

A Survey of Physical, Psychological, and Social Health Indices in Shift Working Nurses

Seyed Ali Majidi¹, Irvan Masoudi^{2*}, Mohammad Taghi Moghadamnia³, Maryam Sharifi⁴, Mehdi Barzegar⁵

¹ School of Health Services Administration, Rasht Branch, Islamic Azad University, Rasht, Iran ² Islamic Azad University, Science and Research Branch, Tehran, Iran ³ Gilan University of Medical Sciences, Rasht, Iran ⁴ Rasoul Akram Hospital, Social Security Organization, Rasht, Iran ⁵ School of Health Services Administration, Islamic Azad University, Science and Research Branch, Tehran, Iran

Abstract

Background and Objectives: Nurses comprise a majority of healthcare professionals. Therefore, their quality of life can directly impact the performance of health system at different level. The aim of this study was to explore the potential impact of work shift on physical, mental, and social aspects of nurses' health.

Methods: A sample of 300 nurses from hospitals of the Rasht city situated in northern Iran was randomly selected. Demographic and physical, psychological, and social health data were collected using corresponding researcher-designed questionnaires. Data were summarized using descriptive statistical methods.

Findings: The majority of subjects considered the effect of work shift on chronic fatigue (88.7%) and illness (85.3%) to be important. Work shifts was found to be a perceived cause of severe physical problems in 77.3% of nurses and a perceived causes severe psychological problems in 59% of nurses.

Conclusions: Given the high proportion of shift working nurses suffering from physical and mental problems, there is an urgent need for revising the currently established work shift program in the healthcare settings.

Keywords: Work shift; Disorder; Nurse; Healthcare workers; Quality of work life

Background and Objectives

Work shifts are among the social phenomena that have their roots in human history. It is said that work shift has a special place in people's life in the ancient Rome. Over the industrial revolution, growth of the population, and progress of science and technology, work shifts still exist in various organizations and are continuously growing [1]. Work shift is a term that refers to long-term shift at night, evening and rotating shift, which causes to disruption in biological rhythms [2]. People follow a 24-hour period for their daily activities, called biological rhythms. Biological rhythms are effective in controlling human behavior and performance, sleep-wake control, digestion, secretion of adrenaline, body temperature, blood pressure, pulse and

other vital signs [3].

Different professions including nursing and medical professions require people to work 24 hours per day [4]. According to the survey, about 25 percent of the total labor forces in the developed countries are having work shifts. Due to the effects that work shift has on the health and safety of hospital staff, especially doctors and nurses; they can also be effective on the service production and productivity [5].

In Iran, 80% of practitioners in the health system are nurses, who are in the first line to provide health services. For this reason, nurses' health can affect on the quality of health care received by patients [6]. Nightshift working has negative physical, mental, social effects on the personal lives of nurses. For most nurses who work on rotating shift, work shift will have complications and undesirable effects on their normal life, and many of them are not manageable [7].

Rahimpour *et al.* working on the connection with the physical effects of work shift stated that the most

*Corresponding author: Irvan Masoudi, Islamic Azad University, Science and Research Branch, Tehran, Iran

important physical problem in nurses is sleep problems so that more than 50% of them suffer from this problem. However, the study conducted by Poordehghan and colleagues showed that the most important physical problems in nurses are hypertension, elevated blood cholesterol, and cardiovascular diseases (CVDs) [8, 9]. Shift-induced stress can be the most dangerous enemy for nurses' health and one of the main risk factors for susceptibility to disease [7]. However, the study conducted by Yamada in Japan showed that the main psychological problems include anger, hostility and depression [10]. Social effects from work shift may include absenteeism, lack of coordination with the environmental conditions, burn-out, job dissatisfaction, and job change [11].

Kubo *et al.* (2011) conducted a study aiming to investigate the acute effects of night shift work on the coronary circulation through the study of coronary returned blood flow using Thoracic Doppler Echocardiogram in Osaka, Japan. In this study, the velocity of blood flow in the distal anterior descending artery in the left coronary was checked in 36 female nurses after spending the night shift at about 9 am had been done by Thoracic Doppler Echocardiogram. The sample had not a history of CVDs and medication use. The results showed that coronary returned blood flow after night working has decreased significantly compared to work in the morning shift ($P=0.03$). This study proved that coronary circulation after night work in female nurses is impaired [12].

Also, in Tirgir's study, aimed to investigate the problems of work shift in nurses on 197 nurses staff in the cities of Mazandaran province, 88.9% of the nurses knew work shifts to be hazardous to their health, and believed that this pattern causes a negative effect on their mood (94%) and family life (80%). About 83.7% of the patients complained of gastrointestinal disorders such as heartburn (64.5%), change in bowel habits (22.6%) and anorexia (12.9%), respectively [13].

Therefore, this research aims "to determine the relationship between work shift and some indicators of physical, psychosocial and social health of nursing staff in the Education & Treatment Centers and Rasool Akram Hospital in Rasht.

Methods

A descriptive cross-sectional study was conducted within May 15 to August 15, 2012. The population was all nursing staff in Rasht Education & Treatment hospitals including the Education & Treatment Centers of Pour-sina, Razi, Dr. Heshmat, 17 Shahrivar, Amiralmomenin,

and Alzahra, and Rasool Akram Hospital. The sample size in this study after conducting a pilot study using a formula to determine the sample size and the opinion of statistical colleague was determined to be 300. In this study, sampling was carried out using a cluster randomized method. Initially, the cluster that was the same in the hospitals and Education & Treatment Centers located in Rasht was listed. Then, the number of nurses working in each center was determined. Given the sample size, the contribution of nurses per hospital who should participate in the study was specified, and the nurses and hospitals were randomly selected based on random number table. Then, in coordination with the above centers and identifying the shift work of each nurse, information was collected using random-cluster sampling. For this purpose, the nurses in the Education & Treatment Centers and Rasool Akram Hospital in Rasht as having the criteria needed to enter the study and after informed consent were considered as subjects. They are working in the formal, contract and conventional form with at least 2 years of work experience, hold associate, bachelor or master's degree, and are involved in patient care services as rotating shift. The research tools included a demographic questionnaire and the physical, psychological and social health indicators' questionnaire containing "affected" and "unaffected" items.

Demographic questionnaire included information on age, sex, marital status, education, work history, employment status, history of CVDs, gastrointestinal diseases and psychiatric disorders, and history of taking sleeping pills and psychotropic substances. Indicators of the physical health questionnaire consisted of 18 questions, indicators of mental health questionnaire contained 13 questions, and social activity questionnaire included 10 questions, which after submitting the samples, were completed personally by them. After library study and getting help from books and journals and surveys from professors, the validity of data collection tools was confirmed. The internal consistency reliability of the survey tool was ensured by Cronbach alpha of 0.85.

In order to data collection, after obtaining approval for research conducting from the Research Vice Chancellor, the researcher and colleagues were presented in a period of 3 months in the evening and night shifts to Rasht Education & Treatment Centers and Rasool Akram Hospital. After sample selection based on random numbers table and determining the studied unit and by coordination with the Hospital Office of Nursing in the shift where the subjects were engaged to provide services, the researcher went to the desired section, and data were collected based on self-report. Furthermore, the participants were as-

Table 1 Frequency distribution of some demographic/social characteristics of the subjects

Variables	Score								Chi-square test
	13-18		6-12		6 <		Total		
	No.	%	No.	%	No.	%	No.	%	
Age									P = 0.29
25<	6	9.5	38	60.3	19	30.2	63	100	
25-35	15	11.4	91	68.9	26	19.7	132	100	
36 >	16	16	58	58	26	26	100	100	
Gender									P = 0.41
Man	1	5	15	75	4	20	20	100	
Woman	39	4	173	62	67	24	279	100	
Marital Status									P = 0.16
Single	9	9.2	1	62.2	28	28.6	98	100	
Married	31	15.5	127	63.5	42	21	200	100	
Education									P = 0.23
Diploma	3	18.8	8	50	5	31.3	258	100	
Associate degree	5	25	12	60	3	15	20	100	
Bachelor	32	12.4	166	64.3	60	23.3	258	100	
MA	0	0	2	40	3	60	5	100	
Employment status									P = 0.1
Official	13	10.9	80	67.2	26	21.8	119	100	
Contract	10	22.2	30	66.7	5	11.1	45	100	
Plan	7	12.3	36	63.2	14	24.6	57	100	
Conventional	10	13.2	41	53.9	25	32.9	76	100	
Cardiovascular Disease									P = 0.004 Significant
Yes	8	36.4	11	50	3	13.6	22	100	
No	32	11.6	177	63.9	68	24.5	277	100	
Gastrointestinal Disease									P = 0.004
Yes	14	20.3	48	69.6	7	10.1	69	100	
No	26	11.3	140	60.9	64	27.8	230	100	
Psychological Disease									P = 0.13
Yes	4	23.5	12	70.6	1	5.9	17	100	
No	38	12.8	176	82.6	69	24.6	281	100	
Hypnotic drugs									P = 0.84
Yes	2	18.2	7	63.6	2	18.2	11	100	
No	38	13.2	181	62.8	69	23	288	100	

sured that their information is completely confidential and, if requested, they will be informed of the results. Inclusion criteria were working for at least 2 years of in rotating shift, and holding at least an Associate degree in nursing.

Scoring the questionnaire was such that each item with two options "unaffected" (0 score) and "affected" (1 score) was considered. So that, in the physical health questionnaire with 18 questions, score less than 6 was considered as low impact and scores 6-12

as moderate impact, and 13-18 as high impact. In the area of mental health, the questionnaire had 13 questions where scores less than 4 were considered as having low impact and 5-8 as having moderate impact and 9-13 as having high impact. In the area of social activity, the questionnaire had 10 questions where scores less than 3.3 were considered as having low impact and 3.4-6.6 as having moderate impact, and 6.7-10 as having high impact.

The collected data were analyzed using the SPSS

16 software. For data analysis, descriptive and analytical statistics were used. In descriptive statistics, the mean and standard deviation were used. In analytical statistics, Chi-square test was used. Significance was considered less than 5%.

Results

The findings showed that the majority of participants (44.6%) were in the age range of 25-35 years. The minimum age of the participants was 20 and the maximum was 57 years with a mean and SD of 31.85 ± 7.08 . The majority of the participants were women (93%), married (67.2%), with Bachelor degree (86.3%) and formal (40.3%). The majority of the subjects (96.9) had no history of using sedative drugs or psychotropic substance. Also, among the participants, the history of cardiovascular, gastrointestinal and psychology disease, was 7.3%, 23% and 5.7%, respectively.

The results of the physical health indicators questionnaire showed that most of the participants reported shift work as responsible for anorexia, epigastric pain, insomnia, dizziness, menstrual disorders and palpitations by 52.3%, 56.7%, 76.3%, 62%, 52.8% and 61.3%, respectively (Table 1). 77.3% of the participants reported that shift work has caused severe physical problems for them (Table 2). Also data obtained from the psychological indicators questionnaire showed that most of the participants reported that shift work contributes to generate irascibility with family, irascibility with colleagues, premenstrual mood changes, reduced level of precision and concentration, reduction in intimate relationship with the family members, concerns about the safety of children and families, feelings of sadness and irritability. In total, 59% of the nurses stated that shift work has caused severe psychological problems for them (Table 2).

The results from social activity questionnaire indices showed that the majority of participants reported that shift work impacts on not having enough time to reach the children and families, inability to family planning, not having enough time to attend funerals, festivities, religious ceremonies, as well as social, sports and the arts activities, interfere with administrative tasks such as Post Bank and other banks, and failure to be admitted in health center, clinics, etc. if needed. 58.3% of the participating nurses reported shift work's role in causing moderate difficulties in social activities (Table 2).

Discussion

Table 2 Frequency distribution of samples based on the severity of the impact of shift work on different aspects of health

Severity of Disorder	Health Indicators		
	physical	Mental	Social
Mild	0.4%	3%	10%
Moderate	22.3%	38%	58.3%
Severe	77.3%	59%	31.7%
Total	100	100	100

The analysis results indicated that most of the participants (83.6%) complaining from the effects of shift work on physical health as chronic fatigue, and 88.7% of the participants believed that shift work had no effect on their smoking habit. Reid *et al.* considered that sleep-wake disturbance and fatigue are related to each other [14]. Torsvall *et al.* did not observe a significant relationship between smoking and shift work [15].

Most of the participants believed that rotating shift often caused ill feeling in them; however, 77% of them mentioned that rotating shift had no effect on anxiety. Kawachi *et al.* observed no significant relationship between shift work and anxiety; however, they reported a significant relationship between shift work and ill feeling among nurses [16]. Also most of the participants (82.3%) believed that shift work caused lack of enough time to socialize with friends and relatives, but it had no effect on the incidence of family disputes (54.7%).

There was no significant relationship between the indices of physical health and age, sex, marital status, education level, employment status, history of nervous system diseases and sleep-inducing drugs and psychotropic substances in the participants based on the results of Chi-square tests. However, a significant relationship was observed between the physical health indexes and heart ($P = 0.004$) and gastrointestinal ($P = 0.004$) diseases so that 40% of the subjects with heart disease mentioned the moderate effect of the shift work to create heart disease, and 69.6 % of them with gastrointestinal disease mentioned the moderate effect of shift work to create gastrointestinal diseases.

Brown *et al.* found that rotating shift work has a significant relationship with increasing 4 percent risk of heart attack every 5 years ($P = 0.01$), and that female

nurses after spending the night work period are at greater risk of myocardial infarction [2]. Zhao *et al.* came to this conclusion that about 60% of the participants (nurses and midwives) are divided into two groups of overweight (31.7%) and obese (27.1%), and the most percent of participants with overweight (33.3%) have rotating shift work, and the most percent of obese group (31.3%) are only in night shift work [17].

The results of data analysis revealed no significant relationship between the indices of psychological health and age, sex, marital status, education level, employment status, heart disease, history of psychiatric disorders and sleep-inducing drugs and psychotropic substances in the participants based on Chi-square tests. However, a significant relationship was observed between the psychological health indexes and age ($P = 0.007$) and gastrointestinal disease ($P = 0.005$).

About 25.4 percent of the participants, who were under 25 years old, reported the greatest impact of shift work on psychological health indicators; however, 20.8 percent of the over 36 years of age participants reported the greatest impact of shift work on psychological health indicators. It seems that nurses who are older in their planning to shift work are more experienced, more work in the morning shift and have less shift work compared to younger nurses. Chang *et al.*, in a study on “the assessment of cognitive abilities and motor impairment at the end of night work in nurses with continuous rotating shift work” did not find a significant relationship between age and impaired motor and autonomic skills among the nurses with rotating shift work [18]. The findings of Kristin, Erin showed that the physical and mental health of nurses with rotating shift was more favorable than nurses with constant shift. They argue that improvement of public health in nurses require constant shifts work [19].

In the present work, there was no significant relationship between social indicators and age, gender, education, experience, history of cardiovascular, gastrointestinal, neurological, and psychological diseases, and consumption of sleeping pills and psychotropic substances based on the Chi-square test results. However, there was a significant relationship between the social indicators and marital status ($P = 0.01$) and employment status ($P = 0.05$). 73.8 percent of the female subjects in this study reported the greatest impact of shift work on their social indicators, and 78.3% of formal subjects stated that shift work has had more influence on their social indicators. Zhao *et al.*, in their study on “relationship between

shift work and weight gain and obesity, and its effect on lowering back pain over 928 nurses” did not find a significant relationship between marital status and social indicators [20]. Due to the fact that information received on the physical, mental and social indicators are based on self-report, so subjects may not represent the actual information in completion of the questionnaires. This is one of the limitations of this study, particularly in the case of mental disorders in nurses.

Conclusions

Since the units of study emphasized on the effect of afternoon and night shift work on the physical health and 60% on mental effects and considering the fact that, if the care giving person him/herself is not in good physical condition he/she would not be able to give good quality and quantity care, so it is necessary to put special attention to the health status of nurses as the most important members of the health care system through modifying the work plan and ongoing evaluation. And unusual shift operations should be prevented if the first symptoms of physical disorders are observed. Also, due to psychological problems caused by shift work (as majority of the nurses reported), paying due attention to the nurses' mental health by providing appropriate recreational programs as well as tourism and pilgrimage services by the senior management of the Health System and related organizations is necessary.

Competing Interests

The authors declare no competing interests.

Authors' Contributions

The authors contributed equally to this work.

Acknowledgements

The authors would like to thank all administrators of nursing services and dear colleagues working in Rasht Education & Treatment Centers and hospitals for their sincere cooperation. We sincerely thank Islamic Azad University of Rasht to fund the project.

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Please cite this article as:

Seyed Ali Majidi, Irvan Masoudi, MohammadTaghi Moghadamnia, Maryam Sharifi, Mehdi Barzegar. The relationship between work shifts and nurses physical, psychological and social health indicators. *International Journal of Hospital Research* 2014, 3(4):193-198.