PREVALENCE OF DELAYED SLEEP PHASE SYNDROME IN UNIVERSITY STUDENTS

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Prior research has demonstrated a relationship between poor sleep quality with academic and cognitive difficulties. A specific disorder associated with poor academic is Delayed Sleep Phase Syndrome (DSPS), a circadian rhythm disorder. With this in mind, the purpose of the study was to explore the prevalence and type of sleep difficulties in college students. According to the results, 11.5% of respondents reported symptoms consistent with DSPS, which is approximately twice as great as the general population. Further, the prevalence of sleep complaints were higher than in prior comparable studies. The authors suggest that the college lifestyle may play a strong role in the development of DSPS and include recommendations that may help universities decrease the prevalence of sleep difficulties.

College years tend to be a time when students experience a significant increase in autonomy and responsibilities (Russell, & Petrie, 1992; Kleeman, & Richardson, 1985). Hence, students often rate their first year of college as one of the most stressful events in their lives (Robertson & Farnill, 1989). Additionally, Family support and the structure present in earlier years is replaced with a more disorganized lifestyle that includes numerous reasons to disrupt sleep habits (Pilcher, Ginter,& Sadowsky, 1997).

Walters and Pilcher (1997) point out that many college students voluntarily deprive themselves of sleep during the week and try to compensate by sleeping long hours on the weekend. Such unstable sleep patterns exacerbate and in some instances may cause symptoms associated with delayed sleep phase syndrome (DSPS). This is a circadian rhythm disorder marked by difficulty falling asleep during the week, problems awakening at a planned time, and morning sleepiness that significantly impairs daily functioning (American Psychiatric Society, 1994; Weitzman et al., 1979, and Wietzman et al., 1981).

In a study limited to Australian college students, Lack (1986) found that the most common sleep complaints were difficulty falling asleep (18%), early morning awakening (13.2%), general sleep difficulties (12.8%) and difficulty staying asleep (9%). Interestingly, Lack found that 17% of the students reported symptoms severe enough to meet the criteria for Delayed Sleep Phase Syndrome (DSPS) — more than twice the estimated amount of the general population of 6-7 % (APA, 1994, Lack, 1986). The students who met the criteria for DSPS had

significantly lower grades, greater feelings of drowsiness, and irritability when compared to the rest of the sample.

Another problem associated with sleep deprivation is that it reduces the amount of REM sleep due to shortened sleep periods. This is important since several studies have found that students' ability to learn is reduced when they get insufficient REM sleep (Smith & Lapp, 1991; DeKoninck, Lorrain, Proulx and Coulombe, 1989; Karni, Tanne, Rubenstein, & Askenasy, 1994 and Smith & Lapp, 1991). Further, when one takes into account that poor sleep quality is strongly associated with reduced quality of life (Pilcher et al., 1997), it is readily apparent that sleep difficulties may have wide ranging implications on students' lives.

Considering the impacts that sleep difficulties, especially DSPS, may have upon students it is remarkable that few studies have explored the extent to which this problem exists. The purpose of this study is to explore the sleep habits and patterns of a sample of college students in the United States focusing on evidence of delayed sleep phase syndrome.

Methods

Participants

The sample consisted of 191 (95 males and 96 females) undergraduates attending a large, rural United States university. Their ages ranged from 17-55, ($\underline{M}$=19.22, $\underline{SD}$ = 4.41), with the vast majority of students being 18 (58.1%) and 19 (22%) year-old, first-year students (78.5%). The majority of respondents were Caucasian (82.8%), 13% were African American, 1.6% Asian American, and 1% Native American. Participants were volunteers from introductory psychology classes. Since the class is required of all students enrolled at the university, participants included a wide range of majors, the most common consisted of Undecided (9.4%), Nursing (5.8%), Computer Science (5.2%), and Mechanical Engineering (4.7 %).

Materials

To explore the sleep patterns and habits in college students, Lack (1986) first used a sleeping habits and difficulties questionnaire. The symptom section of the questionnaire is answered on a 5-point, likert-type scale. Symptoms are rated as occurring: never, seldom, occasionally, frequently and almost every day. The habits section consists of items in which students report such things as their usual amount of sleep, wake-up times, bed-times, etc., for the week and weekend. There is no overall score for sleep quality; rather the symptoms endorsed by participants are reviewed to determine prevalence of sleep difficulties and disorders when applicable.

Procedure

Student volunteers were recruited from undergraduate psychology courses. All students who agreed to participate were provided with a survey packet, which included a copy of the Sleep Habits and Pattern Inventory and a brief demographics questionnaire. All participants gave informed consent before completing the survey and confidentiality was maintained at all times. Students were given standardized oral as well as written instructions, and were encouraged to ask questions on

any items they were confused about.

Results

The sleep difficulties that most often occurred "frequently" or "almost always" were early morning awakenings (25.5%), general sleep difficulties (21.9 %), difficulty falling asleep (19.3%), daytime napping (15.1%), and difficulty staying asleep (10.9%). A series of one-way ANOVA's were used to compare the prevalence of sleep difficulties according to gender. The results indicated that females reported several symptoms significantly more often than males such as difficulty falling asleep, F (1, 189) = 6.10, P = .014 (females: M = 2.91, SD= 1.00; males: M = 2.54, SD = 1.00), difficulty staying asleep, F (1,189) = 17.09, P < .001 (females: M = 2.44, SD = 1.10; males: M = 1.84, SD = .88), and daytime napping, F(1,189) = 15.76, P < .001 (females: M = 2.75, SD = 1.15; males: M = 2.15, SD = .93). While no significant difference were observed for early morning awakenings, use of sleep aids, or symptoms consistent with DSPS. In this sample, 11.5% of participants met the criteria for Delayed Sleep Phase Syndrome as indicated by late sleep onset times, little or no difficulty staying asleep, and significantly later sleep and awakening times during the weekend than during the week. (Lack, 1986; Weitzman, et. al., 1981, APA, 1994).

Using paired t-tests, it was found that students awoke significantly (t= 12.92, df = 190, p< .001) later on the weekends (M = 9:49 am, SD = 1 hr 32 min) than during the week (M = 7:39 am, SD = 1 hr 37 min); students' bedtime was found to be significantly (t = 17.91, df = 190, p < .001) later on weekends (M = 1:17 am, SD = 1 hr 24 min) than during the week (M = 11:24 pm, SD = 1 hr 5 minutes). Examination of sleep perceptions of students shows a significant difference (t = 9.38, df = 191, p < .001) between their actual hours of sleep during the week (M = 8 hr 2 min, SD = 1 hr 45 min) and their estimated amount of sleep for the week (M = 6 hr 55 min hrs SD = 1 hr 21 min). While, no significant differences were found for the weekend. When comparing actual sleep with ideal sleep, students desired significantly (t = 4.99, df = 191, p < .001) more sleep on the weekend (M = 9 hr 17 min, SD = 1hr 45 min) than during the week (M = 8 hr 15 min, SD = 1 hr 45 min). There was also a significant positive correlation (r = .19, p < .01) between the amount of hours students participated in gainful employment and poor sleep quality. [*Lack's (1986) instrument was slightly modified to produce the Sleep Habits and Pattern Inventory, for use in the present study].

Discussion

Lack (1986) reports more (17%) incidences of student DSPS than with the current sample (11.5%). Additionally, there was a higher prevalence of specific sleep complaints with roughly the same distribution when compared to the earlier Lack (1986) study. It is interesting that there is a lower rate of DSPS in this sample, but a higher rate of specific sleep complaints. The reason for this is unclear, although it is possible that the current study may have used a more conservative cut-off for DSPS. Generally however, the findings support a consistent pattern of sleeping habits in university students in these two geographically

diverse samples.

It is clear that for some symptoms, females report significantly higher rates of occurrence than males. There were no instances of males reporting more symptoms than females. Interestingly, this is consistent with a study (Lindberg, Jansen, Gislason, Bjornsson, Hetta & Boman, 1997) in which researchers found that females reported significantly more difficulty maintaining sleep, incidents or morning tiredness and daytime napping. In addition, research also suggests women complain more of depression (Kelly, Kelly, Brown & Kelly, 1999) and that there is a relationship between somatic complaints, depression anxiety and sleep (Lindberg et. al., 1997; Silverstein, 1999). Of particular interest, however, is that significant differences were not found between males and females for incidents of DSPS.

The observations that females generally report more sleep, depressive and somatic complaints, but not more symptoms specific to DSPS, suggests that there may be a common etiology that all students face, such as the university lifestyle. However, even if this is not the reason for the lack of gender difference, the idea that the university lifestyle plays a strong role in DSPS and other sleep problems certainly makes intuitive sense. While this hypothesis warrants further exploration, at this point it is worth providing some suggestions for universities that may help lessen this problem.

There are probably few, if any, interventions that will eliminate students' tendency to stay up much later on the weekend than during the week. However, there are steps that may reduce this discrepancy. One of the interventions most congruent with the function of universities is to educate students' about the impact that poor sleep habits have on their daily and academic functioning and teach them proper sleep habits. The need for improved sleep education is clearly demonstrated by a recent study (Hicks, Lucero-Gorman, & Bautista, 1999) that indicated students believed they were adhering to good sleep practices, but in actuality were not. Further, when students' knowledge of sleep habits was tested, they only answered about half the items correctly (Hicks et al., 1999). Further, such an education program may easily be implemented as part of students' orientation.

Another option that receives empirical support is for universities to offer more late morning and afternoon classes. The fluctuating sleep patterns of college students has led researchers in Brasil (Machado, Varella, & Andrade, 1998) to explore the relationship between students' class and work schedules on their sleep-wake cycles. The authors report that students who had no daytime obligations and took afternoon and evening classes reported the most regular sleep-wake cycles (shifts about 90 min). While these results need to be interpreted with caution due to cultural differences, these results suggest that students may have healthier sleep habits if they are able to take classes that begin later in the day (Machado et al., 1998).

Realizing that most universities are hesitant to change their class schedule, future research should explore the impact of taking classes later in the day upon rates of DSPS. A second recommendation is for

more extensive study of the prevalence of sleep difficulties for university students within different geographic locations. Finally, further exploration of the impact of sleep difficulties on academic performance and daily functioning is suggested so that universities may be convinced that this problem warrants their action.

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