SLEEP DISORDERS IN SAUDI HEALTH CARE WORKERS

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Background: The objective of the study was to screen for sleep habits and various sleep disorders, using a standard questionnaire.

Patients and Methods: The questionnaire was designed to assess sleep habits, the degree of daytime sleepiness using the Epworth Sleepiness Scale (ESS), and specific sleep problems. A random sample of Saudi employees working as medical or paramedical personnel was selected.

Results: There were 163 respondents (65%) comprising 33 females and 130 males. The mean ESS score was 9.4. Sixty-four respondents (39.3%) had an ESS score of more than 10, i.e., excessive daytime sleepiness (EDS). When subjects with poor sleep habits and/or sleep problems were excluded, there were 65 "normal" sleepers, with a mean ESS score of 8.9±3.6. This did not differ from the rest of the sample population, who had a score of 9.8±3.7 (P=0.15). Subjects with inadequate sleep or insomnia consisted of 17 females (51.5%) and 45 males (34.6%). There were seven subjects, all males (5.4%), with habitual snoring. Ten males (7.7%) and two females (6.1%) reported having breathing pauses while asleep. Symptoms of restless leg syndrome, sleep paralysis, and cataplexy were reported by 21 (12.9%), 26 (16.0%) and two (1.2%) subjects, respectively.

Conclusion: The prevalence of EDS in the Saudi population is higher compared to that reported from other populations when a Western ESS normal range is used. Nevertheless, the range of normal score of ESS is probably broader for Saudis compared to other populations. In general, sleep disorders are common but unrecognized in our community.

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Sleep disorders are common problems in Western populations.[1] In an Australian study, 20% of the subjects had habitual snoring and 27% reported breathing pauses during sleep, at least occasionally. In the same study, the prevalence of excessive daytime sleepiness (EDS) was reported in 11% of the sample studied.[2] In another large survey conducted in the United Kingdom, 40% of the population reported snoring regularly, and 49% were reported to experience breathing pauses during sleep.[3] A recent survey in the United States showed a prevalence of insomnia of 34%, which was significantly related to respiratory symptoms.[4]

The prevalence of sleep disorders in the Saudi population has not been defined. They are probably common but undiagnosed and underreported, and to our knowledge there have been no published studies on this subject. The aim of this study was to screen a sample Saudi population for various sleep disorders using a standard questionnaire.

Materials and Methods

Questionnaires were distributed among a random sample of Saudi employees working as medical, paramedical or administrative personnel, at two National Guard hospitals (Jeddah and Riyadh), and King Khalid University Hospital, Riyadh. All subjects were asked to complete the questionnaires at their convenience, and preferably in the presence of their spouses.

The questionnaire addressed 21 questions regarding age, gender, height, weight, sleep habits, and specific sleep problems, including duration of sleep, sleep latency (time from going to bed until onset of sleep), daytime naps, degree of daytime sleepiness using the Epworth Sleepiness Scale (ESS), frequent awakening at nights, snoring history (occasional or habitual), history of breathing pauses while asleep (at least occasionally), symptoms of restless leg syndrome (RLS), cataplexy, and sleep paralysis.

The Epworth Sleepiness Scale (ESS) is a simple questionnaire measuring the general level of daytime

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sleepiness. It consists of eight different situations and activities that are often part of everyday life. The total ESS score is a measure of the average sleep propensity and the probability of falling asleep in those conditions. The total ESS score ranges from 0-24. The upper limit of normal, based on a previous study on healthy adults, is estimated to be 10.[5]

Statistical analysis was performed using chi-square analysis for differences.

Results

Of the 250 questionnaires distributed, 163 respondents (33 females and 130 males) properly completed and returned their questionnaires. The mean age of the subjects was 32.9±7.5 years (18-50 years), and mean body mass index (BMI) was 27.0±7.0 kg per square meter. There were no significant gender differences in age or BMI (*P*=0.08 and 0.37, respectively).

The mean ESS score for the group as a whole was 9.4±3.6. The mean ESS score for males was 9.6±3.6 and for females was 8.7±3.7, which did not reach statistical significance (*P*=0.20). The number of subjects with ESS score of more than 10, i.e., with excessive daytime sleepiness (EDS) was 64 (39.3%), and was more frequent in men at 41.5% than in women at 30.3% (*P*=0.87).

Sixty-five subjects (53 men and 12 women) were considered normal sleepers (i.e., they had no history of habitual snoring, breathing pauses while asleep, symptoms of RLS, cataplexy, or inadequate sleep quality/insomnia, as defined by frequent awakening, sleep latency of more than 30 minutes and/or sleep duration of less than 6 hours). Their mean ESS score was 8.9±3.6, with no significant sex difference. In normal sleepers, item 5, sleepiness while "lying down to rest in the afternoon when circumstances permit" obtained the highest score (2.0), followed by item 7, "sitting quietly after a lunch" (1.7). Item 8, "in a car, while driving" obtained the lowest score (0.20 (Table 1).

The mean duration of sleep was 6.3±1.9 hours, with no significant difference between sexes. This included the time awake during the night, and was not synonymous with the total duration of sleep. The number of subjects with daytime napping was 143 (88.0%). Occasional napping occurred in 122 (75.0%) and usual napping in 21 (13.0%). The number of patients with difficulty falling asleep, as defined by taking more than 30 minutes to do so, was 31 men (23.9%) and 10 women (30.3%). There was no significant difference between genders as far as sleep duration, daytime napping, and difficulty falling asleep were concerned. Frequent awakening was reported by 16.2% in men and 36.4% in women (*P*=0.01). The causes for awakening were not always specified, but they included going to the bathroom and the need to attend to children (Table 2).

Snoring was divided into occasional and habitual. Seventy-two subjects (44.2%) reported a history of snoring.

TABLE 1. *Epworth Sleepiness Score (ESS) in normal sleepers.*

	Mean±SD
Sitting and reading	1.3±0.756
Watching TV	1.1±0.831
Sitting inactive in a public place (e.g., a theater or attending a meeting)	1.2±0.811
As a passenger in a car, for an hour without break	1.2±1.079
Lying down to rest in the afternoon, when circumstances permit	2±0.968
Sitting and talking	0.1±0.348
Sitting quietly after lunch (not having had alcohol)	1.7±0.954
While driving a car	0.2±0.378
Total	8.9±3.6

TABLE 2. *Characteristics of sleep in all respondents.*

	Female n=33 (%)	Male n=130 (%)	*P*-value	Total n=163 (%)
ESS score of >10	10 (30.3)	54 (41.5)	0.87	64 (39.3)
Daytime nap	28 (84.8)	115 (88.5)	0.57	143 (87.7)
Habitual snoring	0	7 (5.4)	0.10	7 (4.3)
Breathing pauses while asleep	2 (6.1)	10 (7.7)	0.75	12 (7.4)
Awakening at night	12 (36.4)	21 (16.2)	0.01	33 (20.2)
Difficulty falling asleep	10 (30.3)	31 (23.8)	0.45	41 (25.2)
Inadequate sleep quality	17 (51.5)	45 (34.6)	0.07	62 (38.0)
RLS symptoms	3 (9.1)	18 (13.8)	0.47	21 (12.9)
Cataplexy	0	2 (1.5)	1.00	2 (1.2)
Sleep paralysis	9 (27.3)	17 (13.1)	0.05	26 (16.0)
ESS (mean)	8.7	9.6	0.21	9.4
Duration of night sleep (hours) (mean)	6.2	6.4	0.53	6.3

There were significant differences between males and females, with only four of the females (12.1%) reporting occasional but not regular snoring, compared with 61 of the males (47.0%) reporting occasional and seven (5.4%) reporting habitual snoring. Twelve subjects (7.4%), comprising 10 males and two females, reported occasional history of breathing pauses while asleep (Table 2).

Twenty-six subjects (16.0%) reported a history of having experienced sleep paralysis at least once. There were 21 subjects (12.9%) with symptoms of RLS, and cataplexy was reported in only two subjects (1.2%).

Discussion

The efficacy of the ESS in determining the degree of sleepiness during the daytime has been verified with both healthy subjects and patients with various sleep disorders.[6-8] Our data showed that the mean ESS score of the selected Saudi sample (9.4±3.6) was much higher than that of samples from Australia (5.9±2.2), Spain (6.1±2.9), and normal subjects (4.5±2.2).[5,9,10] About 39.3% of our subjects had excessive daytime sleep, defined as ESS score

of >10. This, together with the relatively high mean ESS score of our population, suggests that the prevalence of sleep disorders presenting with EDS is substantial, with no significant gender variation.

In a sample from the Australian population, the prevalence of EDS was found to be only 10.9%, with no difference between genders,[2] while it was 18.3% and 16.2% for men and women, respectively, in a large randomized sample from the general population in the United Kingdom.[11] In another large survey in the United Kingdom, which included night-shift workers, 12.0% of car drivers and 8.5% of truck drivers had ESS scores of >10. The lack of difference in ESS score according to sex, and the prevalence of EDS in our study may be related to the relatively small number of subjects recruited. ESS scores did not vary significantly with age in our sample, which is also in keeping with reports from other populations of similar age group.[2,6]

Surprisingly, in our normal sleepers the ESS scores ranged from 2-16 with a mean of 8.9±3.6, which did not differ significantly from that of the rest of the sample population, 9.8±3.7 (P=0.15). This indicates that even with normal Saudi sleepers, the ESS score is higher than that of Western populations. This difference may be related to the selectivity of our subjects, with a number of them taking night calls. A warm climate may unmask physiological sleepiness but it does not increase daytime sleepiness by itself.[13]

One might think that the effect of our cultural habit of taking an afternoon nap could explain this higher ESS score seen in our normal sleepers. However, it is interesting to note that the score obtained for item 5 in our normal sleepers is close to that reported in Western populations.[5,9] This raises the possibility that, regardless of the cultural background, everyone would like to take an afternoon nap if his or her working or social environment permitted. Indeed, the percentage of subjects who take an an afternoon nap in our study was about 86%, which agrees with the higher scores in items 5 and 7. This would seem to indicate that ESS might reflect a physiological increase in sleepiness in the afternoon, as suggested by Izquierdo-Vicario et al.[9]

The occurrence of snoring was 44.2% among our subjects, however, habitual snoring was reported in only seven men (5.4%). On the other hand, 12 subjects (7.4%) of both sexes reported a history of occasional breathing pauses while asleep (possible apnea). The lack of sex difference in our study as compared to previous studies may be due to our small sample size and younger age group.[14] In a similar study from a sample of the Australian population, Jones et al. reported that 21.8% of men and 11% of women had habitual snoring, while 30.4% of men and 14.1% of women reported a history of breathing pauses while asleep.[2] In a telephone questionnaire survey reported from England, 40% of the population (2894 women and 2078 men aged 15-100 years) reported regular snoring, while 3.8% reported breathing pauses during sleep.[3]

Subjects with inadequate sleep quality/insomnia were 17 women (51.5%) and 45 men (34.6%) (P=0.07). This is higher that that of the Australian population, which was 18.8% and 11.3% in women and men, respectively.[2] Although definitive data is not available regarding the prevalence of restless leg syndrome, symptoms of RLS have been identified in 5%-15% of normal subjects,[15] which is similar to our finding. Twenty-six subjects (16%) reported occasional history of sleep paralysis. It was reported that sleep paralysis occurs at least once in a lifetime in 40%-50% of normal subjects.[16]

In our study, only two subjects reported having cataplexy. Cataplexy is a major feature of narcolepsy, and in the presence of excessive daytime sleepiness, it is virtually diagnostic.[16] Narcolepsy is not a rare disorder in the Western population, and its prevalence has been calculated as 0.07% in the Los Angeles area and as 0.06% in San Francisco.[17,18] It is possible that with a larger sample, subjects with major features of narcolepsy may be identified.

As expected, one of the limitations of using subjective evaluations is that some subjects may have maximized and others minimized their symptoms or responses to the questionnaire. Objective evaluation of a sample of our subjects by obtaining a sleep study would have strengthened our subjective data. Other limitations that may have contaminated our results include the small number of subjects involved, the relatively narrow range of subjects' age, and the bias effect of studying a selected population, which may not be a good representation of the whole Saudi population.

We conclude from this study that first, EDS measured by a standard method appears to have a high prevalence when Western ESS normal range is used. Nevertheless, the range of normal score of ESS is probably broader for Saudis compared with other populations. Second, sleep disorders are common but under-recognized in our community. Among sleep disorders, inadequate sleep/ insomnia is the most common, followed in a decreasing order by sleep paralysis, restless leg syndrome, and sleep-disordered breathing. However, a large randomized sample from the general Saudi population with wide coverage of different age groups is needed in order to determine the normal range of ESS score, the prevalence of EDS, and of sleep disorders.

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