



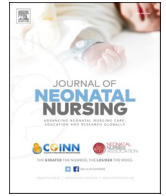
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Association between burnout and nurses' quality of life in neonatal intensive care units: During the COVID-19 pandemic

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ABSTRACT

Background: Neonatal intensive care unit (NICUs) nurses could suffer from job stress and burnout, which could cause increased turnover rates and decreased Quality of Life (QoL) among nurses.

Purpose: To determine the association between burnout and nurses' QoL in NICUs.

Study design: This correlational study was performed in 2020 on 140 nurses working in NICUs. The Maslach burnout and WHO Quality of Life-BREF was used to collect data.

Results: There is a positive association between personal accomplishment and all dimensions of QoL ($r = 0.40$ to 0.56) and a negative association between emotional exhaustion, depersonalization of burnout and all dimensions of QoL ($r = -0.47$ to -0.79).

Conclusion: It is suggested that several interventions must be taken to prevent burnout and increased QoL in NICU nurses. The findings could provide scientific evidence for managers and encourage evidence-based decision-making to reduce burnout and improve the QoL of nurses especially during the Covid-19 pandemic.

1. Introduction

Exposure to unknown diseases, especially pandemics, increases the risk of burnout among nurses (Hu et al., 2020). With the outbreak of Covid-19, the need for nurses to provide care at every stage of basic care and to respond to an emergency has shown that the world needs them more than ever before. With an increase in the incidence of Covid-19 infections, nurses' burnout will worsen (Volpi et al., 2014). Nurses suffer from burnout more than any other job (Volpi et al., 2014) due to lack of adequate productivity of these skilled staff members, limits of service delivery, increases in the cost of health care, and increases in psychological and physical stress (Amini, 2013). Furthermore, burnout causes the most harm to the recipient of services and reduces their satisfaction (Macleod, 2012). In fact, the cost of burnout is paid by organizations (You et al., 2013).

There is a lack of evidence of burnout among women as a job phenomenon (Shanafelt et al., 2020). Other studies among RN nurses prior to the outbreak of Covid-19 have shown that the average burnout in the emotional exhaustion dimension is higher in females than in men

(Whittington et al., 2021). Whereas most nurses in Iran are women, and mostly female nurses are present in Neonatal Intensive Care Units (NICUs), in addition to managing stress in their families, female nurses should make every effort to manage the stress of families with infants in the NICUs (Mahoney et al., 2020). During the Covid-19 pandemic, limited parental presence for NICUs admitted infants (Das and Sankar, 2015) as a result of protocols caused a significant change for the families of sick neonates and parents' experience of the first steps of infant life in NICUs and delays in breastfeeding support and social services. This leads to disruption in families' interactions with their infants and finally results in dissatisfied nurses (Virani et al., 2020). Despite the expansion of NICUs and differences in the severity of diseases and the number of neonates admitted to these departments, the impact of these differences on health care providers is still unknown (Tawfik, 2017).

NICU nursing can be a double-edged sword because a number of these vulnerable newborns die, despite the efforts of the treatment team to save their lives, and others survive with serious lifelong disabilities, all of which may raise questions for NICU nurses regarding the meaning and purpose of their care and predispose them to moral distress

Abbreviations: NICU, Intensive Care Unit; QoL, Quality of Life; WHOQOL-BREF, World Health Organization Quality of Life - Brief.

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(Prentice et al., 2016) and burnout (Malach-Pines, 2000). Burnout has noteworthy adverse effects on quality of care, health, patient outcomes, and turnover (Nantsupawat et al., 2016).

Relationship between QoL, work and family has an inverse conflict (Rabiei et al., 2018). QoL is a multidimensional concept with subjective evaluations of both positive and negative aspects of life (Fayers and Machin, 2013). Since the shortage of nurses is a global problem, as it was clearly felt with the outbreak of Covid-19 in 2020, it could have irreparable consequences for nursing. On the other hand, lack of information about the emerging disease has increased stress among nurses. The unknown nature of the emerging disease Covid-19 has raised many concerns about fetal and neonatal health due to the immature immune system of infants and the potential teratogenic effects of the disease, although most diagnosed neonates have mild symptoms and good outcomes (Dong et al., 2020; Hu et al., 2020). With the emergence of the Covid-19 pandemic as an unknown disease, different conditions prevailing in NICUs and the multi-national community admitted to hospitals in Tehran have affected the QoL and burnout of nurses in NICUs. Therefore, the researchers decided to evaluate the association between burnout and nurses' QoL among NICU nurses during Covid-19.

2. Methods

2.1. Study design

This cross-sectional and correlational study was conducted at the NICUs of seven hospitals affiliated to Iran University of Medical Sciences (IUMS) in Tehran from July 2020 to January 2021.

2.2. Participants

The inclusion criteria for nurses included: having a bachelor's degree in nursing and above, not suffering from chronic diseases, having at least six months' experience in the NICUs, and not being on sick leave for more than one month in the last 6 months. Of the total 173 NICUs nurses, 140 nurses participated in the study. Therefore, the final sample consisted of 81% of the NICUs nurse population.

2.3. Instrument

Demographic questionnaire: The demographic questionnaire included gender, age, marital status, duration of marriage, number of children, spouse's occupation, level of education, and work experience in the NICUs.

The Maslach Burnout Inventory (MBI): The MBI, consists of 22 items in three dimensions: emotional exhaustion (9 questions), depersonalization (5 questions) and personal accomplishment (8 questions). The score of emotional exhaustion was classified to be high with scores (>30), medium with scores (18–29), and low (<17). For the depersonalization dimension, the scores (>12), (6–11), and (<5) were considered as high, medium, and low depersonalization. According to the personal achievement, low, medium, and high were characterized by scores (>40), (34–39), and (<33), respectively (Maslach et al., 1986). The answers for each item were (0 = never, several times = 1, once a month = 2, several times a month = 3, once a week or less = 4, several times a week = 5, and everyday = 6). The results of MBI was comprised of three scores for each participant. If a participant had a high score in emotional exhaustion and depersonalization, with a low score in personal achievement, they would have a high level of burnout. In the Persian version Cronbach's alpha values for MBI and its three dimensions were >0.7 (Moalemi et al., 2018). In present study, Cronbach's alpha of Maslach burnout was 0.915, 0.864 and 0.80 for emotional exhaustion, depersonalization and personal accomplishment respectively.

World Health Organization Quality of Life-BREF (WHOQOL-BREFW): The WHOQOL-BREF Questionnaire consists of 26 items, in which the first and second questions of the questionnaire are about the

QoL and health status in general. The next 24 questions assess the QoL in four dimensions: physical health (7 items); psychological (6 items); environment (8 items); and social relationships (3 items). The WHOQOL-BREF has a five-point Likert-type scale. The scores for every sub-scale range from 4 to 20. When the scores obtained from the sub-scales increase, QoL increases a range of zero to 100 (World Health Organization, 1996). The Cronbach alpha values of the Persian version of the WHOQOL-BREF, for all dimension were more than 0.77 (Nejat et al., 2005). In the present study, the Cronbach alpha values are 0.81, 0.70, 0.75 and, 0.60, respectively.

2.4. Data analysis

Data were analyzed using the Chi-square test, paired *t*-test, and independent *t*-test. Pearson correlation coefficients were used to show the relationship among scores of the burnout and QoL scores. Simple linear regression analyses were used to determine the effect of descriptive characteristics on burnout and QoL. A statistical correlation coefficient of 0.30 was considered as acceptable between the QoL and burnout (Cohen et al., 2000).

3. Results

The mean age of the nurses was 35.87 ± 6.76 with a range of 24–60. Sixty-seven percent of the nurses were married, 76% of the nurses had children and most of the nurses had a Bachelor degree. Furthermore, more than 50% of the nurses' work experience was more than 11 years. In fact, most of the nurses were in rotational shifts and about 80% of the nurses worked more than 100 h in addition to the required hours per month (Table 1). Most of the nurses were identified as perceiving high accomplishment (Table 2). Mean and standard deviation of QoL showed in Table 3.

The results of the independent *t*-test revealed that QoL in married nurses ($P < 0.001$), nurses with bachelor's degree ($P = 0.05$) and nurses with working spouses ($P < 0.001$) had a higher QoL than other nurses.

Table 1
Descriptive characteristics of nurses working in NICU (n = 140).

Variable	N (%)	Variable	N (%)
Age (y)		Occupational status	
<30	30 (21.4)	Official hiring	68 (48.6)
30 to 40	65 (46.4)	Agreement	25 (17.9)
40 <	45 (32.1)	Contract	47 (8.6)
Marital status		Work experience in NICU (y)	
Married	94 (67.1)	<10	61 (43.6)
Single	46 (32.9)	11 to 20	67 (47.9)
Duration of marriage (y)		≥20	12 (8.6)
≤10	42 (30)	Service history in other wards	
10 to 19	42 (30)	ICU	43 (30.7)
20 ≤	15 (10.7)	NICU	134 (95.7)
Number of children		General	51 (36.4)
0	23 (23.2)	Emergency	31 (22.1)
1	30 (30.3)	Position	
2 ≤	46 (46.5)	Charge nurse	129 (92.1)
Education level		Head nurse	11 (7.9)
Bachelor	122 (87.1)	Shift work	
Master	18 (12.9)	Shifts in circulation	105(75)
Employed wife		Others	35 (25)
Yes	21 (21.2)	Overtime (h/m)	
No	78 (78.8)	<100	110 (78.6)
Insurance status		≥100	30 (21.4)
Social Security	132 (94.3)		
Other	8 (5.7)		

Table 2
Comparison of burnout in those whose burnout was low, moderate, or severe in nurses working in NICUs.

Burnout	LowN (%)	ModerateN (%)	HighN (%)	M ± SD
Emotional exhaustion (0-54)	77 (55)	40 (28.6)	23 (16.4)	16.78 ± 11.06
Depersonalization (0-30)	79 (56.4)	35 (25)	26 (18.6)	6.30 ± 5.45
Personal accomplishment (0-48)	5 (7.0)	22 (15.7)	111 (79.3)	27.35 ± 7.39

Table 3
The mean and SDs of the dimensions of QoL in nurses.

Variable	Mean ± SD
Physical	55.34 ± 16.94
Psychological	55.90 ± 17.98
Social relationship	55.99 ± 22.68
Environmental	49.37 ± 18.11
Quality of Life	54.14 ± 16.88

The result of regression showed that only employee spouses was a significant variable in the model ($B = 20.95$), whereas the QoL of nurses who had employee spouses was 20 times higher than others in the model with $R^2 = 0.155$.

In **Table 4**, a correlation matrix between the different dimensions of QoL and burnout is shown. There is a positive association between personal accomplishment and all dimensions of QoL ($r = 0.40$ to 0.56) and a negative association between emotional exhaustion, depersonalization of burnout and all dimensions of QoL ($r = -0.47$ to -0.79).

The results showed that emotional exhaustion was significantly lower in nurses with spouses ($P = 0.001$) and nurses with a bachelor's degree ($P = 0.006$). The Pearson correlation test showed that emotional exhaustion decreases with an increase in the number of years of marriage ($P = 0.023$) and number of children ($P = 0.002$). Furthermore, with an increase in overtime hours, emotional exhaustion also increases ($P = 0.017$). The linear regression analyses revealed that only marriage duration was a significant variable in the model ($B = -0.41$). This means that with an increase in the duration of marriage by one year, emotional exhaustion decreases by 0.41. However, it should be noted that the coefficient of determination of the model was $R^2 = 0.083$, which is very small.

Moreover, the results revealed that depersonalizations in married nurses ($P = 0.008$) and formally hired nurses ($P = 0.019$) were significantly less than other nurses. Nurses with spouse employment had lower scores of depersonalizations ($P = 0.02$). The results showed that with increasing age ($P = 0.047$) and duration of marriage ($P = 0.019$), depersonalization decreases. The result of regression showed that employment contract ($P = 0.001$) and spouse employment ($P = 0.027$) were significant in the model with standard coefficient of $B = 0.36$, and $B = -0.28$, respectively. Depersonalization in contract nurses was 5.9 times more than other types of employment in the model with $R^2 = 0.237$.

Furthermore, personal accomplishment was higher in married nurses ($P = 0.026$) and nurses with an employed spouse ($P = 0.017$) compared to other nurses. Additionally, the score of personal accomplishment in official hiring nurses ($P = 0.041$), head nurses ($P = 0.015$) and nurses

Table 4
Correlation matrix among scores of QoL and burnout subscales in NICU nurses ($n = 140$).

Burnout	QoL	Physical health	Psychological	Social relationships	Environment	Emotional exhaustion	Depersonalization
Emotional exhaustion	-0.79**	-0.77**	-0.70**	-0.64**	-0.72**	1	-
Depersonalization	-0.61**	-0.57**	-0.47**	-0.54**	-0.58**	0.76**	1
Personal accomplishment	0.52**	0.46*	0.56*	0.40**	0.46**	0.57**	0.53**

with experience in general wards was higher than other nurses ($P = 0.04$). The results of regression showed that only having employee spouses was a significant variable in the model ($B = 9.05$), and personal accomplishment in nurses who had employee spouses was 9 times higher than other nurses in the model with $R^2 = 0.222$.

4. Discussion

Despite the fact that more than 3/4 of the nurses experienced low to moderate emotional exhaustion, which was consistent with a study in China during the Covid-19 pandemic (Hu *et al.*, 2020). While studies have shown that women are more vulnerable to emotional exhaustion (Gutiérrez *et al.*, 2005), Maslach did not consider the importance of gender in predicting burnout (Maslach *et al.*, 2001). However, there isn't enough evidence of burnout as a job phenomenon in women (Shanafelt *et al.*, 2020). This role of gender is also related to the culture in different societies (Ziaei *et al.*, 2015). In addition, female nurses in Iran are also responsible for the main role of housekeeping and caring for their children, and sometimes their elderly parents. Result of this study showed that by increasing the duration of marriage by one year, emotional exhaustion decreases by 0.41. Results of this study are supported by previous studies, indicating that nurses who are single presented higher levels of burnout (Gama *et al.*, 2014). This is while it would be expected that according to the results of a study during the Covid-19 pandemic, a 35% reduction in family-centered care in neonatal wards and the rate of neonatal hospitalization led to a reduction in workload in NICUs, which could be a reduction of emotional exhaustion involved during the pandemic (Mahoney *et al.*, 2020).

In this study, the scores of nurses showed that most of them experienced low to moderate depersonalization, which was in line with results of a previous study that showed increased scores of depersonalization during the outbreak of Covid-19 (Cilingir *et al.*, 2012). Furthermore, some other factors including the disparity between the amount of effort and the reward and punishment system among employees can be another reason for increased depersonalization (Gama *et al.*, 2014). However, the role of hereditary, familial and social factors should not be overlooked. In the present study, contract employment also has the greatest effect on depersonalization, so that depersonalization in contract nurses was 5.9 times more than other types of employment. Hence, job security is an important factor in depersonalization.

The results of this study showed that personal accomplishment was higher in married nurses. That was in line with previous studies that showed there is a correlation between burnout and staff members who are single (Gama *et al.*, 2014; Cilingir *et al.*, 2012). This is while a previous study reports marital status (married/single) as having no relationship with the dimensions of burnout (Patrao and Ribeiro, 2012). It seems that culture has a significant effect and we have different results in diverse societies. Furthermore, the score of personal accomplishment in head nurses was higher than other nurses, as supported by a previous study (Luan *et al.*, 2017), and official hiring nurses with experience in general wards experienced higher personal accomplishment. The regression analysis showed that the having employee spouses was a significant variable in the model ($B = 9.05$), and personal accomplishment in nurses who had employee spouses was nine times higher than other nurses.

The results of the present study showed that the nurses rated the QoL score at 54%, approximately half of its total score. Environmental health

of QoL had the lowest mean score compared to the other domains, while social relationship showed the best evaluation, followed by physical health and psychological domain, respectively. Results of this study were in line with previous studies that showed the lowest mean was related to environmental health. On the contrary, physical health does not experience the highest score compared to the other domains of QoL (Maslach et al., 1986). A lower score in the environment domain was shown among nurses who worked more than 36–40 h a week. The findings related to the environmental domain involved aspects such as physical safety, recreation leisure and transportation opportunities. Based on the needs of hospitals and the shortage of nurses, the working hours of nurses during the Covid-19 pandemic were longer than any other time, which affected nurses QoL.

High workload in NICUs affected physical health and increased burnout among nurses and affected job performance and quality of nursing care (Sarab, 2021). The effects of nurses burnout in NICUs is related to high levels of absenteeism, mental and physical fatigue, and morale exhaustion (Braithwaite, 2008) that affects the QoL of nurses. Therefore, assessing the effect of the consequences of the Covid-19 pandemic on the QoL of nurses is crucial to improve the QoL of nurses during this vital period by minimizing their concerns regarding the disease. Since this study was conducted during the outbreak of Covid-19, its results can be the basis for information on developments of further research on QoL.

Regarding the marital status of nurses, the results of this study show that being married and having an employed spouse is a predictor of having a higher QoL and higher personal accomplishment. Meanwhile, according to a study in Pakistan, married nurses experienced higher burnout compared to unmarried nurses (Mitchell, 2009). The marital status variable is related to the perception of social support. Of course, it should be noted that in the work context, nurses also seek more support from their colleagues (Mitchell, 2009) or according to another study, are dependent and adhere to spiritual beliefs (Drach-Zahavy, 2010) compared to personal relationships. Also, with the outbreak of Covid-19, the importance of nursing care was shown more in the media, and nurses became more motivated and cared for patients with interest and love, which increased the dimension of personal adequacy in them following an increase in their experience and skills.

Environmental health results of this study are similar to another study conducted in Iran (Halvani et al., 2018). However, they are not in line with the study of nurses in NICUs in Turkey (Aytekin et al., 2013). Inadequate environmental factors reduce the quality of nursing care. This could be due to the collection of information at the time of the Covid-19 outbreak and the cultural and health differences of different climates and cultural differences between the two groups of people in two countries.

Research conducted on the QoL of nurses can improve the delivery of health care to the clients. Therefore, any study on nurses' QoL must be supported by policy makers. At the time of Covid-19, there is a growing need for nurses across the world, and we are seeing an increasing trend of migration among nurses from developing countries to other countries. This will have a detrimental effect on both developed and developing societies after Covid-19. In developing countries, detailed plans should be made to retain nurses and reduce their migration. Results of a study showed that a good solution to managing lack of nurses in the healthcare system can be achieved when the salary and benefits of the system and the working conditions in the healthcare sector improve.

The present research has several limitations. First, a cross-sectional design was used. Consequently, future research can include an extended region and increase the sample size with a longitudinal research design to obtain a more generalized conclusion. Accordingly, we could employ effective measures to reduce burnout and turnover among nurses to eventually increase QoL.

Knowledge of burnout during the period of Covid-19 can reveal the importance of paying attention to the needs and rights of nurses to receive information and training programs. Increasing nurses'

knowledge of burnout and ways to cope with it, and also enhanced motivation and ability to work in NICU and communication skills could increase the QoL of nurses. Therefore, raising the nurses' level of awareness to change their view about their profession and increase their information in appropriate ways can prevent increased burnout and could increase their QoL. Receiving support from the family, colleagues, managers and having a sense of support can promote the QoL and increase dealing with stressful situations in nursing. Therefore, training should be provided to both staff and managers regarding burnout and QoL.

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None of the authors have no funding to disclose.

Ethical approval

The study was approved by the IUMS (under the code "IR. IUMS.REC.1399.276) and followed the Helsinki Convention. The information letter contained the purpose of the study, its confidentiality, voluntarism, and that they can withdraw whenever they wanted. Moreover, the information letter included the name of the university that is to carry out the research. All participants signed a written informed consent form.

Declaration of competing interest

None declared.

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