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Shift working disorders among nurses of Tehran hospital and its related factors in 2016

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Abstract.

INTRODUCTION: Many adverse effects occur among the nurses due to shift work. Hence, the present study aimed to determine the prevalence of shift work-related disorders and its related factor among the nurses at Tehran University Subsidiary Hospital, Iran, and to find solutions for managing the relevant health problems.

METHODS: In this cross-sectional study, the Survey of Shift workers (SOS) questionnaire and the Personal Information Form were used to collect data related to demographics and working conditions of 1259 randomly selected nurses working at Tehran University Subsidiary Hospital as statistical population.

RESULTS: According to the results, psychological disorders (95%), digestive problems (85%) and social problems (80%) were the most frequent problems among the subjects. Additionally, the satisfaction rate was higher among the volunteer nurses compared to nurses who were forced to do shift work ($P < 0.05$).

CONCLUSION: The nurses volunteered for shift work had higher satisfaction rate compared to nurses forced to shift work system; moreover, they had more job satisfaction and less shift work-related complaints. Therefore, it is important to select the nurses who are volunteer for shift work system. In addition, the shift work schedule in hospitals should be set based on workload and requirements because the shift schedule can adversely influence the social and family issues of the nurses, as well as their sleep quality and body biological process.

Keywords: Psychological disorders, digestive problems health problems, sleep disorder, night work

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1. Introduction

Changes of daily night time constantly influence the physiological parameters in the human body, including hormone secretion, cell cycle and the regular rhythms [1] that can be subject to changes due to factors such as shift work [2]. In fact, shift work is a type of work schedule designed to provide services by workers during the different set periods throughout the day [3, 4]. This kind of work practices can be seen among approximately 20% of employees in developed countries [5, 6]. Accordingly, various problems such as the higher risk of developing anxiety, depression [8], chronic fatigue [9] and cardiovascular and gastrointestinal disorders [10, 11] have been observed among shift workers working rotating shifts and night work [7].

Some of the main factors in occupational settings are overall satisfaction with the job and work time, enhancing productivity, commitment to the organization, guarantees the physical and psychological health and shortening the learning time related to job skills and the person's morale [12]. Judge and Watanabe demonstrated a correlation between job and life satisfaction. They found that job satisfaction leads to increase life satisfaction of the individuals [13].

Nurses are among the employees whose job usually involves night shifts, rotating shifts and even irregular working hours. It is therefore obvious that there are various adverse health effects following such working schedule among the majority of nurses [10]. Although such working conditions are tolerable for some nurses, incidence of critical health problems among a large number of them such as tension and stress [14], disruption of family life [15] and usual or unhealthy diet, have resulted in dissatisfaction with the shift work [16–18].

Excessive occupational stress and the risk of metabolic syndrome have been shown to be the complications of the shift working nurses [19, 20]. Higher cardiac sympathetic regulation might be occurred because of variations in sleeping schedule caused by long-term shift work at night [21]. In a prospective survey and longitudinal data from the nurses' health status, the high risk of cardiovascular disorders was reported among the nurses working on rotating shifts over six months rather than the nurses with no rotating shifts [28].

Job dissatisfaction and occupational stress have been found among the hospital nurses working on rotating shift schedules [22]. Based on the several

previous studies, these nurses usually experience work-related stress, and decline in the mood or cognitive function [23–25], probably due to changes in autonomic function [26–28]. It should be noted that there was no association between the shift work and self-reported physical or mental health status of 463 nurses with various shift patterns [29]. Higher fatigue and depression were seen among night shift nurses compared to nurses with day shifts [30]. Some researchers have already found that long-time fatigue among nurses can lead to a reduction in quality of patient care and high risk of health problems such as depression and dissatisfaction with shift work [15, 31, 32].

Despite a large number of studies conducted in this field, there is limited information on the physical and psychological responses to the shift work among nurses. Therefore, further investigations are required to determine indicators for assessing the health status of hospital nurses in that regard. Accordingly, the current research was designed to evaluate the prevalence of shift work disorders and related factors among nurses at Tehran University Subsidiary Hospital in 2016.

2. Methods

2.1. Study design and sampling

In this cross-sectional study conducted in 2016, Survey of Shift workers (SOS) questionnaire and personal characteristics were used to collect demographic data and work conditions of nurses working at Medical Sciences Hospitals in Tehran. 8 governmental hospitals in the east of Tehran were randomly selected for sampling. 50 nurses using simple random sampling method for the pilot study were selected from Imam Khomeini hospital in Tehran and, after confirming by the experts, were included in the study.

The sample size based on head count estimated 1259 subjects regarding 95% confidence level, 8% test power and 25% absolute error. The participants (44.4% female and 77.4% married) had the mean age of 35.4 years, shift-working history of 11.3 % years, work experience of 11.5 years and the most frequent age group of 24–50 years. In terms of educational levels, 95.5% of them had bachelor's degree in nursing and 4.5% had master's degree in nursing; the least work experience in nursing was one year (Table 1).

Table 1

Demographic characteristics of the study population (n = 1259)		
Parameter	n	%
Age group		
24–30	500	32.3
31–40	600	42.1
41–50	159	25.6
Gender		
Female	359	44.4
Male	900	55.6
Marital status		
Single	309	22.6
Married	950	77.4
Level of education		
Graduate	1159	95.4
Masters science	100	4.6
Work experience		
<5	400	34
5–10	200	16
10–20	559	41
20–30	100	9
History of shift working		
<5	400	26
5–10	100	9
10–20	459	49
20–30	300	16
Select the type of shift working		
Voluntary	600	16
Mandatory	659	84
Satisfaction of shift working		
Yes	400	26
Does not	859	74

2.2. Study instruments

The Survey of Shift worker (SOS) questionnaire was developed by the Economic and Social Research Council (ESRC) and Medical Research Council (MRC) in the UK [33]. This questionnaire is considered as one of the most complete tools regarding the study of disorders related to the shift work and its validity and reliability (in terms of the Persian version) have already been confirmed by Choobineh et al. [34, 35].

This questionnaire was employed to record several parameters associated with the shift work among the nurses. Parameters such as demographic information, type of shift work system, sleep hour, insomnia, musculoskeletal disorders, sedative drugs and adverse effects of shift work on the individual, social and domestic life, as well as gastrointestinal, cardiovascular and mental health problems [36].

The researchers developed a demographic form including characteristics that might affect the sleep quality and job satisfaction of nurses. At the first,

demographic form was given to the experts to get their comments. After proven by expert in pilot study refers to part of sampling.

The aim of pilot study was to eliminate the problem and ambiguity of SOS questionnaire. By the feedback of nurses for filling of this questionnaire, some of the questions were corrected and deleted from the final version. By primary statistical analysis, the correlation coefficient is 0.73. For this study, the correlation coefficient in 8 hospital must be upper than 0.80. Based on obtained results, 2 questions were deleted and 4 questions were changed. Finally, a questionnaire with 54 questions (correlation coefficient of 0.81) was obtained. This correlation coefficient was calculated by the Kuder-Richardson formula.

2.3. Data collection

This project was approved by university institutional review board and hospital nursing research committee. After consultation with the supervisor of each hospital, the nurses were informed about the study and they were asked to give the informed consent. Having consulted the supervisors in charge of the hospital wards, the selected nurses were briefed about the objective of the study and informed consent was obtained from them. The researchers referred to hospitals and, after taking oral and written consent, the questionnaires were completed by nurses within the face-to-face sessions without time limits. This process lasted 30 days.

2.4. Statistical analysis

The obtained data were analyzed using SPSS version 16 (SPSS Inc., Chicago, IL, USA) via frequency distribution, arithmetic mean and Chi Square. Ethical consideration is approved in University of Social Welfare and Rehabilitation Sciences based on this code: IR.USWR.REC.1396.77.

3. Results

Table 1 shows the demographic and work-related characteristics of the studied nurses. The age range of the subjects was 24 to 50 years, with the mean age of about 35 years and 55.6% of them were male. In terms of educational levels, 95.5% of the subjects had bachelor's degree in nursing and 4.6% had master's degree in nursing. 77.4% of the nurses were married.

Table 2
Frequency distribution and incidence of disorders due to shift work

Parameter		n	%
Cardiovascular	Blood pressure	200	16
	Dyspnea	309	19
	Chest pain	150	16
	Heart palpitation	350	28
	Cardiovascular disorders	250	21
Sleep	Disorders early morning wake up	200	28
	Sleepless disorders	200	11
	Disorder took getting to sleep	300	16
	Consent of sleep daily	159	19
	Disorder in place's go to sleep	400	26
Musculoskeletal	Pain in the shoulder/neck	100	16
	Back pain	159	24
	Pain in the arm/wrist	600	26
	Pain in the leg/knee	400	34
Digestive	Yes	900	84
	Does not	359	16
Social life	Yes	1000	79
	Does not	259	21
Consume sedative drugs	Yes	59	12
	Does not	1200	88
Domestic life	Yes	1000	74
	Does not	259	26
Individual life	Yes	950	76
	Does not	309	24
Psychological	Yes	1240	94
	Does not	19	6

The work experience range was 1 to 30 years with the mean of 11.52 years (Table 1).

Table 2 indicates the frequency distribution and incidence of disorders for shift work nurses. The mean one-month prevalence of musculoskeletal complaints (MSC) was 53.5%. The highest MSC rate was related to pain in the leg and knee (34%), back (24%), shoulder (16%) and arm and wrist (26%), respectively. Other problems were related to psychological disorders (95%), digestive problems (85%) and social problems (80%).

The sleep disorders occurred most frequently among the nurses with night shift work than those with regular daytime schedules. There was also a significant relationship between voluntarily choosing of the shift work system and satisfaction ($P=0.008$) (based on the chi-square test).

The rate of satisfaction with spending time with families was higher in the nurses volunteered for shift work (52%) compared to nurses forced to shift work (48%), which indicates the significant correlation between satisfaction with shift work and the time spent with family ($P=0.003$) based on chi-square test.

4. Discussion

This study was conducted to evaluate the association among cardiovascular and musculoskeletal disorders, sleep disorders, mental-psychological problems, digestive disorders, as well as adverse effects of shift work on personal, family and social life and the rate of satisfaction with shift work system among nurses working at Tehran University Subsidiary Hospital. According to the findings obtained from the chi-square test, we found a significant relationship between shift work and its adverse effects on personal, family and social life. Such finding is in line with the result of the study conducted by Choobineh et al. who investigated the shift work-related problems among operating room technicians of Shiraz hospitals in Iran; they found a correlation between adverse effects of shift work and personal, family and social life [35].

Previous investigations demonstrated psychological and gastrointestinal disorders caused by shift work, especially among nurses that are involving with shift work system. They attributed this high prevalence to the lack of adaptation of body biologic cycle with shift work system [37]. Unlike the results reported by Fischer et al. in the present study, no significant relationship was found between shift work and gastrointestinal disorders, [38] and Knutsson [39]. The reasons for discrepancies among the results can be parameters such as environmental, organizational, and cultural differences as well as shift work system, working hours per week, employment status, educational level and workplaces managements in the two communities. Findings showed that mental-psychological disorders could lead to gastrointestinal disorders [40]. The differences in interactions and conflicts of nurses with their colleagues are leading causes of inconsistent results, proving the need for further researches in this regard.

A significant relationship was found between voluntarily choosing shift work and satisfaction. The job satisfaction rate was more evident among the nurses volunteered for shift work compared to nurses forced to shift work. This is in line with a study conducted by Bohle [41] who showed that the number of nurses forced to shift work (85%) were higher than those volunteered to shift work (15%). Suleiman [42], by studying in this regard, indicated that 43.8% of nurses were dissatisfied with their job and 54.2% were relatively dissatisfied. The job dissatisfaction rate was reported to be 63% by Afshar Moghadam and Golchin [43], 67% by RajabiYekta [44] and 85.9

% by Nolan et al. [45], and about 50% by Price et al. [46]. Multifaceted and interdisciplinary interventions may lead to reduce the differences between the nursing job status in our country and the other countries.

No significant relationship was found between satisfaction with shift work and satisfaction with daily sleeping, which it was confirmed by results of Takashi in Japan confirmed; they observed good sleep quality only in 8% of the two-shift nurses and 6% of 3-shift nurses [47].

One of the adverse effects of shift work in our study was the high prevalence of daily sleep dissatisfaction. The effects of sleep disorders on the health status of doctors and nurses can seriously lead to professional errors in the USA hospitals based on the reports of the Sleep Disorders Committee of the American Academy of Otolaryngology [48, 49]. Gold et al. [25] and Ohida et al. [47] demonstrated that nurses forced to work nights or irregular shifts have more tendencies to nap when driving or working compared to those with normal day shifts.

The total prevalence of low back pain was 53.5% in the present study; this rate is lower than the results observed in a study conducted by Swedish that was 84% in neck, shoulder, upper back, or lower back musculoskeletal disorders [50]. The MSD rate was 72.5% among the nurses working in the USA [51]. The prevalence rate of shoulder pain was 41.7% in the present study, which was higher than the results of research in the USA (35.1%) [51], and was in line with the research in South African (41%) [52]; however it was lower than the levels observed in studies conducted in Australia (60%) [53] and Sweden (60%) [50]. There are some reasons that may lead to inconsistencies in the findings, including various studied populations, education background and different data collection methods [54–56].

In this study, 70.2% of the studied shift workers were dissatisfied with the time spent with family, which was consistent with the study conducted by Tepas [4]. Nevertheless, due to inconsistency in the results, further investigations should be performed.

It is necessary to promote the skill levels of the nurses in medical care and associated technologies. Since the nurses work at stressful workplaces, occupational errors or accidents are more likely to occur among them, which may be effective on the prognosis of patients [57].

The study conducted in India suggests that the policy makers and managers perform useful inter-

ventions for improving the program shifts and the quality of work life of staff in the diverse professional [57]. Thus, increasing job satisfaction generally improves the performance and motivation among the staff and leads to more organizational success.

One of the limitations of the present study is small size of statistical population that was among the nurses working in the city of Tehran province; hence, it is recommended to conduct further investigations in other provinces in the county. On the other hand, since our study is cross-sectional, it doesn't show the cause-effect relationship correctly. Moreover, since the questionnaire-based studies are self-reporting, there is a possibility for under report. We recommended must be cohort study in future for this same study.

5. Conclusion

According to the findings obtained from the present study, the nurses volunteered for shift work had higher satisfaction rate compared to nurses forced to shift work system, also had more job satisfaction and less shift work-associated complaints. Therefore, it is important to select the nurses who are volunteers for the shift work system. In addition, the shift work schedule in hospitals should be set based on workload and requirements because the shift schedule can adversely influence social and family issues of the nurses, as well as their sleep quality and body biological process. Paying attention to circadian rhythm can improve job satisfaction and decrease the relevant disorders.

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Conflict of interest

None to report.

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