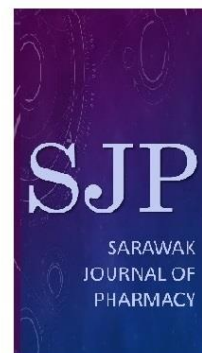




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SLEEP QUALITY ASSOCIATION WITH HEALTH STATUS AMONG PHARMACY DEPARTMENT STAFFS IN MIRI GENERAL HOSPITALS

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ABSTRACT

Introduction: Sleeping is a positive attribute leading us to be more productive and live a healthier lifestyle. As sleep is an important modulator of neuroendocrine function and glucose metabolism, more studies are directed to evaluate the relationship between sleep quality and weight gain as well as health. Evidences are rapidly accumulating showing the relationship between poor sleep quality and the increase of risk of obesity and exposure to illnesses. The objective of this study is to evaluate the relationship between sleeping parameters which includes sleep quality and sleep duration of healthcare professionals with body mass index (BMI) and frequency of doctor's visit.

Method: A survey conducted on pharmacy staff Miri Hospital from 8 January 2018 to 12 January 2018. This study utilised the Pittsburgh Sleep Quality Assessment (PSQI) for sleeping pattern assessment. Descriptive statistics and Fisher's Exact test were applied for analysis of data with $p < 0.05$ as significant test using SPSS Statistics Version 21.

Result: Participants consisting of 61 pharmacy staff in Hospital Miri; Fully Registered Pharmacist (FRP), Provisionally Registered Pharmacist (PRP) and Pharmacist Assistant (PA) involved in this study. Among them, 19.7% (12) were males and 80.3% (49) were females which 25% of the participants experiencing good sleep quality, whereas 45.9% reporting poor sleep quality and 13.1% claiming bad sleep quality.

Conclusion: Relationships between sleep quality with BMI and frequency of visit to doctor for the past half year were not significantly proven. PRP shown to have the most good sleep quality, FRP had the mode of poor sleep quality and PPF had the highest in bad sleep quality.

Keywords: Sleep quality; Body Mass Index (BMI); Health; Healthcare

INTRODUCTION

Sleep is undoubtedly one of the most vital necessities for the human body to function properly. Nine hours of sleep was a norm until sleep curtailment became a hallmark of this modern society. Poor sleep quality has been a problem since centuries as both children and adults are showing a trend of shorter bedtimes than a few decades ago. Evidences are rapidly accumulating showing the relationship between poor sleep quality and the increase of risk of obesity and exposure to illnesses. Sleep is an important modulator of neuroendocrine function and glucose metabolism, thus without a proper sleep, the body's immune system tends to fail and the person will become more susceptible to weight gain and risk of developing illnesses hikes. Those getting less than 5 hours of sleep also shown to have a decline in peak alertness (1). This study designed to evaluate the relationship between sleeping parameters which includes sleep quality and sleep duration of healthcare professionals with body mass index (BMI) and frequency of doctor's visit. Our study hypothesises a poor sleep quality associating with the increase in BMI and declined overall health.

METHOD

This study utilised the Pittsburgh Sleep Quality Assessment (PSQI) the assessment of sleeping pattern of the subjects involved. The standardised PSQI showed a prominent consistency, reliability and validity in quantitative measurement of sleep quality (2). It consists of 19 self-reported questions that categorized seven component scores; [1] Subjective sleep quality (very good to very bad), [2] Sleep latency (≤ 15 minutes to > 60 minutes), [3] Sleep duration (7 hours to < 5 hours), [4] Habitual sleep efficiency ($> 85\%$ to $< 65\%$), [5] Sleep disturbance (not during the past month to ≥ 3 times a week), [6] Use of sleeping medication (none to ≥ 3 times a week) and [7] Daytime dysfunction (no problem at all to a very big problem). Each component is scored with the scale of 0 – 3 in which low score suggests no or slight difficulty with sleep and higher scores imply having difficulty with sleep. The sum of all components would yield a total score ranging from 0 to 21, whereby a score of 0 – 4 indicates good quality of sleep, 5 – 8 shows poor quality of sleep and 9 – 12, bad quality of sleep. As for the health status Body Mass Index

(BMI), the definition of underweight, normal weight, overweight and obese in adult based on Centre for Disease Control and Prevention (CDC) (3). The formula for BMI calculated based on weight (kg)/ height (m^2) in which the height and weight were self-reported. Based on Elgar et al. 2005 and Spencer et al. 2002, the self-reported and clinically measured height and weight seen to be highly correlated, however with an underreporting bias about one unit (4) (5). The sample of questionnaire shown in Appendix 1.

STATISTICAL ANALYSIS

Descriptive statistics and Fisher's Exact test were applied for analysis of data with $p < 0.05$ as significant test using SPSS Statistics Version 21.

RESULTS

61 pharmacy staffs in Hospital Miri participated in this study. Participants include FRPs (47.5%), PRPs (31.1%) and PPFs (21.3%). Participants were mostly females (80.3%) with a mean age of 29.74 years ($SD = 6.93$). 23% of the participants had a $BMI \geq 25$. Out of 61 participants, 9 classified as overweight ($BMI \geq 25 < 30$) and 5 as obese ($BMI \geq 30$). BMI rates varied by sex; with more males reporting $BMI \geq 25$ than females (41.7% vs. 18.4%).

Sleep Pattern

Results of the PSQI presented in Table 1. The mean global PSQI score was 5.39 ± 2.87 , with 25% of the participants experiencing good sleep quality, whereas 45.9% reporting poor sleep quality and 13.1% claiming bad sleep quality.

Overall, only 24.6% of participants reported the recommended eight or more hours of sleep. 49.2% of participants claimed could not get to sleep within 30 minutes; with 13.1% experienced sleep efficiency below 85%. About 80% of participants (83.7%) had sleep disturbance of at least once a week. The most common reported sleeping disturbances includes wake up in the middle of the night or early morning at least once a week (65.6%) and have to get up to use the bathroom at least once a week (65.6%). Besides, 9.8% of participants reported taking sleeping medication for at least once a week to aid sleeping. Perhaps as a consequence of the poor quality of sleep, 60.6% of the participants reported daytime dysfunction at least once a week. While 41% of participants had trouble of staying awake at least once a week, almost half of the participants (52.5%) reported problem of getting enthusiasm.

Table 1: Frequency distributions of sleep quality and sleep disturbance scores as measured by components and individual questions of the PSQI.

No	Question/ Component Scores	0	1	2	3
1	Overall rate of quality of sleep	Very good	Fairly good	Fairly bad	Very bad
		16.4%	59.0%	16.4%	8.2%
2	How long does it take you to fall sleep	≤ 15 min	16-30 min	31-60min	> 60 min
		42.6%	42.6%	9.8%	4.9%
3	Hours do you actually sleep	≥ 7 hrs	6 hrs	5 hrs	< 5 hrs
		24.6%	49.2%	23.0%	3.3%
4	% Time in bed sleeping	> 85 %	75-84 %	65-74 %	< 65 %
		86.9%	8.2%	3.3%	1.6%
5	Overall sleep disturbances score	0	1-9	10-18	19-27
		16.4%	60.7%	23.0%	0.0%
6	Taken medicine to aid in sleep?	Not in past month	< once a week	1-2 times a week	≥ 3 times a week
		90.2%	4.9%	3.3%	1.6%
7	Daytime dysfunction	0	1-2	3-4	5-6
		39.3%	34.4%	18.0%	8.2%
Individual Questions					
	How often have you had trouble sleeping because:	Not in past month	< once a week	1-2 times a week	≥ 3 times a week
I	Cannot get sleep within 30 min	50.8%	31.1%	9.8%	8.2%
II	Wake up middle of night/ early AM	34.4%	19.7%	19.7%	26.2%
III	Wake up to use the bathroom	34.4%	27.9%	24.6%	13.1%
IV	Cannot breathe comfortably	93.4%	1.6%	1.6%	3.3%
V	Cough or snore loudly	75.4%	18.0%	4.9%	1.6%
VI	Feel too cold	59.0%	18.0%	21.3%	1.6%
VII	Feel too hot	62.3%	19.7%	13.1%	4.9%
VIII	Have bad dreams	65.6%	21.3%	9.8%	3.3%
IX	Have pain	78.7%	13.1%	4.9%	3.3%
X	Had trouble staying awake during social activities?	59.0%	24.6%	14.8%	1.6%
XI	Problem getting enthusiasm	47.5%	34.4%	11.5%	6.6%

Relationship between Sleep Quality and BMI

Among 61 participants in the study, most of the participants having poor quality sleep were of normal BMI (26.2%), whereas none of the participants with bad sleep quality were underweight (BMI less than 18.5%). Table 2 showed that 1 out of 8 participants with bad sleep quality were obese (12.5%, $p > 0.05$) and the proportion was higher than those having good and poor sleep quality (4.0% and 1.1%). However, the percentage of participants having bad sleep quality with normal BMI was 62.5%, which is also higher than those with good and poor sleep quality,

suggesting that the sleep quality may not be the important component contributing to the health status (BMI).

Table 2: Sleep categories V.S. health status (BMI)

Health status (BMI)	Sleep Category		
	GOOD	POOR	BAD
Underweight (BMI < 18.5)	7 (28.0%)	5 (17.9%)	0 (0.0%)
Normal Weight (BMI ≥ 18.5 < 25)	14 (56.0%)	16 (57.0%)	5 (62.5%)
Overweight (BMI ≥ 18.5 < 25)	3 (12.0%)	4 (14.0%)	2 (25%)
Obese (BMI ≥ 30)	1 (4.0%)	3 (1.1%)	1 (12.5%)
Total	25 (100%)	28 (100%)	8 (100%)

Relationship between Sleep Quality and Frequency of Doctor Visit

Approximately a quarter of the participants (18 out 61 participants, 29.5%) had good sleep quality and about one fifth of the participants (13 out 61 participants, 21. 3%) visited doctor once in the past 6 months. Table 3 showed that most participants having good sleep quality had visited doctor for not more than once (76%, $p > 0.05$). Nevertheless, the proportion of participants with poor sleep quality but never visited doctor in the past 6 months is 17.9%, which is much higher than those with good and bad sleep quality. Participants with bad sleep quality, the proportion visiting doctor for more than 5 times is the same as those who visiting doctor once in the past 6 months, suggesting that bad sleep quality may not resulting in high frequency of doctor visit and bad health result.

Table 3: Sleep categories V.S. Frequency of Doctor Visit

Sleep Category	Frequency of Doctor Visit						Total
	0	1	2	3	4	>5	
Good	1 (4.0%)	18 (72.0%)	2 (8.0%)	2 (8.0%)	1 (4.0%)	1 (4.0%)	25 (41.0%)
Poor	5 (17.9%)	13 (46.4%)	5 (17.9%)	1 (3.6%)	1 (3.6%)	3 (10.7%)	28 (45.9%)
Bad	0 (0.0%)	2 (25.0%)	2 (25.0%)	2 (25.0%)	0 (0.0%)	2 (25.0%)	8 (31.1%)

Relationship between Post and Sleep Quality

Table 4 compared the relationship between post of the participants and sleep quality. Results showed PRPs were having better sleep quality (10 out 13 PRP, 52.6%) if compared to FRP (11 out 29 FRP, 37.9%) and PPF (4 out 13 PPF, 30.8%). Most of the PPFs experienced bad sleep quality (3 out 13 PPF, 23.1%) compared to FRP (4 out 29 FRP, 13.8%) and PRP (1 out 19 PRP, 5.3%).

Table 4: Post vs Sleep categories

Sleep Category	Post		
	FRP	PRP	PPF
Good	11 (37.9%)	10 (52.6%)	4 (30.8%)
Poor	14 (48.3%)	8 (42.1%)	6 (46.2%)
Bad	4 (13.8%)	1 (5.3%)	3 (23.1%)
Total	29 (100%)	19 (100%)	13 (100%)

DISCUSSION

The main aims of the present study were to explore separate and simultaneous associations between sleep quality with body mass index and the frequency of doctor visits in a small sample of working adults in Hospital Miri. Our findings demonstrated that poor sleep quality is not associated with BMI. Our findings also revealed that poor sleep quality has no association with frequency of doctor visits.

Similar to our study, some studies showed no association between sleep quality and BMI. A study by Wuertz et al. (2012), which conducted on a group of 68 college students showed there is no association between sleep quality and BMI (6). However, it should be highlighted that the aforementioned group of authors had a relatively small sample size, which possibly influenced the power of the study.

Although insufficient sleep has been linked to numerous of health issue and over a long run, poor sleep quality has been linked to shorter lifespan, the result of our studies showed no significant association between quality of sleep with health outcome. However, sleeping behaviour and quality did affect the performance in work. Studies also proved that stress and social environment at work strongly linked to disturbed sleep and impaired awakening (7). There are various factors contributing to sleeping disturbance. One of them from our respondents was breastfeeding. Many mothers in the postpartum period actually complained of fatigue and shortened sleeping time because of child care (8).

At the same time, our findings also showed that different position at work has significant impact on sleep quality (9). As of our study, FRP were complaining of poorer sleep quality as they carry larger responsibility compared to PRP. On the other hand, PPF also lamented on bad sleep quality compared to FRP and PRP. PPF have more shift and longer working hours compared to FRP and PRP. In the study by Shields et al, long working hours has great impact on health outcome (10). Our findings also proved quality of health is greatly associated with the responsibility and working hours in different post.

One of the limitations of this study is that our analysis of height and weight based on self-reported data rather than direct measurements. In addition, we did not obtain the patient history card from the participants where the frequency of doctor visits may not be accurate. Small sample size of this study also limits the generalisability of our findings. Besides, our samples were restricted to pharmacy related staffs in Miri General Hospital only. Finally, we cannot rule out the possibility that our findings are due to other extraneous variables not measured, or to chance.

CONCLUSION

Sleeping is a positive attribute, which leads us to be more productive and live a healthier lifestyle. Future studies would benefit from collecting multiple data points prospectively, using objective measurements of obesity and sleep, and exploring potential causal mechanisms between these variables. A larger sample size which includes not only pharmacy-related healthcare professionals should be included.

To conclude, there was no statistically significant relationship between sleep quality with BMI and frequency of visit to doctor for the past half year. PRP were shown to have the most good sleep quality, FRP had the mode of poor sleep quality and PPF had the highest in bad sleep quality.

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APPENDIX 1

Section 1: Demographic and Socio-economic Details

SLEEP QUALITY ASSOCIATED WITH HEALTH STATUS AMONG PHARMACY DEPARTMENT STAFF IN MIRI GENERAL HOSPITAL

(All information will be strictly confidential)

Age (years)

Gender Male ☐ Female ☐

Race Malay ☐ Chinese ☐ Indian ☐ Others ☐

Post PF ☐ PPF ☐ PRP ☐

Are you married? Yes ☐ No ☐

(If yes to the above question) 1 ☐ 2 ☐ 3 ☐ 4 ☐ >5 ☐

No. of Children

Weight :

Height :

How frequent have you visited
doctor in the past half year? 1 ☐ 2 ☐ 3 ☐ 4 ☐ >5 ☐

Sleep Quality Assessment with Pittsburgh Sleep Quality Index (PSQI)

PITTSBURGH SLEEP QUALITY INDEX (PSQI)

INSTRUCTIONS: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night?

USUAL BED TIME _____

2. During the past month, how long (in minutes) has it usually take you to fall asleep each night?

NUMBER OF MINUTES _____

3. During the past month, when have you usually gotten up in the morning?

USUAL GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)

HOURS OF SLEEP PER NIGHT _____

INSTRUCTIONS: For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...cannot get to sleep within 30 minutes	☐	☐	☐	☐
(b) ...wake up in the middle of the night or early morning	☐	☐	☐	☐
(c) ...have to get up to use the bathroom	☐	☐	☐	☐
(d) ...cannot breathe comfortably	☐	☐	☐	☐
(e) ...cough or snore loudly	☐	☐	☐	☐
(f) ...feel too cold	☐	☐	☐	☐
(g) ...feel too hot	☐	☐	☐	☐
(h) ...had bad dreams	☐	☐	☐	☐
(i) ...have pain	☐	☐	☐	☐
(j) Other reason(s), please describe				

How often during the past month have
you had trouble sleeping because of this?

☐ ☐ ☐ ☐

	Very good	Fairly good	Fairly bad	very bad
6. During the past month, how would you rate your sleep quality overall?	☐	☐	☐	☐
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?	☐	☐	☐	☐
8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	☐	☐	☐	☐
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐
	No bed partner or roommate	Partner/ roommate in other room	Partner in same room, but not same bed	Partner in same bed
10. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐
If you have a roommate or bed partner, ask him/her how often in the past month you have had...				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...loud snoring	☐	☐	☐	☐
(b) ...long pauses between breaths while asleep	☐	☐	☐	☐
(c) ...legs twitching or jerking while you sleep	☐	☐	☐	☐
(d) ...episodes of disorientation or confusion during sleep	☐	☐	☐	☐
(e) Other restlessness while you sleep; please describe	☐	☐	☐	☐

