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Sleep Quality Determinants Among Nursing Students

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Abstract

Higher education has influenced students' concepts of sleeping time leading to a deficit of sleep quality. Sleep disorders constitute one of the most pertinent health problems in western society. Identify the factors that influence the sleep quality in nursing students; Identify which social demographic and academic variants interfere with sleep quality; Analyze the influence of variables of psychological context and investigate the relationship between the daytime somnolence with the sleep quality in nursing students. Analytic, descriptive and correlational study in a non-probabilistic convenience sample of 403 nursing students. We applied a Sociodemographic and Academic characterization survey, Epworth Sleepiness Scale, Positive and Negative Affect Scale, Eysenck Personality Inventory, Anxiety scale, Stress and depression and Pittsburgh h Sleep Quality Index. The students' average age is 23.61 years. Women (86.0%) attending the fourth year (27.4%) reveal less sleep quality (63.2%) and more daytime somnolence (24.3%). First year students aged ⩽ 20 years residing alone in rural areas present higher levels of anxiety, are less extroverted and more neurotic, reveal less sleep quality. Sleep disorders constitute a public health problem that requires intervention and adopting educational measures and promoting health awareness raising in educational institutions in order to improve student action in building up of their own sleep quality.

1. Introduction

Sleep has been defined as an active phenomenon, a functional, reversible and cyclical state with characteristic behaviours such as a relative immobility and increases in the threshold of responses to external stimuli. It produces

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biological and mental changes (Paterson, Nutt & Wilson, 2011). Tembo & Parker (2009) describe that sleep is a primary human need for good health and a healthy life in which there is a physical restoration that protects man from the natural wear of waking hours, because during sleep brain waves are altered allowing the relaxation of the body. It is during this period that the muscles enter a state of deep relaxation, low body temperature, the eyes move, the breathing rate, hormonal rates and frequency of heartbeats change.

These authors claim that recent advances in research on sleep have shown that certain mental disorders are associated with characteristic changes in sleep physiology. It is known that poor sleep quality directly affects the quality of human life because it is involved with increased morbidity from autonomic dysfunction, psychiatric disorders, lower academic performance, premature aging, depression, decreased work efficiency, among other consequences (Araujo Lima, Alencar, Thiago, Fragoso & Daniels, 2013).

Students of higher education usually have an irregular sleep pattern, characterized by changing start time and end time, which occur later at weekends, compared to weekdays. Moreover, during the week sleep time is shorter in relation to the weekend, because students undergo sleep deprivation during the school day or clinical practice, as in the case of nursing students (Araújo et al ., 2013). Such irregularities may have a negative impact on students' health, and is thus a risk factor (Schneider, Vasconcellos et al., 2010).

Higher education students' poor sleep standards compromises attention, memory, problem-solving ability and academic performance (Gomes, 2009; Schneider, Vasconcellos et al., 2010). Given that it affects cognitive functioning, in the view of the authors consulted, sleep should be a major concern when it comes to university students for whom academic performance is a priority.

From the perspective of the authors cited, conducting research on the prevalence of poor quality of college students' sleep is important, especially because it affects a significant number of students, regardless of their course of study. It increases the chances of a variety of health problems, absenteeism and decreased productivity. It also has a close relationship with their physical and psychological condition resulting in stress and anxiety.

The reduction of hours of sleep in college students is an emerging problem, according to Henriques (2008). The reduction of sleep time has consequences due to excessive sleepiness the individual feels during the day, and is associated with the risk of depression, insomnia and accidents.

According to Henriques (2008), studies conducted in the last two decades, such as the study by Hicks, Fernandez and Pellegrini (2005) revealed that the average hours of sleep reported by young students, especially college students decreased by one hour. The same authors report that there has been a significant increase in the percentage of college students who mention being dissatisfied with their sleep. Among the several factors that interfere with the pattern of sleep/wakefulness in college students, the following are highlighted: social and academic demands, reduced parental directives, reduced total sleep time, the delay from phase to phase during sleep and the increase in the number of naps.

It should also be noted that nursing students specifically have a unique concept of lifestyle and healthy lifestyle. They have mentioned diet as a factor of a healthy lifestyle, for example, and a sedentary lifestyle as non-healthy. They further identify that there are changes in their lifestyle during the school year, as well as other aspects that can be harmful to their health, such as: dimensions related to eating habits, physical activity, sleep/rest pattern, and risk behaviours, notably alcohol and tobacco consumption (Smith & Fields, 2008).

This issue has aroused in us several questions. What are the determinants that influence sleep quality in nursing students? Which sociodemographic variables and school context have repercussions on sleep quality in nursing students? What is the influence of psychological context variables on sleep quality in nursing students? What is the relationship of daytime sleepiness with sleep quality in nursing students?

Faced with these questions the following objectives have been outlined: to identify the determinants that influence sleep quality in nursing students; to identify the sociodemographic and academic variables that affect sleep quality in nursing students; to analyse the influence of psychological context variables on sleep quality in nursing students; to analyse the relationship between daytime sleepiness with sleep quality in nursing students.

2. Methods

This study is descriptive-correlational and analytical. We used a non-probability convenience sample consisting of nursing students of both sexes distributed among different nursing and health schools in Portugal. Since the sample obtained has 403 participants, the confidence and error level is at 4.88%.

The scales, inventories and questionnaires used in this study were: Epworth Sleepiness Scale Johns MW (1991), validated for the Portuguese population by Santos, Ferreira and Moutinho (2001); the scale of positive and negative affects originally called "The Positive and Negative Affect Schedule" (PANAS) Watson, Clark and Tellegen (1988), translated and validated for the Portuguese population by Galinha and Pais-Ribeiro (2005); The Personality Inventory of Eysenk short version by Silva, Azevedo and Dias (1995); The Anxiety, Depression and Stress Scale (EADS-21) by Lovibond and Lovibond (1995) validated for the Portuguese population by Pais-Ribeiro, Honrado and Leal (2004) and The Pittsburgh Sleep Quality Index (PSQI) by Buysse (1989).

The data collection instrument was issued online after approval by the Viseu School of Health Ethics Committee (No. 1/2014). The sample consisted of nursing/health students in the country who agreed to participate via email. Anonymity and confidentiality of data was assured, respecting autonomy and freedom of participation in the study. All the statistical analysis was processed using SPSS (Statistical Package for Social Sciences) version 22.0 for Windows and statistical package AMOS (Analysis of Moments Structures) version 22.

3. Results

The statistics regarding student age reveal a minimum of 18 years and a maximum of 54 years, which corresponds to an average age of 23.61 years ± 6.68 years. Of the all respondents, we found that 86.0% are female and 14.0% male. The highest percentage of women (40.1%) is in the less than or equal to 20 years age group, and half of the men (50%) are aged greater than or equal to 23 years. Most of the students are single (females 86.7%, males 82.1%), reside in cities (60.2% for females; 51.8% for males) and live with family members (52.4% students were female vs 62.5 % of males); as for their parents' academic level, most students' fathers (64.3%) and mothers (54.8%) have attained the 9th year of schooling. Most students (64% of females vs. 60.7% of males) have a sibling. Also worthy of note in this study is that 74.6% of girls and 64.3% of boys are of normal weight.

As for the academic characterization, the largest percentage of the students are attending the 4th year of their degree (28.0%), most do not have paid employment (76.7% girls vs 60.7% men). Of those travelling from home to school in a motor vehicle (63.4% of girls versus 71.4% of boys), the highest percentage of female participants (41.5%) takes up to 10 minutes to travel from home to school and 37.5% of participating males take more than 20 minutes. The large percentage of students, 62.2% of the women and 73.2% of the men do not receive grants.

With regard to personality, male students have a higher average in extroversion (M = 218.58), while women appear more neurotic (M = 207.31); students aged less than 20 years reveal a more outgoing personality (M = 18.87 ± 3.107 SD), while participants with ages equal to or greater than 20 years show a more neurotic personality (M = 12.83 ± 3.234 SD). On the whole, female students have higher averages in depression (M = 202.89), anxiety (M = 204.12) and stress (M = 205.26); students younger than or equal to 20 years turn out to be more depressed, anxious and stressed. Men have higher average in positive affect (M = 216.63) and emotional balance (M = 216.42) compared with women who have the highest average in negative affect (M = 202.18); students aged less than 20 years reveal a higher negative affect (M = 19.33 ± 7.159 SD), contrary to participants aged over 23 years (M = 16.03 ± 6.259 SD). Women have more daytime sleepiness (M = 202.52) than men; students aged less than 20 years show more daytime sleepiness (M = 9.00 ± 4.400 SD), followed by students in the of 21-22 year age group (M = 8.20 ± 5.134 SD); most men (42.9%) and women (43.9%) reveal normal daytime sleepiness; most men (73.2%) have very good quality of subjective sleep as well as women (70.0%); students aged less than or equal to 20 years (31.6%) stand out with a very poor sleep quality. Both men (39.3%) and women (41.5%) take between 16-30 minutes to fall asleep; dominated by students reporting to take between 16-30 minutes to fall asleep, regardless of their age group. Both male students (57.1%) and female students (62.2%) report that their sleep lasts between 6-7 hours; in all age groups made up with a predominance of students who report having a duration of sleep between 6-7 hours. Both male students (67.9%) and females (66.6%) those who consider that their sleep has an efficiency of

>85% stand out; in all age groups students who report their sleep has an efficiency >85% prevail. Both male students (93.9%) and female students (74.9%) those who report not having sleep disturbances at any time in the last month stand out; in all age groups, students who admit to sleep disorders less than once per week predominate. Both the vast majority of male students (94.6%) and female students (87.9%) refer that they have not used any hypnotic medication in the last month; in all age groups made students who admit never having resorted to any hypnotic medication in the last month prevail. The vast the majority of men (58.9%) and women (49.0%) reported having had daytime dysfunction less than once a week; in all age groups, students who admit having had daytime dysfunction less than once a week stand out. Both men (76.8%) and women (73.5%) report having poor overall sleep quality; in all age groups, students who admit to having poor sleep predominate.

Women have worse quality of sleep (MW = 202.54); poorer quality of sleep is present in students aged less than 20 years (M = 6.38 ± 2.780 SD); students residing in urban areas have better quality sleep (MW = 208.58); participants who live with their families during class time report having better quality sleep (MW = 193.75); students with paid employment reveal better quality of sleep (MW = 193.99); students with low birth weight show better quality of sleep (MW = 190.50);

Participants in the 4th year have better sleep quality (188.26); students who go to school by motor vehicle report better sleep quality (M = 6.24); students who do not receive grants show better sleep quality (MW = 199.54). The correlations that the independent variables have with the sleep quality range from low to reasonable, registering the highest value with neuroticism; age, gender, extroversion and positive affect establishing an inverse association with sleep quality and are directly correlated with BMI, depression, anxiety and stress, neuroticism, daytime sleepiness and negative affect. The critical ratios revealed the following to be predictor variables: extroversion (p = 0.011), neuroticism (p = 0.000), daytime sleepiness (p = 0.000) and anxiety (p = 0.004), extraversion establishes an inverse relationship to sleep quality, which means that the more outgoing students are those with better sleep quality. There is a direct relationship to neuroticism, anxiety and daytime sleepiness, which means that more neurotic students, more anxious and sleepier students reveal poor sleep quality.

4. Discussion

By studying the sleep habits of nursing students Araújo, Frazili and Almeida (2011), found that the majority were females, aged 19 to 39 years and their average age is 23 years. This study also found similar results to the extent that in our sample, consisting of 403 nursing students, the majority of students were female, attending the 4th year, with most women aged less than or equal to 20 years, while men are mostly aged greater than or equal to 23 years. There was also a prevalence of single students, city dwellers, cohabiting with family members and having only one sibling. As in this study, Araújo, Frazili and Almeida (2011) also ascertained that single nursing students, residing in urban areas predominated.

Regarding BMI values, a clear predominance of students of both genders with normal weight was found. Regardless of gender, it was found that most students do not have a paid job and do not have a scholarship or grant, and travel to school in a motor vehicle. Regarding their parents' educational background, most have reached the 9th year of schooling. The sample's characteristics are similar to those of Benavente, Higashi, Silva, Guido and Costa (2014) whose results showed that of the 151 nursing students participating in the research, there is a predominance of females, mean age 20.93 years and living with their families. Benavente et al. (2014) found that students use a motor vehicle to travel from home to school.

Giving way to the discussion of the results of the first research question, it was found that none of the sociodemographic variables had a statistical impact on sleep quality in nursing students. However in terms of average values, women showed poorer sleep quality and more daytime sleepiness, compared to men. These results are consistent with the literature, since, according to Rocha and De Martino (2010), a poor sleep quality results in increased daytime sleepiness, reducing alertness. These results corroborate Ferreira and Martin (2013), who observed that female nursing students have higher sleep disturbances and higher daytime sleepiness levels than male students.

In this context, it is emphasized that, according to various studies (Araújo, Lima et al, 2013; Ratanasiripong, 2012; Schneider, Vasconcellos et al, 2010), as a rule nursing students have a pattern of irregular sleep characterized by changing their start and end time, which happens later at weekends, compared to weekdays. The same authors are

unanimous in claiming that during the week, sleep duration is less than at weekends as students go through sleep deprivation during class days or their clinical practice. These irregularities can have a negative impact on students' health, becoming a risk factor, influencing school success and the ability to solve problems.

Another result that was reached was that the students who reveal poor sleep quality are those who are 20 years old or less, which is not in line with the data found by Angelone, Mattei, Sbarbati and Di Orio (2011), who observed that the change in sleep patterns is common with a prevalence of insomnia and increased poor sleep with advancing age of the nursing students. Moreover, in this study we found that students aged 23 years or more are the ones who have better quality sleep. Benavente et al. (2014) report that the requirements imposed by university activities favour the increased occurrence of changes in sleep quality, which is a view shared by Angelone et al. (2011). Araújo et al. (2010) also reported that with increasing age there is an increased latency and reduced sleep efficiency, which is not verified in this study.

Although the prevalence varies, studies show that many students tend to have an irregular sleep schedule and present a delayed sleep phase (regular delay in sleep schedules and awakening by two or more hours beyond what would be desired), and a considerable number of problems associated with sleep and poor sleep quality have been observed in university students from various Western and Eastern countries, suggesting that this may be a universal and dominant problem of modern society (Kang and Chen 2009; Yeung, Chan & Chung, 2008). In the age group less than or equal to 20 years, one of the most common complaints is the difficulty in initiating sleep. A large part of the subjects affected by sleep phase delay syndrome and experience difficulty in starting and ending sleep a time considered "normal" preferring to go to bed as well as to rise later (Millman, 2005).

Thus, it should also be noted that during the years of university attendance, especially during the 1st year, as it represents a transition and adaptation period, there is a marked irregularity in sleep patterns; there is a decrease in total sleep duration as well as a delay in onset, resulting in a lower sleep quality and increased daytime sleepiness (Araújo & Almondes, 2012).

It was found that participants residing in urban areas have better sleep quality, which also happens with students who live with their families during class time. These results may be contradictory in a way; it is that students who reside in rural areas are not as prone to nights out, compared to those who reside in urban areas, where the nightly entertainment on offer is great, leading to fewer hours of sleep, as Henriques (2008) stresses. Moreover, students who live alone reveal poor sleep quality, which can be justified by the results reported by Griffey (2003), stating that there are many everyday situations that interfere, either in quality or quantity, of daily sleep, as the fact that students who live alone are more likely to lead unhealthy lifestyles, with an influence on their subjective sleep quality. According to the author, the normal sleep pattern is often hampered by significant day-to-day changes or lifestyle changes which may induce stress.

It is important to remember that entry into higher education can be considered the starting point of a decisive life plan for most college students, confronting them with many challenges and changes, including the possible separation from family and friends, adapting to a number of new tasks and personal, social and academic demands. These challenges have implications not only in terms of success and satisfaction, but also for life in general and the academic dimension in particular (Seco, Dias Pereira, Casimiro & Custódio, 2007). This moment is for many students the first time they leave home and consequently separate from their families and friends, experiencing a new and unknown academic environment where the "entry praxis" does not always promote integration, as well as the taking on of the responsibility of autonomously managing their finances, class attendance, study time and time spent with colleagues (Adams & Cross, 2010). These assumptions may justify the fact we observed that younger students, who live alone during class time, and those living in urban areas (usually away from the family) were those who demonstrated better subjective sleep quality.

In this sense, Griffey (2003) mentions that the manifestations of poor subjective sleep quality by higher education students with features similar to those of our study participants are mainly related to the lack of routines with regard to sleep or irregular sleep schedules, later meals, students' nights out and socializing among students residing with colleagues/friends.

4th year nursing students revealed better sleep quality, and 1st year students exhibited less sleep quality. These results corroborate those determined in relation to age. That is, this study demonstrated that the younger nursing students are those with poorer sleep quality, considering that younger students are the ones in the 1st and 2nd year of

the course. On the other hand, these data are not in accordance with Bertolazi (2008) whose results show that 4th year nursing students are the ones with lower sleep quality, essentially due to the fact that they have a higher burden of academic responsibilities, becoming a causative factor of stress. This finding was also supported by ESWI, Radi and Youssri (2013).

By analysing the sleep pattern of the students in the transition between the last year of the nursing program and the first three years of their entry, Hasson, Gustavsson and Declining (2010) observed that poor sleep began in the second semester of the course and continued over the years, worsening in the 4th year. Thus, it is evident that poor sleep quality, as found in this study, occurs in the transition phase of entry into higher education.

According to various authors (Almeida Ferreira & Smith, 1999; Costa, 2008; Tavares Pereira Gomes, Monteiro & Gomes, 2007), students who have just transitioned to higher education are faced with a multitude of exploration opportunities and the need to operationalize and solve a set of tasks in different areas, including academic, social, personal and vocational/institutional, which are some of the factors that could explain the fact that this research found younger and 1st year nursing students showing worse sleep quality.

Benavente et al. (2014) found that 1st year nursing students have a better sleep patterns than students in more advanced years. 4th year students present higher prevalence of insomnia, with an increase in this change with students' advancing age, which was not observed in this study. In this regard it is noted that the demands imposed by university activities favour the increased occurrence of changes in sleep quality (Angelone, Mattei, Sbarbati & Di Orio, 2011). In this context, it is also worth referring to a descriptive exploratory study on 1st year nursing students, where it was identified that, after the start of school, there was a predominance of poor sleep and daytime indisposition (Furlani & Ceolim, 2005). Consequently, according to the same authors, students often have difficulty falling asleep, sleep less total time or cannot sleep at night, leading to poor quality sleep. Thus, we point out that reducing the sleep period can be associated with poor sleep quality and daytime sleepiness, which can also adversely affect the development of daily activities. Moreover, the start of academic activities will contribute rising early, which seems to aggravate nursing students' poor sleep quality, especially when they have to combine school activities with clinical practice and with the work in the case of working students.

Brunschwig (2008) confirms that the key to sleep disturbance is anxiety, and the persistence of concerns threatens the quality of rest. Since entry into higher education is a stage of change for 1st year students having to confront the new and the unknown in which their sense of control is diminished, it is expected that there would be an increased level of concern for students, with a number of aspects surrounding them, having a more or less direct impact on their sleep, as noted in this study.

Data analysis indicated that students with paid employment report having better sleep quality, which is not in line with the results reported by several authors, including Ferreiro and Martino (2013), who claim that working nursing students show lower sleep quality and exhibit high levels of daytime sleepiness. In addition to this, nursing students have a considerable number of theoretical subjects, plus a heavy load of activities at the practical level. On the other hand, having a paid job while doing the course requires that, in addition to academic demands, the students meet working demands and timetables, which can lead to overload reflecting on sleep duration and quality.

According to Teixeira, Lowden, Turte, Nagai, Moreno Latorre et al. (2007), there is a reduction in working students' hours of sleep. On average they get one hour and thirty minutes less of nocturnal sleep on weekdays compared to students who are not working. Thus, the authors concluded that work has a negative impact on the duration and perception of student workers' sleep quality, and may also significantly limit their quality of life as well as intellectual development and physical and mental well-being. Thus, it can be noted that work is an important factor in increasing excessive daytime sleepiness among nursing students and is a predictor of lower quality sleep, which did not occur in this study given that are students with paid employment reveal better sleep quality.

We tried to find the influence of anxiety, stress and depression on nursing students' sleep quality. We found that the predictor variable of sleep quality was anxiety, that is, the more anxious the nursing students, the lower their sleep quality. These results are in accordance with those found by Akhlagi and Ghalebandi (2009), who showed that students who showed signs of anxiety had less restful sleep. This assertion is in line with Araújo et al. (2010), who ascertained that nursing students with higher levels of anxiety showed lower sleep quality. Bastos, Mohallem and Farah (2008) ascertained that in their sample of nursing students, a significant number of participants had high levels of anxiety, with interference in their sleep quality.

We also attempted to find out if there was correlation between personality and nursing students' sleep quality, and it was found that neuroticism and extraversion were predictors of sleep quality. Extroversion had an inverse relationship to sleep quality, meaning that the more extroverted, the better the students' sleep quality and the higher their neuroticism, the worse their sleep quality was. Let us begin by noting that with regards to neuroticism, the results are in line with Santes et al. (2009), according to whom, students with an outgoing personality, i.e., who are upbeat, show a greater ease in dealing with the stress inherent to higher education. They also say that students with a neurotic personality are most at risk of a more negative well-being, with possible impact on their sleep quality. Similarly, Cano-Garcia Padilla-Muñoz and Carrasco-Ortiz (2005) mention that people with lower levels of neuroticism have a strong tendency to present higher levels of personal achievement and lower levels of emotional exhaustion and lower sleep disturbance.

5. Conclusions

Empirical research allowed us to draw a demographic profile of nursing students who participated. They had an average age of 23.61 years, ranging from 18 to 54; they were mainly females, attending the 4th year, single, residing in the city, living with relatives, only having one sibling and being of normal weight.

Also in relation to the students' profiles, it was found that, regardless of gender, most students do not have paid employment or receive grants or scholarships and travel to school in a motor vehicle. Regarding their parents' educational background, most achieved up to the 9th year of schooling.

It was found that the sociodemographic and academic variables do not influence the sleep quality of nursing students. However, the profile of the students with poorer sleep quality would be female students, aged under 20, living in rural areas without paid work, living alone during class time, receiving study grants, attending the 1st or 2nd year, travelling to school on foot, are pre-obese and have daytime sleepiness.

It was determined that the independent variables are related to sleep quality ranging from weak and reasonable, with the highest correlation value with neuroticism. Age, sex, extroversion and positive affect have an inverse relationship with the sleep quality, which is directly correlated with BMI, depression, anxiety and stress, neuroticism, daytime sleepiness and negative affect. It was similarly concluded that the critical ratios revealed the following predictor variables: extroversion, neuroticism, daytime sleepiness and anxiety, leading us to infer that the more extroverted, more stable, less anxious and less daytime sleepiness, the better the sleep quality.

Notwithstanding the results found, it is suggested that replication studies with broader samples seeking to study the determinants of sleep quality among nursing students be carried out in future to compare results. It is suggested that the relationship of nights out, with academic life and the practice of physical activity among nursing students to sleep quality be found, and to verify if sleep quality is related to the examination/assessment period as well as to study sleep quality only in undergraduate nursing students.

As a final thought, we think that there is a need to implement programs that provide cognitive and behavioural interventions for self-regulation of sleep to nursing students, who must be informed that such interventions exist and which can help them improve their sleep quality, a determining factor in academic performance and to minimize stress and anxiety states. One way to improve sleep quality and avoid disturbances may occur be to have good sleep habits, which in the particular case of students, consist of regular times to begin and end sleep, a suitable duration, plus a better organization of study schedules and extracurricular activities. Training nursing students about sleep quality is fundamental, contributing not only to their individual level decision-making, but also so that, as health professionals, they are vehicles of information and promoters healthy life habits.

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