Other

Sleep Disorders and Fatigue in Mongolian Nurses

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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 that 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 irregularly. Besides, 19% of night shift and 12% of day shift employees sleeps irregularly. 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 shift work nurses for period 1. At 9 regional hospitals: 116 daily working nurses and 119 shift work 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).

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).

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).

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=0.001).

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).

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% CI:0.9-2.4]), sleepiness (OR=1.6 [95% CI:1.05-2.6]), fatigue (OR=1.08 [95% CI:0.9-1.9]) rest legs syndrome (OR=1.08 [95% CI:0.8-1.7]) or stress (OR=1.05 [95% CI:0.7-1.1]) are those symptoms for increased shift work nurses health (Table 3).

### Table 1. Insomnia and sleepiness of all nurses

<table>
<thead>
<tr>
<th>Indices</th>
<th>Total</th>
<th>Day-shift</th>
<th>Shift-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Epworth Sleepiness Scale</td>
<td>p&lt;0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sleepiness are normal</td>
<td>346</td>
<td>54.6%</td>
<td>91</td>
</tr>
<tr>
<td>average</td>
<td>174</td>
<td>18.0%</td>
<td>54</td>
</tr>
<tr>
<td>Seek the advice of a sleep specialist without delay</td>
<td>174</td>
<td>27.4%</td>
<td>72</td>
</tr>
<tr>
<td>Insomnia Severity Index</td>
<td>p&lt;0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No clinically significant insomnia</td>
<td>172</td>
<td>27.1%</td>
<td>70</td>
</tr>
<tr>
<td>Sub-threshold insomnia</td>
<td>264</td>
<td>41.6%</td>
<td>121</td>
</tr>
<tr>
<td>Clinical insomnia (moderate severity)</td>
<td>177</td>
<td>27.9%</td>
<td>76</td>
</tr>
<tr>
<td>Clinical insomnia (severe)</td>
<td>21</td>
<td>3.3%</td>
<td>10</td>
</tr>
</tbody>
</table>

### Table 2. Fatigue and stress all nurses

<table>
<thead>
<tr>
<th>Indices</th>
<th>Total</th>
<th>Day-shift</th>
<th>Shift-work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue Severity Scale</td>
<td>p&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No fatigue</td>
<td>345</td>
<td>54.4%</td>
<td>188</td>
</tr>
<tr>
<td>Need further evaluation by a physician</td>
<td>289</td>
<td>45.6%</td>
<td>129</td>
</tr>
<tr>
<td>Holmes And Rahe Stress Scale</td>
<td>p&lt;0.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a low to moderate chance of becoming ill in the near future</td>
<td>161</td>
<td>25.7%</td>
<td>66</td>
</tr>
<tr>
<td>A moderate to high chance of becoming ill in the near future</td>
<td>219</td>
<td>34.5%</td>
<td>119</td>
</tr>
<tr>
<td>a high or very risk of becoming ill in the near future</td>
<td>252</td>
<td>39.7%</td>
<td>132</td>
</tr>
</tbody>
</table>

### Table 3. Logistic regression between hypertension and risk factors

<table>
<thead>
<tr>
<th>Indication</th>
<th>p</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highest</td>
<td>Lowest</td>
<td></td>
</tr>
<tr>
<td>Insomnia</td>
<td>0.004</td>
<td>1.292</td>
<td>0.938</td>
</tr>
<tr>
<td>Sleepiness</td>
<td>0.013</td>
<td>1.626</td>
<td>1.052</td>
</tr>
<tr>
<td>Fatigue</td>
<td>0.018</td>
<td>1.083</td>
<td>0.919</td>
</tr>
<tr>
<td>Rest legs syndrome</td>
<td>0.05</td>
<td>1.083</td>
<td>0.830</td>
</tr>
<tr>
<td>Stress</td>
<td>0.00</td>
<td>1.017</td>
<td>0.708</td>
</tr>
</tbody>
</table>
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**
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**Reference**
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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.
Rosa RR, Bonnet MH. Reported chronic insomnia is independent of poor sleep as measured by electroencephalography. Psychosomatic Med 2000; 62:474-82


