ORIGINAL ARTICLE

Prevalence of Sleep Quality among Academic Staff of a Private University in Malaysia

Kokila Thiagarajah, Nam Weng Sit, Huei Phing Chee

Department of Allied Health Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, 31900 Kampar, Perak Malaysia.

ABSTRACT

Introduction: Poor sleep quality is frequently related to poor mental health and is a common medical disorder. It may differ by population, but limited studies have been done in Malaysia. This study was conducted to measure the prevalence of poor sleep quality among academic staff at Universiti Tunku Abdul Rahman (UTAR) Kampar Campus. **Methods**: In total, 344 randomly selected academic staff were approached to answer the Pittsburgh Sleep Quality Index (PSQI) questionnaire. **Results:** Unexpectedly, 42.7 % of them were affected by poor sleep quality (global PSQI score >5). The average actual sleep duration was recorded at 6.68 hours. Age and global PSQI scores were not significantly correlated. Female staff had poorer subjective sleep quality (P= 0.027). The elder age group (P= 0.012) and associate professors and professors (P= 0.006) consumed more sleep medications. Non-Ph.D. holders had poorer subjective sleep quality (P= 0.008) and sleep latency (P= 0.032) as well as global PSQI score (P= 0.045) compared to Ph.D. holders. **Conclusion:** Prevalence of poor sleep quality was higher than expected among academic staff. This may affect workplace functioning and burden the staff with more health issues related to poor sleep quality.
Malaysian Journal of Medicine and Health Sciences (2023) 19(6):28-34. doi:10.47836/mjmhs.19.6.5

Keywords: Sleep Quality, Pittsburgh Sleep Quality Index, Academic Staff, Private University, Malaysia.

Corresponding Author:
Kokila Thiagarajah, MSc
Email: kokila@utar.edu.my
Tel: +605-468 8888

INTRODUCTION

Insomnia is defined as difficulty falling asleep and staying asleep associated with daytime impairment or distress which occurs at least three times a week for at least a month. It is considered a disorder when it causes pathological responses (1). It may interfere with normal physical, mental, and emotional functioning yet affected people are not aware of it. Poor sleep quality is a key feature of insomnia although more requirements are needed to diagnose it. The meaning of poor sleep quality such as tiredness on waking and throughout the day, feeling rested and restored on waking, and the number of awakenings they experienced in the night were similar among people with insomnia and poor sleep quality (2). Sleep disturbances are linked to many disorders such as ulcers, neurological problems, migraines, arthritis, asthma, heart disease, hypertension, diabetes, cancer and so on, and have a bidirectional relationship with some of these disorders (3-4). According to the American Academy of Sleep Medicine and Sleep Research Society (5), a sleeping duration of 7 hours or more is crucial to maintain optimal health among adults aged 18 to 60 years. Besides, sleeping less than 7 hours per night is associated with impaired immune function, increased pain, impaired performance, and increased risk of accidents (5). Young adults or those who are ill may need more than 9 hours of sleep. Besides age and medical factors, the sleep problem can be influenced by gender, genetics, ethnicity, socioeconomic status and environment or geographical factors (4).

In a study involving Malaysian adults within the range of 30-70 years old, subjects with insomnia had a higher prevalence of perceived poor health status (40.9 %), loss of concentration (19.1 %), feeling depressed (12.7 %), exhaustion (17.2 %), poor memory (9.2 %) and decreased work productivity (6.4 %) (6). In white-collar workers, long work hours correlate with reduced sleep quality in a duration-dependent manner and daytime dysfunction. The prevalence of global Pittsburgh Sleep Quality Index (PSQI) score was the highest in the workers with overtime hours of ≥50 hours a week (7). Certain working environments or job tasks may affect sleep quality. For instance, academic staff in a university in Japan were found to be in poor mental health due to occupational stress and ineffective coping style. Female and younger academic staff had a higher tendency to be affected. Lower job satisfaction and job control among academic staff in the university led to anxiety and insomnia (8). Work-related stress was also found

among public universities' academic staff in a previous study conducted in Malaysia which was mainly due to performance pressure, role ambiguity, homework interface and workload pressure (9). Meanwhile, poor sleep quality was strongly associated with perceived stress and job dissatisfaction (10).

The prevalence of insomnia among the working population is increasing across the world including in countries like Finland and Australia (11,12). To date, limited studies pertaining to the prevalence of sleep quality have been conducted among working adults, such as academic staff in Malaysia. Many sleep-related studies have been focused on the shift workers such as police officers, nurses, and doctors (13-14). Sleep is very much essential for academic staff as they require high cognitive skills to carry out both teaching and research (15). Moreover, they have multiple roles as a lecturer, clinician, researcher, supervisor, academic advisor, consultant and even administrator, and play a central role in producing high-quality graduates. Therefore, this cross-sectional study investigated sleep quality and the association between sleep quality and basic demographic profile among academic staff of Universiti Tunku Abdul Rahman (UTAR), a private university in Malaysia.

MATERIALS AND METHODS

This study was approved for a year by UTAR Scientific and Ethical Review Committee (U/SERC/66/2017). The academic staff number of the UTAR Kampar Campus, Malaysia was non-stationary throughout the data collection period, but it was 632 at the beginning of the study in 2018. The sample size was calculated based on the prevalence of poor sleep quality with symptoms of insomnia among adults in Malaysia (6). The inclusion criterion of the study was all the teaching staff in the Kampar campus, but deans and deputy deans were excluded as they involve more in the administrative work than teaching. A total of 430 randomly chosen staff were approached during the working days of the teaching semester. Written informed consent was obtained from all the selected subjects in accordance with the Declaration of Helsinki and Malaysian Good Clinical Practice Guidelines. Their sleep pattern and basic demographic profile such as age, gender, ethnicity and education status of both men and women aged 21 and above were studied.

Quality of sleep was measured by the validated English version of the PSQI questionnaire. This self-rating instrument contains 19 questions which are combined to form seven component scores. They are [1] subjective sleep quality, [2] sleep latency, [3] sleep duration, [4] habitual sleep efficiency, [5] sleep disturbances, [6] use of sleeping medications, and [7] daytime dysfunction. These components of the PSQI are the standardised versions of areas routinely assessed in clinical interviews of patients with sleep complaints. Each item is weighted on a 0 to 3 interval scale. The seven component scores were then totalled up to produce a global PSQI score (maximum 21 points). The global PSQI score was used to distinguish between poor sleep quality (a score of six or higher) and good sleep quality (a score of five or lower). A global PSQI score of more than 5 yielded a diagnostic sensitivity of 89.6 % and a specificity of 86.5 % for the diagnosis of primary insomnia or clinically relevant pathological sleep (16).

Statistical Analysis

Values are expressed in means with standard deviations for continuous variables and numbers (percentages) for categorical variables. IBM SPSS Statistics for Windows software version 21.0 was used to analyse the data. χ^2 statistical test was used to assess the association between two categorical variables and Pearson correlation test between two continuous variables. Independent T-test was used to compare the means of two continuous variables, and a one-way ANOVA test was used for more than two groups. Statistical significance was set at $P<0.05$. Tukey post hoc test was conducted to further identify the significance between the groups.

RESULTS

Out of 430 randomly chosen academic staff, 344 (80 %) responded in this cross-sectional study. Table I shows the demographic data and the PSQI scores and sub-scores. The sample taken consisted of 154 (44.8 %) male staff and 190 (55.2 %) female staff. They were in the age groups of 23–75 years with a mean age of 38.0 ± 9.1 years. For the ethnicity, most of them were Chinese (61.6 %). The rest of the ethnicity categories such as Malay, Indians and others were grouped as non-Chinese. The majority of the subjects were lecturers and specialists (59.0%) and belonged to the Faculty of Business and Finance (32.8 %). Table II shows the prevalence of poor sleep quality and its association with the demographic categories. In the screening, 42.7% of academic staff were affected by poor sleep quality. On average, the sleeping duration for the academic staff was 6.68 ± 1.24 hours.

Overall, age was not correlated with the global PSQI scores ($r = - 0.042$, $P = 0.437$). Neither gender, age group, ethnicity, professional position nor faculty had differences in terms of PSQI scores and were associated with sleep quality. However, certain components in the questionnaires showed significant results where females had poorer subjective sleep quality (Component 1) than males (*P=0.027) although there was no significant difference in the total sleeping hours (TSH) between the gender.

There were no statistically significant differences between the age groups for most of the components as well as the global PSQI score except for Component 6

Table I: The demographic data and the PSQI scores and sub-scores

	N	Age (Mean ± SD)	PSQI Global Score (Mean ± SD)	TSH (Mean ± SD)	PSQI Component Score (Mean ± SD)						
					C1	C2	C3	C4	C5	C6	C7
Overall	344	38.0 ± 9.1	5.4 ±3.03	6.68 ± 1.24	1.06 ± 0.82	0.92 ± 0.91	0.97 ± 0.73	0.54 ± 0.99	1.08 ± 0.49	0.12 ± 0.50	0.79 ± 0.73
Gender											
Male	154 44.8 %	40.20 ± 10.52	5.30 ± 3.02	6.69 ± 1.33	0.95 ± 0.74	0.89 ± 0.93	0.99 ± 0.72	0.49 ± 1.00	1.03 ± 0.49	0.17 ± 0.57	0.78 ± 0.73
Female	190 55.2 %	36.20 ± 7.28	5.49 ± 3.04	6.67 ± 1.16	1.15 ± 0.86	0.95 ± 0.89	0.95 ± 0.74	0.57 ± 0.98	1.12 ± 0.49	0.08 ± 0.44	0.79 ± 0.73
P Value		<0.001***	0.551	0.903	0.027*	0.522	0.605	0.454	0.098	0.108	0.897
Age											
40 and below	249 72.4 %	33.53 ± 3.48	5.45 ± 3.08	6.72 ± 1.22	1.10 ± 0.83	0.94 ± 0.91	0.94 ± 0.72	0.59 ± 1.00	1.08 ± 0.50	0.06 ± 0.31	0.77 ± 0.73
41 and above	95 27.6 %	49.69 ± 8.83	5.29 ± 2.90	6.57 ± 1.28	0.97 ± 0.78	0.88 ± 0.90	1.04 ± 0.74	0.40 ± 0.93	1.08 ± 0.48	0.27 ± 0.79	0.82 ± 0.73
P Value		-	0.671	0.333	0.193	0.612	0.270	0.098	0.948	0.012*	0.570
Ethnicity											
Malay, Indian and Others	132 38.4 %	36.88 ± 8.39	5.54 ± 3.02	6.58 ± 1.37	1.07 ± 0.82	0.94 ± 0.93	1.06 ± 0.80	0.64 ± 1.06	1.07 ± 0.53	0.16 ± 0.62	0.70 ± 0.67
Chinese	212 61.6 %	38.69 ± 9.44	5.33 ± 3.03	6.75 ± 1.15	1.06 ± 0.81	0.92 ± 0.89	0.92 ± 0.68	0.47 ± 0.93	1.09 ± 0.47	0.09 ± 0.41	0.83 ± 0.76
P Value		0.072	0.527	0.222	0.898	0.809	0.071	0.127	0.696	0.287	0.097
Education Status											
PhD Holders	101 29.4 %	40.39 ± 10.29	4.90 ± 2.85	6.75 ± 1.14	0.88 ± 0.79	0.76 ± 0.84	0.91 ± 0.66	0.50 ± 0.98	1.04 ± 0.51	0.13 ± 0.54	0.68 ± 0.73
Non-PhD Holders	243 70.6 %	37.00 ± 8.35	5.62 ± 3.07	6.65 ± 1.28	1.14 ± 0.81	0.99 ± 0.93	1.00 ± 0.75	0.56 ± 0.99	1.10 ± 0.49	0.12 ± 0.48	0.83 ± 0.72
P Value	0.140	0.02*	0.045*	0.504	0.008**	0.032*	0.325	0.605	0.312	0.821	0.095
Professional Position											
Tutors and Assistant Lecturers	36 10.5 %	33.22 ± 6.39	5.28 ± 2.92	6.78 ± 1.22	1.17 ± 0.85	0.78 ± 0.83	0.92 ± 0.84	1.05 ± 0.58	1.06 ± 0.58	0.06 ± 0.23	0.78 ± 0.68
Lecturers and Specialists	203 59.0 %	37.21 ± 8.21	5.71 ± 3.10	6.65 ± 1.24	1.13 ± 0.81	1.03 ± 0.94	1.00 ± 0.73	1.11 ± 0.47	1.11 ± 0.47	0.13 ± 0.52	0.85 ± 0.75
Senior Lecturers	11 3.2 %	44.18 ± 11.64	4.82 ± 3.52	6.41 ± 1.99	1.00 ± 0.77	1.00 ± 1.10	1.00 ± 0.89	0.91 ± 0.30	0.91 ± 0.30	0.00 ± 0.00	0.55 ± 0.52
Assistant Professors	83 24.1 %	39.25 ± 8.61	4.78 ± 2.75	6.77 ± 1.11	0.92 ± 0.81	0.73 ± 0.78	0.92 ± 0.65	1.04 ± 0.53	1.04 ± 0.53	0.06 ± 0.36	0.70 ± 0.73
Associate Professors and Professors	11 3.2 %	52.45 ± 14.22	5.55 ± 3.17	6.64 ± 1.36	0.64 ± 0.67	0.82 ± 1.08	1.00 ± 0.77	1.09 ± 0.54	1.09 ± 0.54	0.63 ± 1.21	0.45 ± 0.52
P Value		<0.001***	0.194	0.854	0.104	0.110	0.905	0.500	0.563	0.006**	0.175
Faculty											
Science	59 17.2 %	39.22 ± 8.69	5.58 ± 3.00	6.51 ± 1.13	1.12 ± 0.77	0.86 ± 0.88	1.02 ± 0.63	0.51 ± 0.92	1.10 ± 0.52	0.03 ± 0.18	0.93 ± 0.78
Engineering and Green Technology	32 9.3 %	42.66 ±13.36	5.47 ± 3.56	6.52 ± 1.34	0.94 ± 0.95	0.88 ± 1.01	1.09 ± 0.82	0.47 ± 0.92	0.94 ± 0.50	0.34 ± 0.90	0.81 ± 0.78
Business and Finance	113 32.8 %	37.52 ± 7.46	5.86 ± 3.14	6.69 ± 1.41	1.10 ± 0.77	1.07 ± 1.02	0.96 ± 0.77	0.67 ± 1.06	1.15 ± 0.47	0.13 ± 0.49	0.80 ± 0.71
Arts and Social Science	48 14.0 %	35.33 ± 8.04	4.85 ± 2.99	6.81 ± 1.17	0.98 ± 0.86	1.02 ± 0.86	0.90 ± 0.75	0.52 ± 0.99	1.13 ± 0.53	0.02 ± 0.14	0.75 ± 0.81
Information and Communication Technology	31 9.0 %	38.87 ± 8.69	5.03 ± 2.77	6.71 ± 0.96	0.94 ± 0.77	0.90 ± 0.70	0.97 ± 0.66	0.39 ± 0.92	1.00 ± 0.37	0.13 ± 0.56	0.71 ± 0.69
Institute of Chinese Studies	8 2.3 %	43.75 ± 7.48	5.75 ± 1.58	6.56 ± 0.73	1.25 ± 0.46	0.75 ± 0.71	1.13 ± 0.35	0.75 ± 1.39	1.13 ± 0.35	0.00 ± 0.00	0.75 ± 0.46
Centre for Foundation Studies	53 15.4 %	35.87 ± 9.58	4.89 ± 2.76	6.83 ± 1.17	1.11 ± 0.91	0.66 ± 0.76	0.91 ± 0.77	0.40 ± 0.84	1.00 ± 0.55	0.15 ± 0.60	0.66 ± 0.65
P Value		0.002**	0.375	0.776	0.796	0.194	0.876	0.610	0.258	0.095	0.613

Total sleeping hours (TSH), subjective sleep quality (C1), sleep latency (C2), sleep duration (C3), habitual sleep efficiency (C4), sleep disturbances (C5), use of sleeping medications (C6) and daytime dysfunction (C7); significance at P value * indicates <0.05, ** indicates <0.01, *** indicates <0.001.

Table II: The prevalence of poor sleep quality and its association within the demographic categories

	Good Sleep Quality	Poor Sleep Quality	*P* Value
Overall	197 57.3 %	147 42.7 %	–
Gender			
Male	91 59.1 %	63 40.9 %	0.584
Female	106 55.8 %	84 44.2 %	
Age Category			
40 and below	144 57.8 %	105 42.2 %	0.412
41 and above	53 55.8 %	42 44.2 %	
Ethnicity			
Malay, Indian and Others	77 58.3 %	55 41.7 %	0.823
Chinese	120 56.6 %	92 43.4 %	
Education Status			
Ph.D. Holders	64 63.4 %	37 36.6 %	0.152
Non-Ph.D. Holders	133 54.7 %	110 45.3 %	
Professional Position			
Tutors and Assistant Lecturers	18 50.0 %	18 50.0 %	
Lecturers and Specialist	112 55.2 %	91 44.8 %	
Senior Lecturers	7 63.6 %	4 36.4 %	0.320
Assistant Professors	55 66.3 %	28 33.7 %	
Associate Professors and Professors	5 45.5 %	6 54.5 %	
Faculty			
Science	35 59.3 %	24 40.7 %	
Engineering and Green Technology	19 59.4 %	13 40.6 %	
Business and Finance	57 50.4 %	56 49.6 %	
Arts and Social Science	30 62.5 %	18 37.5 %	0.617
Information and Communication Technology	21 67.7 %	10 32.3%	
Institute of Chinese Studies	4 50.0 %	4 50.0 %	
Centre for Foundation Studies	31 58.5 %	22 41.5 %	

where 41 and above age group took sleep medication more than the younger age group. Similarly, a significant mean difference was shown in the professional position category for the same component. Associate professors and professors tended to consume more sleep medication than the other positions.

In this study, the academic staff were divided into Doctor of Philosophy (Ph.D.) holders and non-Ph.D. holders who are with the degree of bachelor and/or master. Overall, the global PSQI score was significantly higher in non-Ph.D. holders (P=0.045). Non-Ph.D. holders had poorer subjective sleep quality (P=0.008) and sleep latency (P=0.032) compared to Ph.D. holders.

DISCUSSION

PSQI can be a sensitive, reliable, and valid outcome assessment tool to be used in community-based studies of primary insomnia and able to produce a coherent result (14,17). The prevalence of insomnia among workers who are not on alternating shifts has been estimated to be 5–45 %. The prevalence of poor sleep quality among the general population worldwide is 30-35 % (4). The prevalences of insomnia or poor sleep quality are 15 % for China, 39.4 % for Hong Kong and 33.8 % for Malaysia (6, 18,19). However, the prevalence rate could be varied due to confounding factors such as sampling method, methods to measure sleep quality and response rate. TSH or average sleep duration recorded was at 6.68 hours in this study. The TSH among the staff was almost similar to the findings among academic staff of a university in Indonesia with an average sleep duration of 6.7 hours (20). The sleeping duration was also similar/less than Australia but longer than the USA as they had lesser than 6 hours of sleep (12, 21). However, sleep problem was considered an endemic problem in Australia (12).

The result of the study is consistent with a meta-analysis of the prevalence of insomnia in China where no gender difference was reported (18). A study done by Yoshioka and colleagues (22) in Japan showed that the significant difference in the prevalence of insomnia between the gender was wiped out when the family characteristics and paid work was adjusted. Although the TSH was not significantly different between men and women in this study, the subjective sleep quality was lower in women suggesting that women were not satisfied with their sleep experience or desired more sleep. Irrespective of age, women probably need a longer sleep duration (8 hours) than men (7.37 hours). The sleep deficit recorded was around 28.8 min (23-24). A British leading expert on sleep stated that women need 20 minutes longer TSH than men due to their brain complexity and multitasking ability (25). Desiring more sleep may indicate the need for time out not sleep deficit. Anderson and Home also revealed that sleep insufficiency was related more to stressful life than daytime sleepiness (24). Moreover, depressive symptoms tend to occur with higher component scores of subjective sleep quality in women. Nevertheless, sleep quality can be independently associated with depressive symptoms in both males and females (13).

Contradict to the typical belief that older folks have more sleeping problems, this study showed that there is no association between age group and prevalence of poor sleep quality or no correlation between age and global PSQI score although it is inconclusive as only 15

staff in total or 4.4 % were in the elderly group aged 60 and above. Cao et al. (18) showed that the prevalence of insomnia was even higher in younger adults (age<43.7) comparatively (19). This could be due to long working hours, career stress and over usage of computers and smartphones. In a study conducted among university academic staff, age and years of teaching experience were negatively correlated with insomnia and anxiety, implying junior staff were affected by mental health and sleep (8). Generally, academic staff were found to be fatigued even at the beginning of their working day and the fatigue level was negatively correlated with sleep duration (20). Besides, the usage of sleep medication was significantly higher in the age group of 41 and above. Elderly people are usually more accessible to health professionals and insist on sleeping medications as a relief for sleeping problems although there are similar effective alternative treatments like behavioural intervention (26).

In Malaysian public universities, Ph.D. holders accounted for 37 % of their total academic staff while private universities and colleges were only able to achieve 13% of academic staff with Ph.D. in 2014 (Malaysia Education Blueprint 2015-2025) (27). According to the Malaysia National Higher Education Action Plan, at least 75 % of lecturers in the research universities and 60 % in other universities are expected to have Ph.D. qualifications (28). In this study, only 29.4 % of the samples were Ph.D. holders in UTAR Kampar Campus. Thus, most of the academic staff have to pursue their Ph.D., especially on a part-time basis in private institutions including UTAR to sustain their career. This contributes to more occupational stress. When education status was compared within the same profession in an organisation, staff with lower paper qualifications or educational degrees had a higher risk of sleep disturbances (14). This explains why the global PSQI score in non-Ph.D. holders was significantly higher than the Ph.D. holders and the same trend was observed in subjective sleep quality as well as in sleep latency. The mean age of the former group was also significantly lower than the latter and this is not surprising as newly joined UTAR academic staff especially those involved in teaching bachelor or advanced degrees have to pursue their Ph.D. studies within two years of commencement of work. In another study, poor sleep quality was strongly associated with younger age and lower academic attainment in white-collar workers (29). Moreover, job satisfaction of academic staff in higher institutions in Malaysia was at a moderate level and this was due to their position in the institution as well as their salary and age (30).

Poor sleep quality might affect both work and personal or family life. More than one-fifth of the academic staff in two leading Malaysian public universities (22.1 % for Universiti Malaya and 23.3 % for Universiti Sains Malaysia) were found to have occupational stress. Non-Malays were more stressful than Malays. The most work-related stressor was found to be career development (salary and rewards), followed by research and teaching (15). Research has been an essential component to be fulfilled by each academic staff to get promoted. However, research including publication not only needs funding, but it is also a protracted process and one might get to work more than the standard 8 hours to achieve the expected work performance.

There could be other contributing factors that may affect their sleep quality in these subjects such as common medical conditions and other prescribed medications. People with medical conditions such as asthma (30), hypertension (10), and gastroesophageal reflux disease (31) were found to have poor sleep quality. Certain common medications such as beta-blockers, diuretics, corticosteroids and histamine blockers, as well as some sleep medications, may affect one's sleep in the long run (32). Many respondents were not aware of their poor sleep quality until they participated in the screening. Simple lifestyle changes like exercising, controlling diet, reducing emotional stress and having a good sleep environment may pose marked changes in sleep quality as well as the consequences of sleep problems (33). Thus, awareness about poor sleep quality and its associated pathological disorders should be raised.

Limitations and strengths

The majority of the respondents were Chinese and had limited generalizability as only one university was involved. Besides, the analysis was conducted at the univariable level without controlling for potential confounders. Nevertheless, this study does have a number of strengths. Randomized sampling was used and the study instrument, PSQI is highly validated for measuring sleep quality although using this questionnaire might have recall bias as it required recording symptoms experienced in the past one month. To our acquaintance, our study is the first to use the PSQI in studying sleep quality among academic staff in Malaysia. Thus, it provides new findings regarding academic staff in the university, a population that has been less studied in the literature. The finding of this study is preliminary, yet it can act as a basis for broader and empirical research. Health status, work performance and workload pressure and teaching experiences may act as confounding factors for sleep quality and thus can be studied in the future. As recommendation, tt is necessary to find out possible risk factors associated with the sleep quality of academic staff and compared them with other institutions to reach an apposite conclusion.

CONCLUSION

Poor sleep quality is more prevalent (42.7 %) than the previous study conducted in the country. Lack of sleep quality not only can affect health and social life but also workplace functioning. In the future, poor sleep quality

could be an economic burden directly from health issues and indirectly like reduced productivity and work absenteeism. Good sleep is not a current priority of our nation, yet it has been linked to our key national health priority, metabolic syndromes such as diabetes, obesity and cardiovascular disease. Awareness and measures to control the prevalence of poor sleep quality should be instigated.

ACKNOWLEDGEMENTS

This study was supported by UTAR Research Fund (project number: IPSR/RMC/UTARRF/2017-C1/K03). The funding body had no roles in the conception of the study, collection, analysis, and interpretation of data, and in writing the manuscript.

REFERENCES

1. Roth T. Insomnia: definition, prevalence, etiology, and consequences. Journal of Clinical Sleep Medicine. 2007;3(5 suppl):S7-10. doi: 10.5664/jcsm.26929
2. Harvey AG, Stinson K, Whitaker KL, Moskovitz D, Virk H. The subjective meaning of sleep quality: a comparison of individuals with and without insomnia. Sleep. 2008;31(3):383-393. doi: 10.1093/sleep/31.3.383
3. Budhiraja R, Roth T, Hudgel DW, Budhiraja P, Drake CL. Prevalence and polysomnographic correlates of insomnia comorbid with medical disorders. Sleep. 2011;34(7):859-67. doi: 10.5665/SLEEP.1114
4. Morin CM, Drake CL, Harvey AG, Krystal AD, Manber R, Riemann D, et al. Insomnia disorder. Nature Reviews Disease Primers. 2015;1(1):1-8. doi: 10.1038/nrdp.2015.26
5. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. Journal of Clinical Sleep Medicine. 2015;11(6):591-2. doi: 10.5664/jcsm.4758
6. Zailinawati AH, Ariff KM, Nurjahan MI, Teng CL. Epidemiology of insomnia in Malaysian adults: a community-based survey in 4 urban areas. Asia Pacific Journal of Public Health. 2008;20(3):224-33. doi: 10.1177/1010539508316975
7. Nakashima M, Morikawa Y, Sakurai M, Nakamura K, Miura K, Ishizaki M, et al. Association between long working hours and sleep problems in white-collar workers. Journal of Sleep Research. 2011;20(1pt1):110-6. doi: 10.1111/j.1365-2869.2010.00852.x
8. Kataoka M, Ozawa K, Tomotake M, Tanioka T, King B. Occupational stress and its related factors among university teachers in Japan. Health. 2014;6(5):299-305. doi: 10.4236/health.2014.65043
9. Ahsan N, Abdullah Z, Fie DY, Alam SS. A study of job stress on job satisfaction among university staff in Malaysia: Empirical study. European Journal of Social Sciences. 2009;8(1):121-31.
10. Doi Y, Minowa M, Tango, T. Impact and correlates of poor sleep quality in Japanese white-collar employees. Sleep. 2003;26(4):467-471. doi: 10.1093/sleep/26.4.467
11. Kronholm E, Partonen T, Härmä M et al. Prevalence of insomnia-related symptoms continues to increase in the Finnish working-age population. Journal of Sleep Research. 2016;25(4):454-7. doi: 10.1111/jsr.12398
12. Adams RJ, Appleton SL, Taylor AW, Gill TK, Lang C, McEvoy RD, et al. Sleep health of Australian adults in 2016: results of the 2016 Sleep Health Foundation national survey. Sleep Health. 2017;3(1):35-42. doi: 10.1016/j.sleh.2016.11.005
13. Slaven JE, Mnatsakanova A, Burchfiel CM, et al. Association of sleep quality with depression in police officers. International Journal of Emergency Mental Health. 2011;13(4):267-277.
14. Chen PH, Kuo HY, Chueh KH. Sleep hygiene education: efficacy on sleep quality in working women. Journal of Nursing Research. 2010;18(4):283-9. doi: 10.1155/2013/283490
15. Noor A. Occupational stress and its associated factors among academician in a research university, Malaysia. Malaysian Journal of Public Health Medicine. 2016;16:81-91.
16. Buysse DJ, Reynolds III CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Research. 1989;28(2):193-213. doi: 10.1016/0165-1781(89)90047-4
17. Tsai PS, Wang SY, Wang MY, Su CT, Yang TT, Huang CJ, et al. Psychometric evaluation of the Chinese version of the Pittsburgh Sleep Quality Index (CPSQI) in primary insomnia and control subjects. Quality of Life Research. 2005;14:1943-52. doi: 10.1007/s11136-005-4346-x
18 Cao XL, Wang SB, Zhong BL, Zhang L, Ungvari GS, Ng CH, Li L, Chiu HF, Lok GK, Lu JP, Jia FJ. The prevalence of insomnia in the general population in China: a meta-analysis. PLoS One. 2017;12(2):e0170772. doi: 10.1371/journal.pone.0170772
19. Wong WS, Fielding R. Prevalence of insomnia among Chinese adults in Hong Kong: a population-based study. Journal of Sleep Research. 2011;20(1pt1):117-26. doi: 10.1111/j.1365-2869.2010.00822.x
20. Yogisutanti G, Kusnanto H, Setyawati L, Ok SP. Sleeping Duration, Breakfast habits and Fatigue in Lecturer. Conference: 3rd International Nursing Conference 2012.
21. Centers for Disease Control and Prevention (CDC). Short sleep duration among workers--United States, 2010. MMWR. Morbidity and mortality

weekly report. 2012;61(16):281-5.
22. Yoshioka E, Saijo Y, Kita T, Satoh H, Kawaharada M, Fukui T, et al. Gender differences in insomnia and the role of paid work and family responsibilities. Social Psychiatry and Psychiatric Epidemiology. 2012;47:651-62. doi: 10.1007/s00127-011-0370-z
23. Tonetti L, Fabbri M, Natale V. Sex difference in sleep-time preference and sleep need: A cross-sectional survey among Italian pre-adolescents, adolescents, and adults. Chronobiology International. 2008;25(5):745-59. doi: 10.1080/07420520802394191
24. Anderson C, Horne JA. Do we really want more sleep? A population-based study evaluating the strength of desire for more sleep. Sleep Medicine. 2008;9(2):184-7. doi:10.1016/j.sleep.2007.02.006
25. Elkins L. Who really needs more sleep—men or women? One of Britain's leading sleep experts says he has the answer [The Daily Mail];2010 [cited 2019 December 25]. Available from: https://www.dailymail.co.uk/health/article-1246029/Who-REALLY-needs-sleep--men-women-One-Britains-leading-sleep-experts-says-answer.html.
26. Olfson M, King M, Schoenbaum M. Benzodiazepine use in the United States. JAMA psychiatry. 2015;72(2):136-42. doi: 10.1001/jamapsychiatry.2014.1763
27. Ministry of Education, Malaysia. Malaysia Education Blueprint 2015-2025 (Higher Education). Kuala Lumpur: Ministry of Education Malaysia; 2019 [cited 2019 August 25]. Available from: http://mohe.gov.my/en/download/awam/penerbitan/pppm-2015-2025-pt/5-malaysia-education-blueprint-2015-2025-higher-education/file.
28. Ministry of Higher Education, 2011. Pelan Tindakan Pengajian Tinggi Negara Fasa 2 (2011-2015). Kuala Lumpur: Ministry of Higher Education Malaysia; 2015 [cited 2019 December 12]. Available from: https://drjj.uitm.edu.my/DRJJ/OBE%20FSG%20Dec07/OBEJan2010/MOHE-2011-2015-psptn-fasa2.pdf.
29. Noordin F, Jusoff K. Levels of job satisfaction amongst Malaysian academic staff. Asian Social Science. 2009;5(5):122-8. doi: 10.5539/ass.v5n5p122
30. Braido F, Baiardini I, Ferrando M, Scichilone N, Santus P, Petrone A, et al. The prevalence of sleep impairments and predictors of sleep quality among patients with asthma. Journal of Asthma. 2021;3,58(4):481-7. doi: 10.1080/02770903.2019.171139
31. Vela MF, Kramer JR, Richardson PA, Dodge R, El-Serag HB. Poor sleep quality and obstructive sleep apnea in patients with GERD and Barrett's esophagus. Neurogastroenterology & Motility. 2014;26(3):346-52. doi: 10.1111/nmo.12265
32. Honkus, Vicky L, MSN RN. Sleep deprivation in critical care units. Critical Care Nursing Quarterly. 2003;26(3):179-191. doi: 10.1097/00002727-200307000-00003.
33. Chen PH, Kuo HY, Chueh KH. Sleep hygiene education: efficacy on sleep quality in working women. Journal of Nursing Research. 2010;18(4):283-9. doi: 10.1097/JNR.0b013e3181fbe3fd