Original Article

To Assess Sleep Quality among Pakistani Junior Physicians (House Officers): A Cross-sectional Study

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Abstract

Background: Sleep deprivation among junior physicians (house officers) is of growing concern. In developed countries, duty hours are now mandated, but in developing countries, junior physicians are highly susceptible to develop sleep impairment due to long working hours, on-call duties and shift work schedule. **Aim:** We undertook the study to assess sleep quality among Pakistani junior physicians. **Subjects and Methods:** A cross-sectional study was conducted at private and public hospitals in Karachi, Pakistan, from June 2012 to January 2013. The study population comprised of junior doctors (house physicians and house surgeons). A consecutive sample of 350 physicians was drawn from the above-mentioned study setting. The subject underwent two validated self-administered questionnaires, that is, Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS). **Results:** A total of 334 physicians completely filled out the questionnaire with a response rate of 95.4% (334/350). Of 334 physicians, 36.8% (123/334) were classified as "poor sleepers" (global PSQI score > 5). Poor sleep quality was associated with female gender ($P = 0.01$), excessive daytime sleepiness ($P < 0.01$), lower total sleep time ($P < 0.001$), increased sleep onset latency ($P < 0.001$), and increased frequency of sleep disturbances ($P < 0.001$). Abnormal ESS scores (ESS > 10) were more prevalent among poor sleepers ($P < 0.01$) signifying increased level of daytime hypersomnolence. **Conclusion:** Sleep quality among Pakistani junior physicians is significantly poor. Efforts must be directed towards proper sleep hygiene education. Regulations regarding duty hour limitations need to be considered.

Keywords: Epworth sleepiness scale, Excessive daytime sleepiness, House officers, Junior physicians, Pittsburgh sleep quality index, Poor sleepers, Sleep disturbances, Sleep quality

Introduction

Quality sleep is a prerequisite for healthy functioning of human mind and body. Sleep deprivation imposes deleterious effects on one's work and performance, and also predisposes an individual to several morbid conditions.[1,2] Health care providers are no exception to this fact. Sleepiness among physicians not only affects their personal lives but also negatively impact lives of their patients.[3] Several well-designed studies have documented adverse consequences of poor sleep compromising health care delivery such as increase error rates, impaired electrocardiogram interpretation, poor communication and less empathy.[4-6]

Junior physicians (house officers) in particular are at a higher risk of having poorer sleep quality. Long working hours, rotating shifts, and on-call duties make them more susceptible to develop sleep disturbances.[7] Several studies have demonstrated sleep impairment among junior physicians. A study conducted by Puvanendran *et al*. showed marked sleep deprivation among junior physicians of Singapore.[8] Another study conducted at tertiary care hospitals in Karachi, Pakistan, also showed that about 79% of trainee physicians (house officers and postgraduate residents) were sleep deprived.[9]

Poor sleep quality is positively associated with excessive daytime sleepiness (EDS),[10] defined as having increased propensity to fall asleep unintentionally during the daytime,

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especially in passive situations.[11] EDS is one of the main contributing factors, mediating detrimental effects of poor sleep.[12] Although EDS is also caused by certain medical and psychiatric conditions and sleep disorders,[13] its association with deprived sleep has been extensively studied and validated.[14] Junior physicians on account of increased risk of having poor sleep quality are also assumed to have a higher level of daytime sleepiness.

In Pakistan, data regarding junior physician's sleep quality is scarce. This study aimed to characterize sleep quality through validated questionnaires and assess the degree of daytime sleepiness among junior physicians.

Subjects and Methods

After prior approval from Institutional Review Board of Dow University of Health Sciences, this cross-sectional study was conducted at public and private sector hospitals in Karachi, Pakistan. The public sector hospitals included Civil Hospital, Jinnah Post Graduate Medical Centre, Abbasi Shaheed Hospital and Sindh Institute of Urology and Transplantation, whereas private sector hospitals included Aga Khan University Hospital and Liaquat National Hospital. The study was conducted between June 2012 and January 2013 and study population comprised of junior doctors (house physicians and house surgeons). As per guidelines of Pakistan Medical and Dental Council (PMDC), house officer is defined as a trainee physician after completion of 5 years Bachelor of Medicine and Bachelor of Surgery, who must complete 1-year fulltime internship or residential clinical work in a recognized hospital to attain full registration with the council.[15] This requirement must be met in order to enroll into a residency program (mandated preresidency training). The house officers are rotated through general medicine, general surgery, medical allied, and surgical allied departments, for 3 months each.

The working hours of house officers is variable and depend on the department in which they are rotating; however, the average working hours ranges from 70 to 80 h/week with up to 2–3 days of on-call services per week.

The calculated sample size of our study was 344 subjects, using anticipated frequency as reported by a study conducted on primary care physicians of Madrid, Spain, showing poor sleep quality prevalence rate of 35%.[16] The confidence level was set at 95% and 5% margin of error was accepted. The required sample size was rounded off to 350 subjects. A consecutive sample was drawn from above mentioned study setting. Junior doctors provisionally registered with PMDC, who were currently enrolled in a structured fulltime internship (preresidency training), were included in our study. The exclusion criteria were pregnant and lactating females, physicians with a known history of sleep disorders (insomnia, parasomnia, obstructive sleep apnea and physicians on stimulant and/or antidepressant medication; and physicians unable to understand or comprehend English. Physicians were approached at their working places during regular work hours.

After obtaining informed consent, subjects were given two validated self-administered questionnaires, that is, Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS). These questionnaires were used to assess subjective sleep quality, its attributes and level of daytime sleepiness.

PSQI is a self-rated questionnaire which measures subjective sleep quality and disturbances over the previous month and discriminate between normal and poor sleepers.[17] It consisted of 19 questions which are grouped into seven component scores, each component score ranges from 0 (no difficulty) to 3 (severe difficulty). The seven component scores are then summed to yield a global PSQI score. Subjects with global PSQI score >5 are considered to have clinically disturbed or poor sleep with a diagnostic sensitivity and specificity of 89.6% and 86.5%, respectively.[17]

The ESS is a self-administered questionnaire which assesses subject's general level of daytime sleepiness in recent times.[18] It consists of eight self-rated items which measure subject's likelihood to doze off or fall asleep in various commonly encountered situations. Subjects rate on a 4-point scale ranging from 0 (no chance of dozing) to 3 (high chance of dozing) in eight different situations. The score corresponding to each situation are added to produce a summated ESS score. Summated ESS score >10 is considered to be abnormal and indicative of EDS.[18] ESS has an internal consistency of 0.88 and test-retest reliability of 0.82.[19]

Data obtained was entered and verified by two individuals and analyzed in Statistical Package for Social Sciences, Version 17.0 (SPSS-17, Chicago, IL, USA). The quantitative variables were expressed as mean (standard deviation), and qualitative variables were expressed as percentages. Where appropriate, odds ratio (OR) with 95% confidence intervals (CIs) were also calculated. All statistical tests were performed using Chi-square test, and values of $P < 0.05$ were considered as statistically significant.

Results

Of 350 participants, 334 subjects with completely filled questionnaires were included for final analysis with a response rate of 95.4% (334/350). The study population comprised of 59.6% (199/334) females and 40.4% (135/334) males. Mean age was 25.3 (1.3) years. Of the 334 junior physicians, 36.8% (123/334) were classified as "poor sleepers" having global PSQI score >5. Among females, frequency of poor sleepers was 42.2% (84/199) when compared to males among which 28.9% (39/135) were poor sleepers (χ^2 [1, n = 334] =6.14, P = 0.01, OR = 1.7, [95% CI 1.1–2.8]). No statistically significant correlations were observed between

age and prevalence of poor sleep quality (χ^2 [4, n = 334] =4.56, P = 0.33).

Measures of sleep quality were significantly deranged among poor sleepers when compared to normal sleepers. Statistically significant differences were observed within sleep time, sleep onset latency, subjective sleep quality, use of sleep medications and daytime dysfunction [Table 1]. Subjects with sleep onset latency >30 min and total sleep time <6 h were associated with higher odds of having poorer sleep quality, adjusted OR of 4.4 (95% CI 2.7–7.1) and 3.9 (95% CI 2.4–6.4), respectively. In comparison with normal sleepers, poor sleepers also self-reported various sleep disturbances as summarized in Table 2. As evident from the table, can't get to sleep within 30 min after lying on the bed and waking up in the middle of the night or early morning were commonly report sleep disturbances.

Mean ESS score among poor sleepers was 7.83 (4.28) versus 6.58 (3.82) among normal sleepers. Abnormal ESS scores (ESS score > 10) were observed in 20.1% (67/334) study participants. Among poor sleepers, the prevalence of abnormal ESS scores was 28.5% (35/123) when compared to normal sleepers among which 15.2% (32/211) had abnormal ESS scores [χ^2 [1, n = 334] =8.56, P = 0.003). No statistically significant correlations were observed between gender and distribution of abnormal ESS scores (χ^2 [1, n = 334] =0.33, P = 0.56). Itemized responses by study participants on ESS are described in Table 3. From the table, it is evident that 44% (148/334) of physicians reported high chances of falling asleep on lying down to rest in the afternoon when circumstances permit, similarly, about 18% (60/334) of physicians reported the same on sitting quietly after a lunch.

Table 1: Comparison of various measures of sleep quality between poor and normal sleepers

Variables	Poor sleepers	Normal sleepers	*P*
Mean PSQI scores (SD)	7.6 (1.9)	3.3 (1.3)	<0.001
Total sleep time (SD) (h)	5.3 (1.2)	6.2 (1.2)	<0.001
Sleep onset latency (SD) (min)	30.2 (22.1)	16.3 (11.2)	<0.001
Subjective sleep quality (percentage of individuals reported sleep quality to be fairly or very bad) (%)	30.9	1	<0.001
Daytime dysfunction (3 or more times a week) (%)	2.4	0.9	<0.001
Use of sleep medications (once or more a week) (%)	6.5	0	<0.001

PSQI: Pittsburgh sleep quality index, SD: Standard deviation

Table 2: Comparison of sleep disturbances between poor and normal sleepers

Sleep disturbances (once or more a week)	Poor sleepers (%)	Normal sleepers (%)	*P*
Cannot get to sleep within 30 min	49.6	11.3	<0.001
Wake up in the middle of the night or early morning	56.9	18	<0.001
Have to get up to use the bathroom	31.7	12.8	<0.001
Cannot breathe comfortably	8.2	1.9	<0.05
Cough or snore loudly	9.7	5.7	0.54
Feel too cold	20.3	7.1	<0.001
Feel too hot	11.4	3.3	<0.001
Have bad dreams	21.2	6.1	<0.001
Have pain	15.5	3.3	<0.001

Discussion

This was the first attempt to characterize sleep quality among Pakistani junior physicians using validated questionnaires. The study showed that sleep quality among junior physicians is significantly poor with a prevalence rate of about 37%. In addition, it was associated with female gender, excessive daytime sleepiness, lower total sleep time, increased sleep onset latency and increased frequency of self-reported sleep disturbances.

In Pakistan, only single study has been conducted to assess sleep deprivation among trainee physicians (house officers and postgraduate residents).[9] This study showed marked sleep deprivation with estimated prevalence of 79%. Our study, however, showed 36.8% of junior physicians (house officers) as poor sleepers as diagnosed by PSQI >5. Significant differences between the reported frequencies (79% vs. 36.8%) might be due to the use of nonvalidated questionnaire by the previous study, thus overestimating the prevalence of sleep deprivation. Moreover, the inclusion of postgraduate residents could also have affected estimated prevalence in the previous study, owing to the greater degree of sleep impairment among them.

Results obtained in our study are consistent with findings of a comparable study conducted by Rodríiguez-Muñoz *et al*.[16] This study employed same instrumentation (PSQI questionnaire) and showed that 35% of primary care physicians especially females are poor sleepers. Although this study was not specifically limited to junior physicians, but it showed that sleep impairment is generally common among practicing physicians.

Female gender is associated with increased odds of having poorer sleep quality. Poor sleep quality among females has also been demonstrated in different study populations using the same instrumentation.[20] This association can be explained by increased prevalence of various sleep disorders and disturbances among females in general.[21] Added household and family responsibility observed by women in this region can be one of the contributing factors accounting for such gender predominance. However, further studies are required in this regard, explaining any causal relationship between gender and poor sleep quality.

Table 3: Itemized responses by study participants on ESS

Situations	Number of participants reporting each level of chance of dozing *n* (%)			
	0 (would never doze)	1 (slight chance of dozing)	2 (moderate chance of dozing)	3 (high chance of dozing)
Sitting and reading	130 (38.9)	123 (36.8)	55 (16.5)	26 (7.8)
Watching television	198 (59.3)	94 (28.41)	33 (9.9)	9 (2.7)
Sitting inactive in a public place (e.g., a theater or meeting)	173 (51.8)	105 (31.4)	48 (14.4)	8 (2.4)
As a passenger in a car for an hour without a break	116 (34.7)	107 (32.0)	72 (21.6)	39 (11.7)
Lying down to rest in the afternoon when circumstances permit	32 (9.6)	55 (16.5)	99 (29.6)	148 (44.3)
Sitting and talking to someone	287 (85.9)	34 (10.2)	12 (3.6)	1 (0.3)
Sitting quietly after a lunch without alcohol	108 (32.3)	99 (29.6)	67 (20.1)	60 (18)
In a car, while stopped for a few minutes in the traffic	271 (81.1)	41 (12.3)	18 (5.4)	4 (1.2)

ESS: Epworth sleepiness scale

Poor sleep quality, as stated above, is positively associated with EDS. The overall prevalence of EDS, as observed in our study, was 20.1%. Poor sleepers compared to normal were 2 times more likely to develop EDS. This association was also reported in different studies conducted on resident trainee physicians.[22,23] It is noteworthy to mention here that causes of EDS are multifactorial; therefore other causes should also be looked on while evaluating EDS.[13] ESS is one of the screening tools to measure daytime sleepiness, however, abnormal ESS score should be verified by other sophisticated objective tests.

Objective based studies are also required to confirm the presence or absence of different self-reported sleep disturbances among poor sleepers. Sleep disturbances such as difficulty in breathing, need to use the restroom at night, feeling cold or hot, snoring, and pain could point to underlying medical causes. It warrants further clinical and laboratory investigations to exclude obstructive sleep apnea and other medical problems as a potential causes of disturbed sleep among poor sleepers.

The study has certain limitations. The PSQI questionnaire used in the current study assessed subjective sleep quality over the last 1-month period, so the study cannot differentiate between acute and chronic poor sleepers. Some information in PSQI questionnaires require subjects to recall and report events up to a month prior to administration, this can lead to recall bias and could over or underestimate the true picture. Since this study was based on self-administered questionnaires assessing subjective sleep quality, there can be the possibility of biases related to the accuracy of reported information. Different studies conducted on the general population have showed significant differences between subjectively reported and objectively measured sleep quality.[24] Even though instrumentation used in the current study has been extensively validated in western and some Asian countries, good quality validation studies from Pakistan, keeping cultural differences in view, are not yet available. Furthermore, the relationship between poor sleep quality and working hours/call schedules was not addressed in the current study. Nevertheless, the use of validated questionnaires and multicenter data collection approach strengthen the reliability of our findings.

Conclusion

More than one-third of Pakistani junior physicians self-reported to have poor sleep quality. It is associated with female gender, total hours slept, sleep onset latency; and leads to increased level of daytime sleepiness. Proper sleep hygiene should be considered as one of the EDS preventing strategies. Junior physicians in Pakistan, therefore, should be educated about the importance of proper sleep practices and consequences of poor sleep quality. Necessary actions should also be taken on the part of PMDC to establish proper policies and guidelines governing duty hours, call schedule and workload of junior physicians. Further studies employing objective measures are required to validate the relationship of various factors leading to impaired sleep quality.

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