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## Sleep quality in nurses working in different shifts

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### ABSTRACT

The nursing staff who are working at hospitals with a shift-work scheduling might confront with sleep disorders related to the characteristics of nursing profession. The results of studies have ruled out the close relationship between life quality and health. It must be mentioned that the quality of life is affected by sleep pattern. The aim of this study was investigating sleep quality in nurses working in different shifts at hospitals affiliated to Zahedan University of Medical Sciences. A cross sectional study was conducted on 299 nurses who were working at general hospitals of Zahedan University of Medical Sciences in 2008. Pittsburgh sleep quality index was utilized to collect data. The data were analyzed in SPSS version 17. using Mann-Whitney, Kruskal Wallis tests and Spearman correlation coefficient. The subjects were consist of 66 men (22.1%) and 233 women (77.9%) whit age mean  $31.6 \pm 6.6$  years. The mean of work experience was  $7.55 \pm 6.8$  years. The findings of study showed that sleep quality were suitable in only 55(17.1%) of nurses but 221(73.9%) of nurses have not sleepiness. The quality of life was high among only 32(10.7%) of nurses. In this study, quality of life has a relationship with sleep quality ( $P=.001$ ,  $r=-.572$ ) and sleepiness ( $P=.001$ ,  $r=-.246$ ). The sleep quality was related with gender, age, monthly income, disease, marital status and type of insurance. Also, the sleepiness was related to marital status and life quality was related to monthly income, disease, marital status and type of insurance ( $P<0.05$ ). This study showed that sleep quality is not suitable among nurses. Also, in this study the sleep pattern was related to quality of life, so lack of enough and suitable sleep will affected the quality of life, in turn, provided health care by nurses to patients and attendance would not be fair. Correcting and modification the sleep quality among nurses is very important.

**Key words:** Sleep Quality, Nurses, shifts.

### INTRODUCTION

There is consensus amongst researchers on the adverse psychological and physiological effects of night rotations on nurses when compared with their permanent night duty peers(1) Shift work is described as any work regularly performed at the time out of the day work time (2, 3). The results of researches have indicated that sleep disorder is the major complain among the staff working at industrial, hygiene, and medical environments based on a shift work system( 2,4). Paying attention to sleep quality and sleep efficiency is very important to increase job quality especially among nurses. Breslau et al. have stated that sleeplessness is the most important indicator for depression and one who has not the depression history but has a sleeplessness history is tow time more frequent in risk of depression in future(5). This shows the importance of sleeping. About nurses, it has more importance because they suffer from job stresses and long night shift times, more over the nurses' health affect the patient health and recovery. Sleep quality can show sleeplessness and it can affect people physically and mentally, consequently it affects the quality of life and finally it can lead in depression (6). So, recognizing the related factors is necessary to consider the importance of nurses' health (especially mental health). In order to keep mental balance, person needs sleeping. sleeping disorder is considered as a psychosocial disease(7). Sleeping is a returnable condition which is

signified by decreasing of awareness and interaction with the surroundings, decline of movements and muscles activities, and the absolute or relative pause in voluntary behaviors(8). Most of the people don't pay attention to sleeping unless they involve the problems of sleeplessness. Generally Sleeplessness caused a broad sleepiness during the day which can affect the behavior, awareness, memory, security and daily activities of a person (9).

Sleep patterns derived from effects of tow process which are called circadian (a period of 24 hours) and homeostatic such as night sleeping adequacy (sleeping quantity), mental quality of sleeping and the daily sleepiness(10). Alternative shift and night working is a risk for the medical care group and also for the health of patients. The errors of surgeons at night shifts is 20% higher than the others (11). Also the medicine mistakes is more frequent at night shifts than day shifts(12). Parker et al. stated that inadequacy in quality and quantity of night sleeping and daily sleepiness affect the consequences, processes and the results of medical care (13). Physicians, nurses, midwives and other clinical staff offer their services based on a 24-hour system. Studies demonstrated that shift-working in medical centers is more frequent than in other workplaces. Hence, a large number of work forces may influence by the problems caused by shift working in the medical centers(2).

Previous studies about nursing staff have showed that they had been 66% sleeping disorder, 55% sleeping pauses, 37% main sleeping less than six hours and 68% feeling bored after waking up (14). The man spend one-third of his life in sleeping and more than 30% of people suffered od sleep disturbances, the it said that sleep disorders is the most common of psychologic problems(15). In surgeons with night shift working duty, the surgical errors are higher than ordinal duty shifts and medication errors are higher in night shift-working staff(16). Venuta et al. have showed that change of shifts prevent sleeping disorders and restrict the change of biological rhythms. Adaptation to night shifts needs accurate sleeping accustoms, doing exercises, change of life style, family support and suitable planning of alternative shifts by managers (17).

When a person feels happy and doesn't suffer from any kind of illness, has much energy to take care of him. When someone can take care of himself well, he is healthier and consequently he has a high life quality (18). It is obvious that there is an interaction between illness and the quality of life and physical disorders can directly affect all the aspects of life(19).Night duty rotations are common practice in nursing, and particularly in specialist units. It is essential that nurses working in these environments are able to maintain careful and astute observation of their vulnerable patients, and concern arises when they may be unable to do so. Research suggests that fatigue can negatively affect nurses' health, quality of performance, safety and thus patient care, and that the effects of fatigue may be exacerbated for nurses over 40 years of age(1).

The purpose of the present study was to evaluate the sleep quality in nurses working in different shifts at major hospitals of Zahedan University of Medical Science.

## MATERIALS AND METHODS

This research was conducted as a cross-sectional study for the purpose of examining nurses' sleep quality working in different shifts at major hospitals of Zahedan University of Medical Science. The research population was comprised of nurses and the research was conducted with a total of 299 nurses. A Personal Information Form, developed by the researchers based on information in the literature, and the Pittsburgh Sleep Quality Index (PSQI). Every subject was given a self-administered questionnaire. An information form is used which consisted of demographic variables and work condition. Pittsburg sleep quality index for evaluating of night sleep quality and the sleepiness scale of Epworth is used for measuring the daily sleepiness. In questionnaires of PSQI, the scores are from 0 to 30 for each item and if the total score is more than 4, it means that the person doesn't have a good sleep quality. In Epworth scale of sleepiness getting fewer than 10 showed the lack of sleepiness; from 10 to 18 indicated sleepiness and more than 18 showed the intensive sleepiness. So, increased scores of night sleep and daily sleepiness indicated to poor quality of them. Reliability of PSQI was significant and sleepiness scale of Epworth has been confirmed in Iran by previous studies. Participation was entirely voluntary. Nurses who disagreed, were not studied. Data were collected during four months in 2011-2012. Data were collected during four months in 2011-2012. Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) for Windows Version 17. Descriptive analyses used means and standard deviations, frequency and percentage according to the level of the variable. Significant level was considered 5%.

## RESULTS

In this study 66 men (22.1%) and 233 women (77.9%) with mean age of  $31.6 \pm 6.6$  years have been studied. The mean of work experience was  $7.55 \pm 6.8$  years. Table 1 show the information about life and sleep quality in nurses. In this study most of the nurses (46/6%) were 20 to 29 years old and 65% were married. Most of the nurses (45.5%)

had less than four years' work experience. The findings showed that 51 nurses (17.1%) had suitable night sleep and 248 nurses (82.9%) had unsuitable night sleep. 221 nurses (73/9%) were not sleepy, 75 nurses (25.1%) were sleepy and three nurses (3%) were highly sleepy. In sleep quality some other variables were studied which have been shown in table 2. Spearman Correlation Coefficient test showed that there is a significant correlation between the life quality and night sleep ( $r = -0.572$ ,  $P = 0.001$ ) and also day sleep ( $r = -0.246$ ,  $P = 0.001$ ). The k square test has also showed a significant correlation between the life quality and night sleep ( $P = 0.03$ ). It means that, nurses who had a lower quality of life their night sleep was also unsuitable. The sleepiness case was the same.

In this study chi-square test didn't show any significant relationship between gender and the night sleep quality. Based on the Mann-Whitney test had a significant statistical difference ( $p = 0.015$ ). The female nurses' condition was unsuitable and the average night sleep score of men and women was as follow: 11/5  $\pm$  6/6, 7/66  $\pm$  4/1. In this study there was also a significant relationship between the age and night sleep ( $P = 0.016$ ). The nurses who were more than 40 years old had a rather suitable sleep quality in comparison to the younger nurses. It means that the younger nurses had a worse condition. Using chi-square test, it is observed that there is no significant relationship between the marital statuses and the night and day sleep pattern.

The findings showed that the average of day sleep or sleepiness is as follow: 7/57  $\pm$  4, 7/77  $\pm$  3/6. The Kruskal-Wallis test is a nonparametric (distribution free) test, which is used to compare three or more groups of sample data. The Kruskal-Wallis test showed that the marital status is related to night and day sleep pattern ( $p = 0.01$ ). The Mann-Whitney test showed that this difference in night sleep is between the divorced group and single or married group ( $P = 0.05$ ) and in day sleep (sleepiness) between the widow group and single or married group ( $P = 0.05$ ) according the scores the divorced and widow group didn't have a suitable situation.

Considering the income and sleep pattern, it was observed that there was a significant relationship between the night sleep and the amount of income ( $P = 0.35$ ). There was no correlation between the amount of income and sleepiness ( $P > 0.05$ ).

However the night and sleepiness scores in some group according to their work history were higher and nurses with work history of more than 15 years had a worse situation of night and day sleep than those with low work history. But the Kruskal Wallis test showed no correlation between work history ( $P = 0.1$ ) and night sleep pattern ( $P = 0.4$ ) and day sleep pattern ( $p > 0.05$ ). This study showed that there is no significant relationship between the on call time and the night and day sleep pattern ( $P > 0.05$ ). Also the relationship between the insurance situations with the night sleep pattern was significant ( $0/03$ ). The relationship between the number of children and night sleep and sleepiness was not significant ( $P = 0.05$ ).

## DISCUSSION

This study showed that just 51 nurses (17/1%) have a suitable night sleep and 75 nurses (25/1%) suffered of sleepiness. According to these results nurses did have a good sleep quality so the heads should find the reasons and try to solve the problems because if the nurses don't have a good sleep quality, their life quality will be affected and vice versa consequently can't do his job well. It is noticeable that in some studies sleep is one of aspects of life quality.

Furthermore this study showed that more than 22.4 % nurses sleep late and 21.7 % of nurses spent more than 60 minutes in bed to sleep and about 26.4 % of nurses waked up late and also more than 80 % of nurses have mentioned that their main sleep was less than six hours. Normal aging is accompanied by sleep pattern changes that may result in daytime sleepiness and affect the quality of life in older adults. These changes also can signal more serious sleep problems, which become more prevalent with aging (20). The result of this study was close to the result of previous research which has been done in USA, but it is different from the previous research which has been done in Zanzan(21). The situation of sleeping and waking up in this group is better and the main sleep of this group is worse than that group and most of the nurses don't have a main sleep. In this research, Mann-Whitney test has shown a significant relationship between gender and night sleep quality. According to averages female nurses had a worse situation; probably the reasons are: physical problems, family problems, take caring children and being more stressful than men. This result is not related to the result of Zanzan study(21) but it is close to the result of the previous study in Japan.

In this study the nurses who were older than 40 had a better sleep pattern than younger nurses which probably is due to the mind business in young nurses. This result is close to the result of a study which has been done in Australia(22). Using Kruskal-Wallis test, it has seen that the marital status is related to the night and day sleep pattern. These results are close to the result of previous research in Zanzan(21).

Considering the relationship of work history and the time of shifts with the night and day sleep pattern, there was not any significant relationship between the work history of nurses and the night and day sleep pattern. This result is not same as the result of another study which has been done in Japan. It seems that what affected the sleep pattern of nurses is not the work experiences or the time of their shifts but it is the conditions which govern the time and affect the sleep pattern. These conditions may be better or worse than before for any reason. This result is not same as the result of the study which has been done in Zanjan (21). However, some research showed that rapid changes of shifts prevent sleeping disorders and restricts the change of biological rhythms (22). Adaptation to night shifts needs accurate sleeping accustoms exercises, change of life style, family support and suitable planning of alternative shifts by managers (21). This result is close to the result of some other studies which has been done in Spain(23), Japan(24) and Australia(22). This study showed that there is a significant statistics relationship between the night sleep quality and illness. Obviously, an ill person doesn't have a high quality of life and definitely doesn't have a high quality of night sleep. It seems that illness restrict the main sleep in nurses. So it is better to reform the time and amount of shifts about these nurses and they should receive more attention.

Although in this study there was not a relationship between the night shift duration and sleep pattern (probably due to some interferers), most of the studies showed this relationship. So it is better to plan nurses' shifts in a way that they don't have sleep shortage. Some nurses have to spend long hours in night shifts and change their sleep pattern because of economical reasons. Hence, we suggest that nurses should pay attention to this problem and the managers should concern their problem and try to resolve it. It seems that everything that affect the sleep pattern of nurses can affect their life quality and vise versa, so it is possible to reform the sleep pattern by planning and scheduling the working shift in a good manner and recruit more nurses as human resources. Considering the fact that the life quality is related to sleep quality (although some variables are related to sleep quality), so reformation and modification of each one can help to providing good services by nurses. Generally most of the nurses have some problems in night sleep, so a good planning and scheduling for shifts and improving the life quality will be useful to improve the sleep quality in hardworking nurses.

**Table1: Mean median, mod and standard deviation of some quality variables about nurses**

Variables / significant	The time lasted to sleep	The wake up time	duration of main sleep	Life quality	Night sleep	Day sleep
Average	35/87	6/36	5/45	106/31	11/12	7/77
Standard deviation	32/63	1/33	1/49	19/88	6/55	3/96
mode	30	6	6	106	11	6
median	30	6	6	105	11	7

**Table 2: distribution of sleeping time frequency, the time needed to sleep, waking up time and main sleep in nurses who are employed at Zahedan University of Medical Science**

Considering variables		Frequency	Frequency percent
The sleeping time	Before 12 o'clock	226	77/1
	1 – 2 o'clock	58	19/8
	After 2 o'clock	9	3/1
The time needed to sleep	Less than 14 minute	66	22/3
	15-29 minutes	43	14/5
	30-59 minutes	122	41/2
	More than 60 minutes	65	22
Waking up time	Before 6 o'clock	217	73/3
	6- 9 o'clock	61	26/6
	9-12 o'clock	18	6/1
The main sleep duration	less than 3 hours	30	10/2
	3-6 hours	202	68/9
	6-9 hours	61	20/8

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