ORIGINAL ARTICLE

# A Survey of the Demographics and Sleep Habits in Medical Students and House Officers in Singapore

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**Abstract**

**Background:** To survey the sleep habits and the demographics of medical students and interns (house officers) at our institution.

**Methods:** Third- and fifth-year medical students and interns at our hospital were surveyed between November 2006 and March 2007 using a confidential survey.

**Results:** The response rate was 96.5%, with 221 individuals completing the survey. Of these, 59.2% were male and 38.0% were female, with 2.8% unknown. Their mean age was 23.8±1.4 years. There were 60 interns, 115 fifth-year medical students, and 46 third-year medical students. The mean sleep latency was 14.7±9.3 min, and the mean total sleep time was 6.1±1.0 h. Snoring was present in 13.6% of the subjects and 59.2% took afternoon naps on the weekends. Ten participants were admitted to having medical comorbidities, with hypertension affecting 2 people. The majority (77.3%) had daytime hypersomnolence, and 71.0% fell asleep returning home on public transport in the evenings. There were 16.7% who admitted to falling asleep at the wheel, but only 1.8% had car accidents attributable to falling asleep while driving. There were no significant differences between the three groups in all the categories.

**Conclusions:** Participants of this survey were young and generally healthy, but were predominantly hypersomnolent during the day with a significant minority having micro-sleeps at the wheel. There may be more than one possible explanation for this.

**Keywords:** Demographics, Hypertension, Snoring, Sleep, Hypersomnolence

## Introduction

Sleep is an important part of life, occupying up to a third of the day.[1] There is constant exposure in both the print and electronic media regarding sleeping habits and sleep-related disorders. As with most other modern societies, it is not inconceivable that with the pressures of work and fast-paced urbanization, people would where most of the analysis was undertaken. Categorical variables were compared between groups using $c^2$ tests. One-way analysis of variance (ANOVA) was used for parametric quantitative data, and the Kruskal–Wallis test was used for non-parametric data. Lack of adequate sleep and sleep fragmentation have their consequences, namely reduced daytime productivity and metabolic and vascular disorders such as hypertension and heart disease. This survey involved medical students and interns (house officers) attending or working at our institution. This survey hoped to obtain a cross section of sleeping habits of a relatively healthy

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and young population as students progressed from third year through fifth year and finally to internship.

## Materials and Methods

This epidemiological survey was prospectively conducted over a 4-month period between November 2006 and March 2007. Written permission was taken from the university prior to its commencement. The survey involved third-year and fifth-year medical students, as well as interns working at our institution. The hospital Institutional Review Board (IRB) consent was sought, but waived. The survey was administered via a single-page survey form (Figure 1) on a purely voluntary basis, with no identifiers on the survey form. A single investigator collated the data and then transferred it to SPSS version 12.0.1 (SPSS, Chicago, IL, USA).Where possible, results were expressed as mean ± SD.

| Please circle the appropriate response | |
|---|---|
| Year of study: | 3rd year/5th year/house officer |
| Gender: | Male/Female |
| Age: | ---------years--------months |
| Estimated bedtime (on weekdays): | ----------pm/am |
| Estimated time to sleep: | ----------minutes |
| Estimated awakening time (on weekdays): | ----------am/pm |
| Estimated total sleep time: | ----------hours----------minutes |
| Snoring: | Yes/No/Not sure |
| Afternoon naps on weekends or if not working: | Yes/No |
| Medical comorbidities: | Yes/No |
| If Yes: | Diabetes/Hypertension/Hypercholesterolemia |
| Daytime sleepiness (House officers, Please don't include post-call days): | Yes/No |
| Fall asleep on taxi/MRT/bus: | Yes/No |
| Drowsy/fallen asleep at the wheel at traffic light: (If driving) | Yes/No/Not applicable |
| Car accidents because of sleepiness: | Yes/No/Not sure |

**Figure 1:** A Sample of the Survey Form

## Results

There were 229 subjects who participated in the survey. Of these, 221 completed the survey, with a response rate of 96.5%. The three groups were unequally distributed with 46 third-year medical students, 115 fifth-year medical students and 60 interns. There were 131 males and 84 females, with 6 unknown. Their ages ranged between 20.9 and 28.2 years, with the mean age being 23.8±1.4 years. The mean bedtime was after midnight, while the mean total sleep time (TST) suggested that the participants were probably getting less than the optimal quantity of sleep. However, the mean sleep latency was within the normal range (Table 1). The proportion of participants who had afternoon naps when they were not working or during the weekends was 59.2%, and 13.6% of them self-reported snoring. More than three-quarters of the participants reported daytime hypersomnolence. While a significant minority fell asleep at the wheel of their car while driving, only a small proportion had accidents due to this (Table 2). Of those surveyed, 10 (4.5%) reported coexistent medical problems (Figure 2). There were no significant differences between the three groups in all the parameters surveyed ($p$ >0.05).

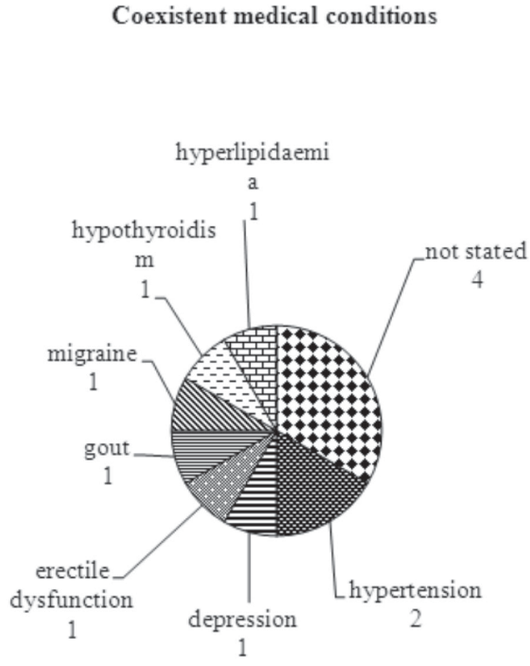


**Figure 2:** Coexistent medical conditions: The pie chart shows, in absolute numbers, the number of coexisting medical conditions in the group. The majority did not

**Table 1:** Sleep Characteristics of the Group

| | |
|---|---|
| Mean bedtime | 0008±1.09 h |
| Mean wake time | 6.3±0.7 am |
| Mean total sleep time | 6.1±1.0 h |
| Mean sleep latency | 14.1±19.3 min |

## Discussion

This is the first survey of sleep habits carried out in this country that included medical students and junior

**Table 2:** Hypersomnolence in the Group and its Possible Consequences

| | (%) |
|---|---|
| Proportion with daytime hypersomnolence | 77.3 |
| Proportion who fell asleep as passengers | 71.0 |
| Proportion who fell asleep at the wheel | 16.7 |
| Proportion who had car accidents due to falling asleep | 1.8 |

medical staff. There were no significant differences between the three groups in all the parameters surveyed.

It is of concern that three-quarters of the participants of this survey reported daytime hypersomnolence, manifested mainly by falling asleep on public transport and while driving. The implications of this phenomenon are grave. What is possibly more important, however, is to question why this may be the case. There are a number of possibilities.

First, it is important to consider the population sampled. Junior medical staff, especially interns, works long hours during the day with frequent overnight calls. Admittedly, while this survey clearly asked interns to consider only non-post-call days, it cannot be overlooked that a sleep debt accumulates with each passing day and will manifest as daytime hypersomnolence with sedentary activity such as travelling on public transport. It may be argued that medical students do not work long hours; however, considering the fact that the survey was conducted over a period when end of year exams were close, it is conceivable that the medical students were sleep deprived more than usual during this period.

Second, as the country progresses onto a fast-paced urbanized economy, it is likely as a society people are sleeping less and are consequently chronically sleep deprived. The "2005 Sleep in America Poll"[2] indicates that, on average, adults in America sleep 6.8 h a night on weekdays, and one-half of all respondents in the poll reported feeling tired, fatigued or not up to par during wake time at least 1 day a week. It is not too dissimilar to the findings of this survey. Studies performed in the United States also show that people sleep 25% fewer hours than they did 100 years ago.[3] Although there is lack of local data to substantiate this, there is no reason why it should be any different in Singapore. Sleep requirements do differ among individuals; however, most adults on average require about 8 h of sleep.[1] An individual's sleep requirement is determined by the number of hours required to feel awake, alert and to perform at peak level of performance.[1] Current recommendations on sleep duration are based on this definition; however, the optimal sleep duration to maintain physiological functioning remains unknown. The studies to date have only been conducted with primarily neurocognitive and neurobehavioral outcomes. Nonetheless, if we were to base our results on this definition, the data obtained from this study (where the mean total sleep time was 6.1±1.0 h) would suggest that the participants in this survey are clearly sleep deprived, and this in turn could greatly contribute to the observed hypersomnolence. It is beyond the scope of this study to discuss in detail the consequences of both acute and chronic sleep deprivation, but they include cardiovascular, neurocognitive, endocrine, metabolic and immune manifestations[4] with impaired vigilance, leading to motor vehicle accidents on the road and accidents at the workplace. More than 16% of those surveyed fell asleep on the wheel, with almost 2% of them having accidents due to having fallen asleep. This clearly shows the effects of sleep deprivation in this population. This has been highlighted in a Web-based survey carried out in the United States considering extended work hours by interns.[5] The study showed that the odds ratio for reporting a motor vehicle crash and for reporting a near-miss incident compared with a shift that was not of extended duration was 2.3. In the majority, the extended shift lasted more than 30 h. As mentioned previously, while this survey was not designed to detect hypersomnolence post an overnight call, the on-call practices in this country are not too dissimilar. Another study considering the effect of interns' weekly working hours[6] on sleep and attention failures showed that interns who worked less than 80 h a week compared with those who did not had half the rate of attention failures while working during on-call nights. In addition, extended on-call shifts are common in all teaching hospitals.

Third, there may be an undiagnosed sleep disorder. This is less likely given the average of the surveyed group, but by no means impossible. Disorders such as obstructive sleep apnoea (OSA) are relatively common. Risk factors include obesity and snoring. Anthropometric measures were not taken in this survey; however, about 16% of the group snored. Other studies of snoring prevalence conducted in Singapore[7,8] show figures between 6.8% and 44%. In our survey, only self-reporting of snoring was conducted, compared with the other two studies mentioned where relatives and

roommates were also interviewed or surveyed. It is well established that not everyone who snores has sleep-disordered breathing; however, interestingly enough, a study of community-dwelling adults found a significant association between snoring and sleepiness, independent of the severity of OSA.[9] There of course is always the possibility of other undiagnosed non-respiratory-related sleep disorders being present. A small fraction reported some coexisting medical conditions, but none of the above-mentioned conditions would be likely to cause sleep disturbances apart from possibly migraines (if the person was having an attack at night) and depression. It could also be argued that these two conditions, along with hypertension (which two participants had) and erectile dysfunction, could be secondary to sleep-disordered breathing. It could also be unrelated and would be impossible to state without detailed history, physical examination and appropriate investigation.

There are some limitations of this survey. First, the three different groups were unequal in number and gender distribution, and the survey was conducted over a relatively short period of time. It would be debatable whether a longer survey period would ensure a different trend altogether. It is suspected not, as the findings are consistent with previous studies carried out in different geographical locations with similar study populations. Nevertheless, the numbers of each group might have been equal had a full-year survey been done. Second, the survey was carried out during a period when medical students were busy with exams and that might have skewed the results a bit, but again, hypersomnolence in this particular subgroup cannot just be accounted for by a reduced total sleep time, but by other sleep hygiene issues. Third, a subjective scale, such as the Epworth Sleepiness Scale (ESS),[10] was not used to measure sleepiness. Although this is a validated tool to measure sleepiness and it might have provided some uniformity, it has its own problems.[11] The ESS has good intra subject variability but poor intersubject variability. Moreover, the survey was meant to be as simple as possible to ensure the highest possible response rate, which was achieved. Fourth, the survey was not designed to provide a link between the aetiologies of the hypersomnolence or the consequences of sleep deprivation, although one possible consequence was motor vehicle accidents, which was reported. However, it was beyond the scope of this survey to ask for specific work-related attention deficits, especially for the interns. This would have made the survey far too long and complicated. Last, the snoring factor was self-reported, which may have underestimated its true prevalence in this population.

In conclusion, the survey showed that participants, while being generally healthy, were significantly hypersomnolent during the day, which in part could have contributed to the road traffic accidents that were reported. There were no significant differences between the three groups.

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