Other

Sleep Disorders and Fatigue in Mongolian Nurses

Davaakhuu Vandannyam[1] , Buyanjargal Pagva[2] , Amarsaikhan Dashtseren[3] ,
Altantsetseg Togoo[4] , Tserendagva Dalkh[5]

1） Department of Adult Nursing School, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia;

2） Kansai University of Nursing and Health Sciences, Japan;

3） Graduate training center, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia;

4） Fifth Health Sector Development Project, ADB;

5） Traditional Medicine Institute, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia.

Objectives: Study aims to survey a sleep and fatigue assessment among nurses.

Design: Cross-sectional study

Results: The difference between day time working nurses and the shift working nurses and compared their insomnia detected by not clinically significant insomnia（34.7% and 19.6%）, Sub-threshold insomnia（38.2% and 45.1%）, Clinical insomnia（moderate severity）（24.0% and 31.8%）, Clinical insomnia（severe）（3.1% and 3.5%）, sleepiness are normal（60.3% and 49.9%）, average（17.0% and 18.9%）, Seek the advice of a sleep specialist without delay（22.7% and 31.2%）, stress to determine from low to moderate chance of becoming ill in the near future（20.9% and 30.6%）, from moderate to high（37.5% and 31.5%）, a high or very high risk（41.6% and 37.9%）（p<0.033）.

Conclusion: The nurses who are too sleepy（sleepiness）（p = 0.002）, and insomnia（p = 0.032）, stress（p = 0.033）, rest legs syndrome（p = 0.017）, and fatigue（p = 0.017）to create impact during of day time work hours and shift.

Keywords: Sleep disorders, Nurses, Shift work, Stress, Fatigue

Introduction

World's rapid development related to electricity power used for daytime work hours has been changed in other words extended to 24 hours of work operation. Nursing is of the professions operates 24 hours daily. When biology time has changed human adaptation to changes in biological time after feeding time and sleep timer self-regulated complex（Parent-Thirion A, Fernandez Macias E, Hurley J, Vermeylen G. 2007）. Human body system is leading biology time and adapted to new time zone. This process is time to re-adapt to the rhythm of progress and is the ability to adapt to the time difference varies depending on the size.（Scott, A.J., & Ladou. J.（1990）. Monk, T. H., Folkard. S., & Wedderburn, A. A. I（1996）. Chandrawanshi, Pati（2000）Chandrawanshi, Pati（2000）, the biological rhythms has been changed adaption to the real situation examines changes in work hours. Negative affection affect to human body when you work in shift such as

fatigue, poor health, working process and safety. In 2011, Williamson research team discovered shift operation is increased somewhat slowed to the continuing decrease in the ability to work, sleep regularly creates stress that the bear is considered. In 2000, Rosa's research report says insomnia increases caused by human resource, not enough break time, 12 hours of nonstop work and busy work. Korean research report says 27% of nurses made mistakes last 6 months during their work, most important statistic is shift nurses are making mistakes more than regular daily nurse（Young-Mi Park, souk Young Kim. 2013）. Sequential shift employees（1/3）work too much and sleeps unregularly. Besides, 19% of night shift and 12% of day shift employees sleeps unregularly. Other research reports says 19% of sequential shift, 9% of night shift and 8% of day shift employees are related with injuries while working（Ohayon MM, Lemoine P, Arnaud-Briant V. 2002）. Like other living organisms, humans have body rhythms which are regulated by a 'circadian clock' in the brain. Over a 24-hour period, the circadian clock regulates sleep/awake patterns, body temperature, hormone levels, digestion and many other functions（ACTU 2000）. In Mongolia, 5500 out of 10948 nurses work in sequential and night shift（Health report from Mongolia in 2014）. Mongolian night shift nurses work 16 to 24 hours in every work shift. Present study aimed to compare degree of insomnia, sleepiness, fatigue and stress between daily and shift work nurses.

Methods
Place and Period of Investigation

The first investigation period was from July 2013 to December 2013（period 1）included 15 hospitals of Ulaanbaatar.
The second investigation period was from December 2013 to June 2014（period 2）included 9 regional hospitals.

Subject of investigation

At 15 hospitals in Ulaanbaatar city: 201 daily working nurses and 198 shiftwork nurses for period 1. At 9 regional hospitals: 116 daily working nurses and 119 shiftwork nurses for period 2.

Data Collection and Analysis

The prevalence of insomnia, sleepiness, fatigue, stress among nurses were assessed by a cross sectional analytical study. Health care facilities which operate in Ulaanbaatar and other regions with the mandate to provide secondary and tertiary level health care services were included in the study. Secondary and tertiary level health care organizations in UB and other regions were selected randomly for this survey.

Using quantitative method specially developed standard questionnaires, the survey for identifying insomnia, sleepiness, fatigue, stress were made and distributed to the nurses. Evaluation of sleep apnea has been done with: "The Holmes And Rahe Stress Scale", "The Epworth Sleepiness Scale", "The Insomnia Severity Index", "The Fatigue Severity Scale", "Restless Legs Syndrome Rating Scale". This study followed ethical protocols, including obtain of written permission from participants and sharing information about the study to participants at the completion of the study. The questionnaire was completed within 35-40 minutes. Nurses selection was made consecutively, and clinical instruments for assessment were: "The Holmes And Rahe Stress Scale" "The Holmes And Rahe Stress Scale"（Thomas H. Holmes and Richard H. Rahe. 1967）, "The Epworth Sleepiness Scale"（Johns MW. 1991）, "The Insomnia Severity Index"（Morin CM; Belleville G; Bélanger L; Ivers H. 2011）, "The Fatigue Severity Scale" [（Krupp LB. 1989）, "Restless Legs Syndrome Rating Scale"（The International Restless Legs Syndrome Study Group. 2003）. Survey data include information SPSS 19.0

software error review, descriptive statistics, analysis, distribution. Basic characteristics of the study groups by their current night shift work status were compared with Student's t-test for the continuous, and chi-square test for the categorical variables. Logistic regression analyses showing the relationships between shift work duration and symptoms were performed using simple and multivariate models stratified by insomnia, sleepiness, fatigue and stress. For definition of symptoms, logistical analysis was made on nominal or categorical variables and estimated by the odds ratio (OR) and 95% confidence interval.

Ethical considerations

Mongolian National University of Medical Sciences and Medical Ethic Controlling Committee granted ethical permission during meeting 13-16/1Aon 24.05.2013. Each nurse signed on consent prior being involved in the study. The investigator maintained confidentiality of research data.

Results

According to a referral from a nurse in the survey that 2nd level of 51.3% of nurses working in health organizations are in shift, 48.7% are daytime nurse and 3rd level of nurses working in health organizations 47.2% are in shift, 52.8 works in day shift. 62.9% are from UB city, rest of them from local and their average ages 39.6 ± 0.42. When nurses were divided by department, stage and 2nd stage arterial HTN 1st was at a total of 20.4% for those in surgery, 19.0% in intensive care, 20.2% in internal medicine, 30.8% in neurology, 35.7% in traditional care, 19.7% in infant care, 20.7% in communicable disease care, 23.7% in pediatrics, 10.0% in oncology, and 12.5% in maternity. (Figure 1).

Figure 1. Nurses working department
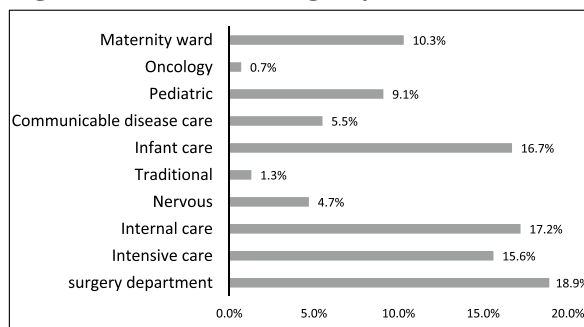
Surveyed a total of 317 nursing shifts, 3.8% 24/24 hours or 2 shifts, 18.9% 8/16/24 hours or 3 shifts and 66.9%, 8/16/48 hours or 4 shifts, and 9.1% 8/16/ 72 hours or 5 shifts and 1.3 percent of the other time schedule is done by shift work (p<0.0001) (figure 2).

Figure 2. Shift working Nurses working schedule
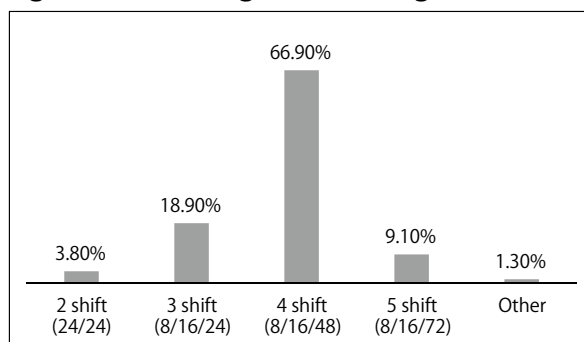
Survey shows shift and day time nurses' working time, 84.9% of nurses work 16 hours, 13.6% work for 24 hours and 1.5% work for other hours (p=0.0001) (figure 3).

Figure 3. Shift nurses working time duration
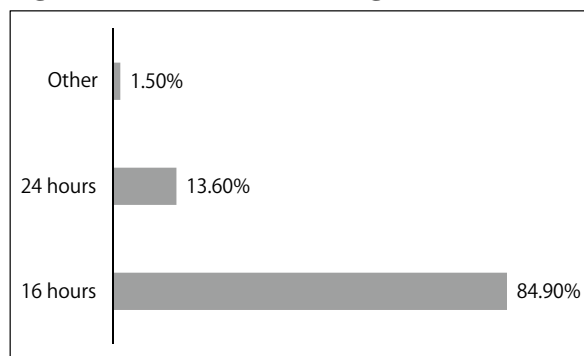
Shift nurses' working hours which lasts for 16-24 hours have to get rest after work. Their vacation time, some of the factors that are

amortized using the questionnaire study 98% of shift exchange time is 30 minutes to 1,5 hour but 59,1% of this amount of time never counts work hours. 75.4% of shift nurses called back to work when they have off duty（p=0.0001）.

Survey indicates 74.8% of nurses, 65.9% of shift nurses are satisfied with their working hours and job. Shift nurses with nurses are dissatisfied with the work and working time is statistically reliable high（p<0.0001）.

Shift nurses' 27.4% has less than 12 hours rest between the turn and shift but sometimes sleep 32.8 percent and 7.6 percent responded that they cannot relax.

We did research about shift-work nurse in the delivery, depending on the workload and the stress of professional mistakes during the work. 24.4% of the day-shift, 28.4% of the shift-work' nurses makes mistakes during workload.

Comparing only day-shift nurses and shift-work nurses, insomnia was detected as not clinically significant insomnia（34.7% and 19.6%）, Sub-threshold insomnia（38.2% and 45.1%）, Clinical insomnia（moderate severity）（24.0% and 31.8%), Clinical insomnia（severe）（3.1% and 3.5%）（p=0.032）, sleepiness are normal（60.3% and 49.9%）, average（17.0% and 18.9%）, seek the advice of a sleepiness specialist without delay （22.7% and 31.2%）（p=0.002）. Shift nurses have higher occurrences of insomnia and sleepiness than only day-shift nurses（Table 1）.

Table 1. Insomnia and sleepiness of all nurses

Indices	Total		Day- shift		Shift-work	
	N	%	n	%	n	%
Epworth Sleepiness Scale					p=0.002	
sleepiness are normal	346	54.6%	191	60.3%	155	49.9%
average	114	18.0%	54	17.0%	60	18.9%
Seek the advice of a sleep specialist without delay	174	27.4%	72	22.7%	102	32.2%
Insomnia Severity Index					p=0.032	
No clinically significant insomnia	172	27.1%	110	34.7%	62	19.6%
Sub-threshold insomnia	264	41.6%	121	38.2%	143	45.1%
Clinical insomnia (moderate severity)	177	27.9%	76	24.0%	101	31.9%
Clinical insomnia (severe)	21	3.3%	10	3.2%	11	3.5%

Nurses were divided into two groups（shift and only day shift）and compared their stress to determine a low to moderate chance of becoming ill in the near future（20.9% and 30.6%）, a moderate to high chance of becoming ill in the near future（37.5% and 31.5%）, a high or very risky of becoming ill in the near future（41.6% and 37.9%）（p<0.033）（Table 2）.

Table 2. Fatigue and stress all nurses

Indices						
	Total		Day-shift		Shift-work	
Fatigue Severity Scale					p< 0.013	
No fatigue	345	54.4%	188	59.3%	157	49.5%
Need further evaluation by a physician.	289	45.6%	129	40.7%	160	50.5%
Holmes And Rahe Stress Scale					p<0.033	
a low to moderate chance of becoming ill in the near future	163	25.7%	66	30.6%	97	20.9%
A moderate to high chance of becoming ill in the near future	219	34.5%	119	31.5%	100	37.5%
a high or very risk of becoming ill in the near future	252	39.7%	132	37.9%	120	41.6%

Comparing shift-work nurses with only day-shift nurses, insomnia was detected as fatigue （50.5% and 40.7%）（p = 0.013）. Work schedules and long work hours and fatigue examining the relationship of fatigue working hours p <0.013, length of working hours p <0.002 confirmed a statistical relevance（Table 2）. By multivariate logistical regression analysis, long work hours insomnia（OR=1.2 [95% Cl:0.9-2.4]）, sleepiness （OR=1.6 [95% Cl:1.05-2.6]）, fatigue（OR=1.08 [95% Cl:0.9-1.9]）rest legs syndrome（OR=1.08 [95% Cl:0.8-1.7]）or stress（OR=1.05 [95% Cl:0.7-1.1]）are those symptoms for increased shift work nurses health（Table 3）.

Table 3. Logistic regression between hypertension and risk factors

Indication	p	OR	95%CI	
			Highest	Lowest
Insomnia	0.024	1.292	0.938	2.457
Sleepiness	0.013	1.626	1.052	2.617
Fatigue	0.018	1.083	0.958	1.911
Rest legs syndrome	0.05	1.083	0.830	1.729
Stress	0.00	1.057	0.750	1.125

Discussion

On the survey, we involved total in 634 nurses and according to affect of health of shift work among nurses sleepiness, insomnia, fatigue and stress levels studied. In recent years, the biological rhythms of the human body is lost sleep over a long period of deceleration, immune weakness, as the biological clock rhythm disturbance caused by a shift has been widely discussed. According to the nurse of 16 countries representing 4 continents shift schedules and working hours instead of 6-shift nurse in Asia continued for 8-10 hours, 6-shift nurses 'time continued to work 9-12 hours in Europe, America and Australia continents in 3-shift nurses' working hours is a continuation of 7-8 hours（Naranchimeg S. 2006）. Our study shows 3.8% of nurses work in 24/24 hours or shifts, 18.9% in 8/16/24 hours or 3 shifts and 66.9% in 8/16/48 hours or 4 shifts, and 9.1% in 8/16/72 hours or 5 shifts and 1.3% work for non-fixed schedule. 1 shift continues for 16 hours and they took 84.9% and 13.6% work for 24 hours and 1.5% work for any alternate times. A shift in the Mongolian-shift nurse's shift lasts for 16-24 hours at average duration of annual working hours of nurses from other countries are working more than 4-16 hours. China, Great Britain, Latvia, the United States, Australia and the Philippines from 8-16 hours, Belgium, Kazakhstan, Hungary, Poland from 4-12 hours long shift on the role of a nurse. Turn off the morning shift nurses' days exchange and spend an average of 30 minutes to 1 hour and 30 minutes, this time shift work affects the crease. In the sense hours spent at a work place（59.1%）are not considered.

Elizabeth E. Devore, a surveyer of shift workers, 15% of female workers, male workers reach the middle of the night to sleep 45%, 20% and 37% of men did not sleep at night set. Our survey, 27.2 percent of nurses, nursing shifts to 35.4 percent in trouble sleeping and it is for all women because she covered Devore of studies is relatively high（Elizabeth E. Devore, Francine Grodstein, and Eva s. Schernhammer. 2013）. Maria Fagerbakke Eldevik, Norwegian study among nurses and nurses last year, from 1-30 times a shift, more than 30 times a shift away from creating a group of ultra-3 with sleep detection（ESS）and fatigue detection using a standard questionnaire survey. In the study, 18.8% of nurses, a nurse from 1-30 times a shift 28.1%, more than 30 times a shift nurses from 30.9% reported to be too sleepy, but fatigue according to 35.5% of nurses 1-30 times the day shift nurse from 37.2%, more than 30 times a shift in 43.4% of the nurses confirmed that disturbing（Maria Fagerbakke Eldevik, Elisabeth Flo, Bente Elisabeth Moen, Stale Pallesen. 2013）.

Our study of 102 nursing shifts（32.2%）, a nurse working at the date of 72（22.7%）were found to sleepiness, but fatigue to be analyzed（day-shift 40.7%, shift-work 50.5 percent,（p = 0.013）, with Maria Fagerbakke Eldevik. This schedule and long hours of work, sleepiness and insomnia length of working hours to examine the confirmed a statistically relevant for our study and other studies out of the shift is related to the duration of working hours 16-24 hours relationship（p<0.002）.

Our study was a cross-sectional observational study, which confirmed that shift nurses have a higher prevalence of insomnia, sleepiness, fatigue and stress. However, there are some study limitations. First, as the study was cross-sectional in design, it is difficult to conclude that the relationship between shift work and insomnia, sleepiness, fatigue and stress. A longitudinal study would be needed to support causation. Second, nurses not currently performing shift work might be misclassified because they had not provided any information about past shift work experience. Finally, shift work exposures at multiple aspects, such as frequency of night shifts, duration of each shifts, speed and direction of shift rotation, were not collected in the

current study. Accordingly, further studies will be needed to assess the relationships of different kinds of schedules and duration of shift work as insomnia, sleepiness, fatigue and stress.

Conclusion

The duration of working hours and shift work nurses are too sleepy（sleepiness）（p = 0.002）, and insomnia（p = 0.032）, stress（p = 0.033）, rest legs syndrome（p = 0.017）, and fatigue（p = 0.017）to create impact.

Conflict of Interest

The authors declared no conflict of interest

Acknowledgments

Reference

ACTU Health and safety guidelines for shift work and extended for shift work and extended working hours. Melbourne 3000. September.2000; 3

Chandrawanshi A and Pati A K. 2000 Could Externally desynchronized Circadian Rhythm be resynchronized in Shift Workers? Biological Rhythm Research, 2000, Vol 31, No. 2, PP: 160 176

Elizabeth E. Devore, Francine Grodstein, and Eva s. Schernhammer. Shift Work and Cognition in the Nurses' Health Study. American Journal of Epidemiology. 2013; Vol.178, №. 8: 1296-1300

Krupp LB. The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematous. Arch Neurol. 1989; 46:1121–3. [PubMed]

Johns MW. A new method for measuring daytime sleepiness, The Epworth Sleepiness Scale. Sleep.1991; 14:540–545. [PubMed]

Maria Fagerbakke Eldevik, Elisabeth Flo, Bente Elisabeth Moen, Stale Pallesen. Insomnia, Excessive Sleepiness, Excessive Fatigue, Anxiety, Depression and Shift Work Disorder in Nurses Having Less than 11 hours in-Between shifts. 2013. Plos One 8（8）:e70882. doi:10.1371/journal.pone0070882.

Monk, T. H., Folkard. S., & Wedderburn, A. A. I（1996）. Maintaining safety and high performance on shiftwork. Applied Ergonomics, 27. 17-23

Morin CM; Belleville G; Bélanger L; Ivers H. The insomnia severity index: psychometric indicators to detect insomnia cases and evaluate treatment response. SLEEP 2011; 34（5）:601-608.

Naranchimeg S. Nursing Shortage in Mongolia. Yonsei university 100 anniversary International conference. 2006.

Ohayon MM, Lemoine P, Arnaud-Briant V, et al. Prevalence and consequences of sleep disorder in a shift worker population. J Psychosom Res. 2002; 53:577-583

Parent-Thirion A, Fernandez Macias E, Hurley J, Vermeylen G. European Working Conditions Survey. Dublin: European Foundation for the Improvement of Living and Working Conditions; 2007; 23

Rosa RR, Bonnet MH. Reported chronic insomnia is independent of poor sleep as measured by electroencephalography. Psychosomatic Med 2000; 62:474-82

Scott, A.J., & Ladou. J.（1990）. Shiftwork: Effects on sleep and health with recommendations for medical surveillance and screening. In A.J. Scott（Ed.）, state of the Art reviews – Occupational Medicine, 5, 273-299

The International Restless Legs Syndrome Study Group. Validation of the International Restless Legs Syndrome Study Group Rating Scale for restless legs syndrome. Sleep Med 2003; 4（2）:121-132.

Thomas H. Holmes and Richard H. Rahe, Journal of Psychosomatic Research, Volume 11, Issue 2, August 1967, Pages 213-218,

Williamson A, Lombardi DA, Folkard S, Stutts J, Courtney TK, Connor JL. The link between fatigue and safety. Accid Anal Prev. 2011 Mar; 43（2）:498-515.

World Health Organization（WHO）. Health report in Mongolia. Ulaanbaatar, Mongolia; 2013. p.76.

Young-Mi Park, souk Young Kim. Impacts of Job stress and cognitive on Patient safety incidents among hospital nurses. Safety and Health at Work 4.2013:210-215