

Emerging Adult Sleep Quality: Health and Academic Performance Factors of Assessment

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Abstract

It is estimated that approximately 10% of “emerging” adults (18-25 years) report significant sleep disturbance. Academic stress and social schedule demands characteristic of this population contribute to compromised sleep. Further, cognitive functions such as attention and concentration are negatively influenced by compromised sleep. The need to address compromised sleep schedules in emerging adults as they are significantly impacted by social schedules. Sleep disturbances/disorders such as insomnia and delayed sleep phase onset are represented.

Emerging Adult sleep was measured in this intense assessment study of sleep, health, and academic performance. Consistent with previous research, we found that poor sleep contributes to poor health and academic performance. This indicates a need for further research that identifies what education and services emerging adults will benefit from in order to implement healthier sleep practices that will positively impact on health and academic performance.

Keywords: Sleep quality; Young adult sleep; Sleep disorders; Adolescent sleep; Academic performance; Health

Introduction

The National Sleep Foundation acts as clearing house of general and empirically based information about sleep. Their annual “Sleep in America” poll indicted a serious sleep deprivation problem in our country [1]. A closer inspection of their data reveals particular cohorts of the elderly and adolescent/emerging adults as most sleep deprived. Adolescent sleep has received considerable focus from the scientific community [2] as well as the elderly [3]. Sleep disturbances in both populations are prevalent. Young adults have typically served as a control group in many sleep studies; however few studies have descriptively examined young adult sleep. It is the case that sleep disturbances are prevalent in young adults primarily shortened sleep periods, increased traffic accidents secondary to sleep deprivation, and undiagnosed sleep disorders [4].

The emerging adult sleep population is defined as those between the ages of 18 and 25 years. Over 50% are enrolled at least part time in college level education [4]. This developmental period is further described as a period of transition to adulthood responsibilities with mounting social pressures and expectations such as advanced education and professional training, establishment of an independent self, and the setup of social support systems with the newly established autonomy. With these changes, emerging adults have to determine their knowledge, skills and abilities within their identity context as well as their social self to the world around them. College students underestimate their need for sleep; with the stresses related to classes, jobs and the independence of living away from home, coupled with an active social life, many fall into the pattern of poor sleeping habits. In addition, emerging adults are determining their health habits within their independent lifestyle which are essential to cognitive, emotional, and social performance.

Female emerging adults report more daytime sleepiness [5,6] These general findings about college student sleep quality have generated additional research to evaluate specific sleep quality factors in young adults [7]. For example, positive health behaviours of exercise and

food choices have not often been assessed in sleep studies despite their relation to good sleep quality.

Research has indicated that emerging college students are at risk for engaging in unhealthy sleep practices. Insufficient sleep and daytime sleepiness have been found to be the highest ranking sleep problem within this population [6]. This is a concern for today’s emerging adults, as sleep deprivation and poor sleep quality have been found to be associated with lowered cognitive performance and decreased physical and psychological well-being.

Emerging Adult College Student Sleep Studies

A median of 6 hours and 39 minutes of sleep from a student young adult population [8]. The student population, as a group, reported increased dissatisfaction with their sleep. The increased social, academic and occupational demands may lead to the variable sleep pattern choice of emerging adults [4,9]. Adolescents require approximately 8.5 hours of sleep although less than 20% accomplish this [1]. Emerging adults require 7.5 to 8 hours and less than 20% accomplish this [4]. This sleep problem of loss is escalated by changing sleep patterns typical of the poor sleepers [4]. That is, sleeping later on the weekends and daytime napping, both of which substantially disturb sleep determinants, are used frequently as compensation for poor sleep during the week and late weekend nights. While a causal relationship has not been found, an association between poor sleep, low grades and poor school performance, in adolescents, has been identified [2,4].

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Emerging adults' sleep patterns per survey reports sometimes reached criteria for delayed sleep phase [4]. Situational factors that initially start this condition may serve to sustain the pattern. For many emerging adults, strategies to alleviate their poor sleep quality often worsen the problem. Investigations in this area have examined emerging adults' sleep time (i.e., bedtime, wake time, during weekdays and weekend days) [4].

In college students, the behavioral deficits are evident but the acknowledgement of their significance by students seems to be lacking [4]. Some research has indicated that a period of 20 hours of sleep deprivation (i.e., an all-nighter) may be equal to a blood alcohol level of 0.08 [1]. College students have a large work load and nearly 50% are also employed at least part time – which is often masked by excessive activity and social/personal scheduling of events. Excessive worry about relationships was highly reported on surveys [10-12]. A seminal study in this area that collected performance data of college students on exams given on a daily basis for a six week period, across a 12 hour day revealed mental efficiency, as measured by performance scores, was best at mid-week (Wednesdays) with a steady decline each day from 8 am until the period of 4 to 5 pm [13]. In this study of 112 college student, there was a rise from 8 pm until 10 pm that did not, however, exceed the average for the day. It was also reported that a decrease from 10 to 11 pm occurred on a daily basis. Hourly measures over a six week period on tasks similar to academic work were not compromised; these data highlight the natural tendencies of mental deficiency that is assumed to be modified by sleep loss.

Cognitive and Academic Performance

College students are also at risk for poor sleeping behaviors due to their academic load [14] Students who carried a full course load and reported poor sleep quality performed less well within academic majors when compared to those students who reported better sleep quality [15].

Measurements of student performance on cognitive tasks declined with increasing sleep deprivation. As compared to non-sleep deprived students, the sleep deprived students were more willing to give up on difficult tasks, or express unrelated thoughts such as “I wonder what I should have for lunch today”.

Oversleeping is found to be significantly correlated with the lowered grade point average [16]. It has been found that students with a grade point average below 2.0 reported more unhealthy sleep behaviors that put them at risk for a sleep disorder [16]. College students often believe that they will be able to catch up on sleep that they missed during the week on weekends, but this has not been shown to be the case. Research has shown that differences between weekend and weekday sleep duration and bedtimes lead to sleep wake problems [17].

In one study it was reported findings about sleep quality with sleep logs, journals of emotional memory measures administered in the morning and evening. Participants with good sleep quality reported 58% recollections of judgments made on the morning task after sleep. They concluded that sleep facilitates the consolidation of emotional declarative memory.

Health, Sleep Quality and Academic Performance

Reporting's from stable subjective measurements of sleep, health and well-being over a three month period in young adult college students indicated that with decreased sleep quality, participants also reported psychological and physical health complaints, feelings of

tension, decreased positive affect and life satisfaction over the semester-long measurement [18]. Poor sleep quality has also been associated with decreased fitness levels in female college students as measured by lower levels of muscular endurance, flexibility, and cardiovascular fitness [19]. Regardless of the extent or type of sleep disturbance, a clear association consistently appears in the co-descriptions of findings in the literature—health and academic performance vary as a function of sleep quality. Trockel et al. [16] report negative effects of sleep deprivation on college students' cognitive performance. Further, the weekend sleeping intervals were reported to be significantly delayed compared to weeknight sleeping times [4,17]. The irregular sleep patterns, impaired driver safety (dozing while driving), poor time management and not eating breakfast or taking vitamins were other health related factors associated with poor sleep. Greater variability in rise time, consuming a morning beverage, and later bedtimes were found in those participants with more disturbed sleep. When academic examination stress in emerging adults was measured with randomized conditions of exam-stress and stress-free intervals, significant increases in perceived stress and emotional distress; increase in smoking and caffeine consumption; decrease in healthy eating, emotional control, frequency and duration of physical activity; and deterioration in sleep patterns and study habits were found in controlled conditions [20].

In an odds ratio analysis, sleep was reported as higher in those that participated in regular vigorous/moderate physical activity, were not employed and who had not experienced anxiety. Emerging adults in the A and B grade range were more likely to report good sleep [21]. Interestingly, the strongest predictor of grade point average reported in the study was Body Mass Index (BMI) [21]. Those classified with a normal BMI were more likely to earn a grade of A or B according to the results [21]. Thus, sleep quality is associated with grade point average, a primary measure of academic productivity among college students [21].

The current study was designed to re examine the issues related to academic performance and sleep quality in a contemporary sample of emerging adult college students. It was hypothesized that a significant positive correlation would be found between the variables measuring sleep quality, academic performance, and health.

Method

Participants

College students enrolled in psychology undergraduate courses at a Mid western liberal arts college were invited to participate in an assessment study that entailed 2 weeks of sleep logging and the completion of several self-report measures about the quality of their sleep and wake experiences. The information specifically indicated that changing one's sleep or a diagnosis of sleep disturbance/disorder was not the focus of the study.

Nineteen subjects signed up for the study and 16 participants completed the study. The attrition of 3 was related to the students conveying disinterest in spending time logging sleep for the full 2 weeks and preferred to be a part of a study that was a one time only survey. 16 participants were within the ages of 18 to 23 years. Males (N=4, mean age=19) reported on average completing 11 hours of employment per week. Females (n=12, mean age=20) reported a mean of 17 hours of work per week. All participants were Caucasian.

Measures

A standard structured sleep interview (Pittsburgh Sleep Quality

Index) was used along with several measures rating sleep quality, health, study habits, and mood. A standard sleep log form was used by each participant for six days following the assessment period. A questionnaire composed of general health questions germane to the emerging adult population was constructed. Each question was coded as a separate variable.

Procedure

Students that signed up for the study were provided with full information about the specific extent of the study and reasons for the importance of logging their sleep. They were provided with full information about each measure with the exception of the research hypothesis. Every subject signed an informed consent form and agreed to be a participant in the study in exchange for extra credit or psychology laboratory coursework credit.

A time period that fell two weeks before the midterm exams was chosen as the schedule was deemed to be the most balanced with academic assignment deadlines and exams than other periods during the term. Thus, students were required to participate in the study only during that specified 2 weeks. All participants were free of sleep disorders and in good academic standing per interview findings by the first author. The proposal for this study had received approval from the Internal Review Board of the College.

All participants were requested to come at the same appointment time where a general overview of the investigator's research program and the intent of the study were presented. Following this, a full explanation of sleep measures and the log was given. All questions were answered. Participants were then asked to complete the materials with the investigator and trained assistants available to manage any questions or need for further information. Following this, all participants handed in their materials and were given an additional, brief explanation of the sleep log and the importance of tracking their sleep. The first author met with each participant individually and went over the rationale and procedure for completing the sleep log and self-assessment measures. Participants were telephoned by the first author every other day to see if they had any questions and to provide any further information about the measurements they were doing. Semester grade point averages were obtained from the registrar for all participants.

Results

All data responses from the sleep logs and surveys were treated as separate variables and descriptive statistical analyses using SPSS PC was conducted. The grades recorded in each students class at the time of the sleep study and that were summated into an overall grade point average by the college registrar were correlated with the sleep log and health survey responses.

Tables 2 and 3 illustrate median values of the sleep variables during the weekdays and weekends, and daily ratings, on average, for the group, of the sleep variables. There were a moderate number of endorsed health factors. Table 3 summarizes the average daily rating of the sample on health factors.

The participants' ratings emotions experienced each day were also recorded. The averaged values by emotion rating appear in table 4. Of note, the participants' highest ratings were for "irritable", "poor concentration" and "tired". Cross tabulation analyses of the emotion ratings, sleep efficiency and grade point average were non-significant.

Correlational analyses of the health variables and grade point average resulted in a statistically significant relationship between

"dozing off during an activity" and lowered grade point average. These findings are illustrated in table 5.

Discussion

The findings are consistent with the literature in indicating a relationship between poor health, low grades and poor sleep quality. The disturbance in each category appears to be sufficient to impact the other area yet the interrelationship is unknown. We have an ongoing investigation at present to examine wake day activity levels, health and sleep quality in the college student that addresses the interrelationship question we identified [4,21].

The irregularity of sleep for weekdays and compared to weekends has been noted in the sleep literature. Variable sleep patterns sustain poor sleep quality with sleep deprivation accumulated during the week that is met by extended sleep intervals and napping on weekends [4]. We think our findings on this aspect points to the need for quality psychosocial intervention delivered in effective small group workshop fashion. The patterned behavior can be restructured efficiently, we think, with a small scale workshop approach combined with online resources for this population. It is clear that emerging adults need

Median	Weekday Sleep	Weekend
Total Sleep Time (TST)	5 h 46 m	7 h 8 m
Total Time in Bed (TiB)	7 h 33 m	8 h 27 m
Sleep Efficiency (TST/TiB)	76.37%	84.42%
Number Awakenings	1.0	1.0
Sleep Quality*	2.71	2.50
Time Until Sleep (minutes)	15	10
Nap		
Wakeup Prompts Needed	$\bar{x} = 2$	1.98

*= 1-5 scale where 1=poor, 5=excellent.

Table 1: Sleep variables.

	\bar{x}	
Number of activities dozed off in today	1.13	(1.36)
Number of hours dozing off during the day	1.31	(2.44)
Number of planned naps* today	.31	(.479)
Amount of time spent in daylight	15 minutes	(39.94 minutes)
Difficulty waking up (1=easy, 5= hard)	3	(1.81)
Use of sleep aid	1.94	(.250)

Note: Nap time reported as 2 p.m., for thirty minutes.

Table 2: Sleep experience.

	\bar{x}	SD
Headache	1.75	.447
G/I Upset	1.94	.250
Cold/Allergy Symptoms	1.75	.447
# Caffeine Use	.56	.73
Muscle/Joint Pain	1.75	.447
Exercise	1.75	1.44
Light Exposure*	15 minutes (0-45 min range)	—
Medication Use	0	—
Stomach Ache	0	—
Tobacco Use	2	.32

Note: The mean and standard deviation summarize the frequency endorsement of these behaviors by the participants in one week's time.

Table 3: Health disturbing behaviors report by young adults.

Emotions	\bar{x}	SD
Happy – Sad	2.44	1.09
Tense – Relaxed	2.81	0.834
Sleepy – Alert	2.81	1.424
Even tempered – Mood swings	2.25	0.931
Irritable – Easy going	3.75	1.065
Poor conc. – Good conc.	3.00	1.033
Tired – Energetic	2.75	1.00
Worried – Carefree	2.69	1.014
Calm – Jittery	2.56	0.964

Note = Ratings were 1=none to 5=very much so. Higher scores are indicative of the first term in the description.

Table 4: Emotions ratings.

Grade Point Average		
	Typical week	ns
	Headache	ns
	Gastrointestinal symptoms	ns
	Cold/Allergy Symptoms	ns
	Planned naps	ns
	Number of activities dozed off in	6.38*
	Use of tobacco	ns

Table 5: Correlational analysis of academic performance, health and sleep factors.

more education and information on the importance of sleep and ways to increase their sleep quality and efficiency.

Furthermore, the findings of inadequate sleep efficiencies (Table 1, weekday sleep efficiency = 76.37%; weekend sleep efficiency = 84.42%) denote poor sleep in a context of high sleep need. The prolonged times in bed despite not sleeping reflect, we believe, sleep deprivation/disturbance. Investigations and subsequent psychosocial interventions in this area are needed to examine sleep perception, pre-sleep behaviors, and wake day behaviors of health and academic activity that influence sleep in the college student. The need for intervention is blatant. Our findings reflected in Table 3 present varied behaviors such as dozing off in activities during the day, napping and use of sleep aids that can be addressed. Controlled treatment interventions to measure behaviors before and after a psychosocial intervention are paramount to addressing this need. The number of times during the week that participants endorsed a health disturbing behavior is of clinical note as there are comparable weekly tabulation data sets. Current sleep courses need to continue to be refined in order to create long-lasting change in sleep patterns of emerging adults. The effect of a “sleep management” course on sleep patterns over 18 weeks found that the students’ sleep quality increased throughout the semester when compared to controls, these were mild and limited findings [18]. Intervention programs need to be further developed and implemented into colleges because poor quality sleepers report more than decreased academic functioning; they also report significantly more problems with physical and psychological health [21]. The sleep factors and moderate number of endorsed health factors by our sample indicate, collectively, life adjustment issues co-occur with sleep disturbances. These findings are parallel to nationwide studies of sleep in emerging adults. A summarization of the data from the National College Health Assessment that was based on students’ responses from 78 United States institutions (N=56,637) indicated that more students reported having poor sleep (affirmative response to “haven’t gotten enough sleep over the last 7 days to feel rested”) than good sleep [21].

This study also highlights that an emerging adult’s health and

emotional state impacts sleep. Poor sleep was found to be related to wake-day emotional changes. It is likely that an individual experiencing negative emotions has additional difficulty with completing and attending to academic work, as well as difficulties with obtaining quality sleep. Our findings of endorsements of “irritableness”, require, we feel, intervention with education about getting good quality sleep.

In future research, it will be important to consider wake-day activities with wake-day emotions. This will lead to a broadened understanding of how an individual’s 24-hour complete day impacts sleep quality. Additionally, further research should be done with within subjects groups and longitudinal designs in order to reveal emerging adult sleep patterns more fully. This will allow for a better understanding of what information and education these emerging adults need in order to implement healthier sleep practices that subsequently affect overall health and academic progress.

In conclusion, we feel we have measured support for the relationship between poor sleep quality, health disturbing behaviors and poor academics. The specific measurements of sleep and health provide evidence for mismanagement of these behaviors. A short-term psycho educational intervention with online resources for the college student about sleep and health would be of potential benefit and would likely contribute to better academic outcomes.

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