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Self-reported prevalence of sleep disorders among medical and nursing students

M. Belingheri, A. Pellegrini, R. Facchetti, G. De Vito, G. Cesana and M. A. Riva

School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy

Correspondence to: M. Belingheri, School of Medicine and Surgery, University of Milano-Bicocca, Building U38 (Villa Serena), Via Cadore 48, Monza, Italy. Tel: +39 02 6448 8191; e-mail: michael.belingheri@unimib.it

Background	Sleep disorders are highly prevalent among university students. In particular, the symptoms of sleep disorders are more prevalent among healthcare students.
Aims	To assess the prevalence of risk factors of insomnia and sleep disorders and to examine the correlations between them among nursing and medical students. We also compared the effects of shift work during internship.
Methods	The sample was 417 healthcare students; 202 of them were nursing students, and the remaining 215 were medical students. We used a self-administered questionnaire to assess the risk factors for insomnia (i.e. age, BMI, tobacco consumption, physical activity and perceived stress, using the General Health Questionnaire-12). We also used the Sleep and Daytime Habits Questionnaire and Epworth Sleepiness Scale to assess the prevalence of sleep disorders and daytime sleepiness.
Results	A higher percentage of nursing students than medical students were aged 25 years or older, engaged in inadequate levels of physical activity and consumed tobacco. With the exception of tobacco consumption among nursing students, high scores on the GHQ-12 were the only risk factor associated with daytime and nighttime symptoms and poor sleep quality. There was no significant association between the symptoms of sleep disorders and shift work including night shifts.
Conclusions	Since sleep disorders are highly prevalent among healthcare students, early detection and management is recommended. This will decrease the risk of harm to students and patients, due to medical mistakes.
Key words	Insomnia; medical students; nursing students; sleep disorders.

Introduction

Sleep disorders are more prevalent among university students than in the general population [1]. The prevalence of associated symptoms, such as greater daytime tiredness, depressive traits and irritability, are especially high among healthcare students. Specific risk factors are associated with a higher prevalence of sleep disorders. For instance, higher stress levels and subclinical depression have been identified as risk factors for sleep disorders among medical students [2]. Late-night study routines and internship participation can result in sleep deprivation and disrupt sleep habits. Several studies have found an association between shift work and prevalence of sleep disorders [3], but no previous study has focused on healthcare students doing internships.

This study aimed to assess the prevalence of risk factors for insomnia, symptoms of sleep disorders, and the correlations between them among nursing and medical students. We also examined group differences in the study variables and the effects of undertaking shift work during internships.

Methods

An independent ethics committee approved our study protocol. All the nursing and second- and third-year medical students of an Italian university were recruited as the study participants. They provided written consent and participated on a voluntary and anonymous basis. All the students completed a self-administered questionnaire at a predetermined time after a period of internship at a hospital.

We collected data about participants' sociodemographic characteristics (i.e. sex, age, height, weight, course and year of study), the risk factors for insomnia (i.e. smoking and physical inactivity) and perceived stress, which was

Key learning points

What is already known about this subject:

- The prevalence of sleep disorders is higher among healthcare students than in the general population and among students in other subjects.
- No previous study has compared nursing and medical students or examined the impact of night shifts during internships.

What this study adds:

- We found a high prevalence of sleep disorders among nursing and medical students.
- The symptoms of sleep disorders were related to perceived stress.
- Shift work and a higher frequency of night shifts were unrelated to the symptoms of sleep disorders and GHQ-12 scores.

What impact this may have on practice or policy:

- Medical surveillance may play a role in the early detection and management of sleep disorders to reduce the risk of clinical incidents during internships.

assessed using the self-administered General Health Questionnaire-12 (GHQ-12) [4].

The potential risk factors were defined as follows: age ≥ 25 years, tobacco consumption > 10 per day, BMI ≥ 25 kg/m^2 and duration of engagement in physical activity ≤ 2 days per week. Distress was defined as GHQ-12 scores ≥ 5. We also collected data about the nature of the shift work undertaken during the internship (i.e. ward/department, work schedule and the frequency of night shifts).

The author of a similar study among nursing students provided us with the Italian version of the Sleep and Daytime Habits Questionnaire, which we used to assess the prevalence of insomnia [5]. The questionnaire included the Epworth Sleepiness Scale (ESS) [6], which is a validated measure of daytime sleepiness.

We analysed the data using SAS (SAS Institute). Results with *P*-values < 0.05 were considered to be statistically significant. We used Fisher's exact test or χ^2 test to examine group differences and logistic regression to examine the relationship between the aforementioned risk factors and insomnia symptoms.

Results

A total of 417 students completed the questionnaire, and the sample consisted of 202 (48%) nursing students and 215 (52%) medical students. When compared to medical students, a higher percentage of nursing students were aged 25 years or older, engaged in inadequate levels of physical activity and consumed tobacco. Medical students experienced daytime symptoms more frequently than nursing students did (Table 1).

The effect of shift work was assessed among 120 nursing students doing shift work. Eighty-six (72%) students had a rotating shift pattern that included night shifts; 19 (16%) of them had a rotating shift pattern that did not include night shifts; and 15 (13%) of them had a fixed pattern. Moreover, 32 (27%), 21 (18%), 40 (33%) and 27 (23%) students had > 5, 4–5, 1–3 and no night shifts during their entire internships, respectively.

GHQ-12 scores ≥ 5 were related to daytime and nighttime symptoms and poor or very poor sleep quality among both nursing and medical students. Further, tobacco consumption was also related to daytime symptoms (Table 2), but gender was not significantly associated with any of these variables. However, there was no significant relationship between either the symptoms of sleep disorders and shift work that involves night shifts, or the number of night shifts and the GHQ-12 scores.

Discussion

Our study found a high prevalence of sleep disorders among nursing and medical students and an association between these symptoms and perceived stress. Only one previous study conducted in 1969 compared nursing and medical students [7]. Our study is the first to compare different groups of healthcare students and examined the impact of night-shift work within the Italian context.

The use of a self-administered questionnaire is a limitation of this study as we could not further differentiate participants' responses. However, participants may have provided more honest responses because they responded anonymously.

High scores on the GHQ-12 emerged as the primary risk factor for sleep disorders and poor sleep quality. High scores were obtained by 20% and 16% of nursing and medical students, respectively. These rates are comparable to those previously reported for healthcare professionals in similar studies [8]. Furthermore, there were more women in the nursing sample (70%), compared to the medical sample (53%), but gender did not have an effect on the GHQ-12 scores or symptoms of sleep disorders.

Table 1. Prevalence of the risk factors for insomnia, insomnia symptoms, poor or very poor sleep quality and daytime sleepiness among nursing and medical students

Risk factors	**Nursing students**	**Medical students**	***P***
Age ≥ 25	27 (13)	7 (3)	<0.001
BMI ≥ 25	27 (13)	22 (10)	NS
Lack of physical activity	108 (54)	85 (40)	<0.01
Smoker	55 (27)	12 (6)	<0.001
GHQ-12 ≥ 5	40 (20)	35 (16)	NS
Pathological features	**Nursing students**	**Medical students**	***P***
Nighttime symptoms	27 (13)	42 (20)	NS
Daytime symptoms	82 (41)	125 (58)	<0.001
At least one symptom	89 (44)	136 (63)	<0.001
Poor or very poor sleep quality	19 (9)	24 (11)	NS
Daytime sleepiness	23 (11)	24 (11)	NS

The data represent *n* (%). NS, not significant; GHQ-12, General Health Questionnaire-12.

Table 2. The relationship between the risk factors for insomnia and symptoms of sleep disorders

Risk factors (nursing students)	**Nighttime symptoms**		**Daytime symptoms**		**Poor or very poor sleep quality**	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***	**OR (95% CI)**	***P***
Age (≥ 25 versus < 25 years)	1.05 (0.30–3.61)	NS	0.68 (0.27–1.72)	NS	3.07 (0.85–11.13)	NS
BMI (≥ 25 versus < 25 kg/m^2)	0.86 (0.72–1.03)	NS	0.98 (0.88–1.09)	NS	0.85 (0.68–1.05)	NS
Physical activity (yes versus no)	1.05 (0.44–2.48)	NS	0.86 (0.46–1.60)	NS	0.96 (0.34–2.72)	NS
Smoker (yes versus no)	0.79 (0.29–2.16)	NS	3.31 (1.62–6.76)	<0.001	0.30 (0.07–1.28)	NS
GHQ-12 scores (≥ 5 versus < 5)	4.31 (1.78–10.46)	<0.01	3.51 (1.63–7.59)	<0.01	7.40 (2.63–20.84)	<0.001
Gender (men versus women)	1.58 (0.56–4.51)	NS	0.88 (0.42–1.85)	NS	1.45 (0.40–5.25)	NS
Risk factors (medical students)	**Nighttime symptoms**		**Daytime symptoms**		**Poor or very poor sleep quality**	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***	**OR (95% CI)**	***P***
Age (≥ 25 versus < 25 years)	0.38 (0.04–4.12)	NS	0.95 (0.20–4.63)	NS	2.38 (0.35–16.16)	NS
BMI (≥ 25 versus < 25 kg/m^2)	1.05 (0.92–1.20)	NS	0.92 (0.83–1.03)	NS	1.04 (0.88–1.23)	NS
Physical activity (yes versus no)	0.89 (0.42–1.87)	NS	0.79 (0.44–1.43)	NS	0.42 (0.16–1.08)	NS
Smoker (yes versus no)	0.54 (0.10–2.86)	NS	1.10 (0.29–4.18)	NS	0.52 (0.06–4.86)	NS
GHQ-12 scores (≥ 5 versus < 5)	5.31 (2.35–11.97)	<0.001	2.81 (1.19–6.65)	<0.05	4.99 (1.90–13.06)	<0.01
Gender (men versus women)	0.92 (0.42–2.00)	NS	1.33 (0.72–2.48)	NS	0.66 (0.24–1.80)	NS

CI, confidence interval; GHQ-12, General Health Questionnaire-12; NS, not significant; OR, odds ratio.

Group differences in most of the risk factors for insomnia were not significant. However, nursing students smoked more frequently and engaged in physical activity less frequently than medical students did. This finding is consistent with the existing literature [9].

Neither participation in shift work nor the frequency of night shifts was related to symptoms of sleep disorders or GHQ-12 scores. This is contrary to previous studies, which found that rotating night-shift work is associated with insomnia-related symptoms [3]. These findings may be attributable to the nature of the samples used. Specifically, students' high levels of motivation may protect them against sleep disorders, and the duration of internships may be too short to result in sleep disorders. In addition, the prevalence of insomnia symptoms was lower among nursing students than among medical students who did not participate in internship activities that involved a rotating shift schedule.

Altogether, 44% and 63% of nursing and medical students reported at least one symptom of sleep disturbance. These results concur with previous findings [5,10]. Daytime symptoms are particularly disruptive and may cause significant incidents, which in turn can endanger future workplaces and student interns themselves.

Moreover, daytime symptoms can cause interns to make clinical errors, which can adversely affect patient outcomes. Medical surveillance is an important means of detecting sleep disturbance at an early stage in order to reduce risk of harm to both students and patients.

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