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Original article

Depression and sleep quality among nurses in a tertiary hospital in Bangkok

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Background: Currently, depression is a mental health problem that tends to increase. Nurses are one of the healthcare workers that are at risk of depression. The cause of which is due to their heavy workload. In addition, shift work results in decreased sleeps quality. Moreover, research studies on the relationship between sleep quality and depression including other factors are few.
Objectives: To investigate the relationship between sleep quality and depression including the prevalence of depression and its associated factors. The recruited subjects of the study were nurses who worked at Nopparat Rajathanee Hospital in 2019.
Methods: A cross-sectional survey of 638 nurses was conducted in this study. Depression was assessed by a Patient Health Questionnaire-9 (PHQ-9) Thai version and sleep quality was assessed by self-administered questionnaire adapted from the Pittsburgh sleep quality index (PSQI). Prevalence of depression and the sleep quality assessment results are presented in percentage while the associated factors are presented by crude and adjusted odds ratios (ORs).
Results: The study has found a significant association between sleep quality and depression. Most subjects (61.0%) had poor sleep quality and the poor quality of sleep was depressed 3.38 times. The prevalence of depression in subjects was 17.3%. The factors associated with depression included: exercise, body mass index, job satisfaction, receiving welfare and support from the leader and sleep quality.
Conclusion: Sleep quality affects the occurrence of depression including associated factors that may aggravate more depressive symptoms. This study provides information leading to planning and guidelines for solving psychological problems.

Keywords: Depression, nurse, quality of sleep.

Depression causes a significant loss of health and affects people worldwide. According to the estimates from the WHO, more than 300 million people are suffering from depression. Report of Thai Mental Health Epidemiological Survey in 2008 by Department of Mental Health[(1)] found that Thai people aged 15 years and over have a prevalence of depression 2.7% and also found that women are 1.7 times more at risk of depression than men. Not only is untreated clinical depression unhealthy, but it can destroy relationships, work life and increases the risk of suicide.

Nurses are health care worker who work hard and have little time to relax due to work as a duty shift 24 hours. Working with unstable work schedules or shift work resulting in decreased sleep quality and abnormal sleep patterns. Study in China[(2)] found that nurses have problems with sleep quality that cause depression than the nurse who does not work late at night almost 2 times. Thailand has found that 93.3% of nurses have sleep problems. [(3)] Gong Y, *et al*.[(4)] conducted a study on nursing depression found that the prevalence of depression was 38.0%.

From previous literature reviews and research, Thailand has studies on the quality of sleep in nurses and found that the nurses had poor quality of sleep

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when compared to normal people. [5, 6] In addition, there is no research in Thailand that directly studies depression and the quality of sleep. This study was conducted to study the relationship between sleep quality and depression including the prevalence and other factors related to depression. The goal is not only to set guidelines for care and assistance but also topromote mental health rehabilitation in nurses and increase efficiency in their work.

Materials and methods

This research is a cross-sectional descriptive study conducted in nurses at Nopparat Rajathanee Hospital. Inclusion criteria is working as a nurse in the hospital in the year 2019. Exclusion criteria is pregnancy during the study, postpartum depression, resignation, absence, death, currently depressed or refusing to participate in this study.

Calculation of the population studied

$$n \geq \frac{NZ_1^2 - \alpha/2p(1-p)}{d^2(N-1) + Z_1^2 - \alpha/2p(1-p)}$$

N = The total population in the research is 638 people.
P = The prevalence of depression = 0.38[4]
A = Chance of type I error = 0.05, (2-sided = 1.96)

Although a sample size of 232 was required, the data are collected from all departments of nurses as much as possible. The tools used for collecting data were divided into 4 parts, namely:

Part 1: Personal factors questionnaire

Part 2: Factors Associated with Depression from literature reviews including psychosocial factors and work factors; shiftwork status, years of work, working hours per weeks, eating 3 meals a day, holiday per week, welfare and support from the leader, workplace violence, lack of self-respect and conflicts with colleagues.

Part 3: The depression assessment by The Thai version of the PHQ-9. PHQ-9 is a 9-item self-report screening tool that may help identify symptoms that could relate to depression and follow-up treatment results, including relapse or recurrence of depression. PHQ-9 was developed by Manote Lortrakul and acceptable psychometric properties for screening for major depression in general practice with a recommended cut-off score of nine or greater. The Thai version of the PHQ-9 had satisfactory internal consistency (Cronbach's alpha = 0.821), sensitivity of 85.0% and a specificity of 72.0%.

Part 4: Thai version of the Pittsburgh sleep quality index, T-PSQI developed by Tawanchai Jirapramukpitak. T-PSQI is a self-reported questionnaire that measures sleep quality during the previous month. The measure consists of 19 individual items, creating 7 components that produce one global score. A cut-off point of 5 score resulted in a sensitivity of 77.8 % and specificity of 93.3%.

Statistical analysis

Data were analyzed by using SPSS version 23.0. The qualitative data were presented with percentage. The quantitative is presented by arithmetic means, standard deviation. The relationship between related factors and depression was analyzed by Chi-square test, odds ratio, 95.0% confidence interval (CI) and multiple logistic regression. A $P < 0.05$ was considered statistically significant.

Results

The study consisted of 402 subjects with the response rate of 63.0% (2 people excluded from the study due to previous episodes of depression). Regarding personal factors, most of them have adequate of income (69.8 %), non-alcoholic and non-smokers accounted for 93.0% and 93.8%. Only 9.0% had high body mass index and were considerd obese. Regarding the work factor, it was found that there was a 65.5% shift in work. The duration of work is in the range of 40 - 60 hours/week, accounting for 68.5%. The details of other information are shown in Table 1.

The sleep quality evaluation using by PSQI found that 61.0% of the subjects had poor sleep quality. Depression from PHQ 9 screening has depression 17.3% of nurses. Considering the relationship between data and other factors, the associated factors of depression are sleep quality, monthly income, status, adequate of income, drinking alcohol, exercise, body mass index, behavior, working hours per week, years of work, job satisfaction, eating 3 meals a day, welfare and support from the leader and conflicts with colleagues (Table 2).

Table 1. Summary of subjects' characteristics (n = 400).

Characteristics	N (%)	Characteristics	N (%)
Status		**Working hours per week**	
Married	171 (42.8)	Less than 40 hours	28 (7.0)
Single	187 (46.8)	40 - 60 hours	274 (68.5)
Widows/Divorced/Separated	42 (10.5)	More than 60 hours	98 (24.5)
Monthly income (Baht)		**Years of work**	
<= 20,000	16 (4.0)	Less than 1 year	20 (5.0)
20,000 - 40,000	238 (59.5)	1 - 10 years	151 (37.8)
>= 40,000	136 (34.0)	More than 10 years	229 (57.3)
Adequate of income		**Job satisfaction**	
Enough	279 (69.8)	Satisfied	323 (80.8)
Not enough	121 (30.3)	Not satisfied	77 (19.3)
Alcohol drinking		**Welfare and support from the leader**	
Don't drink	372 (93.0)	Satisfied	313 (78.3)
Drink	28 (7.0)	Not satisfied	87 (21.8)
Smoking		**Holiday per week**	
Don't smoke	395 (98.8)	No holidays	24 (6.0)
Smoke	5 (1.3)	1 - 2 days off	351 (87.8)
Exercise		>= 3 days off	25 (6.3)
>= 3 times per week	193 (48.3)	**Workplace violence**	
1 - 2 times per week	80 (20.0)	No	343 (85.8)
No exercise	127 (31.8)	Yes	57 (14.3)
Related chronic diseases		**Lack of respect and confidence in oneself**	
None	292 (73.0)	No	357 (89.3)
1 disease	85 (21.3)	Yes	43 (10.8)
>= 1 disease	23 (5.8)	**Conflict with colleagues**	
Body Mass Index(kg/m^2)		No	372 (93.0)
BMI < 30.0	362 (90.5)	Yes	28 (7.0)
BMI >= 30.0	38 (9.5)	**Sleep quality (PSQI)**	
Loss of a beloved person		Good	156 (39.0)
No	254 (63.5)	Poor (PSQI > 5)	244 (61.0)
Yes	146 (36.5)	**Assess mental health (PHQ9)**	
Shiftwork status		No depression	331 (82.7)
No	136 (34.0)	Depression (PHQ >= 9)	69 (17.3)
Yes	264 (66.0)		
Eating well, 3 meals a day			
Yes	248 (62.0)		
No	152 (38.0)		

Table 2. Relationship between sleep quality, association factors and depression by Chi- Square statistics.

Variables	No depression	Depression	N (%)	Crude OR (95% CI)	*P* - value
Sleep quality					
Good	148	9	5.7	1.00	< 0.001*
Poor	185	60	24.7	5.39 (2.59 - 11.23)*	
Status					
Married	150	21	12.3	1.00	0.071*
Single	147	40	21.4	1.94 (1.09 - 3.45)*	
Widows/Divorced/Separated	34	8	19.0	1.68 (0.68 - 4.12)	
Monthly income (Baht)					
<= 20,000	14	2	12.5	1.00	0.136
20,000 - 40,000	188	50	21.0	1.25 (0.26 - 6.05)	
>= 40,000	122	14	10.3	2.31 (1.23 - 4.37)*	

Table 2. (Con) Relationship between sleep quality, association factors and depression by Chi- Square statistics.

Variables	No depression	Depression	N (%)	Crude OR (95% CI)	*P* - value
Adequate of income					
Enough	239	40	14.3	1.00	0.019*
Not enough	92	29	24.0	1.88 (1.10 - 3.21)*	
Alcohol drinking					
Don't drink	312	60	16.1	1.00	0.031*
Drink	19	9	32.1	2.46 (1.06 - 5.71)*	
Smoking					
Don't smoke	328	67	17.0	1.00	0.175
Smoke	3	2	40.0	3.26 (0.54 - 19.91)	
Exercise					
> = 3 times per week	171	22	11.4	1.00	< 0.001*
1 - 2 times per week	72	8	10.0	0.86 (0.37 - 2.03)	
No exercise	88	39	30.7	3.45 (1.92 - 6.17)*	
Associated diseases					
None	237	55	18.8	1.00	0.316
1 disease	75	10	11.8	0.58 (0.28 - 1.18)	
> = 1 disease	19	4	17.4	0.91 (0.30 - 2.77)	
Body mass index(kg/m^2)					
BMI < 30.00	304	58	16.0	1.00	0.028*
BMI > = 30.00	25	11	30.6	2.31 (1.08 - 4.95)	
Loss of a beloved person					
No	208	46	18.1	1.00	0.324
Yes	115	19	14.2	0.75 (0.42 - 1.34)	
Shiftwork status					
No	120	16	11.8	1.00	0.037
Yes	211	53	20.1	1.88 (1.03 - 3.44)*	
Working hours / week					
Less than 40 hours	24	4	14.3	1.00	0.008*
40 - 60 hours	236	38	13.9	0.97 (0.32 - 2.94)	
More than 60 hours	71	27	27.6	2.28 (0.72 - 7.19)	
Years of work					
Less than 1 year	16	4	20.0	1.00	0.018*
1 - 10 years	115	36	23.8	1.25 (0.39 - 3.99)	
More than 10 years	200	29	12.7	0.58 (0.18 - 1.86)	
Job satisfaction					
Satisfied	283	40	12.4	1.00	< 0.001*
Not satisfied	48	29	37.7	4.27 (2.42 - 7.54)*	
Welfare and support from the leader					
Satisfied	274	39	12.5	1.00	< 0.001*
Not satisfied	57	30	34.5	3.70 (2.12 - 6.44)*	
Eating well, 3 meals a day					
Yes	218	30	12.1	1.00	< 0.001*
No	113	39	25.7	2.51 (1.48 - 4.25)*	
Holiday per week					
No holidays	15	9	37.5	1.00	0.026*
1 - 2 days off	295	56	16.0	0.31 (0.13 - 0.75)	
> = 3 days off	21	4	16.0	0.32 (0.08 - 1.23)	
Workplace violence					
No	281	62	18.1	1.00	0.284
Yes	50	7	12.3	0.29 (0.68 - 3.64)	
Lack of respect and confidence in oneself					
No	295	62	17.4	1.00	0.858
Yes	36	7	16.3	0.93 (0.39 - 2.18)	
Conflict with colleagues					
No	313	59	15.9	1.00	0.007*
Yes	18	10	35.7	2.95 (1.30 - 6.70)*	

n = the number of samples, OR = Odds ratio, * = Statistically significant, [1] Associated diseases: COPD, DM, Allergy, Arthritis, Cardiovascular disease, Hypertension.[7 - 9]

In a multiple logistic regression analysis, significant variables of depression were exercise, body mass index, job satisfaction, welfare and support from the leader and quality of sleep (Table 3).

Discussion

The purpose of this study was to find a relationship between sleep quality and depression. Including the prevalence and other factors associated to depression. The study was conducted in 638 nurses working at Nopparat Rajathanee Hospital and response rate was calculated at 63.0%. Fewer responses are caused by shift work that cannot answering the questionnaire during the data collection.

Sleep quality evaluation with PSQI questionnaire found that 61.0% of the subjects had poor sleep quality. The quality of sleep was associated with depression with statistical significance. The group that had poor sleep quality had 3.38 times more depression than the good sleep quality group. Disturbance in the sleep cycle from poor sleep quality affected work decision and socializing. The causes of subsequent depression problems are consistent with the study of Zhang L. The study found that most nurses had poor sleep quality up to 72.0 %, especially shiftwork group[10] and 1.83 times more depression.[2]

The prevalence of depression by using the PHQ-9 questionnaire is equal to 17.3%. Compared to previous studies, the study of Letvak S, *et al*. [11] is close to the results of this study. The study conducted in the United States by the PHQ9 questionnaire, found that the prevalence of depression is 18.0 %. While other studies of the prevalence of depression such as Gong Y, *et al*. [4] and Dai C, *et al*. [2] had similar prevalence at 38.0% and 40.8%. A respectively. Both studies were conducted in nurses in Asian countries so they have the same cultural factors, work load and similarities in diseases. In addition, from the basic data, it is found that China is densely populated. There is also a problem of hygiene that causes illness easily as a result, the ratio of beds to the population is inadequate for the population and the work load is increased.

Exercise is significantly associated to the occurrence of depression. The group that did not exercise, compared to the group that exercised for at least 3 times per week, had 2.17 times depression more than the latter. In line with previous studies, Stanton R, *et al*.[12] found that exercise is a protective factor for depression. By helping to increase the secretion of dopamine and serotonin resulting in balance and better control of emotions.

Body mass index (BMI) is related to depression. The group with a BMI greater than or equal to 30 would have a depression of 2.44 times compared to the group with BMI less than 30. Consistent with the Kranjac AW, *et al*. [13] this study found that body mass index greater than or equal to 30 led to depression is 1.43 times compared to healthy weight group. Obesity can cause mood disorder, impaired response inhibition capacity and reduced executive function in general. [14]

Job satisfaction is a statistically significant relationship with depression which the dissatisfaction group has a depression of 2.29 times as well as the satisfaction in receiving appropriate welfare and support from the leader. The dissatisfaction group at work was depressed 2.17 times. Consistent with previous studies[15, 16] that found that when satisfied will cause neurotransmitters related to mood balance to function normally and is a preventive factor for depression.

Table 3. Analyze relationships of sleep quality and factors related to depression by multiple logistic regressions.

Variables	Adjusted ORs (95% CI)	Variables	Adjusted ORs (95% CI)
Alcohol drinking		**Job satisfaction**	
Don't drink	1.00	Satisfied	1.00
Drink	2.32 (0.92 - 5.83)	Not satisfied	2.29 (1.18 - 4.47)*
Exercise		**Welfare and support from the leader**	
> = 3 times per week	1.00	Satisfied	1.00
1 - 2 times per week	0.80 (0.32 - 1.99)	Not satisfied	2.17 (1.15 - 4.08)*
No exercise	2.17 (1.15 - 4.08)*	**Sleep quality (PSQI)**	
BMI (kg/m^2)		Good	1.00
BMI < 30.00	1.00	Poor (PSQI > 5)	3.38 (1.56 - 7.32)*
BMI > = 30.00	2.44 (1.05 - 5.67)*		

* = Statistically significant

Drinking alcohol causes depression 2.46 times. Although there was no statistically significant association with depression but consistent with the study of Caetano R. found that drinking alcohol was correlated to depression by 1.96 times.[17] This may be the result of a hangover resulting from abnormal sleep and decreased ability to control emotions.

Shiftwork has a depression of 1.88 times. The relationships were not statistically significant but found that shiftwork have the effect of poor sleeping quality as well.[2] In addition, shiftwork also resulting in poor sleeping quality may be a confounding factor of the occurrence of depression.

Strength of this study is that it is the first research examining the relationship of sleep quality and the prevalence of depression in nursing in tertiary hospital in Thailand by using a questionnaire (PSQI and PHQ-9). The questionnaire is specific and reliable.

The study has some limitations. First, the data may not be representative of the entire population (response rate 63.0%). Second, the questionnaire has some questions that are not clear resulting in inability to interpret. Third, the study not divides the severity of symptoms which makes the prevalence measured quite high.

Conclusion

The quality of sleep was significantly related to the occurrence of depression. Including associated factors such as exercise, body mass index, job satisfaction and appropriate support welfare. From past studies, it was found that there are studies on depression of nurses in many countries. The importance of this problem is that the nurse has a higher prevalence of depression than the general population.[1] There are some associated factors from work problems, i.e. the lack of skills in adaptation, ability to deal with stress and pressure from workload. There should be suggestions to reduce depression, especially changing the amount of shift work appropriately and finding ways to sufficient sleep. In addition, the survey also helps screening people who have depression in the early stages. There should be plans to help nurses including care and monitoring to assess after treatment. These should also include a goal for sustainable good mental health and quality of life.

This study is a qualitative data collection to make it easier to answer questions but it cannot calculate the mean or standard deviation. Future study should cover more government hospitals, private hospitals, home nurses, nursing room in the industrial estates, Tambon health promotion hospitals, etc.

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Conflict of interest

The authors, hereby, declare no conflict of interest.

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