Sleep Quality among the Geriatric Population residing in Northern Region of Malaysia

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ABSTRACT

Objectives: To assess sleep quality and to examine its related factors among the geriatric population in the northern region of Malaysia. **Methodology:** A cross-sectional study was conducted. A structured questionnaire consisting of 2 sections including Pittsburgh Sleep Quality Index (PSQI) was used. Data obtained were analysed using Statistical Packages for Social Sciences (SPSS) version 29.0. Descriptive statistics was used to present demographic data, medical conditions data, lifestyle data and PSQI score. Association between independent variable and dependent variables was tested using Pearson Chi-square test. The statistical significance was set at $p<0.05$. **Results:** The number of elderly people completing the survey was 392. The overall prevalence rates of poor sleep quality were 57.9% in the total sample. The mean PSQI score was 5.20 ± 1.975. Among the PSQI components, the highest mean score was poor subjective sleep quality (1.06 ± 0.487) and the lowest mean score was use of sleeping medication (0.96 ± 0.509). The finds show an association between age, medical conditions and coffee consumption with PSQI score. **Conclusion:** More than half of the respondents had poor sleep quality. The study emphasized needs to develop good sleeping habits and initiate a campaign relating to sleep.

Keywords: Sleep disorders; Sleep quality; Geriatrics; Pittsburgh Sleep Quality Index; Northern Malaysia.

INTRODUCTION

Sleep is a sedentary state of mind and body. It is characterized by altered consciousness, relatively inhibited sensory activity, reduced muscle activity and reduced interactions with surroundings. Sufficient amount of sleep is required for normal metabolic, hormonal and autonomic functioning. For normal cognitive and behavioral performance, an individual needs about 7 hours of sleep. The undisturbed and sound sleep hours help to maintain good mood, memory and cognitive performance [1]. When normal sleep patterns are disturbed, it refers to a group of conditions called sleep disorders. Sleep disorders involve problems which affect the quality, timing, and amount of sleep, causing daytime distress and impairment in functioning. Inadequate or non-restorative sleep can interfere with normal physical, mental, social, and emotional functioning [2].

There is an epidemiological survey reported that more than half of older adults are suffering from insomnia, and these subjects are often not recognized and undertreated [3]. This is because aging process is always correlated with an increasing prevalence of multimorbidity, polypharmacy, psychosocial factors affecting sleep, and certain primary sleep disorders [4]. Elderly people who have sleep problems typically have difficulty falling asleep, less time spent in the deeper stages of sleep, early-morning awakening and get less total sleep time [5].

There are various factors that causing sleeping disorders in the elderly. Among them are acute and chronic medical illness, comorbid disease, geriatric complications, medication effects, obesity and circadian rhythm shifts. All these conditions will shorten sleep time and thus impair sleep quality [3]. Besides, the use of caffeine, tobacco and alcohol will also interfere with sleep. Although sleep disorders are not usually causing life-threatening condition, decreased time of sleep associated with these disturbances may increase the risk of accident, fall and chronic fatigue. These may directly

affect the quality of life if the conditions remain untreated [6].

Although the prevalence of sleep disorders among elderly is high, up to 50% of cases are undiagnosed and undertreated [4]. This poses a serious risk as sleep disorder can be life-threatening. For example, obstructive sleep apnea can cause death if it remains untreated. As sleep apnea is associated with an increased risk of cardiovascular mortality, it can cause sudden death to a person [7]. Early detection of sleep disorders with receiving treatment improves a person's life.

Few studies have assessed the sleep quality of among the geriatric population in Malaysia majorly focusing on the residents of nursing home which revealed the poor sleep quality among the residents [8,9]. Studies on the geriatric sleep quality and the impact due to the disease states were limited to Malaysian population and there is a lack of research carried out to assess the sleep quality and identify sleep disorders among geriatric population in the northern region of Malaysia. The findings of this study help assess and identify sleep disorders among the target population. By carrying out this research, the sleep quality among the geriatric population in the northern region of Malaysia can be clearly understood. This study was focused to find the association of the comorbidities with sleep quality.

The assessment of sleep quality and identifying the sleep disorders are important to a person's living quality among the elders this study was conducted to assess the sleep disorders prevailing among the geriatric populations and to determine the medical conditions that interfere with their sleep, where the sleep quality among the study population can be clearly understood as the sleep disorders may not be deadly, but they may have an impact on a person's quality of life. This study focuses majorly on the geriatric individual's sleep quality as the published data on geriatric individuals living other than nursing homes in Malaysia are limited.

METHODS

A cross-sectional study was conducted in the northern region of Malaysia using structured questionnaire. Older adults above 60 years of age consenting to participate in the study were included. Residents out of northern region of Malaysia were excluded from this study. A total number of study sample was calculated to be of 384 using Raosoft Sample size calculator for a total population of 890,700 from the four states of northern Malaysia [95% confidence interval and 5% of margin of error]. Older adults above 60 years of age with no cognitive impairment were included in this study irrespective of their gender, participants not signed informed consent and incomplete data filling or repeated data were considered invalid and excluded from the study.

The questionnaire included 2 sections. Section I addressed the demographic characteristics of the participants. Section II covered the PSQI test. PSQI is a self-report questionnaire that assesses sleep quality over a 1-month time interval. PSQI consists of 19 self-rated questions. These 19 questions were then grouped into 7 components that produce one global score. The seven components of PSQI are subjective sleep quality (C1), sleep latency (C2), sleep duration (C3), habitual sleep efficiency score (C4), sleep disturbances (C5), use of sleeping medications (C6) and daytime dysfunction (C7). Each component was evaluated on a score range of 0-3. The 7 components were then summed to yield a global PSQI score, which had range of 0-21; higher scores indicate worse sleep quality. In this study, the PSQI cutoff threshold for defining poor sleep quality was set at a score of 5 or higher [10].

PSQI was self-administered and the study population were selected conveniently from each state to meet the required sample size. The questionnaire was distributed in English language to the participants. All the older adults ≥ 60 years from the northern region of Malaysia were included. Participants with any cognitive impairment and those who are less that 60 years old and not residing in the Northern region of Malaysia were excluded from the study.

Data was analyzed using Statistical Packages for Social Sciences (SPSS) version 29.0. Descriptive statistics was used to present demographic data, medical conditions data,

lifestyle data and PSQI score. Under descriptive summary statistics of data, frequency and percentage was calculated. Mean and standard deviation was calculated as well. Association between independent variable (gender, age, medical conditions, lifestyles) and dependent variables (PSQI score) were tested using Pearson Chi-square test. The data were normally distributed. The statistical significance was set at $p < 0.05$.

RESULTS

In Table 1, a total of 392 respondents from Northern region of Malaysia who met the inclusion criteria participated in the study. There was almost an equal participation of respondents from every state in Northern region of Malaysia (Perak, Penang, Kedah, Perlis) in this study, which were 112 (28.6%), 97 (24.7%), 98 (25%) and 85 (21.7%) for Perak, Penang, Kedah and Perlis respectively. A total of 51.5% of respondents were males. There was more male than female respondents for Perak state, which making up 61.6% of respondents. There were more female respondents than male respondents for both Penang and Perlis state, which making up 53.6% and 54.1% respectively. There was equal number of male and female respondents in Kedah state. There was 32.7%, 36.5%, 15.8%, 8.9%, 5.1% and 1.0% for respondents who aged 60 - 64, 65 - 69, 70 - 74, 75 - 79, 80 - 84, 85 - 89 respectively.

Table (1): Demographic Characteristics of Respondents.

Variables	Total (n=392)	Perak (n=112)	Penang (n=97)	Kedah (n=98)	Perlis (n=85)
Gender: n (%)					
Male	202 (51.5)	69 (61.6)	45 (46.4)	49 (50)	39 (45.9)
Female	190 (48.5)	43 (38.4)	52 (53.6)	49 (50)	46 (54.1)
Age: n (%)					
60 - 64	128 (32.7)	41 (36.6)	26 (26.8)	32 (32.6)	29 (34.1)
65 - 69	143 (36.5)	42 (37.5)	36 (37.1)	35 (35.7)	30 (35.3)
70 - 74	62 (15.8)	10 (8.9)	24 (24.8)	19 (19.4)	9 (10.6)
75 - 79	35 (8.9)	9 (8.0)	6 (6.2)	9 (9.2)	11 (12.9)
80 - 84	20 (5.1)	8 (7.2)	4 (4.1)	3 (3.1)	5 (5.9)
85 - 89	4 (1.0)	2 (1.8)	1 (1.0)	0 (0.0)	1 (1.2)

Table (2): PSQI Total and Content Domains Score.

Content Domains	Mean ± SD
Subjective sleep quality	1.06 ± 0.487
Sleep latency	0.93 ± 0.254
Sleep duration	0.76 ± 0.741
Habitual sleep efficiency	0.31 ± 0.754
Sleep disturbances	1.05 ± 0.300
Use of sleep medication	0.14 ± 0.460
Daytime dysfunction	0.96 ± 0.509
PSQI global score	5.20 ± 1.975

Sleep quality and sleep disturbances were assessed by using PSQI. Table 2 shows mean and standard deviation of the 7 different components of PSQI as well as the global PSQI score. The respondents reached a mean PSQI global score of 5.20 ± 1.975.

Table (3): Association Between Sociodemographic Characteristics, Medical Condition(s), Lifestyles and Global PSQI Score.

Variables	Score Distribution		*p* value
	Below mean (<5)	Above mean (≥5)	
Sociodemographic Characteristics			
State			
Perak	42	70	
Penang	33	64	0.460
Kedah	48	50	
Perlis	43	42	
Gender			
Male	93	109	0.696
Female	73	117	
Age			
60 - 64	60	68	
65 - 69	67	76	
70 - 74	27	35	< 0.001*
75 - 79	6	29	
80 - 84	5	15	
85 - 89	1	3	
Medical Condition(s)			
Hypertension	48	54	
High cholesterol	31	34	
Diabetes	10	19	
Hypertension + High cholesterol	18	48	< 0.001*
Hypertension + Diabetes	3	5	
High cholesterol + Diabetes	3	5	
Hypertension + High Cholesterol + Diabetes	0	7	
None	53	54	
Lifestyles			
Consuming tea			
Yes	48	74	0.330
No	118	152	
Consuming coffee			
Yes	28	71	< 0.001*
No	138	155	
Smoking			
Yes	17	23	0.467
No	149	203	

*Significant at p<0.05 using Pearson Chi-square test.

Table 3 shows the findings for the association between demographic characteristics, medical conditions, lifestyles and PSQI score. The mean PSQI score (5.20 ± 1.975) was used as cut point to distribute the respondents into two categories, namely "below mean" (scored less than 5) and "above or equal to mean" (scored more than or equal to 5). For demographic characteristics, the findings show no association between state and gender and PSQI score. However, there is an association between age and PSQI score. There is an association between medical conditions and PSQI score. For lifestyles, the findings show no association between tea consuming and smoker and PSQI score but showing an association between coffee consuming and PSQI score.

DISCUSSION

This study aimed to assess sleep quality and its contributing factors among geriatric population in northern region of Malaysia using PSQI test. The mean PSQI score among respondents was 5.20 ± 1.975 and 57.9% of the respondents scored ≥ 5, which indicates poor sleep quality. This is completely less than the previous studies conducted among nursing home residents in Malaysia with mean PSQI score of 6 and 7.1 respectively [8,9]. The overall prevalence rates of poor sleep quality were 57.9% in the total sample, 54% in men and 61.6% in women. Among the PSQI components, the highest mean scores were poor subjective sleep quality (1.06 ± 0.487) while the lowest mean score was use of sleeping medication (0.96 ± 0.509).

Adib-Hajbaghery et al. [11] conducted a study in Kashan, Iran, on hospitalized elderly people and found that the mean PSQI score was 7.3±5.6. Similarly, Öztürk et al. [12] study reported that the mean PSQI score was 7.76 ± 3.71. The two studies had a mean PSQI score higher than this study. This might be due to the difference in selecting the target participants. Different from selecting participants randomly, both the studies

selected hospitalized patients and diabetic patients as the study participants respectively. M. J. Park & Kim [13] study also reported that the PSQI mean score of the respondents was 8.57, which was greater than this study. This difference might be because the study was conducted on elderly people who were hospitalized while we selected our respondents randomly from outside of the hospital. It is noteworthy that elderly people who are in hospitals are older and have inadequate family and social support. Moreover, ward environment might have an impact on the sleep quality.

Study findings also revealed that age was directly correlated with PSQI score. In other words, elderly people had significantly lower sleep quality than young people. Previous studies revealed that the global PSQI score significantly increased as the age increased (p<0.001) [14]. Similarly, the results of this study also suggest that the global PSQI score significantly increased as the age of the respondents increase. Apart from the previous study, limited research has been conducted among geriatrics in the northern region of Malaysia. From this study, we could know the association between the sleep quality level and the age of the respondents in northern region of Malaysia. In this study, residential state and gender had no significant association with PSQI score.

Besides, there was association between medical conditions and sleep quality of the respondents. In this study, 72.7% of the respondents had either hypertension, high cholesterol, diabetes or two of the medical conditions or all the three medical conditions. It was found to be a significant factor associated with sleep quality among the respondents (p<0.001). In Bruno et al. [15] study, elderly hypertensive patients were involved in the study. The study found that global PSQI score > 5, was present in 38.2% of the studied population. According to Chiang et al. [16] study, elderly people with cardiometabolic risk factors such as diabetes,

hypertension and hyperlipidemia might have nocturia, which was a multifactorial condition and also one of the most disturbing and irritating lower urinary tract symptoms. The study showed that nocturia was associated with an increased risk of poor sleep quality in elderly people.

This study shows the findings for the association between coffee consuming and PSQI score. 25.3% of the respondents had habit of consuming coffee at least 3 times a week. Among them, 71.71% of the respondents had a PSQI score ≥ 5. In Clark & Landolt [17] study, the mean PSQI score was found to be 5.3 ± 2.5 among the respondents. Among 2696 respondents, 40% of them reported that they were moderate coffee consumers (1-4 cups/day within 6 h of bedtime), had a shorter sleep latency, fewer awakenings, and were more satisfied with their sleep quality than heavy coffee consumers (4%) or those abstained from caffeine (54%).

In a survey of 170 college students, those reporting habitual short sleep duration (< 6h) consumed 3.6 times more coffee daily than those who regularly slept for longer period of times (> 8h). In this sample, although it did not achieve significance statistical significance, it was reported that heavy caffeine consumers (> 8 cups/day) had poor subjective sleep quality when compared to light caffeine consumers (0-1 cup/day), However, in a larger sample study, it was found that the sleep duration decreased by 40 minutes on average when caffeine intake exceeded 8 cups/d. However, coffee consumption may affect more on sleep quality among elderly compared to young people as caffeine metabolism decreases when age increases [18].

The conducted study had several limitations. First of all, as the current study was conducted as a cross-sectional analysis of older adults, we were unable to establish a causal relationship between the variables studied or analyze behavior over a period of time; instead we could only make a prediction of sleep quality among elderly for a specific time period. There is a possibility that the association of sleep quality with a measured correlate could be affected by some other variable or variables. To overcome this, longitudinal studies shall be carried out to better understand these determinants of sleep quality and enhance the prediction of perceived sleep quality.

In this study, the findings have suggested an immediate need to promote good sleeping habits among geriatric population. There is need to include more social support from family members, especially for those who live with elderly people. Besides, relevant government agencies should pay attention on this problem by initiating a campaign relating to sleep to raise awareness regarding importance of sleep and the impact of sleep disorders among geriatric population. During the campaign, healthcare professionals can educate the older adults about their sleeping habits and how they can effectively change the way they sleep to improve their sleep quality.

CONCLUSION

Sleep quality among the geriatric population in northern region is poor which brings an attention for the policy makers and the care takers to motivate good sleeping habits among the geriatric individuals. Public awareness about the importance of quality sleep should be adequately inculcated through various means of education to the geriatric populations. Effective sleeping habits and sleep education are essential to promote good sleep among geriatric population to improve the quality of daily living.

Ethics Statement

This study was conducted in accordance with the Declarations of Helsinki's standards of ethics. This study was approved to be conducted by the Human Ethics Committee (AUHEC/FOP/2/09/03/2023) at AIMST University. All the study participants were included in this study after signing the

informed consent to state their willingness to participate in this study.

Data Availability

Study data are available with the corresponding author and will be produced on valid request.

Author's contributions

All the authors have equally contributed in conceptualizing, designing, data collection and analysis, Manuscript preparations.

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