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Examination of the psychological changes in nurses due to workload in an intensive care unit: a mixed method study

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Background: The workload is the impinged stress due to several inter-related factors, including the competence of the intensive care unit nurse.

Objectives: The objective of this study was to investigate the workload-related psychological changes in intensive care nurses.

Methods: The study had a two-phase explanatory mixed method design. Data were collected through in-depth personal interviews and with other instruments. The obtained data were analyzed with SPSS 18.0 and MAXQDA plus10.

Results: The workload of intensive care nurses was 315.8 per minute and the mean TISS 28 score was as high as 65.00. The in-depth interviews with intensive care nurses revealed that participants experienced professional stress due to high workload and went through psychological changes.

Conclusion: The study findings demonstrate that psychological symptoms seen in intensive care nurses relate to a high workload.

Impact Statement: The results of this study can be used by hospital administrators to create a healthy work environment with a moderated workload and optimized shift schedules so that the mental well-being of nurses can be promoted.

Keywords: workload; nursing; mental health; critical care

Introduction

The starting point of today's intensive care units (ICU) occurred when Florence Nightingale and her team founded a military hospital facility during the Crimean War so that they would be able to provide nursing care intensively. These units were called as intensive nursing care units from the time Nightingale pioneered their implementation until the mid-1950s. They may be conceptualized as critically marginal units not only in terms of providing nursing care services but they were also critical for the psychological well-being of nurses (Marshall et al., 2017; Tunc et al., 2014). The nurses working in these units might be more prone to many environmental and emotional stimuli along with the sustained workload compared to other healthcare staff because the provision of intensive nursing care services has been demanding and patients should be monitored closely. This condition of the nurses virtually resembles that of soldiers in a specialized military force (Hay & Oken, 1977; Marshall et al., 2017; Morton & Fontaine, 2017; Neuraz et al., 2015).

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The workload is the impinged stress due to several interrelated factors; including the competence of the nurse, the allocated time and effort for the care of the patients, and the intensity and complexity of anticipated care services. This stress requires an increasing level of focusing on stimuli in the environment (Alghamdi, 2016; Swiger et al., 2016). The sounds coming from the monitors, humming of the nutrition pumps, the intensity of light, and the illumination status in the intense care unit (ICU) will expose an emotionally neutral nurse to a high number of environmental stimuli at the beginning. The nurse will encounter several other emotional stimuli in the meantime; while providing care for distressed patients, who may moan, cry out, or require end-of-life care. Furthermore, the nurse will be exposed to several other emotional stimuli, too; while calming the patient during recovery from anesthesia after surgery or while intervening in a cardiac arrest case.

Although a sort of habituation to the stressful atmosphere will develop after some time, the sustenance of the number of the environmental stimuli and the workload may lower the threshold of frustration, creating chronic and enduring stress (Bazuin & Cardon, 2011; Hay & Oken, 1977; Morton & Fontaine, 2017). Consequently, several psychological symptoms may arise including depression, anxiety, anger, burn out, sleep problems, and interpersonal sensitivity; affecting the performance of the nurse unfavorably (Chuang et al., 2016; Gyórfy et al., 2016; Tsai & Liu, 2012).

There is a vast majority of studies in the literature reporting that the ICU conditions affect the performance and the well-being of the nurses adversely and recommending that the unfavorable factors and conditions should be minimized. Unfortunately, the level of awareness about the psychological problems resulting from the heavy workload is still low. Within this scope, the study aimed to investigate the workload-related psychological changes in intensive care nurses. The following questions were asked: “what is the workload of the ICU nurses?” and “what types of workload-related psychological changes develop in intensive care nurses?”

Method

The study had a two-phase explanatory mixed method design. This design of the study requires the retrospective collection of quantitative data and their analysis before the collection of the qualitative data. This type of design is useful especially to explain the study findings and the relationships between the variables (Creswell, 2003).

The first phase of the study searched for an answer to the question; “what is the workload of ICU nurses?”. The first phase was cross-sectional and the qualitative data were collected retrospectively. The study sample consisted of 152 patients; who were hospitalized for more than 24 h in a 14-bed tertiary ICU in the period from 1 January 2015 to 30 June 2015.

In the second phase of the study, qualitative data were collected by interviewing ICU nurses to address the question; “what type of workload-related psychological changes develop in intensive care nurses?”. The non-random sampling selection technique and purposeful sampling methods were used for participant selection in this phase of the study. The inclusion criteria required the nurses at least to have a bachelor’s degree and a three-year-experience in ICU and not to have a history of a mental disorder and its treatment. Nine nurses having a less than three-year-experience in ICU, three nurses having a history of a mental disorder and its treatment, and three nurses; who did not have a bachelor’s degree, were excluded from the study. The study sample of the second phase of the study included 14 nurses.

Research site and characteristics of the participants

The study was conducted in the period from 1 August 2015, to 31 January 2016, in a tertiary intensive care unit of a private hospital in Turkey. The participants worked for 12 h in two

shifts in a closed-system ICU. Although the patient-nurse ratio was aimed to be 2:1 in the unit, that ratio occurred to be 3:1 at times due to staff shortage as they might be on maternity leave or annual leave.

Instruments

In the first phase of the study; demographic characteristics of 152 patients, TISS-28 (Therapeutic Intervention Scoring System-28) scores, APACHE-II (Acute physiology and chronic health evaluation score) scores, and mortality data were collected.

Therapeutic Intervention Scoring System (TISS-28)

TISS was developed in 1974 for determining the disease severity in ICU patients. This tool is currently used for assessing nursing activities. The original tool contained 57 items but the number of the items was reduced to 28 in 1996. Thereafter, the tool was named as TISS-28. The tool scores the items under seven major categories; which include basic activities, cardiovascular support, ventilator support, renal support, neurological support, metabolic support, and specific interventions. The total score of the system may vary from 1 to 78. Low TISS-28 scores indicate that the required level for nursing care is low (Miranda et al., 1996).

The relationship between the TISS-28 scores and the time spent with the bedside nursing activities is linear. Each one-point score in TISS-28 corresponds to 10.6 min at the bedside. A score of 46 in TISS-28 is accepted to be appropriate for the work capacity of a nurse in the ICU. This issue is also closely related to the management of the workforce in ICU nursing (Miranda et al., 1996). The translated version of TISS-28 (Sarsilmaz & Akyol Durmaz, 2012) is used in ICUs in Turkey. There for, the translated version of TISS-28 in Turkish was used in this study.

In this present study, the workload of the nurses was quantified using the TISS-28 scores, the number of beds in the ICU, and the number of working hours. The ratio of the workload of the nurses to the number of working hours provided the number of nurses required for each shift. (The number of nurses = Duration of care × number of beds / duration of a shift).

Acute physiology and chronic health evaluation score (APACHE II)

It was developed by Knaus et al. in 1985. It is a simplified version of the APACHE scoring system used for determining general disease severity and survival rates. It is calculated by summing up the scores of three main domains including the age, chronic status of health, and the acute physiological status based on the measures derived from 12 physiological items. For each of the 12 physiological variables, the worst measured value in the first 24 h is used. Mortality is predicted based on the evaluation of 34 diagnostic items at admission. The highest score on APACHE II is 71 (Knaus et al., 1985).

The Turkish version of the APACHE II scoring system; which was translated into Turkish by the Turkish Ministry of Health Quality Standards is used in ICUs in Turkey (Ministry of Health of Turkey Health Quality Standards-Hospital, 2016). Therefore, this translated version of the APACHE II scoring system in Turkish was used in this study.

In the second phase of the study, SCL 90-R (symptom checklist) and a semi-structured interview form, which consisted of four open-ended questions developed by the investigator, were used to collect data.

Symptom Checklist (SCL 90-R)

It was developed by Derogatis et al. between the years 1973 and 1977 as a “screening tool for psychiatric symptoms”. The test aims to identify psychological symptoms in individuals with normal mental status and to quantify the changes in the symptom severity. The checklist consists of 90 questions and evaluates nine main symptom domains including “Somatization, Obsessive-compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism”. In addition to these nine domains, the scores derived from quantifying the additional items are included in the general symptom index calculation. Therefore, the means of the total scores derived from the nine subscales are summed up with the mean score of the additional items. The general symptom index (GSI) covers all items to perform a general evaluation. Scores of 1 or lower indicate normal findings for the respective subscale; whereas, scores higher than 1 indicate that the individual is more prone to the specified pathology in the subscale (Dağ, 1991). The validity and reliability of the Turkish form; which was conducted by Dağ (1991), as used in this study. The validity and reliability study of the Turkish version of the scale reported that the alpha internal consistency value was 0.97 based on the GSI scores. The study reported that the reliability coefficients of the subscales ranged between 0.65 and 0.87, yielding a value of 0.90 based on the GSI score (Dağ, 1991).

Ethical considerations

This study was approved (no. BTEDK-10-32/2015) by Bayındır Hospital. Written informed consent forms were collected from the study participants. Furthermore, voice recording consent forms for individual interviews were also collected from the respective study participants.

Study conduct

The first phase was performed in the period from 1 August to 27 November 2015. During this phase of the study, patient records were retrospectively collected to determine the workload of nurses.

The second phase was conducted in the period from 7 December 2015, to 28 January 2016. Firstly, the interview time was determined for the 14 participants in the sample group. All participants were interviewed individually and voice recordings were made. These individual interviews took 20–45 min in the ICU in a specifically designed area for this purpose and for ensuring that the participants would feel relaxed and comfortable. After the interview records were transcribed into text by the investigator, they were reviewed with the respective participants so that any potential misperceptions would be prevented and the conclusions would be confirmed. Based on the discretion of the participants, the respective parts of the interview were excluded. After finalizing the individual interviews and their reviews, SCL 90- R was administered to the participants.

Data analysis

The quantitative data obtained for the study were analyzed with SPSS 18.0 (Statistical Package for the Social Sciences). The qualitative data content was analyzed by the first researcher using the MAXQDA plus10 qualitative data analysis software. This analysis process aimed to bring similar data together within the framework of certain concepts and themes so that they would be comprehensive for the reader (Creswell, 2003). For this purpose, qualitative data were analyzed in the following four stages: (1) coding of data, (2) finding themes, (3) editing codes and themes, and (4) defining and interpreting findings. When the first researcher completed these

steps; the themes and the codes were presented for approval to the second researcher, who was the second writer and the advisor for this study. Then, the presented content was revised to address the recommendations.

Results

The quantitative phase of the study included 152 patients; most of whom were male patients followed up with central venous catheters, arterial catheters, and feeding tubes for respiratory failure. Most of these patients had decubitus ulcers. The APACHE II scores (44.1 ± 9.8 ; 36.9 ± 8.2) and the mortality rates (49 ± 32.2 ; 32 ± 21.8) were high both in the males and females respectively (Table 1). The nurse:patient ratio concerning the patients presented in Table 1 was 1:2. Based on the TISS-28 scores (55.2 ± 1.2), the workload of an ICU nurse was found out to be high (315.8 ± 118.7).

The qualitative phase of the study included ICU nurses. Of them; 85% (n:12) were women, 15% (n:2) were men, the mean age was 35.43 ± 3.45 years, and they had a mean ICU experience duration of 12.14 ± 1.18 years. Table 2 presents the SCL-90 R psychological symptom scores and the general symptom index (GSI) of the 14 nurses in the study sample.

The table shows that; compared to the GSI scores, the scores of somatization (1.95), interpersonal sensitivity (1.07), depression (1.36), anxiety (1.10), and the additional items (1.15) were higher; however, their obsessive-compulsive (0.93), anger and hostility (0.91), phobic anxiety (0.66), paranoid ideation (0.78), and the psychoticism symptom (0.52) scores were lower.

The data collected from the participants during the individual interviews were analyzed in association with the following three main items: (1) The factors affecting the psychological well-being of the nurses adversely in the ICU, (2) the reported changes in the psychological status, and (3) the psychological integrity and the preventive features against mental status changes.

Factors affecting the psychological well-being of the nurses adversely in the ICU

The psychological well-being of ICU nurses is affected adversely by occupational stress arising from “personal factors” at a rate of 44.6% and “working environment conditions” at a rate of 55.6% based on codes/sub-codes relations in the hierarchical structure model. Under the main category of personal factors, 10 sub-codes were defined. Of them; the personality characteristics and resilience against stress held the first rank (both at a rate of 7.2%); problem-solving skills ranked

Table 1. Patient characteristics collected retrospectively.

Male gender	n(%)	Female gender	n(%)
Age	94 (61.84)	Age	58 (38.16)
Diagnosis at admission		Diagnosis at admission	
Respiratory failure	37 (39.36)	Respiratory failure	28 (48.27)
Acute renal failure	19 (20.21)	Acute renal failure	25 (43.10)
Cardiopulmonary arrest	14 (14.89)	Cardiopulmonary arrest	9 (15.51)
Sepsis	9 (9.57)	Sepsis	2 (3.44)
Other	4 (4.25)	Other	5 (8.62)
Central venous catheterization	86 (91.48)	Central venous catheterization	45 (77.58)
Arterial catheterization	91 (96.80)	Arterial catheterization	52 (89.65)
Presence of a feeding tube	63 (67.02)	Presence of a feeding tube	21 (36.20)
Invasive mechanical ventilation	71 (75.53)	Invasive mechanical ventilation	35 (60.34)
Decubitus ulcers	18 (19.14)	Decubitus ulcers	11 (18.96)
APACHE II score	44.1 ± 9.8	APACHE II score	36.9 ± 8.2
Mortality	49 ± 32.2	Mortality	32 ± 21.8

Table 2. Symptom checklist results.

Participant code	Age/ Gender	Somatization	Obsessive compulsive	Interpersonal sensitivity	Depression	Anxiety	Anger and hostility	Fobic anxiety	Paranoid ideation	Psycoticism	Additional items scale (Disorders of eating and sleep)	GSI
1	F/38	2.66	0.54	0.68	1.46	2.42	1.20	0.83	0.3	0.42	0.3	1.08
2	M/36	1.41	1.1	0.72	0.92	0.74	1.66	1.66	0.52	0.1	0.71	0.95
3	F/30	1.33	0.60	0.66	1.30	0.30	0	0.28	0.83	0.10	0.86	0.62
4	F/34	2.25	0.8	1.54	0.6	1.18	1.14	1.18	0.5	0.86	0.84	1.08
5	F/27	2.58	0.7	1.36	1.92	1.8	1.33	0.24	0.80	1.12	1.12	1.28
6	M/28	1.44	1.2	1.38	1.07	0.84	0.83	0.28	1.16	0.92	1.18	1.03
7	F/32	3.08	1.41	1.38	1.45	1.16	0.6	0.57	1.33	0.68	1.85	1.35
8	F/25	1.33	1.2	1.36	1.88	1.4	1.38	0.1	1.12	0.54	1.42	1.17
9	F/29	1.68	0.94	1.26	0.88	1.16	0.76	0.5	0.44	0.1	1.85	0.95
10	F/28	2.25	1.3	1.38	0.78	2.66	1.42	1.5	0.92	0.46	1.54	1.56
11	M/26	1.48	0.2	0.72	0.92	0.78	0.80	0.3	0.2	0.1	1.71	0.72
12	F/27	1.54	1.32	1.22	1.48	0.94	0.2	0.84	0.16	1.3	1.24	1.02
13	F/29	2.25	1.44	0.55	1.84	0.32	0.86	0.57	0.56	0.2	0.85	0.94
14	F/28	2	0.3	0.87	2.46	0.6	0.60	0	1.18	0.44	0.66	0.91
All	Participants	1.95	0.93	1.07	1.36	1.10	0.91	0.66	0.78	0.52	1.15	1.04

F: Females; M: Males; GSI: General Symptom Index.

second (6.2%), and the workload and personal habits ranked the third. Under the main category of working environment conditions, 12 sub-codes were defined; including an inadequate number of leaves in the first rank (7.2%), long duration of shifts and negative feedbacks ranking the second (both at a rate of 6.2%), and witnessing deaths frequently ranking the third (5.5%) (Figure 1).

The participants working in the ICU reported the factors unfavorably affecting them as follows:

The alarm sounds from monitors, pumps, and ventilators make me feel very uncomfortable. They make me want to cry (Participant 5)

Isn't it already hazardous for people's mental health to work in an indoor environment for twelve hours? ... You cannot go out to get some fresh air while working. (Participant 9)

. . . . For instance, they assign me to a patient who was seriously ill for the past 5 days, just because I am more experienced. I find this really unfair. I have started to think that they are deliberately trying to make me quit. I, therefore, argued about this with the nurse in charge today. (Participant 10)

Reported changes in the psychological status

Figure 2 shows the reported changes in the psychological status in association with the code/sub-code theory. The severity of the spontaneously reported psychological changes is represented in the figure under three main categories, which have been defined as low (11.4%), moderate (30.8%), and high (57.8%). The changes were further subcategorized under each main category. According to the model, anger and stress ranked the first (15.4%); worries of losing a loved one or an organ ranked second (7.7%), and introversion and isolation in professional relationships held the last rank (1.9%).

Some of the participants' opinions on the psychological changes due to their workload were as follows:

Sometimes, I can't go get a bite to eat or even go to the bathroom. I once even had cystitis. Thus, when it is so crowded and active around, I am afraid of getting cystitis again. (Participant 3)



Figure 1. Factors affecting the psychological well-being of the nurses adversely in the ICU.

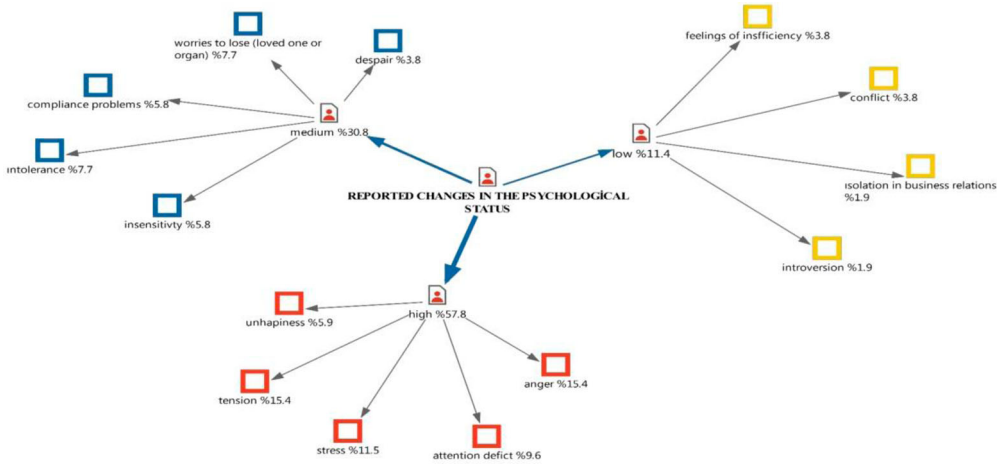


Figure 2. Reported changes in the psychological status.

... I'm not afraid of working too much; I'm afraid of making mistakes due to stress. We're dealing with people, after all. We are not dealing with paperwork here. You cannot just rip the people up and toss them in the trash. (Participant 8)

... The thing I dislike the most is to take care of the patient, who is constantly groaning. That groaning sound makes me so angry that sometimes I lose control and get mad at the patient. (Participant 11)

I get so tired the whole day that I find it difficult to get home. When I reach home and when my parents tell me that they are sick; trust me, I do not even want to care for them at that moment. (Participant 14)

Psychological integrity and preventive features against the changes in the mental status

Workload-related potential psychological changes and ICU conditions-environment bring the main theme of psychological integrity to the forefront along with “personal characteristics and features” within the framework of preventive medicine. In terms of psychological integrity, the significant sub-codes were defined under this main theme, including positive personality characteristics (39.2%), adequate financial power (18%), religious beliefs (%12.1), life experiences (11.7%), adequate social support (9.8%), age (4.8%), and gender (4.4%) (Figure 3).

Concerning psychological resilience and preventive personality characteristics against changes in the psychological condition, the opinions of the participants that are found worthy to be highlighted by the researchers are listed below:

I feel good no matter what if my job satisfies me financially. (Participant 1)

... Male nurses think that this as a job to do; however, women let their emotions get involved hurting themselves emotionally. (Participant 2)

... Nursing is a job of conscience and mercy as well as knowledge and skill. No one; who believes in Allah, can be unfavorably affected due to this job. (Participant 7)

... If the nurse chooses this profession with the self-awareness of his/her characteristics, he/she can protect himself both psychologically and spiritually. (Participant 10)

... Of course; in the years when you first start the profession, your psychology is easily affected adversely, especially in intensive care. Most importantly, you often encounter death. As you gain experience and grow older, you learn how to protect yourself. (Participant 12)

If you get along well with yu teammates, you can overcome even the most difficult jobs ... (Participant 13)

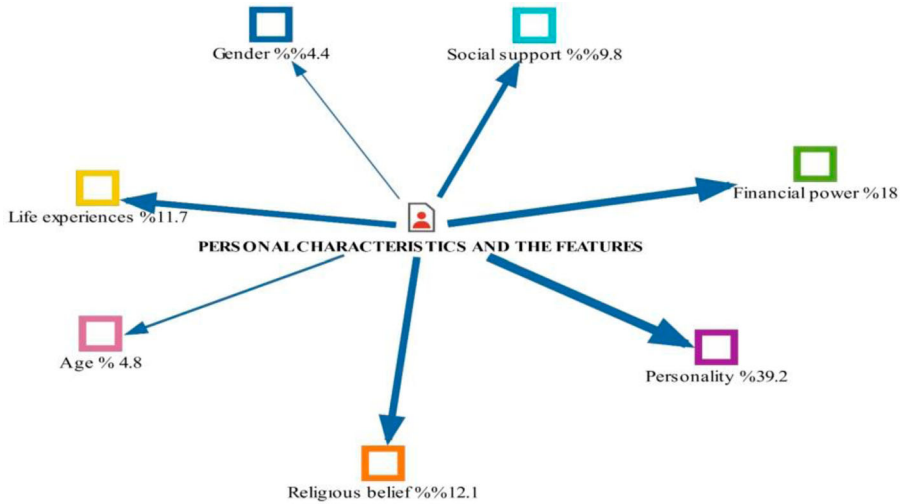


Figure 3. Psychological integrity and preventive features against the changes in the mental status.

Discussion

The most important task in a study is to measure the level of psychological health at the best possible degree in a given area in the respective country by performing a holistic evaluation of the quantitative and qualitative data. This will allow for identifying and eliminating the methodological grey areas during the comparison of the study data.

When the studies carried out for similar purposes in different intensive care units were examined, different TISS 28 scores and workload were found to be associated with disease severity and type. For example; in a retrospective study conducted by Muehler et al. (2010) on 6903 patients in a surgical intensive care unit, the TISS-28 score was found to be 47.7 and a significant association was found between TISS-28 scores and the disease type, mortality, and workload. Öztürk Birge and Bedük (2018) and Hamsen et al. (2018) demonstrated the association between workload and disease severity. Also, they demonstrated that disease severity increased the workload in most of the cases. Romano et al. (2018) reported that the mortality rate in intensive care was a determining factor for nurse workload. On the other hand, Guenther et al. (2016) conducted a retrospective study on 152 patients in an ICU and found that the workload and the disease type were not related.

Bahadori et al. (2014) study concluded that workload was associated and built up by the following factors; including the high number of patients, the inadequacies in the provision of equipment, and the assignment of nurses to duties not included in their job descriptions due to the lack of clearly defined job responsibilities and authorizations. In this present study, it can be concluded that the follow-up of patients by intensive care nurses in hospital departments other than ICU caused increases in the workload. Wihardja et al. (2019) reported that motivation was an important variable in determining the workload of ICU nurses in their study.

Secondly; in this present study, psychological changes reported by the ICU nurses were found to be associated with their workload. When the studies conducted in this context were examined, it was observed that workload was related to mental health (Tajvar et al., 2015) and it increased the likelihood of developing depressive symptoms (Gong et al., 2014) such as anxiety, social withdrawal, sleep disturbance, emotional burnout, and somatic complaints (Arrogante & Aparicio-Zaldivar, 2017; Jaradat et al., 2016; Kane, 2009; Kawano, 2008; Shen et al., 2016). Verdon et al. (2008) reported that burnout was common in ICU nurses due to excessive workload, resulting in the development of emotional problems in the staff.

The in-depth interviews with the participating ICU nurses in this present study revealed that the participants associated the fear of losing (of a loved one or an organ) with the feelings of unhappiness, hopelessness, introversion, anger, tension, intolerance, distraction, and self-insufficiency parallel to their workload. Furthermore, the SCL 90-R scores of somatization, interpersonal sensitivity, anxiety, and depressive symptoms of the participants were higher than the general symptom level (Table 2). Similarly; in the study by de Vargas and Dias (2011), it was reported that the discouraging situations in the ICU setting induced despair and sadness significantly in ICU nurses and affected the prevalence of depression. Also, other studies have shown that witnessing the moaning, crying, suffering, worsening, and death acts as an important emotional stressor for nurses (Lambrou et al., 2014; Zaybak & Çevik, 2015).

In our study, the participants' interpersonal sensitivity dimension score in SCL 90-R was found above the general symptom level. However; in the in-depth interviews, the participants reported that the workload caused feelings of personal insufficiency, insensitivity, unhappiness, hopelessness, and intolerance. In this sense; after evaluating the study findings as a whole, we suggest that participants were at risk for emotional burnout. The high workload in a tertiary-care ICU, the incessant provision of intensive care, and witnessing patient deaths frequently may affect the mental status of ICU nurses adversely.

In addition to the main findings of the study discussed above, the significant sub-codes determining the psychological integrity as reported by the participants included positive personality characteristics (39.2%), adequate financial power (18%), religious beliefs (12.1%), life experiences (11.7%), adequate social support systems (9.8%), age (4.8%), and gender (4.4%). As it was reported by the study participants that these factors might help overcome workload-related psychological changes, it will be important to evaluate their role in preventive mental health measures. The study results might have been yielded in association with hospital-specific factors, where the study was conducted. The duration of working hours was long in the hospital at the time of the study conduct. The participant nurses knew each other by their personality characteristics as they had worked in the same workplace for a long time. Therefore, they perceived each other as resources for social support. Finally, the participant nurses shared the same religious values. When other similar studies in the literature were reviewed from this point of view, it was observed that the implementation of several personal development programs was recommended for training nurses; including stress management, occupational training, and awareness; along with the Health Service Workplace Environmental and Psychological Resilience Model. Moreover, holistic self-care programs have been recommended such as reiki, yoga, intonation, meditation, imagination, as well as the use of creative expressions (Chesak et al., 2015; Cusack et al., 2016; McDonald et al., 2012; Mealer et al., 2014; Tarantino et al., 2013).

Validity and reliability

To ensure the validity of the quantitative method, measurement tools suitable for the objective of the research were used. The reliability of the measurements is ensured by their replicability in another universe. Concerning the validity and reliability of the qualitative method, the trustworthiness assumption is taken into consideration (Shenton, 2004). The reliability of the research was ensured by credibility, transferability, reliability, and verifiability criteria. To ensure the credibility of our study, both researchers worked independently during the data analysis and evaluation.

The concept of "generalization" used in judging the value of quantitative research is called transferability in qualitative research (Streubert & Carpenter, 2011). Transferability is ensured by showing that the data are collected from a sample representing the universe (Guba & Lincoln, 1982). To ensure the transferability of the findings in our study, the purposeful and random sampling method was used.

The reliability criterion represents the consistency of the findings and interpretations obtained from the research; while verifiability is the comprehensive representation of the study subject by the study results (Guba & Lincoln, 1982). In this context, the data analysis process of the study was carried out independently by the first researcher in order to ensure reliability. Then, the themes obtained by the first researcher were evaluated by the second author and the advisor of the research. The second author made the final revisions. This verification ensured the objectivity and verifiability of the data.

Limitation of research

As it occurs in other studies too, this study has some limitations. The first and probably the most important one of these limitations is the restriction of the study to a single working environment. Since the research would be carried out by a single researcher, it was decided to conduct the study at a single center due to time and resource limitations. Another limitation is that the data obtained in the study can reflect only the characteristics of study participants. Therefore, the results obtained from this study cannot be generalized to all ICU nurses.

Implications for nursing

The study results may create awareness in nurses about potential workload-related psychological changes in ICU nurses. Hence, ICU nurses can plan their schedules by taking their competencies into account including their skills in the provision of care and their competency in stress management so that they can take preventive measures against unfavorable psychological changes, which may occur due to excessive workload.

Conclusion

This study examined the workload-related psychological changes in ICU nurses. The quantitative data revealed that the workload of the nurses was high with a score of 315.8 (per minute). The qualitative data from 14 participants collected via individual interviews associated the psychological changes in nurses with three main categories; which are “the factors affecting the psychological well-being of nurses unfavorably”, “the reported psychological changes”, and “the psychological resilience and preventive features against psychological changes”. Fourteen participants were given SCL-90R, which revealed that the scores of somatization, interpersonal sensitivity, depression, anxiety, and the additional item scores were high and the scores of obsession-compulsion, anger and hostility, phobic anxiety, paranoid ideation, and psychoticism symptoms were low.

The literature review revealed that there are no studies available, investigating workload-related psychological changes quantitatively and qualitatively in ICU nurses. Therefore, this study may contribute further to the awareness of administrative management teams for achieving a better understanding of workload-related psychological changes in ICU nurses. The workload of nurses can be regularly evaluated considering the ICU mortality rates, APACHE II scores, TISS-28 scores, and nurse:patient ratios so that preventive measures can be implemented to avoid workload-related psychological changes in ICU nurses.

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