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Gastrointestinal symptoms and sleep disturbance in female nurses

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ABSTRACT

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Sleep disturbance is a common symptom in the general population. An association between sleep disturbances and functional gastrointestinal (GI) disorders has been reported by several investigators. GI symptoms are more common among people with sleep disturbance in female nurses. To explore this issue further, a study using a cross sectional design was conducted to determine whether unexplained GI symptoms are more common in female nurses with self-reported sleep disturbance. This study was conducted from February through April 2007 in Hospital X in Central Jakarta. A total of 152 female nurses participated in this study. A questionnaire consisting mainly of items concerning sleep disturbance was distributed to the subjects. Significant associations were observed between gastrointestinal symptoms such as anorexia and constipation and sleep disturbance. Constipation was significantly more common in female nurses with sleep disturbance (prevalence ratio=6.1;95% C.I. 1.76 – 20.56), but the association between shift work and sleep disturbance was not statistically significant (prevalence ratio=1.67;95% C.I. 0.53-5.24). Both constipation and anorexia are more prevalent in female nurses with self-reported sleep disturbance. Further research to understand the associations between GI symptoms and sleep disturbance is warranted.

Keywords: Gastrointestinal symptoms, sleep disturbance, female nurses

INTRODUCTION

Sleep disturbance is a common symptom in the general population, with an estimated 50% or more of American adults experiencing one or more symptoms that indicate insomnia at least a few nights per week.[1] Insomnia, in turn, causes significant morbidity, as evidenced by the increased need for general medical and mental health treatment for emotional problems.[2] Conceivably, abdominal pain could be an etiology of sleep disturbance if it causes patients difficulty going to sleep or awakens them from sleep. Conversely, a specific sleep disturbance might lead to a functional gastrointestinal disturbance.[3] Gastrointestinal disease is

associated with shift work and insufficient sleep is often the reason for leaving shift work.[4] Shift workers commonly go to sleep when everybody else has woken up and started working. To adjust to this change may be a sufficiently severe problem for the shift worker. This results in sleep disturbance, such that shift work is usually associated sleep disturbance, which leads to disorders of the immune system, causing the shift worker to become susceptible to flu, rhinorrhea, or other health problems.

As many as 20 percent of workers in industrialized nations are shift workers in other words, people who work either at night or on rotating shifts.[5] Shift-work sleep disturbance, defined as a primary complaint of insomnia or excessive sleepiness temporally associated with a work period that occurs during the habitual sleep phase, has been diagnosed in as many as 10 percent of shift workers.[6] Shift workers overall appear to be at increased risk for peptic ulcer disease, coronary heart disease, insulin resistance, and the metabolic syndrome.[7-9]

Reports on the impact of shift work on health and well-being have shown a progressive increase and evolution over the years.[10] Shift work is frequently associated with gastrointestinal and cardiovascular disorders. Other complaints commonly occurring in shift workers with sleep disturbance are excessive sleep, insomnia, disturbed sleeping schedules, decreased performance, difficulties in interpersonal relations, and irritable moods or depression.

A cross-sectional study conducted by Ohida et al[11] in 11 Japanese hospitals in young female nurses found no significant association between the frequency of night shifts and sleep disturbance. Occupational sleep disturbance was defined as a complaint of insomnia or excessive sleep associated with work periods (usually at night), occurring during normal sleeping hours. The chief complaint in sleep disturbance is the feeling of unfreshness upon awakening and difficulty in staying awake in the post-shift period, particularly when the major sleep period starts in the morning between 06:00 and 8:00. The combination of decreased quality and quantity of sleep is associated with medical and social problems. Shift workers commonly suffer from gastrointestinal and cardiovascular disturbances.[12] and often report sleep-related syndromes such as chronic gastritis, gastroduodenitis, peptic ulcer and colitis.[13] A high proportion of shift workers are employed in the health care and transportation industries. To explore this issue a study was conducted to determine whether gastrointestinal symptoms and sleep disturbance are more common among female nurses.

METHODS

Research design

The study used a cross-sectional design and was conducted in Hospital X in Central Jakarta from February to April 2007.

Study subjects

All female nurses working in Hospital X who were willing to participate and agreed to give informed consent were included in the study.

Measurements

Assessment of sleep disturbance was performed with an instrument for sleep disturbance, comprising duration of sleep, dreaming, depth of sleep, time needed for falling asleep, waking during the night, time needed for going back to sleep, pattern of awakening in the morning, and feeling of being refreshed on awakening. Individuals categorized as having sleep disturbance were those with a score of over

8 – 22, out of a range of 8 – 33. Sleep disturbance was associated with shift work, age, occupation, and gastrointestinal disorders.

Data analysis

Data were processed by means of the SPSS for Windows version 10 and STATA version 6.0. Logistic regression analysis was used for determining an association between various risk factors for sleep disturbance, with significance level set at p=0.05.

RESULTS

The participants in this study were 152 in number, with minimum age of 22 years (3.9%) and maximum age of 55 years (0.7%). As to marital status, 61 subjects were single (40.1%) whilst 91 subjects were married (59.9%).

Table 1 shows that the majority of nurses were under 35 years of age (79%) and that age group, marital status, work station, and work shift did not constitute risk factors for the occurrence of sleep disturbance.

Among the risk factors listed in Table 2, the univariate risk factors causing sleep disturbance were anorexia and constipation, which significantly caused sleep disturbance. Anorexia resulted in a five-fold increase in the risk of sleep disturbance, compared with nurses without anorexia (PR 5; 95% CI = 1.90 – 13.13). In nurses with constipation there was a seven-fold increase in the risk of sleep disturbance, compared with nurses without constipation (PR 7.12; 95% CI = 2.22 – 22.80). Both factors were subsequently subjected to multivariate analysis using the ENTER method of logistic regression, of which the results are presented in Table 3.

From Table 3 above it is evident that anorexia and constipation were risk factors for sleep disturbance. Anorexia caused a four-fold increase in the risk of sleep disturbance, compared with the nurses without anorexia (PR 4.37; 95% CI = 1.59 – 12.07). In nurses with constipation there was a six-fold increase in the risk of sleep disturbance, compared with the nurses without constipation (PR 6.01; 95% CI = 1.76 –20.56)

Table 1. Characteristics of subjects and risk of sleep disturbance

Risk factor	Sleep disturbance		Total 152	Odds Ratio	95% Confidence Interval
	Present (n = 24)	Absent (n = 128)			
Age group					
≤35 years	23	98	121	1.00*	Reference group
> 35 years	1	30	31	0.14	0.18 – 1.09
Marital Status					
Single	12	49	61	1.00*	Reference group
Married	12	79	91	0.62	0.26 – 1.49
Job					
Outpatient clinic	2	17	19	1.00*	Reference group
ICU/Operating	2	23	25	0.74	0.09 – 5.79
Room					
Inpatient ward	20	88	108	1.93	0.41 – 9.04
Work shift					
No	4	32	36	1.00*	Reference group
Yes	20	96	116	1.67*	0.53 – 5.24

*Reference group

Table 2. Gastrointestinal disorder and risk of sleep disturbance

Risk factor	Sleep disturbance		Total	Prevalence ratio	95% Confidence Interval
	Present (n = 24)	Absent (n = 128)			
Anorexia					
No	14	112	126	1.00*	Reference group
Yes	10	16	26	5	1.90 – 13.13
Diarrhea					
No	22	119	141	1.00*	Reference group
Yes	2	9	11	1.20	0.24 – 5.94
Constipation					
No	17	121	138	1.00*	Reference group
Yes	7	7	14	7.12	2.22 – 22.80
Nausea/Vomiting					
No	17	105	122	1.00*	Reference group
Yes	7	23	30	1.88	0.70 – 5.05
Abdominal distention					
No	16	91	107	1.00*	Reference group
Yes	8	37	45	1.23	0.48 – 3.11
Epigastric pain					
No	15	96	111	1.00*	Reference group
Yes	9	32	41	1.80	0.72 – 4.51
Eructation					
No	14	69	83	1.00*	Reference group
Yes	10	59	69	0.83	0.34 – 2.01

*Reference group

DISCUSSION

A total of 24 or 26.18% out of 152 nurses suffered from sleep disturbance. A similar prevalence was found by Ohayon et al. in that more night-shift workers had difficulty in falling asleep, compared with non-shift workers (20.1% : 12.0%). In Ohayon's study it was found that workers on night-shift had a shorter duration of sleep than those not on shifts.[14]

Table 3. Final model of risk factors of sleep disturbance

Risk factor	Sleep disturbance		Total 152	Prevalence ratio	95% Confidence Interval
	Present (n = 24)	Absent (n = 128)			
Anorexia					
No	14	112	126	1.00*	Reference group
Yes	10	16	26	4.37	1.59 – 12.07
Constipation					
No	17	121	138	1.00*	Reference group
Yes	7	7	14	6.01	1.76 – 20.56

*Reference group

The National Sleep Foundation has defined insomnia as any of the following: difficulty falling asleep, waking a lot during the night, waking too early with inability to get back to sleep, or waking up feeling unrefreshed.[1]

In the present study shift work was not a risk factor for the occurrence of sleep disturbance, although 26.18% of shift workers had sleep disturbance. The evidence points to anorexia and constipation as risk factors for sleep disturbance. Anorexia caused an increase of 4.37 times in the risk of sleep disturbance, whereas constipation resulted in an increase of 6.01 times in the risk of sleep disturbance. Uniquely, sleep disturbance in turn caused an increase of 7.12 times in the risk of anorexia and a five-fold increase in the risk of constipation, compared with those without sleep disturbance. Thus it is apparent that sleep disturbance increases the risk of anorexia and constipation, and vice versa. This may be due to the fact that individuals suffering from daily sleep disturbance do not pay attention to their diet, whilst persons with anorexia and constipation become anxious at sleeping time, thus disturbing their sleep.

In the present study age, marital status, occupation, work shift, diarrhea, nausea/ vomiting, abdominal distention, epigastric pain, and eructation were not risk factors for sleep disturbance. That work shift was not a risk factor for sleep disturbance may be due to the fact that the majority of nurses working on shifts were accustomed to shift work and thus did not suffer from sleeping problems. The study by Chung et al. showed that disturbance in sleep quality was not caused by shift schedule or pattern, but by "morningness" or "eveningness" in relation to sleeping times.[15]

The study conducted by Chan[16] in 163 nurses demonstrated that more than 70% of the nurses had sleep disturbance, with older age and gastrointestinal disorders being risk factors for sleep disturbance. Around 79.6% of the nurses were under 35 years of age and 19% of these had sleep disturbance, whereas among the 31 nurses in the age group over 35 years only one had sleep disturbance, because most of these older nurses were not on shift work; 63.2% of them worked at the outpatient clinic without night shifts.

Similar results were obtained by Sivertsen et al using a historical cohort design, where the results showed that sleep disturbance was associated with somatic diagnoses and somatic symptoms.[17] There are several limitations in the present study, as assessment of sleep disturbance was obtained by self-report rather than clinical diagnosis, and as the instrument did not include an item on duration of sleep disturbance. The absence of the duration criterion may have reduced the specificity of the measurements and thus underestimated the true association. Self-report instruments are prone to error and residual confounding cannot be ruled out.

CONCLUSION

The present study on the relationship between gastrointestinal symptoms and sleep disturbance provided evidence of an association in female nurses between anorexia and constipation on the one hand and sleep disturbance on the other hand. To determine which of them is the cause and which the result, or whether they contribute to each other, future studies should be focussed on intervention by treatment of gastrointestinal symptoms.

REFERENCES

1. National Sleep Foundation. Sleep in America Poll. Washington, DC. Available at: http://www.sleepfoundation.org/2003poll.cfm. Accessed August 1, 2009.
2. Vege SS, Richard Locke III G, Weaver AL, Farmer SA, Joseph Melton III L, Talley NJ. Functional gastrointestinal disorders among people with sleep

disturbances: a population-based study. Mayo Clin Proc 2004;79:1501-6.
3. Fass R, Fullerton S, Tung S, Mayer EA. Sleep disturbances in clinic patients with functional bowel disorders. Am J Gastroenterol 2000;95:1195-200.
4. Akerstedt T. Shift work and disturbed sleep/ wakefulness. Occup Med 2003;53:89–94.
5. Basner RC. Shift-work sleep disorder the glass is more than half empty. N Engl J Med 2005;353:353-5.
6. Drake CL, Roehrs T, Richardson G, Walsh JK, Roth T. Shift work sleep disorder: prevalence and consequences beyond that of symptomatic day workers. Sleep 2004;27:1453-62.
7. Knutsson A. Health disorders of shift workers. Occup Med 2003;53:103-8.
8. Karlsson B, Knutsson A, Lindahl B. Is there an association between shift work and having a metabolic syndrome? Results from a population based study of 27,485 people. Occup Environ Med 2001;58:747-52.
9. Merijanti LT, Samara D, Tandean R, Harrianto R. The role of night shift work on blood pressure among healthy female nurses. Univ Med 2008;27:65-71
10. Giovanni Costa Shift work and occupational medicine: an overview. Occup Med 2003;53:83–8.
11. Ohida T, Kamal AMM, Sone T, Ishii T, Uchiyama M, Minowa M, et al. Night-shift work related problems in young female nurses in Japan. J Occup Health 2001;43:150–6.
12. Garbarino S, Bellke M, Costa G, Violani C, Lucidi F, Ferrilo F, et al. Brain function and effects of shift work: implication for clinical neuropharmacology. Neuropsychobiology 2002;45:50-6.
13. Scott AJ. Shift work and health. Prim Care 2000;27:1057-79.
14. Ohayon MM, Lemoine P, AB Veronique, Dreyfus M. Prevalence and cosequences of sleep disorders in a shift worker population. J Psychosom Res 2002;53:577-83.
15. Chung MH, Chang FM, Yang CH. Sleep quality and morningness-eveningness of shift nurses. J Clin Nurs 2009;18:279-84.
16. Chan MF. Factors associated with perceived sleep quality of nurses working on rotating shifts. J Clin Nurs 2009;18:285-93.
17. Sivertsen B, Overland S, Neckelmann D, Glozier N, Krokstad N, le Pallesen S, et al. The long-term effect of insomnia on work disability. The HUNT-2 historical cohort study. Am J Epidemiol 2006;163:1018–24.