

Comparative Study of Job Burnout Among Critical Care Nurses With Fixed and Rotating Shift Schedules

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Background: Nurses, as health care providers, are insurmountably obliged to the practice of shift work. Literature has reported shift working as one of the inducing factors of burnout. Despite numerous studies in this area, there are inconsistencies on the relationship between shift working and burnout among nurses, especially in those who work in critical care settings.

Objectives: The aim of this study was to compare the occupational burnout in critical care nurses with and without fixed shift schedules.

Patients and Methods: In this comparative study, 130 nurses with rotating shift schedule and 130 nurses with fixed shift schedule from six university hospitals were selected using stratified random sampling. Maslach burnout inventory was used for data collection. Independent samples t-test, chi-square and one-way ANOVA tests were used to analyze the data.

Results: Most of the participants were females (62.7%), aged between 22 - 29 years (38.5%), married (59.2%), and had a bachelor degree (86.9%). The mean score of emotional exhaustion was significantly higher in nurses with fixed shift schedules ($P < 0.001$). However, no significant difference was found between the mean scores of the two groups in the personal accomplishment and depersonalization subscales ($P > 0.05$). Moreover, no significant difference was found in burnout mean scores between nurses with fixed morning and fixed night shifts ($P > 0.05$). The means of the emotional exhaustion subscale were significantly different in nurses with different characteristics ($P < 0.05$) except the gender and working unit.

Conclusions: As a result of this study, it was found that critical care nurses with fixed shift schedules display more burnout in emotional exhaustion dimension, compared to those working with rotating shift schedules.

Keywords: Critical Care; Nurses; Burnout; Shift Work

1. Background

Burnout is defined by the three dimensions of emotional exhaustion, depersonalization and reduced personal accomplishment (1). Many devastating consequences associated with burnout have been reported. Job burnout can be associated with anxiety, depression, low self-esteem, inclination to use of drugs and more health problems with employees. It also may lead to lower standards of nursing care, increase in late arrivals at work, unjustified absence from work and increased employee turnover rate (2, 3). In the United States of America, billions of dollars are lost annually due to low productivity, staff turnover and work absence caused by burnout (4).

Nurses are experiencing significant levels of burnout (5, 6). One study from five different countries found that the incidence of burnout in nurses was 32% to 54% (7). The rate of severe burnout is even higher among nurses working in critical care settings (2, 8, 9).

Nurses, as health care providers, are insurmountably obliged to the practice of shift work, and with inpatient

care necessitating 24 hour work schedules. International council of nursing (ICN) is concerned that shift work may have a negative impact on the individual's health and functioning, thus affecting the services provided (10). Many detrimental effects of shift work have been reported (10-12). In the nursing context, the problems faced by shift workers, are complex and multidimensional, and potentially impact the quality of patient care and the occupational health and safety of the nurses (13). Shift working has been reported to be one of the inducing factors of burnout (14). Several studies in Iran have reported that the incidence of burnout is higher among nurses with rotating shifts than in nurses with fixed shifts (4, 5, 15). However, Dwyer et al. have reported that rotating shifts had a positive impact on psychological well-being and work satisfaction among critical care nurses (16). Choobineh et al. have also studied shift work-related consequences among operation room technicians and reported similar finding among those with voluntary

regular rotating shifts (17). Khazaei et al. have also studied professional burnout among nurses and found no significant differences between nurses with fixed and rotating shifts in terms of emotional exhaustion and personal accomplishment (18). Due to the controversies about the effects of shift work on nurses, the question still comes to mind that is there any relationship between shift work and burnout among nurses? This question is especially important to be investigated in nurses who work in critical care settings.

2. Objectives

This study was conducted to compare the occupational burnout in critical care nurses with and without fixed shift schedules.

3. Patients and Methods

3.1. Study Design and Population

This comparative study was conducted from January to April 2014. A fixed shift was defined as a fixed morning, fixed evening, or fixed night shifts alone during a month while a rotating shift was defined as having an alternating shift schedule during a month. In addition, Intensive care units (ICU), coronary care units (CCU), and emergency departments (ED) were defined as critical care units. The study population comprised all nurses worked in six adult hospitals affiliated to the Isfahan university of medical sciences. Sample size was calculated using the results of a local study conducted with Khazaei et al. (18).

Based on the results of Khazaei et al. μ_1 , μ_2 , σ_1 and σ_2 , were respectively equal to 12.9, 11.7, 3.4 and 3.7 (18). Accordingly, with a type I error probability of 0.05 and a power of 0.80, the sample size was determined to be 130 nurses for each group. Then, 130 subjects with fixed shift schedule and 130 subjects with rotating shift schedule were recruited from a total of 850 nurses who were working in 15 ICUs, 6 CCUs and 6 EDs in the six selected university hospitals of Isfahan (of whom approximately 60% worked in rotating shift schedule). Participants were recruited to the study by using the stratified random sampling. Each hospital was considered as a stratum. The number of subjects for each stratum was determined in proportion to the number of nurses in each hospital. Then, using a random number table, simple random sampling was carried out in each stratum.

Inclusion criteria were having a Bachelor of science or higher degree in nursing, working in one of the former mentioned units in either a rotating or a fixed shift schedule for at least 1 year, being occupied in just one job (nursing), not having a history of special chronic diseases such as mental disorders, severe headaches, or backaches and not having taken sick leave for more than, one month in six months prior to study.

3.2. The Instruments and Data Collection

Two instruments were used to collect the data. The first instrument was created by the authors, including demographic data such as gender, age, marital status, education level, years of professional experience, hours of overtime working per month, shift schedules, and their working hospitals and wards. The second instrument was the Maslach burnout inventory (MBI), human services survey (HSS) version, developed by Maslach and Jackson to assess the three dimensions of burnout (19). The MBI-HSS consists of 22 items in three subscales of emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). The three subscales consist of 9, 5 and 8 items, respectively. Each item was answered on a seven-point Likert's scale ranging from never 0 to every day (6). Thus, the summation of scores can range from 0 to 54 on the EE subscale, 0 to 30 on the DP subscale, and 0 to 48 on the PA subscale. High scores on EE and DP subscales and low scores on PA subscale indicate high levels of burnout (19). In this study, we used a Persian version of MBI-HSS. Validation of the Persian version has yielded satisfactory results. The Cronbach's alpha coefficient of 0.95 was calculated for the Persian version of MBI-HSS (20).

All data in this study were collected by the first author who attended in the hospitals, performed the sampling and distributed the questionnaires among the selected participants. After checking the inclusion criteria and explaining the study aims to the participants, they were asked to respond the questionnaire in a quiet and private environment while the researcher were present in a corner of the ward. The participants could ask the researcher any query occurred in answering the questionnaire. If a subject did not agree to participate in the study or decided to withdraw from the study, another subject was randomly selected from the same unit.

3.3. Ethical Considerations

This study was approved by the research ethics board in Isfahan University of Medical Sciences, Isfahan, Iran, with the number 392015. All participants were briefed about the study objectives and were assured that their participation is voluntary. In addition to using anonymous questionnaires, all of the participants were assured about the confidentiality of their personal information and signed a written informed consent.

3.4. Data Analysis

Statistical analyses were performed using SPSS 11.5 software (SPSS, Inc., Chicago, Illinois). Chi-square test was used to test the homogeneity of the two groups in terms of demographic and contextual variables. Independent sample t-test was used to compare the mean scores of burnout dimensions between rotating and fixed shift groups. Moreover, independent sample t-test was used to compare the mean scores of burnout dimensions in subjects with dif-

ferent genders, marital status, education level, and work experiences. In addition, one-way analysis of variance was used to compare the mean scores of burnout dimensions in subjects with different age groups, overtime working categories and working in different units. P value < 0.05 was considered statistically significant.

4. Results

Two hundred sixty critical care nurses were studied including 130 cases with fixed shift schedules and 130 with rotating shifts. Among the nurses with fixed shift schedule, 54% worked in fixed morning and the others worked

in fixed night shifts (there were no nurses working in fixed evening shift schedule). Most of the participants were females (62.7%), aged between 22 - 29 years (38.5%), married (59.2%), and had a bachelor degree (86.9%). Most of the participants worked in ICU (57.7%), had 1 - 9 years experience as a nurse (47.3%), and worked for 1 - 49 hours overtime per month (51.9%). No significant differences were found between two groups in terms of demographic and contextual variables ($P > 0.05$; Table 1).

The mean score of EE was significantly higher in nurses with fixed shift schedules ($P < 0.0015$). However, no significant differences were found between the mean scores of the two groups in the PA and DP subscales ($P > 0.05$, Table 2).

Table 1. Comparison of the Demographic Characteristics in Nurses With Rotating Shift and Fixed Shift Schedules ^{a,b}

Characteristics	Rotating Shift	Fixed Shift	P Value ^c
Gender			0.248
Male	44 (33.8)	53 (40.8)	
Female	86 (66.2)	77 (59.2)	
Marital status			0.077
Single	46 (35.4)	60 (46.2)	
Married	86 (64.6)	70 (53.8)	
Education level			0.086
Bachelor	115 (88.4)	105 (80.8)	
Master	15 (11.6)	25 (19.2)	
Age, y			0.098
22 - 29	57 (43.8)	43 (33.1)	
30 - 39	41 (31.5)	57 (43.8)	
≥ 40	32 (24.7)	30 (23.1)	
Years as a nurse			0.172
1 - 9	67 (51.5)	56 (43.1)	
≥ 10	63 (48.5)	74 (56.9)	
Hours of overtime working			0.711
1 - 49	67 (51.5)	68 (52.3)	
50 - 99	31 (23.8)	26 (20)	
≥ 100	32 (24.6)	36 (27.7)	
Working unit			0.99
ICU	75 (57.7)	75 (57.7)	
ED	44 (33.8)	44 (33.8)	
CCU	11 (8.5)	11 (8.5)	

^a Abbreviations: CCU: coronary care unit; ED: emergency department; ICU: intensive care unit.

^b Data are presented as No. (%).

^c Chi-square test.

Table 2. Mean Scores of Burnout Dimensions in Nurses With Rotating Shift and Fixed Shift Schedules ^a

Burnout Dimensions	Rotating Shift	Fixed Shift	CI 95%	Independent T-Test	
				P	t
Emotional exhaustion	20.52 \pm 11.08	26.56 \pm 11.43	-8.79 - 3.29	0.001	-4.328
Personal accomplishment	31.10 \pm 9.92	29.30 \pm 11.18	-0.78 - 4.38	0.171	1.372
Depersonalization	10.75 \pm 6.72	11.73 \pm 6.38	-2.58 - 0.61	0.227	-1.211

^a Data are presented as mean \pm SD.

Table 3 compares the mean burnout scores of the participants in terms of different demographic variables and shows no significant difference in burnout mean scores between nurses with fixed morning and fixed night shifts ($P > 0.05$).

Although, the mean scores of the two subscales of PA

and DP were not significantly different in nurses with different genders, marital status, education level, work experiences, age groups, and different working units. However, the means of the EE subscale were significantly different in nurses with different characteristics ($P < 0.05$) except for gender and working unit.

Table 3. Association Between Demographic Characteristics and Job Burnout Among Nurses ^a

Characteristics	Emotional Exhaustion	Personal Accomplishment	Depersonalization
Sex			
Male	23.02 ± 11.69	28.69 ± 11.05	11.55 ± 6.14
Female	23.85 ± 11.63	31.11 ± 10.23	11.06 ± 6.80
Independent t-test	P = 0.575, t = -0.561	P = 0.075, t = -1.789	P = 0.557, t = 0.588
Marital status			
Single	25.28 ± 12.33	30.15 ± 10.81	12.06 ± 6.78
Married	22.35 ± 11.02	30.24 ± 10.47	10.68 ± 6.36
Independent t-test	P = 0.046, t = 2.007	P = 0.943, t = -0.072	P = 0.095, t = 1.678
Education level			
Bachelor	22.82 ± 11.45	29.96 ± 10.72	11.12 ± 6.53
Master	28.32 ± 11.90	31.79 ± 9.66	12.02 ± 6.77
Independent t-test	P = 0.010, t = -0.595	P = 0.350, t = -0.936	P = 0.456, t = -0.746
Age, y			
22 - 29	26.31 ± 11.80	29.66 ± 10.13	11.91 ± 7.04
30 - 39	21.65 ± 11.40	31.55 ± 10.64	10.96 ± 6.49
≥ 40	23.54 ± 11.03	28.96 ± 11.16	10.61 ± 5.81
One-way ANOVA ^b	P = 0.010, F = 4.738	P = 0.261, F = 1.350	P = 0.413, F = 0.887
Years as a nurse			
1 - 9	25.27 ± 11.85	30.12 ± 10.25	11.52 ± 6.88
≥ 10	21.99 ± 11.26	30.28 ± 10.92	11.00 ± 6.26
Independent t-test	P = 0.023, t = 2.289	P = 0.902, t = -0.123	P = 0.524, t = 0.638
Hours of overtime working			
1 - 49	22.11 ± 12.02	32.47 ± 10.50	9.85 ± 6.54
50 - 99	28.28 ± 11.29	30.91 ± 9.84	13.28 ± 6.73
≥ 100	22.41 ± 10.17	25.11 ± 9.76	12.29 ± 5.85
One-way ANOVA ^b	P = 0.002, F = 6.299	P = 0.000, F = 12.006	P = 0.001, F = 6.928
Ward			
ICU	22.87 ± 11.76	28.96 ± 11.06	11.36 ± 6.52
ED	24.86 ± 10.08	33.18 ± 7.29	11.18 ± 7.18
CCU	24.36 ± 11.82	31.57 ± 10.23	11.06 ± 6.52
One-way ANOVA ^b	P = 0.546, F = 0.606	P = 0.071, F = 2.688	P = 0.946, F = 0.056
Shift			
Fixed morning	25.60 ± 11.73	29.51 ± 12.34	11.08 ± 6.54
Fixed night	27.70 ± 11.07	29.06 ± 9.75	12.50 ± 6.15
Independent t-test	P = 0.298, t = -1.044	P = 0.821, t = 0.227	P = 0.209, t = -1.262

^a Data are presented as mean ± SD.

^b Analysis of variance.

5. Discussion

The results of this study showed that the mean score of EE was significantly higher in the critical care nurses with fixed shift schedule compared to those with rotating shifts. However, no significant differences were observed between the two groups in terms of PA and DP subscales. The findings of the present study showed that critical care nurses with fixed shift schedules experienced higher levels of emotional exhaustion and burnout compared to those with rotating shifts. These findings are consistent with the results of Esfandiari (4) and Mahmoodi et al. (5) who studied the incidence of burnout among nurses. Dwyer et al. have also reported that rotating shifts had a positive impact on psychological well-being and work satisfaction of critical care nurses (16). In contrast, Abdi Masooleh et al. have found that the incidence of burnout was higher among nurses with rotating shifts (15). Khazaei et al. found that there was no significant difference between fixed and rotating shift schedules in terms of EE and PA. However, the nurses with rotating shift schedule had higher DP scores compared to those with the fixed shift schedule (18). Although the studies are conflicting on the effect of work schedule on burnout, it seems that critical nurses with fixed schedules experience higher levels of burnout while rotating shift schedule may alleviate the level of burnout especially if nurses choose the rotating schedule voluntarily, as confirmed by Choobineh et al. (17). The high level of burnout in nurses with fixed night shift schedules may be attributed to the fact that there are fewer nurses working at night, then, the nurse-patient ratio is not appropriate and the time of 12 hours, which is allocated for a night shift, is too long (10, 21). On the other hand, the high level of burnout in nurses with fixed morning shift may be attributed to the fact that most of the caring procedures and physicians' visits are performed in the morning shifts. Therefore, the workloads of nurses are higher in morning shifts than in other shifts. Furthermore, a low level of burnout in rotating shift schedules in the present study may be attributed to the fact that most rotating nurses in the study setting are usually lower skilled and hence they are interchangeable. Therefore, they can change their shifts, which interfere in their lives, with coworkers to cope with work-family conflict (22). In the present study, no significant difference was found in the mean scores of burnout dimensions between male and female nurses. One study showed higher burnout among female nurses (1) while another study showed higher burnout among males (23); however, some others found no significant differences in burnout between male and female nurses (24-26). Moreover, the present study showed that the mean score of EE was significantly higher in the single nurses. This finding was consistent with the results of some of the previous investigations (26, 27). The lesser burnout in the married nurses may be attributed to the family support (28).

In this study, nurses with a higher level of education

(MSN degree) had the higher mean score of EE than the less educated ones. However, no significant differences were observed between the mean scores of PA and DP in nurses with different education levels. Mohammadpoorasl et al. have reported that higher education is associated with an increased risk of burnout (25). Khazaei et al. found that nurses with higher levels of education experience higher levels of PA and lower levels of EE and DP (18). Higher burnout, seen amongst those with higher education, might be attributed to the greater responsibilities often assign to these nurses that consequently bring them higher levels of stress (25).

With respect to age, the findings of the present study showed the higher mean score of EE among younger nurses and those who had less work experience. However, this was not the case in terms of PA and DP. The literature available on this issue also supports a higher rate of burnout among younger nurses (29, 30). Demir et al. have also reported that young and inexperienced nurses report higher burnout scores. However, their levels of burnout would decline as they mature in work experience (14). The higher levels of emotional exhaustion in younger nurses of the present study may also be attributed to the fact that younger nurses are usually less experienced and therefore experience higher levels of stress when their patients are critically ill. However, this finding should be cautiously observed because of the survival bias. For instance, nurses who burnout early in their careers are likely to quit their jobs, leaving behind the survivors who, as a result, demonstrate lower burnout (26).

In the present study, it was found that the critical care nurses with more hours of overtime working per month received higher mean scores in EE, DP, and PA. In line with the current study, Natvik et al. found that overtime working and increase in workload would lead to more burnout (11). With respect to ward, the findings of the present study showed no significant difference between the mean EE, PA and DP in nurses who worked in different units. This finding was in line with the results of Ahmadi et al. who found no significant difference between the level of burnout among nurses worked in ICU an EDs (31). This finding may be attributed to the fact that patients in all working units studied in the present study are critically ill. Then, nurses in these units experience higher levels of stress.

In conclusion, the results of the present study showed that critical care nurses with fixed shift schedules experience higher levels of burnout compared to those with rotating shifts. This finding may offer useful information for nursing leaders. For instance, nurse leaders should provide more emotional supports for these nurses. The research reported here has several limitations. Firstly, our findings may reflect a particular response bias because nurses experiencing high levels of burnout may have less motivation to participate in the study. Secondly, some of nurses might have special situations in their lives (out of their works) that psychologically made them vulnerable to job burnout. However, we did not assess such situa-

tions in this study. Thirdly, different nurses have different levels of psychological development and hence they have different abilities for coping with the strains and pressures that make population vulnerable to job burnout. Thus, the findings should be viewed cautiously. Moreover, further studies with larger sample sizes and more contextual variables and also on nurses in different work settings are suggested.

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Authors' Contributions

Study concept and design: Mahdi Shamali. Acquisition of data: Mahdi Shamali, and Mohammad Abbasinia. Analysis and interpretation of data: Mohsen Shahriari and Mohammad Abbasinia. Drafting of the manuscript: Mahdi Shamali and Atye Babaii. Critical revision of the manuscript for important intellectual content: Mohsen Shahriari and Mahdi Shamali. Statistical analysis: Mohammad Abbasinia and Atye Babaii. Administrative, technical, and material support: Mohsen Shahriari and Atye Babaii. Study supervision: Mohsen Shahriari.

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