

Prevalence and correlates for self-reported sleep problems among nursing students

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Key words

Insomnia • Nursing students • Daytime sleepiness

Summary

Introduction. University students report significantly worse sleep quality than the general population. Sleep problems are related to increased health concerns, irritability, depression, fatigue, attention and concentration difficulties, along with poor academic performance. The aim of this paper is to conduct a survey based on a questionnaire that would characterize night time and daytime habits in nursing students to estimate the prevalence of chronic insomnia, sleep disturbance and their correlates.

Methods. We conducted a cross-sectional survey among 364 nursing students of the University of L'Aquila, in Italy. Self-reported sleep data were derived from Sleep and Daytime Habits Questionnaire" (S&DHQ) that covered sleep and daytime habits and academic progress. Anxiety and depression symptoms were assessed by the Mental Health Inventory-5 (MHI-5) questionnaire. A supplement includes information about lifestyle, health status and physical activity.

Results. The overall prevalence of insomnia was 26,7%. It increased significantly from 10,3% for students aged < 20 years to 45,5% for those aged > 40 years. The prevalence of sleep problems were 9,4% for disorders of initiating sleep, 8,3% for disrupted sleep, 7,7% for early morning awakening and subjectively poor quality of sleep 22,3%. Multiple logistic regression analysis showed that greater age was significantly associated with an increased risk of insomnia. Other risk predictors of insomnia were headache, severe depression and self perception of poor quality of life. Daytime sleepiness and morning tiredness were significantly associated with current smoking habit and painful physical condition. The risk of unsatisfactory academic progress increased significantly in students reported poor sleep quality.

Discussion. Our study demonstrates that sleep problems are very common among students, and supports the need to assess sleep problems and identify students at risk regarding school achievement.

Introduction

Insomnia is the most commonly reported sleep problem in the industrialized world [1]. It is historically defined by complaints of disturbed sleep in the presence of adequate opportunity and circumstance for sleep. The disturbance may consist of one or more of three features: difficulty in initiating sleep; difficulty in maintaining sleep; or waking up too early. A fourth characteristic, non-restorative or poor-quality sleep has frequently been included in the definition, although there is controversy as to whether individuals with this complaint share similar pathophysiologic mechanisms with the others. The importance of sleep disruption often rests with its impact on the individual daytime function [2].

Epidemiological studies done all over the world suggest that symptoms of insomnia and the disorder (symptoms and daytime impairment) are very common. In the general population, the range for the presence of symptoms was about 10-40 percent. Although there are outliers, depending on the definition used, a reasonable estimate of the prevalence of insomnia symptoms plus daytime impact is 5-15 percent [3].

Insomnia has been correlated with frequent use of medical services [4], chronic health problems [5], increased drug use [6], and perceived poor health [5], and has been

associated with medical problems including heart disease [7], hypertension [8], psychiatric disorders [9] and musculoskeletal problems [7].

Current data demonstrate a high rate of comorbidity between sleep disorders and various psychiatric illnesses, especially mood and anxiety disorders. The disturbance of sleep quality and continuity that is associated with many sleep disorders predisposes to the development or exacerbation of psychological distress and mental illness.

The daytime consequences of chronic insomnia often include increased healthcare utilization, increased risk of depression [9], poor memory, reduced concentration, poor work performance, and perceived or real risk of failure at work [4].

The results of a study conducted by Suen LK et al. showed that sleep hygiene practice was significantly associated with sleep quality. Appropriate measures and sleep hygiene education need to be emphasized among university students in order to increase their awareness on the importance of adopting healthy sleep hygiene practices [10].

Epidemiological data showed that the prevalence of sleep disorders among students are more common in comparison with young adults who are not students. A study done with Estonian students of University of

Tartu has estimated that a self-reported poor sleep quality is associated with unsatisfactory academic progress and living conditions, but is not associated with students workload. Daytime sleepiness is also a significant problem and is linked with sleep disorders and work while studying [11].

The aims of our study is to assess the prevalence of insomnia disorders in nursing students, and to estimate how demographic characteristics, lifestyle, health status and academic progress are linked with nocturnal and diurnal symptoms of disrupted sleep.

Methods

PARTECIPANTS

The survey, that covers all population, has been conducted from April and June 2008 in student of Nursing Science of L'Aquila University on the three year degree course. Each student was contacted for obtained informed consent.

During that period we handed out the questionnaire to 370 students. Only six participants did not give informed consent therefore the study involved 364 students. We applied several security safeguards in the data access, handling, and storage. There were no personal identifiers recorded in the database.

Instruments

Data of sleep disorders were collected from students using a self-report questionnaire, derived from Sleep and Daytime Habits Questionnaire" (S&QDH). This questionnaire was based on the "Questionnaire on Sleep and Daytime Symptoms" used in three European countries together with Health Survey programme [11, 13].

The questionnaire S&QDH, in appendix, includes sleep and daytime habits (20 questions), and lifestyle and academic progress (5 questions). In a supplement we added questions about demographic characteristics, smoking status, alcohol use, health status and physical activity.

Mental health status was measured using Mental Health Inventory 5 (MHI-5), a brief questionnaire included in the Short Form Health Survey (SF-36), that measures health-related quality of life. MHI-5 is a well validated and reliable measure of mental health status and it has been widely used in surveys of general health and quality of life.

VARIABLES

Studied variables included:

- *Socio demographic information:* gender, age grouped as 18-20 years, 20-29 years, 30-39 years and ≥ 40 years, weight and height; Body Mass Index (BMI) was calculated based on self-reported height (in meters) and weight (in kilograms) as $\text{weight}/\text{height}^2$. It was grouped into 3 categories: $< 25 \text{ kg}/\text{m}^2$ (normal weight), $25\text{-}29.9 \text{ kg}/\text{m}^2$ (overweight) and $\geq 30 \text{ kg}/\text{m}^2$ a obesity.
- *Sleep and daytime habits:* bedtime hour, the average time needed for falling sleep, the average number of nocturnal awakenings, sleep duration. These four

questions are expressed as continuous variables on an interval scale.

Twenty multiple choice questions provided answers expressed as discontinuous variables on a nominal scale to estimate the frequency of symptoms during the whole week: 1) never; 2) less than once a week; 3) 1-2 nights a week; 4) 3-4 nights a week; 5) almost nightly/daily.

Two quality-associated questions (usual sleep quality on whole week and on the night before an exam) rated sleep on five point scale as 1 excellent; 2 good; 3 satisfactory; 4 poor; 5 very poor.

The symptoms of insomnia were also evaluated and defined as followed:

- *DIS:* Difficulty in initiating sleep at least 3 evenings per week (being quite or completely dissatisfied with sleep latency at least 30 min);
- *DMS:* Difficulty maintaining sleep at least 3 nights per week, for disrupted sleep (DS-difficulty in resuming sleep after awakening in the night) or early morning awakenings (EMA);
- *NRS:* Non-restorative sleep at least 3 nights per week: sleep of normal duration (7 h or greater) associated with complaint of daytime sleepiness or tiredness at least 3 mornings per week.
- *Insomnia (nocturnal symptoms)* was defined by the presence of DIS or DMS, and insomnia with diurnal symptoms was defined by the presence of DIS or DMS associated with NRS.
- *Academic progress, leisure activity and living conditions* were investigated with three questions that provided answers expressed as 1-excellent; 2-good; 3- satisfactory or 4-unsatisfactory.
- *Health status:* physical illnesses and self perception of health and life quality expressed as dichotomous variables (present versus absent) for the following conditions, that subjects indicated had to last 12 months or more: musculoskeletal pain, current asthma (wheezing or whistling in the chest in the past 12 months) abdominal pain, headache, or other chronic conditions.
- *Mental health status:* the MHI-5 comprises five questions. There are six possible responses to the questions (all, most, good bit, some, little, or none), scored between 1 and 6. The score for each individual therefore ranges between 5 and 30. This is then transformed into a variable ranging from 0–100 using a standard linear transformation. On this scale, lower scores indicate worse mental health status. For the present analysis, a MHI-5 score < 52 was considered an indicator of the presence of severe depressive symptoms.
- *Lifestyle:* night time or daytime work, smoking status, alcohol use, and physical activity (hours per week spent exercising).

STATISTICAL ANALYSES

We performed data management and statistical analysis by using the STATA software package. Descriptive analyses for qualitative variables included number, frequency, and the 95% confidence interval, whereas quan-

titative variables were analyzed in terms of mean value and standard deviation. Collected data were analyzed for the total population and by subgroups of age. We tested differences in proportions for statistical significance using the Chi-square test or Fischer's exact test.

To determine predictive factors (sociodemographic and lifestyle characteristics and health status) for insomnia symptoms and non-restorative sleep we used logistic regression analysis. The associations were expressed using odds ratios, after adjustment for potential confounders (age, gender, BMI, night time work, bedtime hour, and smoking status).

Logistic regression analysis have been also conducted to analyse the associations between sleep impairment and academic progress after adjustment for age, gender, and year of course.

All test were used in the two-tailed version and p-value ≤ 0.05 were considered as statistically significant.

Results

DESCRIPTION OF THE SAMPLE

Of 364 respondents to the initial questionnaire with valid data on sleep assessment, 256 were female (70,3%)

and 108 were male (29,7%). Students distribution within years of course was: 52,2% (n = 188) in the first year, 14,6% (n = 51) in the second year and 31,8% (n = 117) in the third year. Their ages ranged from 18 to 53 years, with a mean age of 24 ± 5.4 .

Out of the overall 364 subjects, 153 (42.3%) were current smokers, 17 (4.7%) were ex-smoker and 192 (53%) had never smoked. Most of the current smokers (66%) had 15 or fewer tobaccos per day. The Body Mass Index (BMI) was 17-36 kg/m² (mean $22,4 \pm 3,1$). The subjects included 60 (16,5%) full-time or part-time workers; only 8 (2,2%) students worked full or part-time during the night.

Of all students, 26.6% reported going to bed after midnight during the weekdays, with higher prevalence among the age group between 20 and 29 years (28.6%). The distribution of the students demographic characteristics' according to age groups is presented in Table I.

INSOMNIA SYMPTOMS

The prevalence of nocturnal sleep disturbance symptoms were: 9.4% for disorder of initiating sleep (DIS) ≥ 3 nights per week, 8.3% for at least three nocturnal awakening (DS) and 7.1% for early morning awakening (EMA) ≥ 3 times a week.

Tab. I. Demographic and lifestyle characteristics of the sample.

| | < 20 years (n = 29) | | 20-29 years (n = 286) | | 30-39 years (n = 32) | | ≥ 40 years (n = 11) | |
|---|---------------------|-----------|-----------------------|------------|----------------------|-----------|--------------------------|-----------|
| | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI |
| Distribution of the sample | 8.1 | 5.5 -11.4 | 79.9 | 75.4 -83.9 | 8.9 | 6.2-12.4 | 3.1 | 1.5-5.4 |
| Women | 93.1 | 77.2-99.1 | 65.4 | 59.3-70.7 | 90.7 | 75.0-98.0 | 72.7 | 39.0-94.0 |
| Daytime work | | | | | | | | |
| Sometimes | 17.2 | 5.8-35.8 | 18.2 | 13.9-2.3 | 21.9 | 9.2-40.0 | - | - |
| Part time or full-time | 6.9 | 0.8-22.8 | 14.0 | 10.1-18.6 | 40.6 | 23.7-59.4 | 45.5 | 16.7-76.6 |
| Night time work | | | | | | | | |
| Sometimes | 3.5 | 0.8-17.8 | 13.3 | 9.6-17.8 | 19.3 | 7.5-37.5 | 45.5 | 16.7-76.6 |
| Part time or full-time | - | - | 2.5 | 0.9-5.0 | 3.2 | 0.1-16.7 | - | - |
| Smoking status | | | | | | | | |
| Never smoked | 65.5 | 45.7-82.1 | 52.1 | 46.1-58.0 | 43.8 | 26.4-62.3 | 60.7 | 30.8-89.1 |
| Current smoker | 34.5 | 17.9-54.3 | 42.9 | 37.1-49.0 | 46.9 | 29.1-65.3 | 36.3 | 10.9-69.2 |
| Ex smoker | - | - | 4.9 | 2.7-8.1 | 9.4 | 2.0-25.0 | - | - |
| BMI | | | | | | | | |
| < 25 kg/m ² | 79.3 | 60.3-92.0 | 78.3 | 73.1-83.0 | 84.4 | 67.2-94.7 | 63.6 | 30.8-89.1 |
| ≥ 25 kg/m ² < 30kg/m ² | 6.9 | 0.8-22.8 | 15.1 | 11.1-19.7 | 9.4 | 12.0-25.0 | 27.5 | 6.0-61.0 |
| ≥ 30 kg/m ² | 13.8 | 3.8-31.7 | 6.6 | 0.4-10.1 | 6.3 | 0.7-20.8 | 0.9 | 0.2-41.3 |
| Time of going to bed during the weekdays | | | | | | | | |
| Before midnight | 82.1 | 63.1-93.9 | 71.4 | 65.7-76.5 | 80.7 | 62.5-92.5 | 81.8 | 48.2-97.7 |
| After midnight | 17.9 | 0.6-36.9 | 28.6 | 23.4-34.3 | 19.4 | 7.5-37.5 | 18.2 | 0.2-51.8 |

Analysis of sleep complaint by groups of age, revealed that the prevalence of DS and EMA increased in a step-wise fashion with advancing age (trends significant to $p = 0.02$ and $p = 0.006$ respectively), but there were no gender differences.

As shown in Figure 1, 26.7% (95% CI 22.1-31.2) of the students suffer from insomnia (definite as at least one nocturnal symptom) and 16.2% (95% CI 12.4-20.0) suffer from insomnia with diurnal symptoms of non-restorative sleep.

Overall, 37.6% (95% CI 32.6-42.6) of the students reported morning tiredness or sleepiness during the day, at least three days a week. No statistically differences were observed between males and females.

The prevalence of symptoms (nocturnal and diurnal) increased gradually by age ($p = 0.02$ and $p = 0.009$ respectively).

Sleep dissatisfaction (poor or very poor quality of sleep) was reported by 22.3% (95% CI 18.0-26.6%) of the whole sample. Similarly, 32.3% of the students with insomnia symptoms and 27.2% of those with diurnal symptoms reported sleep dissatisfaction (results not shown in the table).

COMPLAINTS ABOUT DAYTIME SLEEPINESS

The figure 2 shows the prevalence of complaints about sleepiness by age groups.

Daytime sleepiness during classes and in free time (at least 3 times a week) were more frequently reported by subjects younger than 30 years, than the remaining sample, while the proportion of students with tiredness in the morning increased by age.

LOGISTIC REGRESSION ANALYSIS

The results of multivariate logistic regression analyses for predictive factors for sleep disorders are shown in Tables II and III.

Fig. 1. Prevalence (%) of insomnia by age groups: insomnia with only nocturnal symptoms, daytime symptoms (sleepiness or morning tiredness) and insomnia with nocturnal and diurnal symptoms.

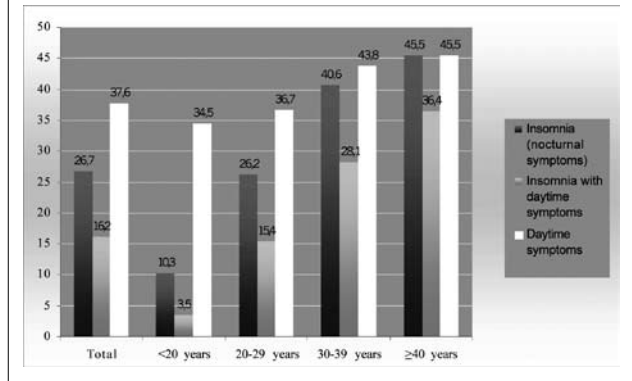
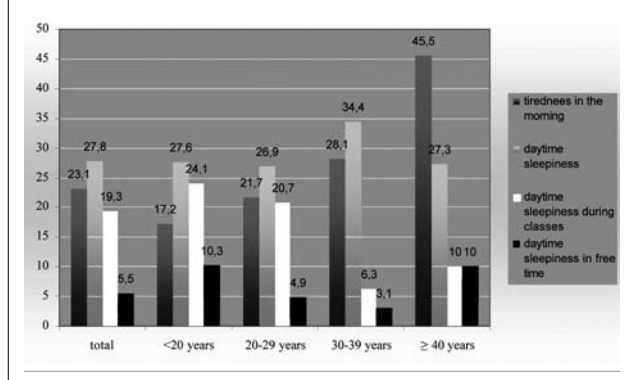


Fig. 2. Prevalence (%) of complaints about sleepiness (at least 3 times a week) by age groups: tiredness in the morning, daytime sleepiness during classes, and daytime sleepiness in free time.



Tab. II. Associations (Multivariate models - OR and 95% CI) of sleep disorders with main demographic and lifestyle characteristics.

| | Insomnia (nocturnal symptoms) | | | Daytime symptoms (sleepiness or morning tiredness) | | | Insomnia disorder (nocturnal and daytime symptoms) | | | Poor sleep quality | | |
|--|-------------------------------|----------|---------|--|----------|---------|--|----------|---------|--------------------|----------|---------|
| | OR | 95% CI | p-value | OR | 95% CI | p-value | OR | 95% CI | p-value | OR | 95% CI | p-value |
| Gender | | | | | | | | | | | | |
| Female (versus male) | 1.1 | 0.6-1.8 | n.s | 1.7 | 1.1-2.3 | 0.04 | 1.5 | 0.7-3.0 | n.s | 0.8 | 0.4-1.5 | n.s |
| Age groups (versus < 20 years) | | | | | | | | | | | | |
| between 20-29 years | 2.8 | 0.8-9.7 | n.s | 1.3 | 0.5-3.1 | n.s | 5.1 | 0.7-39.2 | n.s | 2.6 | 0.7-9.4 | n.s |
| between 30-39 years | 4.7 | 1.2-19.4 | 0.012 | 1.4 | 0.4-4.2 | n.s | 10.6 | 1.5-82.3 | 0.028 | 0.9 | 0.2-5.3 | n.s |
| ≥ 40 years | 6.7 | 1.2-37.9 | 0.021 | 1.7 | 0.4-7.5 | n.s | 14.5 | 1.6-57.6 | 0.020 | 5.1 | 0.9-30.8 | n.s |
| Year of course (versus 1st year) | | | | | | | | | | | | |
| 2 nd year | 1.2 | 0.6-2.5 | n.s | 1.4 | 0.6-3.2 | n.s | 1.4 | 0.7-2.7 | n.s | 0.5 | 0.2-1.4 | n.s |
| 3 rd year | 1.1 | 0.6-1.9 | n.s | 0.9 | 0.4-2.0 | n.s | 1.0 | 0.6-1.7 | n.s | 1.9 | 1.1-3.6 | 0.020 |
| BMI (versus normal weight) | | | | | | | | | | | | |
| ≥ 25 e < 30 kg/m ² | 0.9 | 0.4-1.8 | n.s | 0.8 | 0.4-1.8 | n.s | 1.7 | 0.4-2.1 | n.s | 0.8 | 0.9-1.8 | n.s |
| ≥ 30 kg/m ² | 0.7 | 0.2-1.9 | n.s | 0.8 | 0.3-1.9 | n.s | 1.3 | 0.3-3.4 | n.s | 0.6 | 0.4-1.8 | n.s |
| Smoking status (versus never smoker) | | | | | | | | | | | | |
| Current smoker | 1.2 | 0.7-1.9 | n.s | 2.1 | 1.2-3.4 | 0.02 | 1.8 | 0.8-3.0 | n.s | 0.9 | 0.5-1.6 | n.s |
| Ex smoker | 1.1 | 0.4-3.5 | n.s | 0.7 | 0.2-2.9 | n.s | 0.5 | 0.2-4.0 | n.s | 0.6 | 0.1-2.9 | n.s |
| Night time work (versus no work) | | | | | | | | | | | | |
| Sometimes | 1.1 | 0.6-2.3 | n.s | 1.3 | 0.7-2.7 | n.s | 0.9 | 0.4-2.5 | n.s | 0.7 | 0.3-1.7 | n.s |
| Part or full time | 2.2 | 0.5-10.3 | n.s | 3.5 | 0.7-16.8 | n.s | 1.1 | 0.9-24.8 | n.s | 1.1 | 0.2-6.1 | n.s |
| Time of going to bed | | | | | | | | | | | | |
| Going to bed after midnight (versus before) | 1.7 | 0.9-3.0 | n.s | 2.7 | 1.6-4.6 | 0.001 | 2.7 | 1.4-5.4 | 0.007 | 1.7 | 0.9-3.3 | n.s |

OR: Odds Ratio; CI: Confidential Interval; n.s.: no statistically significant difference

Tab. III. Associations (Multivariate models - OR and 95% CI) of sleep disorders with health and mental status (present versus absent for each condition).

| | Insomnia (nocturnal symptoms) | | | Daytime symptoms (sleepiness or morning tiredness) | | | Insomnia disorder (nocturnal and daytime symptoms) | | | Poor sleep quality | | |
|--------------------------------------|-------------------------------|---------|---------|--|---------|---------|--|---------|---------|--------------------|---------|---------|
| | OR | 95% CI | p-value | OR | 95% CI | p-value | OR | 95% CI | p-value | OR | 95% CI | p-value |
| Headache | 2.0 | 1.2-3.2 | 0.038 | 1.3 | 0.8-2.2 | n.s. | 2.0 | 1.1-3.6 | 0.031 | 0.9 | 0.5-1.8 | n.s. |
| Musculoskeletal diseases | 1.6 | 0.9-2.7 | n.s. | 1.7 | 1.1-2.5 | 0.040 | 2.1 | 1.1-3.8 | 0.042 | 0.9 | 0.5-2.6 | n.s. |
| Abdominal pain | 1.1 | 0.6-2.0 | n.s. | 2.4 | 1.4-4.0 | 0.038 | 1.4 | 0.7-2.7 | n.s. | 1.3 | 0.7-2.5 | n.s. |
| Wheezing in the past 12 months | 1.1 | 0.5-2.4 | n.s. | 2.3 | 1.3-4.6 | 0.041 | 2.0 | 0.9-4.5 | n.s. | 0.4 | 0.1-1.1 | n.s. |
| Self perception of poor life quality | 1.8 | 1.1-2.2 | 0.021 | 1.6 | 1.1-2.5 | 0.033 | 2.4 | 1.3-4.4 | 0.012 | 3.9 | 2.3-6.9 | 0.034 |
| Severe depression (MHI 5 score > 52) | 1.6 | 0.8-3.3 | n.s. | 0.8 | 0.4-1.6 | n.s. | 2.6 | 1.2-5.6 | 0.004 | 2.2 | 1.2-4.2 | 0.031 |

OR: Odds Ratio; CI: confidential interval; n.s.: no statistically significant difference

Multivariate models are adjusted for age, gender, BMI, night time work, going to bed after midnight, and smoking status

Tab. IV. Associations (OR and 95% CI) between sleep disorders and academic progress.

| | Unsatisfactory academic progress | | | Unsatisfactory leisure activity | | |
|--|----------------------------------|---------|---------|---------------------------------|---------|---------|
| | OR | IC 95% | p-value | OR | IC 95% | p-value |
| Insomnia (nocturnal symptoms) | 0,7 | 0,4-1,2 | n.s. | 1,1 | 0,7-1,9 | n.s. |
| Daytime symptoms (sleepiness or morning tiredness) | 0,8 | 0,5-1,3 | n.s. | 1,0 | 0,6-1,7 | n.s. |
| Insomnia disorder (nocturnal and daytime symptoms) | 0,8 | 0,4-1,5 | n.s. | 1,0 | 0,6-1,9 | n.s. |
| Poor sleep quality | 2,1 | 1,2-3,6 | 0.011 | 1,9 | 1,2-3,2 | 0.020 |

OR: Odds Ratio; CI: confidential interval; n.s.: no statistically significant difference

Multivariate models are adjusted for age, gender year of course

Four logistic models that use insomnia (only nocturnal symptoms), diurnal symptoms, insomnia with diurnal symptoms and poor quality of sleep as response variables, were created. Among socio-demographic and lifestyle variables (table II), only age was a significant risk factor for insomnia. Compared with younger subjects, those between 30 and 39 years (OR 4.7; IC 95%: 1.2–19.4) and those 40 years and older (OR 6.7; IC 95%: 1.2–37.9) were at higher risk of having nocturnal symptoms of insomnia.

Significant predictors of insomnia with diurnal symptoms among students were: being between 30 and 39 years (OR 10.6; IC 95%: 1.5–82.3), or being 40 years of age or older (OR 14.5; IC 95%: 1.6–57.6) and going to bed after midnight (OR 2.7; IC 95%: 1.4–5.4).

Current smoking habit was significantly associated to an increased risk (OR 2.1; IC 95%: 1.2–3.4) of morning tiredness or daytime sleepiness.

Among health and mental status variables (table III), health perceived as being poor was significantly associated with all the four response variables of the model (OR 1.8; IC 95%: 1.1–2.2; OR 1.6; IC 95%: 1.1–2.5; OR 2.4; IC 95%: 1.3–4.4 and OR 3.9; IC 95%: 2.3–6.9 respectively).

Other risk predictors of insomnia were: having frequently headache (OR 2.0; IC 95%: 1.2–3.2) for nocturnal symptoms, and having musculoskeletal diseases (OR 2.1; IC 95%: 1.1–3.8) for insomnia with diurnal symptoms.

Daytime sleepiness and morning tiredness were significantly associated with musculoskeletal diseases (OR 1.7; IC 95%: 1.1–2.5), abdominal pain (OR 2.4; IC 95%: 1.4–4.0), current asthma (OR 2.3; IC 95%: 1.3–4.6) after

adjustment for age, gender, BMI, night time work, going to bed after midnight, and smoking status. Severe depression gains importance in association with insomnia disorder and with a poor quality of sleep (OR 2.6; IC 95%: 1.2–5.6; O.R. 2.2; IC 95%: 1.2–4.2 respectively)

ACADEMIC PROGRESS

The results concerning academic progress of students on a four point scale, not shown in the table, were the following: excellent 3.9% (n=14); good 25.6% (n=93); satisfactory 47.3% (n=172); unsatisfactory 23.2% (n=85).

After controlling for socio-demographic variables and year of course, the risk of unsatisfactory academic progress (Table IV), increased significantly (OR 2.1; IC 95%: 1.2–3.6) in students reporting a poor sleep quality. Results similar to those for academic progress were found in analogous regression model for leisure activity (OR 1.9; IC 95%: 1.2–3.2).

Discussion

This study aimed to assess the prevalence of sleep disorders and daytime sleepiness in young nursing students. The sample was of small size but included the whole population of subjects enrolled on the three years course of Nursing Science. Among study participants, the majority of students were aged between 18 and 29 years and only 13% were aged 30 years or older. The proportion of working students was greater among older students, whereas the prevalence of current smoking habit and being overweight didn't significantly change with age.

The study demonstrates that complaints about sleep problems are very common in young nursing students. In fact a relatively high proportion of students appear to suffer from poor sleep; one student in four reported nocturnal symptoms of insomnia and this proportion was very higher among subjects of 30 years or older (about 40%).

Daytime sleepiness and fatigue were the most frequent symptoms reported by the students (27,8% and 23,1% respectively) and the prevalence significantly increased with age. Both sleepiness and fatigue are common in the general population, with an estimated prevalence of 5,5% to 23%. Several studies have reported that these symptoms are associated with an increased prevalence of various somatic disorders [12], have a negative influence on daily activities and are related to perception of general health and quality of life [13].

Among the correlates we found to be most strongly associated with nocturnal and daytime symptoms the time of going to bed and the age (age 30 - 39 and \geq 40 years). Those last results associated to age are to be considered with caution due to the low number of students incorporated in the groups. In multivariate logistic regression analyses, the self perception of poor life quality and severe depression were strongly associated with nocturnal and diurnal symptoms of insomnia and sleep dissatisfaction. Among physical diseases, especially painful physical condition were related to insomnia symptoms and daytime sleepiness.

These findings are consistent with previous epidemiological surveys [14]. Psychological consequences of insomnia and poor sleep, including depression [15], and increased anxiety have previously been reported [16] and diseases that cause pain during sleep (e.g. arthritis, back pain) are well known to be associated with insomnia symptoms, especially with disrupted sleep [17, 18].

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Our results also suggest that low levels of perceived interpersonal support increases the risk of depression by more than 10 times, and that having a higher household income does not necessarily diminish the risk of depression. We have also found some evidence that poor quality of sleep, an irregular diet, and a poor self-reported health status may be associated with depressive symptoms in medical students.

Nevertheless the retrospective and cross-sectional nature of the our data precluded reliable differentiation between primary insomnia and insomnia secondary to another mental, medical, or another sleep disorder.

The study also demonstrates that a poor sleep quality is associated with unsatisfactory academic progress and leisure activity.

Conclusions

In conclusion, we found diverse sleep alterations in a large proportion of the studied subjects. Our study supports the need to assess sleep problems and identify students at risk regarding school achievement.

Many college students are at risk for sleep disorders, and those at risk may also be at risk for academic failure [19].

Educating students for appropriate sleep hygiene and encouraging them to seek professional advice to treat sleep disturbances may be useful to prevent and to improve student university performances. Clinical research indicates that psycho educational interventions are among the most effective methods for improving sleep quality in the general population [20]. Similar studies for university students are still lacking.

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Appendix

QUESTIONNAIRE ON SLEEP AND DAYTIME HABITS (S&DHQ)

Guidelines: the questionnaire includes several different types of questions about sleep and daytime habits. The questions should be answered by circling a number that rates when, what, how, and how long some habit occurred during the previous months on both weekdays and weekends. Only the first question includes information about weekdays. Most questions should be answered by circling a number that rates how often something occurred during the week. The supplement includes information about lifestyle and academic progress in the current year [11].

1. **When do you go to bed on weekdays?**
before 20:00 20:00-21:00 21:00-22:00 22:00-23:00
23:00-24:00 24:00-01:00 01:00-02:00 after 02:00
2. **How long does it take you to fall asleep usually?**
5 minutes 5-10 minutes 10-30 minutes 30 minutes more than 1 hour
3. **How many times do you wake up during the night?**
0 1-2 3-4 5-6 more than 7
4. **If you take daytime naps, how long are they?**
5-10 minutes 15-30 minutes 30 minutes-1hour more than 1 hour more than 2 hours
5. **How do you evaluate your sleep quality?**
excellent good satisfactory poor very poor
6. **How do you evaluate your sleep quality before an exam?**
excellent good satisfactory poor very poor

How often during the week:

- 1: never or almost never
- 2: less than once a week
- 3: once or twice a week
- 4: 3-5 nights/day a week
- 5: almost every day or night

7. **Do you go to bed at an unusual time (later than usually) at night**
1 2 3 4 5
8. **Do you have difficulty in getting to sleep at night?**
1 2 3 4 5
9. **Do you drink coffee late in the evening?**
1 2 3 4 5
10. **Do you use sleeping pills?**
1 2 3 4 5
11. **Do you wake up because of noise?**
1 2 3 4 5
12. **Do you wake up because of nightmares?**
1 2 3 4 5
13. **Do you wake up because of talking during sleep?**
1 2 3 4 5
14. **Do you wake up because of walking during sleep?**
1 2 3 4 5
15. **Do you wake up because of nocturnal eating habits?**
1 2 3 4 5
16. **Do you wake up because of leg movements or disagreeable leg sensations?**
1 2 3 4 5
17. **Do you snore?**
1 2 3 4 5
18. **Do you grind your teeth while asleep?**
1 2 3 4 5

19. Do you wake up too early and have difficulty in getting to sleep again?
1 2 3 4 5
20. Do you feel tired when waking up?
1 2 3 4 5
21. Do you feel daytime sleepiness?
1 2 3 4 5
22. Do you feel excessive sleepiness during the lectures?
1 2 3 4 5
23. Do you feel excessive sleepiness in your free time?
1 2 3 4 5
24. Do you take daytime naps?
1 2 3 4 5

SUPPLEMENT

1. How do you evaluate your accademic progress?
excellent good satisfactory unsatisfactory
2. How do you evalutae your leisure activity?
excellent good satisfactory unsatisfactory
3. How do you evaluate your living conditions?
excellent good satisfactory unsatisfactory
4. Do you work while studying?
not at all sometimes part-time full-time
5. Do you work at night?
not at all sometimes part-time full-time

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