Sleep Quality among Residents and Fellows in Rajavithi Hospital

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Background: *Sleep is one of the basic needs of human beings and is important to their health. Medicine is one of the most stressful fields of education because of its highly demanding professional and academic requirements, and psychological stress and poor sleep are highly prevalent in resident and fellowship training; however, they are not well documented and have not yet been taken seriously.*

Objective: *This study aimed to determine the prevalence of poor sleep and associated factors in resident and fellowship training in Rajavithi Hospital, a tertiary referral hospital in Bangkok, Thailand.*

Material and Method: *This cross-sectional study was conducted between June and August 2015. The two hundred and fourteen participants were all residents or fellows in the academic year 2015. The data were collected using: 1) Demographics; 2) Suanprung stress test-20 items (SPST-20) modified by the Department of Mental Health, Ministry of Public Health, Thailand; 3) Health behavior; and 4) a Thai version of the Pittsburgh Sleep Quality Index (T-PSQI) questionnaire (score >5 indicates poor sleep). Binary logistic regression was used to identify factors associated with poor sleep status. This study was reviewed and approved by the ethics committee, Rajavithi Hospital.*

Results: *Most of the participants were female with mean age (±SD) of 28.87±2.55 years (range 25-41 years). Subjects studying in the 1st, 2nd and 3rd year accounted for 48.1%, 32.2% and 19.7% respectively, and 36.9% of participants were involved in shift work. The mean ± SD of SPST-20 scores was 15.57±8.27, and the prevalence of poor sleep quality was 54.7%. Factors associated with poor sleep were shifting work schedule (OR 2.10, 95% CI 1.07-4.12, p = 0.031) and raised stress score (OR 1.15, 95% CI 1.09-1.21, p<0.001). Those who had poor sleep quality stated that the activities they pursued to relieve this condition were social media (42.0%), followed by reading books (32.4%) and watching television (16.8%). Only a few poor sleepers used sleeping pills (6.4%).*

Conclusion: *There was a high prevalence of poor sleep quality, and factors associated with this were shifting work schedule and higher stress scores. Proper interventions should be made in the form of recommendations of measures to help to relieve sleep problems.*

Keywords: *Sleep, Pittsburgh Sleep Quality Index, Residents, Fellows*

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Poor sleep quality is a common condition in many people and affects the quality of life of both healthy people and patients because it affects both physical and mental health[1]. Over the past decades, there has been much debate on how much sleep is needed for humans to function normally. One study has found that those who sleep at least 7 hours daily can maintain a satisfactory level of cognitive function[2]. Previous studies have highlighted sleep problems in patients suffering from various psychological and neurological diseases such as rheumatologic diseases, cancer, myocardial infarction, and hemodialysis[3-6]. In healthy people, sleep problems are also related to sick leave from work, occupational accidents, and long-term health problems[7-9]. It is known that healthcare employees work hard to cope with increased workloads and to improve their productivity; consequently, working overtime or night shifts persists, and poor quality of life and stress can then ensue. A recent study has indicated that sleep problems are common among health care workers[10]. In hospital, residents and fellows have many duties to perform including working in out-patients departments (OPD), in-patients departments (IPD), emergency on-call, and

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consultation-liaison duties. Normally, residents and fellows work 8 hours daily with extra emergency duties on a rotational basis; however, it is expected sometimes that they perform their duties on most working days, and extended hours are likely occurrences. This results in longer, sometimes double, the number of working hours, or even more. In India, an assessment of sleep quality in post-graduate residents in a tertiary hospital and teaching institute found that 12.5% of the subjects were poor sleepers (Pittsburgh sleep quality index: PSQI $\geq$5). They suffered from more day-time sleepiness, were less satisfied with their lives, and they were likely to use potentially addictive substances at some time during their residency[11]. A prevalence of poor sleep quality of about 30 to 40% has been reported among medical students, and is mainly due to their rigorous training programs[12,13].

Many factors, such as socio-demographic and occupational characteristics, have been documented as affecting the prevalence of poor sleep quality[10]. Patterson determined associations between poor sleep quality, fatigue, and self-reported safety outcomes among workers in the emergency medical services (EMS). They indicated that their average PSQI score was in the poor sleep quality range, with more than half of them feeling fatigued. Sleep disturbance can negatively affect quality of work and increase the risk of injury, medical error, adverse events and safety-compromising behaviors[14]. An association between shift work and the prevalence of poor sleep quality has been identified: work schedules involving shift work disrupt the circadian clock, causing symptoms from poor sleep to jet lag[15]. Poor sleep quality or sleep problems in shift officers occur because the sleeping time is transferred to a period of the day that is not conducive to sleep, either in circadian rhythms or environmental conditions[16]. In this cross-sectional study, we assessed the prevalence of poor sleep in residents and fellows. Factors associated with quality of sleep were also explored. This overview aimed to evaluate health problems which can be important warning signs of the presence of many medical conditions and can affect many aspects of life.

Material and Method

This study aimed to determine the prevalence of poor sleep and its associated factors among residents and fellows who were trained in Rajavithi Hospital. After giving informed consent, two hundred and fourteen residents were recruited who were working and studying in the various departments at the time of the study period (academic year 2015). To evaluate sleep quality, participants were asked to complete the Thai version of the Pittsburgh Sleep Quality Index (PSQI)[17,18] while other characteristics and data were obtained using a structured questionnaire. The PSQI is a validated scale which assesses sleep quality across seven domains (subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medications, and day-time dysfunction), and the composite scores obtained indicate "good" (score <5) and "poor" (score $\geq$5) sleepers. A score of 0 to 3 is assigned to each of the seven scales (0 meaning no problem). The sum of the global PSQI scores range from 0 to 21. Residents and fellows whose global PSQI score was 5 or less were considered to have good sleep quality. A 20-statement questionnaire was adapted from the Suan Prung Stress Test-20 (SPST-20) to assess levels of stress[19]. The subjects were asked to rate their degree of stress on a 5-level scale from "extremely severe" (5), to "severe" (4), "moderate" (3), "slight" (2), "none" (1). These total stress scores were interpreted as mild stress (<25), moderate stress (25-42), high stress (43-62) and severe stress (63 and above).

All statistical analyses were performed using the software program SPSS for Windows version 17.0 (SPSS Inc., Chicago, Illinois, USA), and baseline characteristics were analyzed using descriptive statistics. Chi-square test was used to compare the categorical variables and frequency distributions, and Student's t-test was used to compare continuous variables between poor and good sleep quality. In addition, binary logistic regression analysis was performed to determine the association between poor sleep and related factors. Multivariate-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were reported, and $p<0.05$ was considered statistically significant. Ethical clearance was obtained from the Ethics Committee of Rajavithi Hospital.

Results

Females accounted for 57% of the study population. Participants' ages ranged from 25 to 41, and the mean age was 28.87$\pm$2.55 years old. The majority of the subjects were residents and most of them were single. The subjects in the first year of study represented the largest proportion of the sample, and 36.9% had shifting work schedules. Most of the subjects had mild stress, and poor sleepers had significantly higher stress scores than those of good sleepers. Baseline characteristic of the subjects are shown in Table 1. There were significant differences

between poor and good sleepers in relation to years of study, underlying diseases, shift work, stress, and physical and environmental factors ($p<0.05$). Among the 214 participants who completed the PSQI questionnaire, 117 (54.7%) were poor sleepers.

Univariate analysis showed a significant association between poor sleep quality and second year of study; shifting work schedule; physical and environmental factors; and stress. There was no association with accommodation, or consumption of coffee or tea. According to multivariate analysis, changing work schedules and stress were associated with poor sleep quality (Table 2).

Subjects were questioned about how they sought solutions to poor sleep quality, and the sleep interventions used by subjects to attain normal sleep included reading, watching TV, alcohol consumption, social media, sleeping pills, and praying. Use of sleeping pills was only significantly difference factor between poor and good sleepers ($p = 0.016$); however, while some poor sleepers used sleeping pills, none of the good sleepers did so.

Discussion

This is the first study to specifically examine the prevalence of poor sleep quality and its associated factors among residents and fellows in Rajavithi Hospital, where medical training is as rigorous as in most other countries in the globe. Training facilities are sometimes overstretched by the number of trainees and activities[12]. The medical trainees who participated in this study undergo clinical rotations in most of their

Table 1. Baseline characteristics classified by sleep quality

Characteristics	Total (n = 214)	Sleep Quality		*p*-value
		Poor (n = 117)	Good (n = 97)	
Sex				0.934
Male	92 (43.0)	50 (42.7)	42 (43.3)	
Female	122 (57.0)	67 (57.3)	55 (56.7)	
Age (years)				0.820
Mean±SD	28.87±2.55	28.84±2.54	28.92±2.56	
≤30	174 (81.3)	96 (82.1)	78 (80.4)	
>30	40 (18.7)	21 (17.9)	19 (19.6)	
Marital status				0.466
Single	187 (87.4)	104 (88.9)	83 (85.6)	
Married	27 (12.6)	13 (11.1)	14 (14.4)	
Educational status				0.178
Residents	184 (86.0)	104 (88.9)	80 (82.5)	
Fellows	30 (14.0)	13 (11.1)	17 (17.5)	
Years of study				0.018*
First year	103 (48.1)	46 (39.3)	57 (58.8)	
Second year	69 (32.2)	44 (37.6)	25 (25.8)	
Third year and above	42 (19.7)	27 (23.1)	15 (15.5)	
Underlying diseases [A]				0.580
Yes	40 (18.7)	93 (79.5)	80 (82.5)	
No	172 (80.3)	24 (20.5)	17 (17.5)	
Shift work				0.001*
Yes	79 (36.9)	85 (72.6)	50 (51.5)	
No	135 (63.1)	32 (27.4.5)	47 (48.5)	
Physical and environmental problems [A]				0.023*
Yes	19 (16.2)	6 (6.2)	19 (16.2)	
No	98 (83.8)	91 (93.8)	98 (83.8)	
Stress (Mean±SD)	15.57±8.27	18.83±7.63	11.63±7.26	<0.001*

Values are represented as number (percent) and mean ± standard deviation

[A] = Numbers may not add up to the totals because of missing data, * significant at $p<0.05$

Table 2. Factors associated with poor sleep quality

Factors	Crude OR (95%CI)	*p*-value	Adjusted OR (95%CI)	*p*-value
Accommodation				
Living alone	Ref		Ref	
With family	0.61 (0.32 to 1.15)	0.124	0.71 (0.33 to 1.50)	0.367
Dorm in hospital	1.48 (0.74 to 2.97)	0.265	0.88 (0.37 to 2.08)	0.770
Years of study				
First year	Ref		Ref	
Second year	2.18 (1.17 to 4.08)	0.015*	1.83 (0.84 to 4.01)	0.131
Third year and above	2.23 (1.06 to 4.68)	0.034*	1.98 (0.78 to 5.04)	0.151
Coffee and tea consumption	1.44 (0.78 to 2.66)	0.241	1.74 (0.83 to 3.64)	0.142
Shifting work schedule	2.50 (1.41 to 4.41)	0.002*	2.10 (1.07 to 4.12)	0.031*
Physical and environmental problems	0.34 (0.13 to 0.89)	0.028*	0.55 (0.19 to 1.55)	0.255
Stress	1.15 (1.1 to 1.21)	<0.001	1.15 (1.09 to 1.21)	<0.001*

OR = Odds Ratio; 95% CI = 95% Confidence Interval
* = significant at $p<0.05$

specialties at the hospital, and many of them live far from the hospital's location. Regarding characteristics of the subjects, significant differences between good and poor sleepers were found in years of study, shifting work schedule, physical and environmental factors and stress.

This study showed that poor sleep quality among residents and fellows has a high prevalence of about 55%, and this is consistent with the results of other studies in the literature. A higher prevalence of sleep disorders was also observed in a study of medical students in Pakistan[20] which used the same research instrument (PSQI questionnaire). The high prevalence of poor sleep quality in a group of healthy medical doctors can be an important early sign of underlying undetected physical or mental health issues[21].

Shifting work schedules have often been found to be associated with sleep disorders and poor sleep quality[21-24]. These changing working hours, including night work, can also affect work performance and accident risk, and they can also contribute to adverse health outcomes such as cardiovascular disease and certain forms of cancer[24]. In the present study, the prevalence of poor sleep quality among shift-workers was significantly higher than that of non-shift workers, according to both univariate and multivariate analysis, and these results are also consistent with those of previous studies. The association between poor sleep quality and shift work can be explained by the fact that overtime work for residents and fellows has become the norm, resulting in high levels of fatigue and stress, exhaustion, and low levels of job satisfaction. Sleep quality may be affected when shifts exceed the standard working time (8 hours), causing adverse effects especially on their productivity. In a study on sleep disorders in physicians who performed shift-work schedules, the risk factors influencing the development of sleep disorders were found to be genetic factors (15% of the population), advancing age (>50 years), undiagnosed sleep apnea, and alcohol abuse as well as multiple stress factors including shift work, research, teaching, and family obligations. In order to reduce fatigue and to improve performance, a short nap and change of environment is recommended. Environment management at home for daytime sleeping after a night shift should ensure a dark area to support continuous sleep. Sleep disorders can be treated with timed light exposure, and there are some behavioral and environmental strategies that can be utilized to help cope with sleep deprivation[25].

Similar to other findings, stress is common in persons facing poor sleep quality or insufficient sleep[24,26]. A review of studies of the stresses of residency training and descriptions of intervention programs and mental health surveys published in 1980 reported that inadequate sleep and fatigue were major causes of stress in residents[27]. One study also suggested an increase in distress during the six-year medical training programme. Stress, fatigue, sleeping problems, anxiety, irritability and depression were also common. Moreover, students who were most distressed at the beginning of training also reported more stress in later years[28]. Normally, signs of stress include depression, sleep problems, anxiety, making mistakes

at work, and poor concentration. If this unwanted stress is not properly managed, physical and mental well-being may be affected. Therefore, it is crucial to consider how to manage stress in all professions including the medical field.

Drug misuse to induce sleep quality was found in 6.4% of the subjects. This is lower than in a study by Zafar et al (2008)[29] who performed a study in four universities in Karachi, Pakistan, and reported a rate of 10% of self-medication in the form of misuse of sleeping pills. Although drugs can be useful at times, they cannot replace the correct management of sleep disorders. Drugs also affect the function of biological time and rhythm characteristics[30]. In addition, overuse in the long term does not help to alleviate the symptoms.

The present study revealed a high prevalence of poor sleep quality among residents and fellows. Shift work and stress were the most common factors associated with poor sleepers, and some subjects reported using sleeping pills. These findings can be a sign of undiagnosed health problems in medical students, and screening and monitoring health status may result in early detection of possible problems. Proper interventions such as flexible working time, and education about sleep quality and hygiene should bring about some mitigation of sleep problems.

Some limitations of the study should be noted. The study design may not allow for inferring cause and effect, as a self-reported questionnaire about irregular sleep history is prone to recall bias. Although the study findings identified some factors related to sleep quality, further work is required to clarify the impact of these exposures.

What is already known on this topic?

Previous studies have reported the prevalence of poor sleep and factors associated with it; however, incidence rates vary depending on study subjects and research settings.

What this study adds?

This study determined the prevalence of poor sleep quality and factors associated with it in a single setting. It also evaluated the prevalence of low sleep quality in medical doctors with no previous health issues or complaints of sleep problems.

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Potential conflicts of interest

None.

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คุณภาพการนอนในแพทย์ประจำบ้าน/แพทย์ประจำบ้านต่อยอดในโรงพยาบาลราชวิถี

จารุวรรณ หมั่นมี, กัญญา จันทร์พล, กฤษณา อายายศ, พลอยภัสสร อินทร์วัน

ภูมิหลัง: *การนอนเป็นความต้องการขั้นพื้นฐานที่สำคัญของมนุษย์ การเรียนในสาขาแพทยศาสตร์เป็นสาขาที่มีความเครียดสูงเนื่องจากความต้องการในเกณฑ์และมาตรฐานของหลักสูตร พบความชุกของความเครียดและคุณภาพการนอนที่ไม่ดีในการเรียนเฉพาะทางของแพทย์ประจำบ้านและแพทย์ต่อยอด อย่างไรก็ตามไม่ค่อยพบข้อมูลในโรงพยาบาลที่ศึกษาด้านนี้*

วัตถุประสงค์: *การศึกษานี้จึงมุ่งหาความชุกและปัจจัยที่สัมพันธ์กับคุณภาพการนอนที่ไม่ดีในแพทย์ประจำบ้านและแพทย์ต่อยอดที่ศึกษาในโรงพยาบาลราชวิถี*

วัสดุและวิธีการ: *การศึกษาภาคตัดขวาง (cross-sectional study) เก็บข้อมูลระหว่างเดือนมิถุนายน ถึง เดือนสิงหาคม พ.ศ. 2558 จากจำนวนแพทย์ประจำบ้านและแพทย์ต่อยอดทุกชั้นปี ทุกภาควิชา ที่เข้าศึกษาในปีการศึกษา พ.ศ. 2558 จำนวน 214 ราย เครื่องมือในการเก็บข้อมูลคือ 1) ข้อมูลทั่วไปส่วนบุคคล 2) แบบวัดความเครียดสวนปรุง กรมสุขภาพจิต จำนวน 20 ข้อ 3) แบบเก็บข้อมูลพฤติกรรมสุขภาพ และ 4) แบบสอบถามคุณภาพการนอนหลับที่ดัดแปลงมาจาก The Pittsburgh Sleep Quality Index ฉบับภาษาไทย (T-PSQI) โดยค่าคะแนนมากกว่า 5 หมายความว่ามีคุณภาพการนอนที่ไม่ดี การวิเคราะห์ข้อมูลด้วย Binary logistic regression เพื่อหาปัจจัยที่สัมพันธ์กับคุณภาพการนอน การศึกษาผ่านการพิจารณาจากคณะกรรมการวิจัยและจริยธรรมการวิจัย โรงพยาบาลราชวิถี*

ผลการศึกษา: *แพทย์ประจำบ้านส่วนใหญ่เป็นเพศหญิง อายุเฉลี่ย±ส่วนเบี่ยงเบนมาตรฐาน 28.87±2.55 (25 ถึง 41 ปี) โดยร้อยละ 48.1, 32.2 และ 19.7 กำลังศึกษาในปีที่ 1, 2 และ 3 ตามลำดับ ร้อยละ 36.9 ของกลุ่มตัวอย่าง มีการทำงานเป็นกะ ค่าคะแนนความเครียดเฉลี่ย 15.57±8.27 ความชุกของคุณภาพการนอนที่ไม่ดีร้อยละ 54.7 ปัจจัยที่สัมพันธ์กับคุณภาพการนอนที่ไม่ดี คือการทำงานเป็นกะ (OR 2.10, 95% CI 1.07-4.12, p = 0.031) และความเครียด (OR 1.15, 95% CI 1.09-1.21, p<0.001) การแก้ปัญหาคุณภาพการนอนโดยส่วนใหญ่พบว่า ร้อยละ 42 ใช้ social media, ร้อยละ 32.4 อ่านหนังสือ และร้อยละ 16.8 ดูโทรทัศน์ ขณะที่มีผู้ใช้ยาช่วยการนอนหลับร้อยละ 6.4*

สรุป: *ความชุกของคุณภาพการนอนที่ไม่ดีค่อนข้างสูงและปัจจัยที่สัมพันธ์กับคุณภาพการนอนที่ไม่ดี คือการทำงานเป็นกะและความเครียด การใช้แนวทางการบำบัด/แนวทางปฏิบัติที่เหมาะสมจะช่วยบรรเทาเรื่องคุณภาพการนอนได้*