹/۰۴		۲۲/۵۰	۶/۸۷	
*Employment status	Novice nurses	۲۱(۱۵/۰)	۱۷۰/۳۸	۲۲/۷۰	F=۰/۸۶۲ P=۰/۴۲۵	۲۲/۲۳	۷/۰۵	F=۳/۳۰۳ **P=۰/۰۴**
	Contractual	۱۵(۱۰/۷)	۱۸۲/۳۳	۲۲/۹۵		۱۷/۰۶	۵/۸۴	
	Formally employed	۹٤(٦۷/۱)	۱۷۴/۴۰	۲۸/۶۰		۲۲/۱۰	۷/۳۸	
**Shift work	fixed	۲۹(۲۰/۷)	۱۸۶/۳۴	۲۵/۱۵	t=۲/۶۷۶ df=۱۳۸ **P=۰/۰۰۸**	۲۱/۱۳	۶/۰۸	t=۰/۳۸۵ df=۱۳۸ P=۰/۷۰۱
	rotating	۱۱۱(۷۹/۳)	۱۷۱/۷۳	۲۶/۴۱		۲۱/۷۳	۷/۷۹	
*Working experience (year)	<۵	۳۰(۲۱/۴)	۱۷۱/۲۳	۲۴/۹۶	F=۱/۳۹۲ P=۰/۲۴۸	۲۱/۵۰	۶/۲۸	F=۰/۰۸۵ P=۰/۹۶۸
	۵ – ۱۰	۴۱(۲۹/۳)	۱۷۰/۵۸	۲۶/۴۰		۲۱/۷۸	۸/۱۸	
	۱۱– ۱۵	۵۰(۳۵/۷)	۱۷۶/۷۳	۲۸/۸۱		۲۱/۳۰	۷/۸۴	
	> ۱۵	۱۹(۱۳/۶)	۱۸۴/۱۵	۲۳/۳۵		۲۲/۲۶	۶/۹۵	
*Working experience in NICU (year)	<۵	۵۹(۴۲/۱)	۱۷۳/۵۰	۲۴/۸۸	F=۸/۱۴۶ **P<۰/۰۰۱**	۲۱/۵۰	۶/۷۰	F=۰/۲۵۹ P=۰/۷۷۲
	۵ – ۱۰	۳۴(۲۴/۳)	۱۶۲/۳۵	۳۱/۹۶		۲۱/۰۰	۸/۷۶	
	۱۱– ۱۵	۴۷(۳۳/۶)	۱۸۵/۳۱	۲۰/۴۴		۲۲/۱۹	۷/۴۵	
**Participation in training courses related to the neonatal	Yes	۱۲۹(۹۲/۱)	۱۷۴/۵۰	۲۶/۸۶	t=۰/۳۹۳ df=۱۳۸ P=۰/۶۹۵	۲۱/۸۰	۷/۵۷	t=۱/۰۴۳ df=۱۳۸ P=۰/۲۹۹
	No	۱۱(۷/۹)	۱۷۷/۸۱	۲۶/۳۵		۱۹/۳۶	۵/۷۱	
**Personal and family problems	Yes	۲۷(۱۹/۳)	۱۷۳/۲۵	۳۱/۹۳	t=۰/۳۲۴ df=۱۳۸ P=۰/۷۴۶	۲۴/۴۰	۷/۷۵	t=۲/۱۹۶ df=۱۳۸ **P=۰/۰۳**
	No	۱۱۳(۸۰/۷)	۱۷۵/۱۲	۲۵/۴۹		۲۰/۹۴	۷/۲۶	
**History of sedative drug use	Yes	۱۲(۸/۶)	۱۶۹/۵۰	۳۸/۵۹	t=۰/۷۱۲ df=۱۳۸ P=۰/۴۷۸	۲۴/۰۰	۸/۳۸	t=۱/۱۶ df=۱۳۸ P=۰/۲۴۸
	No	۱۲۸(۹۱/۴)	۱۷۵/۲۵	۲۵/۵۱		۲۱/۳۹	۷/۳۶	
	Yes	۱۶(۱۱/۴)	۱۷۲/۷۵	۳۷/۳۷	t=۰/۳۱۹ df=۱۳۸	۲۳/۴۳	۸/۱۱	t=۱/۰۳۹ df=۱۳۸

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**History of background problems	No	۱۲۴(۸۸/۶)	۱۷۵/۰۲	۲۵/۲۴	P=۰/۷۵	۲۱/۳۷	۷/۳۷	P=۰/۳
**Participation in the clinical competency test	Yes	۵۹(۴۲/۱)	۱۸۱/۶۴	۲۴/۲۰	t=۲/۶۵۴ df=۱۳۸ **P=۰/۰۰۹**	۲۱/۶۱	۷/۱۱	t=۰/۰۰۶ df=۱۳۸ P=۰/۹۹۶
	No	۸۱(۵۷/۹)	۱۶۹/۷۵	۲۷/۵۲		۲۱/۶۱	۷/۷۳	
**t-test *Analysis of variance								

Most of the nurses under research, that is, 75% of them, had very good clinical qualifications. It can also be seen that the clinical competence of most of the nurses studied in all subscales was at a very good level. The average score of clinical competence in the nurses of the study was 174.76 ± 26.74. Additionally, to compare the subscales of clinical competence, the results show that the average score obtained in the fourth subscale, "managing situations", with an average of 83.72 ± 14.53, is the highest, and in the sixth subscale, "ensuring quality", with an average of 75.31 ± 18.26, has obtained the lowest average score among other subscales of clinical competence (Table 2).

Table 2. Scores of nurse's Clinical competence and Subscales (Mean ± SD).

Clinical competence and subscales	Low		Relatively good		Good		Very good		Mean ± SD Minimum-maximum
	N	(%)	N	(%)	N	(%)	N	(%)	
Helping role	۰	۰	۳	۲/۱	۳۶	۲۵/۷	۱۰۱	۷۲/۱	۱۶/۹۲ ۸۸/۲± ۱۰ -۲۱
Teaching–coaching	۰	۰	۵	۳/۶	۴۲	۳۰/۰	۹۳	۶۶/۴	۳۷/۷۸ ۵۸/۶± ۱۸ -۴۸
Diagnostic functions	۰	۰	۴	۲/۹	۲۸	۲۰/۰	۱۰۸	۷۷/۱	۱۷/۲۲ ۰۹/۳± ۶ -۲۱
Managing situations	۱	۰/۷	۴	۲/۹	۳۲	۲۲/۹	۱۰۳	۷۳/۶	۲۰/۰۹ ۴۸/۳± ۴ -۲۴
Therapeutic interventions	۱	۰/۷	۶	۴/۳	۳۸	۲۷/۱	۹۵	۶۷/۹	۲۳/۷۷ ۶۶/۴± ۱ -۳۰
Ensuring quality	۱	۰/۷	۱۸	۱۲/۹	۴۳	۳۰/۷	۷۸	۵۵/۷	۱۳/۵۵ ۲۸/۳± ۴ -۱۸
Work role	۰	۰	۴	۲/۹	۳۷	۲۶/۴	۹۹	۷۰/۷	۴۵/۴۰ ۱۱/۸± ۱۹ -۵۷
Overall competence	۰	۰	۲	۱/۴	۳۳	۲۳/۶	۱۰۵	۷۵/۰	۱۷۴/۷۶ ۷۴/۲۶± ۶۹ -۲۱۹

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The results showed that alarm fatigue had a statistically significant correlation with clinical competence in the second subscale of teaching–coaching. In other words, with the increase in alarm fatigue, the clinical competence in the teaching–coaching subscale decreases (p=0.019). However, there was no any correlation between, clinical competence (exception to Teaching–coaching) and alarm fatigue and between each of subscales of Clinical competence and alarm fatigue (P> 0.05) (Table 3).

Table 3. The correlation between alarm fatigue and clinical competence and the subscale scores of nurses.

Clinical competence and subscales	Alarm fatigue
Helping role	r= -۰/۰۱۶ p=۰/۸۵۰
Teaching–coaching	r= -۰/۱۹۸ p=۰/۰۱۹
Diagnostic functions	r= -۰/۰۵۶ p=۰/۵۸۰
Managing situations	r= -۰/۰۹۹ p=۰/۲۴۶
Therapeutic interventions	r= -۰/۰۶۰ p=۰/۴۸۳
Ensuring quality	r= -۰/۰۳۳ p=۰/۷۰۰
Work role	r= -۰/۰۷۶ p=۰/۳۷۲
Clinical competence	r= -۰/۰۱۰۷ p=۰/۲۰۶

Discussion

In this study, the average score of alarm fatigue in nurses was above average. The findings of the research in this regard are in line with the results of the research of Sayadi et al. in 2018, Therefore, the results showed that the average score of alarm fatigue in nurses was higher than average. The researchers concluded that adopting solutions according to the standard guidelines to reduce these alarms, it is necessary to monitor physiological monitoring systems in hospitals[21].

The results of the study showed that most of the nurses in the study, had very good clinical qualifications. Additionally, the clinical competence of most of the researched nurses in all subscales was at a very good level. This was although in the study of Mirlashari et al. on the nurses of the neonatal intensive care unit in Iran, more than half of the nurses had an average level of clinical competence[4]. In the 2018 study by Keshavarzi et al., approximately 77% of nurses had good clinical competence[3]. Additionally, in the research of Soroush et al., the clinical competence of nurses was reported at an average level in almost all subscales, and the researchers came to the conclusion that although clinical competence is acquired during the student period, it takes time to achieve clinical competence at a good level[26]. Considering the

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clinical importance of competence in practice, the clinical competence of nurses should be evaluated objectively and positively, and measures should be taken to improve the application of their clinical competence[8]. Additionally, in order to compare clinical competency subscales, scores based on 0-100, the average score obtained in the fourth subscale of "managing situations" is the highest, and in the sixth subscale of "ensuring quality", the average score is the lowest among other subscales of clinical competence. The findings of the research in this regard are in line with the results of the research of Deldar et al. 2019, who showed that in the case of clinical competence, the highest average score is related to managing situations and diagnostic functions, and the lowest average is related to ensuring quality[27]. According to the results of the studies conducted by Faraji et al. in 2018, the highest level of clinical competence was related to the dimension of "managing situations", and the lowest average scores were related to the dimensions of "therapeutic interventions" and "ensuring quality"[8]. Ensuring quality refers to the evaluation of goals and participation in the promotion of nursing care, which is one of the main concerns of nursing managers and health care systems and is taken into account by ensuring the appropriate level of clinical competence in nurses[13].

Based on the results of the present study, with the increase in alarm fatigue, the clinical competence of nurses in the "Teaching–Coaching" subscale decreases. The issue of alarm fatigue is considered a priority by the American Special Care Nurses Association, and since 2013, alarm fatigue has been one of the 4 patient safety priorities. In this regard, it is necessary to conduct a survey of medical staff, including nurses and doctors, to hold meetings to determine the limits of alarms and to implement strategies that can reduce the occurrence of false alarms. The training of employees in this regard and appropriate action by them alarm bells should also be considered[21, 28]. Additionally, to improve the quality of newborn care, refresher courses should be held in accordance with the latest changes in the scientific resources of newborn nursing to improve clinical competence.

The results of the study showed that clinical competence was higher in nurses with fixed work shifts and nurses who had a history of participating in the clinical competence test. Additionally, there were more nurses with 10 years of work experience and more nurses with 5 to 10 years of work experience. The evidence shows that work experience is one of the influencing factors in the clinical competence of nurses. Therefore, it is expected that with the increase in work experience, clinical competence will also increase[9]. In the 2018 study by Keshavarzi et al., there was a statistically significant relationship between nurse shift work and clinical competence, so nurses who worked in the morning shift had more clinical competence[3]. Perhaps attending the morning shift, which is a more educational environment, plays a greater role in improving clinical competence. On the other hand, on the night shift or rotating shift, it is possible that, due to disruption of the biological cycle[29] and more fatigue of the nurse, the clinical competence is affected. On the other hand, one of the limitations of obtaining professional competence in NICU departments is that instead of team and interdisciplinary work, nurses are asked to act above their level of competence and abilities to solve the problems of the neonatal and the family[30, 31]. If the department has a less supportive atmosphere or if the nurse is active more in night shifts or on tour, which has less educational and supportive environment and there is a need for more professional independence, she may have a lower level of professional competence[3].

According to the results of the study, the alarm fatigue in nurses who had personal and family problems was higher than that in other nurses. Additionally, it was significantly lower in nurses with contractual employment status than in nurses with formal employment.

One of the limitations of this study was the use of an instrument based on a self-reporting method that could affect the results of the study, which to minimise it and gain trust, the nurses were assured that this study is research-based and anonymous.

Conclusions

Based on the results of the present study, the overall clinical competence was obtained at a very good level, and the alarm fatigue was above average. This study is one of the first studies conducted regarding the relationship between alarm fatigue and the clinical competence of nurses and shows the relationship between alarm fatigue and clinical competence in the teaching–coaching subscale among nurses in the neonatal intensive care unit of Kermanshah. Additionally, the findings showed that the clinical

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