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**Parasomnias, Sleep and Psychological Adjustment Among Students with**

**Different Disabilities**

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**Parasomnias, Sleep and Psychological Adjustment Among Students with Different Disabilities**

**Abstract**

It is well known that sleep problems are linked to poorer academic performance. Parasomnias are a category of sleep disorder not well documented among post-secondary students. particularly true of students with disabilities.

This study investigated parasomnias, sleep quality, well as related aspects such as daytime functioning and well-being, in a sample of post-secondary students with different disabilities. The hypotheses were that parasomnias are common in this population, that they are more frequent in students with disabilities, and that they are most strongly related to mental health-related disabilities.

Two hundred and two current post-secondary students participated: 125 with and 77 without disabilities. Nature and frequency of parasomnias, sleep quality, psychological and mental health aspects were evaluated by questionnaire.

The results show that the parasomnia experiences within the previous year were highly prevalent in both students with and without disabilities, >90%. Daytime functioning and concentration were associated with parasomnias in students with mental health- related disabilities, suggesting that this group may be particularly at risk for impaired academic performance.

This study documents an important yet under-appreciated problem common in post-secondary students with and without disabilities. Informing post-secondary professionals, and the students themselves, of parasomnia prevalence could impact the recognition and management of these common and disturbing events.

Key words: parasomnia, sleep quality, post-secondary students, disability

**Introduction**

It is well known that sleep problems are linked to poorer academic performance (e.g., Prichard, 2020; Toscano-Hermoso et al., 2020), making the study of sleep related disorders an important consideration in research with post-secondary populations. Parasomnias are “disorders characterized by abnormal behavioral, experiential, or physiological events occurring in association with sleep, specific sleep stages, or sleep-wake transitions” (American Psychiatric Association, 2022, p. 451); these sleep disorders are not well documented among post-secondary students and this is especially true of students with different types of disabilities.

In view of the limited availability of information about sleep disorder and its potential impact on both academic performance and psychological wellbeing, the present study investigates parasomnias, sleep quality, insomnia, chronotype, and sleep disorders, as well as related aspects such as daytime functioning and well-being, in a sample of post-secondary students with different disabilities.

A variety of studies have reported on associations among sleep quality, mental health and single parasomnias (e.g., Benham, 2022; Jalal & Hinton, 2015; Petrov et al., 2014; Wróbel-Knybel et al., 2022). In addition, the few studies that have looked at parasomnia experience in the post-secondary student population typically show that higher levels of depression, anxiety, neuroticism, worry, and post-traumatic stress disorder (PTSD) are related to parasomnias (Alshahrani et al., 2023; Kelly, 2016; Jalal & Hinton, 2015; Petrov et al., 2014; Wróbel-Knybel et al., 2022).

Notably, studies of post-secondary students with parasomnias would likely include large numbers of unidentified students with disabilities. In Canada, between 18% and 30% of college and university students have a disability (Canadian University Survey Consortium, 2020, 2021). Similarly, in the United States of America, 21% of university students reported having a disability (National Center for Education Statistics, 2023). The most common disabilities reported in a recent Canadian study were mental health- related disabilities and attention deficit hyperactivity disorder (ADHD) (Fichten et al., 2022). Therefore, it is possible that grouping these students together with students without disabilities could significantly bias the results. Moreover, the opportunity is lost to better understand the unique challenges confronted by students with disabilities in their pursuit of higher education.

Among those studies that did not study students with disabilities as a separate group, a recent study by Kirwan and Fortune (2021) reported on the one-year prevalence rates of parasomnias among 135 university students in Ireland. This study showed that 98% of the students had experienced at least one parasomnia during the past year. The most common parasomnias reported were hypnic jerks, nightmares, sleep talking, nocturnal leg cramps, hypnagogic/hypnopompic hallucinations, and rhythmic leg movements while falling asleep. A study conducted by Alshahrani et al. (2023) in Saudi Arabia consisted of a sample of 1296 university students and found that during the past 6 months 81% reported at least one parasomnia. The most frequently reported parasomnias included sleep-talking, nightmares, and confusional arousals. A two-week study by Oluwole (2010) found that among 58 Nigerian university students the incidence of any parasomnia was 21%, with the most commonly reported parasomnias being hypnic jerks, nightmares, sleep paralysis and sleepwalking.

We conducted a study of 77 post-secondary students who were specifically selected because they self-identified as having no disabilities (Fichten et al., 2024). This study showed that most students (i.e., 92%) had experienced several parasomnias during the past year, with nightmares, hypnic jerks, sleep talking, sleep-related bruxism, and nocturnal leg cramps being most common.

*However, no study has explored the variety of parasomnias nor the psychological and sleep- related variables among post-secondary students with disabilities. Our goal is to address this knowledge gap.*

**Present Study**

There is sparse literature about parasomnias and related psychological and sleep information among students with different disabilities. The literature suggests that those with mental health related disabilities such as anxiety and depressive disorders, are more likely to experience a variety of parasomnias and other sleep and mental health related disabilities. We divided our sample of current and recent post-secondary students into three groups: those with mental health- related disabilities, those with other disabilities, and those with no disabilities. Since the literature suggests that students with different impairments may have specific parasomnias, we also explored several groupings of students with different disabilities. For example, much of the literature deals with attention deficit hyperactivity disorder (ADHD), a very common disability among post-secondary students (Fichten et al., 2022). Although studies typically show that individuals with ADHD report a range of sleep problems, the results do not elaborate on specific problems (Corkum et al., 2023). This is true for other disabilities such as chronic pain, health conditions, and physical disabilities (de la Vega et al., 2019).

**Hypotheses**

Based on existing research findings and continuing unanswered questions, the following hypotheses were formulated:

1. Over 80% of participants with disabilities will report experiencing at least one parasomnia.
2. Participants with mental health- related disabilities will report more parasomnias and more psychological and sleep- related difficulties than those with other disabilities.
3. Participants with disabilities, but without mental health- related disabilities, will report more parasomnias and more psychological and sleep- related problems than those without any disability.

**Method**

**Participants**

Two hundred and two current post-secondary students participated or recent (were post-secondary students in the past five years) participated: 125 with and 77 without disabilities. We excluded 25 participants who had finished or been out of school for more than 5 years from the sample. Consistent with findings reported in previous studies (e.g., Fichten et al., 2022), results of an ANOVA (*F* (2,199) = 8.25, *p* = 001, *ηp2* =.077) found that students with mental health- related (*M* = 24.93, *SD* = 4.41) and other disabilities (*M* = 25.00, *SD* = 4.32) were significantly older than those without disabilities (*M* = 22.53, *SD* = 3.64). There was no significant age difference between males and females with and without disabilities.

As shown in Table 1 and confirmed by a chi square test, there were significantly more females among students with mental health- related disabilities than among nondisabled students, *X2* (1,192) = 9.16, *p* =.010. Ten students indicated a nonbinary gender. Since a substantial number of students reported a mental health- related disability, in subsequent analyses, we divided the sample into three groups: participants with at least a mental health- related disability (*n* = 87), those with any other disabilities (n = 38), and students without disabilities (*n* = 77).



**Measures**

**Demographics**. Participants reported their gender, age, the presence or absence of the 14 disabilities, and whether they were currently or recently (during the past five years) a post-secondary student.

**Munich Parasomnia Screening Questionnaire (MUPS)**(Fulda et al., 2008).This 21-item measure evaluates frequency of experiencing 21 parasomnias (see Table 3). We modified the MUPS frequency scoring to a 6-point Likert-type scale (1 = never, 2 = very rarely, 3 = rarely, 4 = sometimes, 5 = often, 6 = very often,during the past year). Fulda et al. (2008) reported good validity for this measure. Heinzer used a non-validated French language version (R. Heinzer, personal communication, June 26, 2023). We made changes to Heinzer’s version to reflect French language usage specific to Canada. Notably, the MUPS categories do not correspond with the current ICDS-3 classification (Sateia, 2014).

This measure consists of two frequency related scores: how often people report experiencing each parasomnia using the following scale (sum of 1= never to 6= very often) and the total number of parasomnias that people report experiencing out of a total score out of 21. For each MUPS item they endorsed we also asked participants to indicate how disturbing they found the parasomnia on a 10-point scale (1= not at all disturbing to 10 = very disturbing).

**Sleep Questionnaire** (Fichten et al., 1995). This measure is typically used clinically. We utilized three items scored on 10-point scales: Are you a good or poor sleeper? What was the quality of your sleep? How difficult is it to concentrate?

**Insomnia Severity Index (ISI)** (Bastien et al., 2001). The purpose of the ISI is to measure insomnia severity. It is a 7-item instrument with a range of scores from 0 to 28, with higher scores indicating greater severity of insomnia.

**Reduced Morningness-Eveningness Questionnaire (rMEQ).** Adan and Almirall’s (1991) five-item version of the original Horne and Ostberg Morningness-Eveningness Questionnaire was employed. Scores range from 4 to 25, with higher numbers indicating more morningness and lower numbers indicating more eveningness.

**Revised Eysenck Personality Questionnaire (EPQR-A** **Neuroticism subscale** (Francis et al., 1992). This short version of the neuroticism sub-scale consists of 6 items which participants answer by indicating yes or no. Lower scores indicate higher neuroticism.

**Sleep Symptoms Checklist (SSC)** Adapted from Bailes et al. (2009), this 21-item measure has four frequency subscales: insomnia, daytime distress, sleep disorder, and psychological maladjustment. The measure uses the following scale (0 = never, 1 = sometimes, and 2 = often). Higher scores indicate worse functioning.

**Single-Item PTSD screener** (**SIPS**) (Gore et al., 2008). This single item screening measure of posttraumatic stress disorder was validated by its authors. It asks the following, “During the last 12 months were you bothered by a past experience that caused you to believe you would be injured or killed?” Scoring is as follows: 0 = Not applicable, 1 = Not bothered at all, 2 = Bothered a little, 3 = Bothered a lot. Higher scores indicate a higher level of disturbance resulting from traumatic events.

**Quality of Life Enjoyment and Satisfaction Questionnaire - Short Form (Q-LES-Q-SF) (**Schechter et sl., 2007). This 16-item measure evaluates well-being. It uses a 5-point scale (1= very dissatisfied to 5 = very satisfied) and asks about overall satisfaction with a variety of aspects related to one’s physical health, daily activities, and personal relationships. Scores vary from 16 to 80, with higher scores indicative of greater enjoyment or satisfaction.

**Hospital Anxiety and Depression Scale (HADS)** (Zigmond & Snaith, 1983). This is a self-report measure with two sub-scales, anxiety and depression, each consisting of seven items. Response options for both depression and anxiety range from zero to three, with some items using reverse scoring. Lower scores indicate fewer indicators of anxiety or depression.

**Procedure**

We conducted a bilingual (English, French) online survey between October and December 2023 and between January and March of 2024 (LimeSurvey, V3). The host institution’s Research Ethics Board approved the study (Certificate: FICHC23244335). Participant recruitment proceeded as follows: (1) email invitations were sent to Canadian post-secondary students who had participated in our previous research and had indicated that we could contact them for future studies, (2) announcements were emailed to discussion lists focusing on Canadian post-secondary education, and (3) student team members recruited friends and acquaintances. All students were participating in a larger investigation and each participant who completed the survey received a $30 Amazon gift card.

**Results**

**Disability types**

Participants self-reported one or more of the disabilities listed in Table 2. Of those who indicated having a disability, 50% reported having a single disability while 50% reported having two or more disabilities. Overall, the 125 participants reported 232 disabilities. Table 1 shows that, among self-reported disabilities, mental health- related disabilities were the most common, followed by ADHD, chronic health problems, and learning disabilities.

The mental health disability category includes 34 participants who reported a mental health disability only, and 53 who reported at least one additional disability. All other disability categories exclude participants who reported a mental health disability.



**Parasomnia occurrence within disability types.**

One hundred and twenty-four (99%) of the 125 participants with disabilities reported at least one parasomnia and participants reported an average of six different parasomnias experienced at least once in the past year. Among those without disabilities, 71 of 77 participants (92%) reported at least one parasomnia, while reporting an average of four different parasomnias experienced at least once in the past year.

In order to simplify the data presentation, related disabilities were grouped together to form the following categories: Chronic health and neurological disorder, sensory disabilities, and mobility impairments. Table 3 presents the percentage of participants in each disability grouping who experienced each of the 21 parasomnias. Note that the Mental health related disorder group is exclusive such that participants are not represented in other disability groups. Otherwise, participants may be represented in more than one disability grouping.

 Results in Table 3 indicate that students with no disabilities as well as those with autism and those with chronic health/neurological disabilities, experienced the fewest parasomnias; all groups reported experiencing nightmares and hypnic jerks. Most participants with disabilities reported sleep-related bruxism, and nighttime leg cramps. Students with mobility impairments reported the largest number of parasomnias. The least frequently reported parasomnias were unconsciously eating while asleep, sleep enuresis, sleepwalking / sitting up in bed while asleep, and hypnagogic/hypnopompic hallucinations.

**How disturbing were the experienced parasomnias?**

A subset of student participants who experienced a parasomnia rarely to very often (i.e., score =>3 on the 6-point frequency scale) provided ratings about how disturbing they found these. Table 4 shows the mean disturbance score for each parasomnia type for participants with and without disabilities, with a significant difference for only one parasomnia - hypnagogic/hypnopompic hallucinations.



**Group differences in parasomnia, other sleep variables and mental health variables**

To examine the relationship between disabilities and sleep- related variables, we compared scores of participants with mental health- related disabilities, other disabilities and no disabilities. Given the significant age difference between participants with and without disabilities, we first conducted multivariate analysis of variance comparisons with age as the covariate (MANCOVA). Since we conducted one questionnaire two weeks after the other, resulting in slightly different sample sizes, we conducted two separate MANCOVAs. Both were significant, F(26,374)=5.55, p<.001, ηp2=.278 and, F(6,310)=3.13, p =.005, ηp2=.057. These were followed by univariate analysis of covariance comparison on the 16 variables.

Although there was a significant difference between the number of males and females in the mental health related disabilities group, t-test comparisons between scores of males and females resulted in only two significant results among the 16 variables. Moreover, both of these significant results were at the .05 level. Therefore, subsequent analyses group males and females with mental health related disabilities together.

Variables of interest in Table 5 are grouped into three categories: parasomnias, sleep, and psychological. Results indicate that participants with mental health- related disabilities generally had significantly worse scores than participants with other disabilities, who generally had worse scores than those with no disabilities. Only three variables showed no significant differences among the three groups: rMEQ, well-being, and HADS depression. Participants with other disabilities did not differ from those with no disabilities for the following five variables: being a good vs poor sleeper, having difficulty concentrating, number of parasomnias, frequency of experiencing parasomnias, and HADS anxiety.



 Table 6 shows correlations between the two parasomnia scores and the other 14 sleep and psychological variables. Scores of participants with mental health- related disabilities are above the diagonal and scores of those with no disabilities below. Because of the diversity of disabilities among students with other disabilities, we decided not to examine correlations for this group. Although many coefficients are significant, we only explored coefficients of .400 and greater.

Results show that among participants without disabilities there is a significant relationship between the two parasomnia variables and between both of these and one sleep variable: SSC sleep disorders. There were no significant relationships between either parasomnia variable and any of the psychological measures.

Among students with mental health- related disabilities, there is a significant relationship between the same two parasomnia variables as well as between these and SSC sleep disorders and three psychological variables: EPQR-A neuroticism, SSC daytime distress, and SSC psychological maladjustment.



For both groups of participants, sleep- related variables are closely related to each other (e.g., good vs. poor sleep, quality of sleep, ISI, SSC insomnia). Most psychological variables are closely related to each other. Among participants with mental health related disabilities, there is a relationship between sleep variables and depression and other psychological variables, as well as with difficulty concentrating.

It is noteworthy that among participants with mental health- related disabilities, SSC daytime distress and well-being have significant relationships with almost all sleep related variables as well as with most psychological variables.

rMEQ (morningness-eveningness) and SIPS (post-traumatic stress disorder) scores are not closely related to any other variables for either group.

**Discussion**

**Parasomnias**

Consistent with hypothesis 1 and with data reported by others (Kirwan & Fortune, 2020; Alshahrani et al., 2023), our findings show that over 90% of participants, both those with and without disabilities, reported experiencing at least one parasomnia during the past year. Moreover, those participants with multiple parasomnias reported an average of five different ones. As predicted in hypotheses 2 and 3, participants with mental health-related disabilities reported significantly more parasomnias than those with other disabilities. However, participants with disabilities other than mental health did not have more parasomnias than those without disabilities (i.e. hypothesis 3 was not confirmed).

Although sample sizes are small, descriptive data show that three groups: no disability, chronic health / neurological disorder, and autism, reported the fewest parasomnias; those with mobility impairments reported the most. Participants with mental health related disorders, ADHD, and learning disabilities reported an intermediary number.

Consistent with the literature (Fichten et al., 2024; Kirwan & Fortune, 2021; Oluwole, 2010, the most frequently experienced parasomnias were nightmares, hypnic jerks and nocturnal leg cramps. The least frequent were unconsciously eating while asleep, hypnagogic/hypnopompic hallucinations, sleepwalking / sitting up in bed, and sleep enuresis.

Sleep enuresis, sleep terrors, sleep paralysis, hypnagogic/hypnopompic hallucinations, nocturnal leg cramps, sleep related abnormal choking / suffocating/ swallowing, nightmares, and acting out a dream were experienced as particularly disturbing. Notably, frequency of the parasomnia was variably related to level of disturbance (e.g., sleep enuresis, which few participants reported experiencing, was associated with a high level of disturbance.

We explored the relationship of parasomnias to psychological and other sleep- related variables by (i) examining potential similarities and differences between sleep and psychological variables among the three groups (mental health-related disabilities, other disabilities, no disabilities) and (ii) we evaluated the relationships among variables.

Our findings show that: participants with mental health related disabilities generally had significantly poorer scores than those with other disabilities; both groups had poorer scores than those with no disabilities on five of the six sleep variables and on seven of the eight psychological variables.

**Relationships Among Variables**

***Parasomnias.*** For both participants with mental health- related disabilities and for those with no disabilities, parasomnias are closely related to measures of sleep disorders, including restless legs and sleep apnea.

***Sleep and psychological variables: Participants with mental health- related disabilities.*** Interestingly, for participants with mental health related disabilities, parasomnias are also related to difficulty concentrating - a skill needed for academic success - as well as to daytime distress and two psychological variables, neuroticism and anxiety. Moreover, for this group daytime distress and well-being are linked to almost all sleep related variables and to most psychological variables.

Despite studies reporting that poor sleep was related to depressive symptoms among Brazilian college students without disabilities (Ramos et al., 2021), as well as among student athletes (Grandner et al., 2021) in the present study, for participants without disabilities, relationships among variables are not clear.

**Limitations**

While our study contributes valuable and unique insights about parasomnias, psychological and sleep variables- particularly for students with disabilities- there are limitations that warrant attention in future research. First there were more females than males, especially in the mental health- related disabilities group; this is common among individuals with mental health- related conditions (Maser et al., 2019). Second, all responses were based on self-report. Third, some parasomnias such as sleep terrors, sleep talking, and REM sleep behavior disorder symptoms may be under-reported because these require corroboration from a bed partner.

**Implications**

1. Our findings highlight a surprisingly high prevalence of parasomnias among post-secondary students, especially those with disabilities. This is important as we know that sleep disturbances can have a negative impact on academic performance. Informing post-secondary professionals of the prevalence could impact their approach to gathering information and adapting interventions.
2. Daytime functioning and concentration are linked to experiencing parasomnias in students with mental health- related disabilities, suggesting that this group may be particularly at risk for impaired academic performance
3. Among students with mental health- related disabilities and depression, poor quality sleep and concentration are inter-related.
4. Unexpectedly, individuals with mobility- related disabilities were found to have the largest number of parasomnias, However, higher frequency of parasomnias experienced was not found to be related to level of disturbance expressed.
5. Information about how to manage parasomnias, especially the common and disturbing ones, should be made available directly to students as they may be reluctant to seek professional help. Also, in many institutions there is a paucity of mental health services and long waiting lists.

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