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Sleep quality and psychosocial correlates among elderly attendees of an urban primary care centre in Malaysia

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Abstract

Sleep quality can vary in relation to one's general well-being and in the elderly, it is often affected by the presence of medical or psychological conditions. This study aims to determine the frequency of different components of sleep quality in the elderly, and their relationships with psychosocial and medical attributes. A cross-sectional study was conducted on 123 attendees aged 60 years and above at Pusat Perubatan Primer Universiti Kebangsaan Malaysia. Sleep quality and psychological distress were assessed using the validated Malay versions of Pittsburgh sleep quality index (PSQI) and Hamilton anxiety depression scale (HADS) respectively. Information on medical comorbidities and medications were obtained from the participants, their doctors and medical notes. Almost half of the patients experienced poor sleep quality (47.2%) which was significantly associated with older mean age (69.5 ±4.55). There was no statistical significance between sleep quality and other sociodemographic characteristics (gender, ethnicity and living arrangement). Most patients described their sleep quality as subjectively generally "fairly good" (69.1%) despite PSQI scores indicating poor sleep quality. A majority of the patients (59.3%) were on follow-up for 3 or more medical illnesses, with heart disease as the only medical comorbidity significantly associated with poor sleep quality. Most of them also complained of only "mild difficulty" with their sleep. Among the 7 sleep components of PSQI, "sleep disturbance" was the most frequent experience. Most experienced mild sleep disturbance (87.8%) and usage of hypnotic agents was low (6.5%). Only 23.6% of patients had significant psychological distress (HADS scores ≥ 8), with positive correlation with sleep quality.

INTRODUCTION

The term "Sleep quality" is still poorly defined and is often used to mean "sleep disturbance", "sleep disorder" and "insomnia" by researchers, clinicians and patients. Indeed, Buysse *et al.* defined "sleep quality" as a "complex phenomenon that is difficult to define and measure objectively."[1] For example, studies have shown that self-reported "sleep quality" often did not show association with "sleep quality" as defined in polysomnography studies.[2]

While poor sleep quality is a key feature of insomnia, investigations of sleep quality in patients with insomnia are lacking. Sleep quality study is essential because disturbances in sleep pattern in the elderly may have significant impact on their morbidity and mortality.[2-5] Insomnia has been linked to poor attention and concentration, slow response time and impairment in memory[6,7]; affecting driving, increase tendency to falls[8] as well as increased risk for heart disease, stroke and suicide.[9,10]

Sleep quality can vary in relation to one's general well-being and in the elderly, it is often affected by the presence of medical or psychiatric illnesses. Studies have shown that sleep quality is not directly related to sleep quantity only, but includes both quantitative and subjective aspects of sleep. Quantitative measures of sleep quality include sleep duration, time taken to fall asleep (sleep latency) and number of arousals during sleep. On the other hand, subjective measures of sleep quality include 'restfulness', or perceived 'depth' of sleep.[11,12]

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Poor sleep quality, often referred to as "sleep disturbance" is found in up to 55% of the elderly population and consistently increases with age,[13-15] There are multiple aetiologies that influence sleep quality in the elderly.[6] Among important factors are chronic medical illnesses, psychological influences and physiological age-related alterations in the circadian timing system.[3,7]

The elderly need as much sleep as younger adults. However they tend to experience different distribution of sleep patterns throughout the night.[16] The elderly experience more fragmented sleep-wake cycles and less total nighttime sleep due to more nighttime arousals and awakening which result in increased daytime sleepiness. Any complaint of significantly disrupted nighttime sleep or impaired daytime functioning due to excessive sleepiness should be investigated and treated.

Sleep deprivation is a major concern to health professionals in view of the consequences of insomnia which include depression, hypnotics or benzodiazepines misuse, cognitive impairment, daytime fatigue, reduced work performance, interpersonal relationship problems, increased health care utilization, impaired quality of life and traffic accidents.[3,5]

In view of its prevalence, consequences, and costs, poor sleep quality is a primary care concern for health professionals. Thus, this study was conducted to examine sleep quality of elderly individuals and to determine its relationship with their sociodemographic and clinical attributes, as well as psychological distress in a Malaysian urban cohort.

METHODS

This descriptive, correlational, cross-sectional study was conducted at the Pusat Perubatan Primer, Universiti Kebangsaan Malaysia (PPPUKM), Kuala Lumpur. PPPUKM is part of an extension of services provided by Universiti Kebangsaan Malaysia Medical Centre (UKMMC), a major teaching hospital in the Klang Valley. It is a primary care clinic serving the surrounding population within 20 km radius of UKMMC as well as for stable patients who have been discharged from UKMMC.

All elderly patients ('newly-referred' and 'old' cases) aged 60 years and above, attending PPPUKM for their medical illnesses follow-up were enrolled consecutively using the convenient sampling method. Patients who were too physically ill, had serious visual or hearing impairment, already diagnosed as having serious psychiatric disorders (for example, schizophrenia) or having possibility of a major neurocognitive disorder and unable to read or understand English or Malay language, were excluded from this study. Patient information sheets were distributed to the patients and explained before informed consents were obtained from them. Those who lacked cognitive capacity in understanding the study information sheet or refused to give their informed consent were also excluded.

Patients who were screened and detected to have poor sleep quality and significant depressive symptoms were referred to the psychiatric clinic for further assessment and treatment. This study had been approved by the UKMMC Ethics and Research Committee (UKM FF-210-2009) and was supported by a UKM study grant.

Socio-demographic data were assessed using a brief questionnaire to obtain information on age, gender, household living arrangement, comorbid medical conditions and usage of sleeping aids/ hypnotics. In this study, comorbid conditions were classified into the common types seen in PPPUKM: hypertension, diabetes mellitus, heart disease, arthritis, pulmonary diseases, stroke and others. However, as all these medical conditions could contribute to sleep problems, and occasionally present concomitantly, this study only analysed the numbers of medical conditions that patients had at the time of study. Information on medical comorbidities and medications use were obtained from the participants, their accompanying relatives and wherever possible, verified from the clinic records or their doctors.

Sleep quality was assessed using the validated Pittsburgh sleep quality index (PSQI)- Malay version. It is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval. PSQI is highly reliable as it has an internal consistency and reliability coefficient (Cronbach's alpha) of 0.83.[1] This questionnaire consists of 19 self-rated questions which assess a wide variety of factors relating to sleep quality. These 19 items are grouped into 7 components: 1) Subjective sleep quality; 2) Sleep latency; 3) Sleep duration; 4) Habitual sleep efficiency; 5) Sleep disturbances; 6) Use of hypnotic agent; and 7) Daytime dysfunction. Each component is graded from 0 to 3, or "no difficulty" to "severe difficulty" in each component. The 7 component scores are subsequently summed up to produce global PSQI scores which range between 0 to 21. Poor sleep quality is defined as scores greater than 5, and good sleep quality is defined

as scores of 5 and below.

The hospital anxiety and depression scale (HADS), was used to screen for the presence of symptoms of depression and anxiety (psychological distress). A score of 8 or more was considered as a probable case of anxiety and depression.[17] A Malay version of HADS had been validated and shown to have good psychometric properties among local cancer patients.[18]

Results from the study were analyzed using statistical package for social sciences (SPSS) Version 12. The information obtained from the socio-demographic data, PSQI and HADS questionnaire were analyzed using descriptive statistics. T test was used to assess the difference of age. Chi Square Test was used to assess relationship between poor sleep quality (based on global PSQI scores) and socio-demographic data and psychological stress (using HADS). Risk associations between dependent and independent variables were determined using odds ratio. Confidence interval of 95% and p value of less or 0.05 was considered significant.

RESULTS

Sociodemographic and clinical background

A total of 123 patients participated, with their ages ranging between 60.42 to 83.50 years and mean age of 69.15± 5.32 years. Majority of the study subjects were women (54.5%), Chinese (58.5%), living with their spouses and children (49.6%), suffering from hypertension (86.2%) and having more than 3 chronic medical conditions (59.3%) (Table 1)

Sleep quality

a. Distribution of sleep components of PSQI

The most common sleep component experienced was "mild sleep disturbance" (87.8%). Table 2 shows that in general, the majority of the patients experienced either "no difficulty" or only "mild

Table 1: Socio-demographic characteristics of the study subjects

Variables	N(123)	(%)
Gender		
Male	56	45.5
Female	67	54.5
Ethnicity		
Malay	45	36.6
Chinese	72	58.5
Indian	6	4.9
Household members		
Spouse & children± relatives	61	49.6
No spouse& children	31	25.2
Spouse	20	16.3
No spouse& relatives/friend	7	5.7
Alone	4	3.2
Medical Illnesses		
Hypertension	106	86.2
Arthritis	62	50.4
Dyslipidaemia	62	50.4
Diabetes mellitus	46	37.4
Heart disease	26	21.1
Urinary problems	25	20.3
Thyrotoxicosis	7	5.7
Others	36	29.3
Number of comorbid medical illness		
1 comorbidity	11	8.9
2 comorbidities	39	31.7
⩾3 comorbidities	73	59.3

Table 2: Distribution of sleep components of PSQI and their severity

Sleep Components	n (%)			
	No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty
Subjective sleep quality	21(17.1)	85(69.1)	12(9.8)	5(4.1)
Sleep latency	40(32.5)	47(38.2)	20(16.3)	16(13.0)
Sleep duration	16(13.0)	53(43.1)	21(17.1)	33(26.8)
Habitual sleep efficiency	61(49.6)	24(19.5)	12(9.8)	26(21.1)
Sleep disturbance	5(4.1)	108(87.8)	10(8.1)	0(0)
Use of hypnotic agent	119(96.7)	0(0)	0(0)	4(3.3)
Daytime dysfunction	100(81.3)	17(13.8)	6(4.9)	0(0)

difficulty" in all sleep components. The habitual sleep efficiency component of the PSQI revealed that most patients went to bed around 10 pm and arose between 5 to 6 am. They spent 7.15±1.38 hours in bed, averaging 5.68±1.51 hours per night. This result showed that patients spent an average of 1.47 hours lying in bed before actually sleeping.

b. Distribution of subjective sleep quality and causes of sleep disturbance

Most of the patients rated themselves as having "fairly good" sleep quality (69.1%), followed by "very good" subjective sleep quality (17.1%) (Table 2). The 2 most frequent causes of "severe" sleep disturbance were: having to get up to use the bathroom (58.5%), waking up in the middle of the night (30.1%) and difficulty to fall asleep or initiate sleep (21.1%) (Table 3).

Association between sleep quality and socio-demographic characteristics

PSQI defines "poor sleep quality" as scores greater than 5, and "good sleep quality" as scores of 5 and below. An independent-samples t-test was conducted to compare PSQI scores among them. There was significant difference in scores for study subjects with "good sleep quality" (mean 3.52 ±1.13) and "poor sleep quality" (mean

Table 3: Distribution of causes of sleep disturbance in study subjects

Causes of sleep disturbance	Severity, n (%)			
	Nil	Mild	Moderate	Severe
1. Have to get up to use bathroom	27(22.0)	14(11.4)	10(8.1)	72(58.5)
2. Wake up in the middle of night	60(48.8)	13(10.6)	13(10.6)	37(30.1)
3. Difficulty to fall asleep	59(48.0)	24(19.5)	14(11.4)	26(21.1)
4. Feel too hot	95(77.2)	10(8.1)	9(7.3)	9(7.3)
5. Have pain	101(82.1)	8(6.5)	5(4.1)	9(7.3)
6. Others	103(83.7)	11(8.9)	1(0.8)	8(6.5)
7. Cough or snore loudly	103(83.7)	12(9.8)	2(1.6)	6(4.9)
8. Cannot breathe comfortably	110(89.4)	6(4.9)	2(1.6)	5(4.1)
9. Had bad dreams	107(87.0)	12(9.8)	1(0.8)	3(2.4)
10. Feel too cold	112(91.1)	8(6.5)	1(0.8)	2(1.6)

Table 4: Association between sleep quality and socio-demographic characteristics

Variables	Good sleep quality	Poor sleep quality	n (100%)	t value	p value
Mean age	68.9±5.94	69.5±4.55		0.62	<0.05
Age group					
60-69	35(55.6)	28(44.4)	63	0.38	0.54
≥ 70	30(50)	30(50)	60		
Gender					
Male	34(60.7)	22(39.3)	56	χ^2=2.55	0.11
Female	31(46.3)	36(53.7)	67		
Ethnicity					
Malay	23(51.1)	22(48.9)	45	χ^2=0.12	0.94
Chinese	39(54.2)	33(45.8)	72		
Indian	3(50.0)	3(50.0)	6		
Living arrangement					
Spouse	10(50)	10(50)	20	χ^2=3.33	0.50
Spouse & Children	37(60.7)	24(39.3)	61		
No spouse, with Children	13(41.9)	18(58.1)	31		
No spouse, with relatives/ friends	3(42.9)	4(57.1)	7		
Alone	2(50)	2(50)	4		

Level of significance: p<0.05

8.95±2.34), with t value of 16.04 and p value of less than 0.0001.

The only significant statistical difference was between the sleep quality and mean age. "Poor sleep quality" was associated with older mean age (69.5 ±4.55) than "good sleep quality" (mean age 68.9±5.94), with t-value of 0.62 and p-value less than 0.05. There was no statistical significance between sleep quality and the rest of other characteristics (gender, ethnicity and living arrangement).

Association between sleep quality and chronic medical illnesses

Hypertension was the most common medical illness (86.2%). Among patients with heart disease, 65.4% of them were significantly associated with higher prevalence of poor sleep quality (χ^2=4.40. p=0.04). However, there was no significant association between sleep quality and other medical conditions (Table 5). Even though the number of patients on prescribed psychotropics as hypnotic agents was small, it was slightly higher among patients with poor sleep quality.

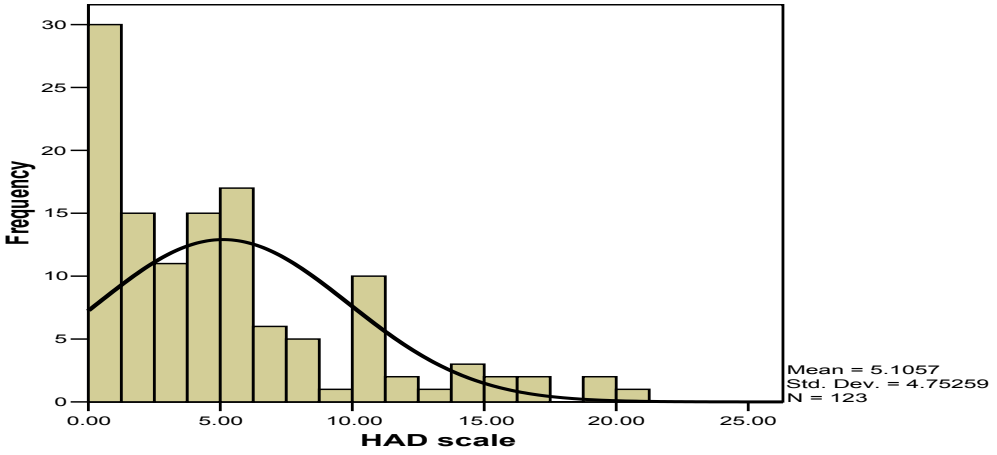
Association between sleep quality and level of psychological distress

The prevalence of patients with significant psychological distress (HADS scores ≥ 8) was 23.6%. Figure 1 showed the HADS scores were not normally distributed with most patients scoring below 8 and having a median score of 46. However, statistical analysis showed significant association between sleep quality and level of psychological distress with p value of 0.02 (Table 6).

DISCUSSION

Nearly half (n=58/123) (47.2%) of the elderly in this study reported poor sleep quality. This finding was higher than other reported studies done on healthy elderly population based samples by Buysse *et al.*[19] (31.9%), (37.3%)[15] and (28.9%).[5] This discrepancy was due to socio-demographic differences and the patients were elderly primary health care attendees, on treatment for acute or chronic medical illnesses.

More than half of them had 3 or more comorbidities. Acute and chronic medical illnesses (e.g arthritis, prostatic hypertrophy and pulmonary diseases) have been well established to trigger sleep disturbance.[20,21] Hypertension for example,



Median 4(IQR=3-11)

Figure 1. Distribution of hospital anxiety and depression scale (HADS) scores among respondents

Table 5: Association between sleep quality and comorbidities, and hypnotic agents

Variables	Good sleep quality, n (%)	Poor sleep quality, n (%)	n	χ^2value, p value	OR	95%CI
Comorbidities						
Hypertension	55 (51.9)	51 (48.1)	106	χ^2=0.28, p=0.59	-	-
No HPT	10 (58.8)	7 (41.2)	17			
T2DM	26 (56.5)	20 (43.5)	46	χ^2=0.40, p=0.53	-	-
No T2DM	39 (50.6)	38 (49.4)	77			
Heart disease	9 (34.6)	17 (65.4)	26	**χ^2=4.40, p=0.04**	2.5	1.05,6.36
No heart disease	56 (57.7)	41 (42.3)	97			
Arthritis	28 (45.2)	34 (54.8)	62	χ^2=2.96, p=0.08	-	-
No arthritis	37 (60.7)	24 (39.3)	61			
Urinary problem	10 (40)	15 (60)	25	χ^2=2.08,p=0.15	-	-
No	55 (56.1)	43 (43.9)	98			
Stroke	2 (25)	6 (75)	8	χ^2=3.49, p=0.17	-	-
No stroke	63 (54.8)	52 (45.2)	115			
Dyslipidaemia	32 (51.6)	30 (48.4)	6	χ^2=0.08, p=0.78	-	-
No	33 (54.1)	28 (45.9)	61			
Psychological	1 (20)	4 (80)	5	χ^2=2.26, p=0.13	-	-
No	64 (54.2)	54 (45.8)	118			
Thyrotoxicosis	2 (28.6)	5 (71.4)	7	χ^2=1.75, p=0.18	-	-
No	63 (54.3)	53 (45.7)	116			
Others	15 (48.4)	16 (51.6)	31	χ^2=1.04, p=0.31	-	-
No	50 (54.3)	42 (45.7)	92			
Number of co morbidities						
1 co morbidity	8 (72.7)	3 (27.3)	11	χ^2=3.99,p=0.14	-	-
2 co morbidity	24 (61.5)	15 (38.5)	39			
3 or more	33 (45.2)	40 (58.8)	73			
Psychotropic drugs						
Yes	1 (12.5)	7 (87.5)	8	χ^2=5.58, p=0.02	8.87	1.05,73.70
No	64 (55.7)	51 (44.3)	115			

Level of significance: p<0.05
HPT, hypertension; T2DM, Type 2 diabetes mellitus

Table 6. Association between sleep quality and level of psychological distress

Psychological distress	Good sleep quality	Poor sleep quality	N=123, n(%)	χ^2	P value	OR	95%CI
No	55(58.5)	39(41.5)	94(100)	5.32	0.02	2.68	1.12,6.39
Yes	10(34.5)	19(65.5)	29(100)				

Level of significance: p<0.05

which was the most common comorbidity in this study population, can affect patients' sleep through adverse effects of diuretics. Certain lipid soluble beta-blockers are often associated with adverse central nervous system side effects, such as insomnia, nightmares and depression.[22] Arthritis, second most common comorbidity in this study population, has been associated with more sleep complaints than healthy controls. Patients with arthritis often rated themselves as having poor self-rated health and physical functioning, and physical performance.[21] Heart disease was the only medical comorbidity significantly associated with poor sleep quality (p=0.04), probably attributed by the side effects of medication or discomforts of heart failure. It could also be one of the many medical conditions coexisting simultaneously among poor sleep quality patients (Table 5).

The mean age of 69.15±5.32 years among these patients was similar to those of previous studies.[23,24] Nearly three quarters of patients were living with either their children (70.7%) and/or with their spouse (66.7%), consistent with findings from other local surveys done among elderly Malaysians.[25,26] Such living arrangements might affect personal sleeping space, comfort and consequently affect their sleep quality.

The percentage of psychotropic agents used was much lower (3.3%) compared to that of an American study (46%) among medical patients which revealed the prescriptions indications were often undocumented and not correlated to patients' requests or with previous use of hypnotic agents.[27] This disparity in 'sleeping pill' use could be attributed by many local patients refusing its prescription out of fear of addiction. Another postulation is that most local patients tend to accept insomnia as part of ageing, not a medical problem.

In general, the elderly patients experienced little difficulty in all sleep components, including sleep latency or often called sleep initiation. In this study, the median time for sleep latency was 20 minutes (IQR 10-20). The patients spent longer time in bed (7.15±1.38 hours) than for actual sleep (5.68±1.51 hours) which was slightly shorter than what has been reported.[20]

However, among the 7 sleep components, almost half of the patients (43.9%) had moderate to severe difficulty with their sleep duration (less than 6 hours), which was higher in comparison to the elderly Chinese immigrants living in Seattle (33.7%) and elderly population of Shanghai and Beijing.[2,14] The average sleep duration (5.68 hours) was markedly reduced compared to independently living elderly population in Taiwan (7.09 hours).[5]

However, a study done among independently living elderly population in Shanghai and Beijing (both urban and suburban) showed that problems with sleep were associated with the sleep latency component, use of hypnotic agent followed by subjective sleep quality.[14] The differences in the findings are postulated to arise from several reasons. Firstly, the difference in terms of study setting in which this study was conducted in a teaching hospital. Thus the respondents have poorer health status as compared to independently living population of the comparative study. Secondly, the difference in multi-ethnic composition and socio-cultural practices of the respondents in this study may be a contributing factor as suggested in a study by Redline *et al.* who reported a difference of sleep architecture among different ethnic groups.[28] However, it was impossible to provide evidence for this hypothesis as this study was only a single centre study, not performed as a comparison between urban and rural areas.

In this study, the most common cause for disturbed sleep was 'having to get up to use bathroom' (58.5%), similar to the study by Hsu *et al*.[2] Ageing process has been known to be associated with age-related changes in the urinary system and renal function, for example, benign prostatic hyperplasia, detrusor overactivity and poorly controlled diabetes mellitus.[29] Such contributing factors were unfortunately not examined in this study due to the heterogenous medical background of the study population.

The proportions of early awakening (30.1%)

and difficulty to fall asleep (21.1%) among our study population were lower than those in another local study (42.0% and 42.7 respectively).[30] Differences in study methodology, including size samples (123 versus 1611) and study methods (universal versus random stratified sampling) might have contributed to the different findings.

The prevalence of poor sleep quality (47.2%) in this study was comparatively higher when compared to another local cross-sectional study done among government clinics and general practitioners attendees which reported a prevalence rate of 32.9% elderly with insomnia.[31]The differences in the findings could be contributed by different methodology adopted.

This study also found that, nearly half of patients with good subjective sleep quality were actually poor sleepers (poor sleep quality) based on the PSQI scores. A possible explanation was that a proportion of primary care attendees had different perceptions on sleep, that is, there was widespread belief that reduced sleeping time was the norm as an individual gets older. Hence, the common belief that sleep disturbance was an expected phenomenon among the elderly which did not require acute medical attention. Some patients did not even regard this as a legitimate complaint when this question was posed to them by their doctors.

In this study, there was a statistically significant association between sleep quality and level of psychological distress, despite less than a quarter of the patients had psychological distress (23.6%) with a median score of 4. Similarly, psychological distress has been shown to be related to severity of insomnia and help-seeking behaviour in primary care.[32,33] A study by Bluestein *et al.* showed a positive relationship between depressive symptoms and insomnia severity, whereby difficulty in sleeping increased with severe depression.[34] Unfortunately, patients screened positive for depression in this study were not assessed further for comorbid anxiety and depressive disorders.

There were a few limitations in this study. Among them, patients were merely screened for psychological distress (both symptoms of anxiety and depression). Unfortunately, patients with probable anxiety and depressive disorders (HADS scores >8) were not assessed further using validated diagnostic tools for comorbid anxiety and depressive disorders. Hence, the percentage of patients with separate anxiety and depression scores above 8 on the HADS were not available to be analysed.

Other limitations included the small sample size and single-centre study which rendered the results not comparable to the whole elderly population living in the community. Other sociodemographic characteristics like marital status, occupation and financial status were not studied.

In conclusion, in this study, most of the elderly attendees of PPPUKM (69.1%) rated themselves as having "fairly good" subjective sleep quality despite almost half of the patients (47.2%) actually experienced "poor sleep quality" as shown by scores of more than 5 on the PSQI. Most of them complained of only "mild difficulty" with their sleep and "sleep disturbance" was the most frequent nightly experience. A majority of them (59.3%) were on outpatient follow-up for 3 or more medical illnesses with heart disease as the only medical comorbidity significantly associated with poor sleep quality, probably due to the side effects of medications or the illness itself. There was significant relationship between sleep quality and psychological distress. Hence, questions on sleep quality should be routinely asked by clinicians or health workers as part of general health assessment of an elderly individual.

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DISCLOSURE

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