

Comparative Analysis of Academic Performances of Sleep Deprived Versus Non-Sleep Deprived Undergraduate Students

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Abstract

The study used *Ex Post Facto* research design to compare the academic performances of sleep deprived and non-sleep deprived undergraduate students of tertiary institutions. A sample of 385 male and female undergraduate students (mean age = 25.43±4.76) filled the modified version of the eight-item Epworth Sleepiness Scale and Self-reported Perceived Academic Performance. The data was analyzed using Pearson's Chi square method in STATA 14. Findings reveals a significant effect of sleep deprivation on students' academic performance, Pearson $\chi^2(3) = 19.554, p < 0.05$, with academic performance of sleep deprived students within age 23-27 significantly affected than other age range, Pearson $\chi^2(9) = 176.804, p < 0.05$. However, further analysis did not suggest significant differential effect of sleep deprivation on academic performance of sleep deprived male and female students, Pearson $\chi^2(3) = 1.636, p = 0.651$. The study concludes that sleep deprivation may be strongly related to poor academic performances among university undergraduate students. It will therefore be important for school authorities to enlighten newly admitted students on the benefits of having adequate sleep and the consequences of lack of it.

Keywords: Sleep deprived, Non-sleep deprived, Academic performances, Undergraduate students

1. 0 Introduction

Sleep deprivation is a condition of lacking the necessary amount of sleep. The connection between sleep deprivation and performance have been studied in many different samples across different fields such as human science, medicine, psychology, education, and business (Chiang, 2013). Studies suggest sleep is important to cognition just as food to the body and sleep-related variables such as sleep deficiency, and poor sleep quality can influence performance of both teachers and students, and employees and managers as well (Lack, 1986; Mulgrew, Ryan, Fleetham, Cheema, Fox, Koehoorn, FitzGerald, Marra, & Ayas, 2007; National Sleep Foundation, 2008; Pilcher & Huffcutt, 1996; Rosekind, Gregory, Mallis, Brandt, Seal & Lerner, 2010).

As a basic human need, on average, an adult will spend about one-third of his/her life sleeping (Lee, 1997). Studies through the years found that sleep is closely related to physical and psychological distress, cognitive processes and metabolic function (Samuels, 2008). Complete rest or sleep is still seen as the main means of restoring physical working capacity, as well as mental restoration (Dale, 2004; Bompa & Haff, 2009) and most significantly, information consolidation and recovery (Venter, 2012).

Nowadays however, sleep deprivation are arguably common among university students no thanks to the increasing demand for better Grade Point Average (GPA) by students and the society (Drake, Roehrs & Roth, 2003). Studies reported that between 13% and 52 % of students' population is suffering from different kinds of sleep insufficiency (Hamilton, Gallagher, Preacher, Stevens, Nelson, Karlson, McCurdy, 2007). This means that compare to general adult population, sleep problems among university students are prevalent (Yang, Wu, Hsied, Liu, & Lu, 2003). National Sleep Foundation (2006) stated that a minimum of 9 hours of sleep per night is vital for the physical and mental development and it is needed for optimum performance during the day. However, in a 2006 poll the foundation founds that the average amount of sleep students received per night was 7.6 hours, which it reported as inadequate - but may be adequate for others based on sleep needs. It also reported that after a continuous time of wakefulness or insufficient rest within 24 hours, students' performance was found to be impaired significantly.

There are many reasons accounting for students sleep deprivation but academic stress occasioned by academic workloads and social pressures were considered among the major factors attributing to students' engagement in sleep problems (Ginsberg & Gapen, 2008; Roane & Taylor, 2008; Wolfson et al., 2006). These sleep problems may not only affect students studying, but also make them prone to more serious sleep disorders, such as insomnia, cognitive problems, and even other physiological problems.

Furthermore, since sleep, which is viewed as an active, repetitive and reversible behaviour serving several different functions, such as repair and growth, is important for physical, intellectual and emotional health (Neinstein, Gordon, Katzaman, Rosen & Woods, 2008; Curcio, Ferrara & De Gennaro, 2006), the lack of it can result in impairment on students' daytime performance. Examples include falling asleep in class, lacking energy, poor concentration, and inattentiveness (Smaldone, Honig & Byrne, 2007; Wolfson & Carskadon, 2003), and poorer academic performances in school (Wolfson & Carskadon, 2005; Curcio, et al. 2006). It was also

reported that, sleep deprivation would result in impairment of words, psychological and neurocognitive functioning (Curcio et al. 2006). One study showed that sleep-deprived students performed worse on attention, memory, and problem-solving tasks and this adversely affected their academic performance (Curcio, Ferrara & Gennaro, 2006).

1.1 Statement of the problem

Over the years and currently in Nigeria, there is a public outcry about the dwindling fortune of education and this is evident based on the quality of graduates coming out of the universities. Almost everyone, including government, parents, and employers of labour and even university lecturers who produce the graduates are complaining that universities are producing half-baked graduates. The causes of this nosedive could come from various sources but typically, in situation as this, parents and other stakeholders would blame variety of educational and social factors for the lack of improvement in learning proficiency and better school average by students. Little emphasis if at all is placed on sleep deprivation, a condition of not having sleep enough at night to perform optimally in the day.

The fact is that students might not be able to learn according to school, national or personal expectations in part because they are too tired during the day, deprived of sleep at night, feeling sleepy or falling asleep in class the following day. Therefore, the warning sign of inattentiveness and concentration problems often observed in students in the class may after all not be due to lethargy or lack of enthusiasm as traditionally perceived by teachers, and other stakeholders rather, may be due to sleep deprivation. In view of the above, it is pertinent therefore, to conduct an investigation of this nature to understand and unveil some hidden and mostly ignored factors that could be accounting for students' poor performances in school.

1.2 Objectives of the study

The general objective of this study is to compare the academic performance of sleep deprived and non-sleep deprived students of higher institutions of learning. The following are the specific objectives;

- i. To find out the difference between academic performance of sleep deprived and non-sleep deprived students.
- ii. To assess the effect of sleep deprivation on academic performance of students based age.
- iii. To find out the effect of sleep deprivation on academic performance of male compare to female students.

1.3 Research Questions

The following are research questions raised which the study will seek to provide answers.

- i. What is the effect of sleep deprivation on academic performance of sleep deprived and non-sleep deprived students?
- ii. What is the effect of sleep deprivation on academic performance of students based age?
- iii. What is the effect of sleep deprivation on academic performance of male compare to female students?

1.4 Research Hypotheses

Three non-directional hypotheses were stated in this study, which are in line with the research questions raised. They are as follows;

- i. There is no significant difference between academic performance of sleep deprived and non-sleep deprived students.
- ii. There is no significant differential effect of sleep deprivation on academic performance of students based age.
- iii. There is no significant effect of sleep deprivation on academic performance of male compare to female students.

2. Methodology

2.1 Research Design

Ex post facto research design was used for this study. Ex post factor design is a non-experimental research technique in which preexisting groups are compared on a dependent variable. In this design, usually, assignment of participants to a particular group is based on events that occurred in the past. It does not involve manipulation of researched participants thanks to research ethics. For instance, sometimes a researcher may want to study variables he may not be able to manipulate for ethical reasons (e.g., depriving participants of sleep). Under this circumstance, Ex post facto design therefore becomes appropriate in examining how their existing behaviour (sleeping pattern) present prior to the study, affects a dependent variable (perceived academic performance).

2.2 Participants

The population of this study comprised of undergraduate students of Ahmadu Bello University, Zaria. Three hundred and eighty-five (385) students with a mean age = 25.43±4.76, participated in the study. The respondents comprised of both male and female students of different age range, levels of study, ethnic and geographical background.

2.3 Outcome Measure

2.3.1 Epworth Sleepiness Scale

A modified version of the eight-item Epworth Sleepiness scale was used to collect data from respondents. A Self-reported perceived academic performance of students was used to measure academic performance. The sleep deprivation instrument used is a standard instrument that have been tested and found valid and reliable. The instrument yielded a reliability coefficient of 0.86, as reported by Kendzerska, Brignardello, Smith, Leung, and Tomlison (2014). Higher score of 10 and above indicates sleep deprivation.

2.3.2 Brief Academic Performance Scale

The academic performance scale is made up of a single item which seeks to understand student's opinion on their schoolwork. The question and response is as follows; Compared to your mate at school, how would you rate your academic performance at the moment? Please, be honest with your response by ticking a single option. Thank you.

- i. Below average
- ii. Average
- iii. Above average
- iv. One of the very best

2.4 Data Analysis

The data collected were sorted and analyzed using descriptive and inferential statistics on STATA 14. A standard P value < 0.05 was considered statistically significant. The results of the analysis were presented in tables.

3. Results

Table 1. A two by four chi-square measure of association between perceived academic performance of sleep deprived / non-sleep deprived students

Pearson $\chi^2 (3) = 19.554, p < 0.05$

<i>Performance</i>	<i>Sleep Deprived</i>	<i>Non-sleep deprived</i>	<i>Total</i>
Below average	99 29.3%	0 0.0%	99 25.7%
Average	168 49.7%	30 63.8%	198 51.4%
Above average	53 15.7%	13 27.7%	66 17.1%
One of the very best	18 5.3%	4 8.5%	22 5.7%
Total	338 100.0%	47 100.0%	385 100.0%

Table 1 shows a two by four chi-square measure of association between perceived academic performances of sleep deprived / non-sleep deprived students. It shows that 99 respondents representing 29.3% of sleep deprived students reported academic performance below average in contrast to none for the non-sleep deprived students. There were less sleep-deprived respondents, 49.7% in contrast to 63.8% who reported average academic performance. In addition, 15.7% of sleep-deprived students in contrast to 27.7% of non-sleep deprived, reported academic performance above average. These outcome suggests that there is a significant association between academic performance and sleep deprivation among students, Pearson $\chi^2 (3) = 19.554, p < 0.05$.

Table 2. A two by four chi-square measure of association between sleep deprivation and perceived academic performances of male and female students

Pearson $\chi^2(3) = 1.636, p = 0.651$					
Sex	Below average	Average	Above average	One of the very best	Total
Male	54 _a 54.5%	92 _a 54.8%	24 _a 45.3%	9 _a 50.0%	179 53.0%
Female	45 _a 45.5%	76 _a 45.2%	29 _a 54.7%	9 _a 50.0%	159 47.0%
Total	99 100.0%	168 100.0%	53 100.0%	18 100.0%	338 100.0%

Table 2 is a two by four chi-square measure of association between sleep deprivation and perceived academic performances of male and female students. It shows that 54 sleep-deprived male respondents representing 54.5% in contrast to 45 female representing 45.5% who reported below average in their academic performance. Of the 179 sleep-deprived male respondents, 24 (45.3%) compared to 29 (54.7%) reported above average academic performance. It was also found that only 9 male and female respondents reported excellent academic performance. This result has suggests that there is no significant association between sleep deprivation and perceived academic performances of male and female students, Pearson $\chi^2(3) = 1.636, p = 0.651$.

Table 3. A four-by four chi-square measure of association between sleep deprivation and perceived academic performances of students of different age range

Pearson $\chi^2(9) = 176.804, p < 0.05$					
Respondents Age	Below average	Average	Above average	One of the very best	Total
18-22	11 _a 11.1%	65 _b 38.7%	31 _b 58.5%	18 _c 100.0%	125 37.0%
23-27	66 _a 66.7%	59 _b 35.1%	0 _c 0.0%	0 _c 0.0%	125 37.0%
28-32	22 _a 22.2%	33 _a 19.6%	0 _b 0.0%	0 _{a, b} 0.0%	55 16.3%
33-38	0 _a 0.0%	11 _a 6.5%	22 _b 41.5%	0 _a 0.0%	33 9.8%
Total	99 100.0%	168 100.0%	53 100.0%	18 100.0%	338 100.0%

Table 3 shows a four-by four Pearson chi-square measure of association between sleep deprivation and perceived academic performances of students of different age range. Outcome suggests that there is a significant association between academic performance and sleep deprivation among students of different age range, Pearson $\chi^2(9) = 176.804, p < 0.05$. Of the 99 out of 338 respondents equaling 29.3% of the sleep-deprived students, 11.1% in contrast to 66.7% who were within age 18-22 and 23-27 respectively reported below average academic performance. There were 22.2% of sleep-deprived students who reported below average academic performance. Comparatively therefore, poor academic performance may be associated with sleep-deprived students who are 23 years and above as significant majority reported poor school average while those within age 18-22 reported average performance more than any age range.

4. Discussion

The study found 29.3% of sleep-deprived students reported academic performance below average in contrast to none for the non-sleep deprived students. Less sleep-deprived respondents, 49.7% in contrast to 63.8% none sleep-deprived reported average academic performance. In addition, 54.5% sleep-deprived male respondents in contrast to 45.5% female reported below average in their academic performance. Of the 179 sleep-deprived male respondents, only nine male and female respondents reported excellent academic performance. Outcome also suggests that of the 99 out of 338 respondents equaling 29.3% of the sleep-deprived students, 11.1% in contrast to 66.7% who were within age 18-22 and 23-27 respectively reported below average academic performance. Comparatively, poor academic performance may be associated with sleep-deprived students who are 23 years and above as significant majority reported poor school average more than any age range used in the study. This outcome is in line with Lim and Dinges (2010) assertion that after a continuous time of wakefulness or insufficient rest within 24 hours, human performance can be impaired significantly. In addition, Bonnet and Arand (2003) reported that sleep deprivation leads longer reaction time, distractedness, disturbances in attention and concentration, forgetting known facts, difficulty in memorizing new information, and making mistakes and omissions. It leads to tiredness, drowsiness and irritability; work effectiveness decreases and motivation usually

falls down. Reasoning slows down not only during the night of sleep deprivation but also on the following day. Trockel, Barnes, and Egget (2000) also reported a significant correlation between sleep habits and lower academic performance. However, Oyerinde and Onifade (2009) reported a different outcome in their study on the effect of sleep deprivation on secondary school students' performance in a standardized English language test. Their result revealed that 72% respondents (control) passed while 84% of the respondents (experimental) passed, 29% and 16% respectively failed under the two groups. Oyerinde and Onifade (2009) concluded that respondents' adequate or inadequate hours of sleep does not have much impact on academic performance in standardized English. The possible reason for variation in study outcome between this study and Oyerinde and Onifade (2009) could be the sample used for the study and also Oyerinde and Onifade (2009) measure academic performance in standardized English only while this study examines perception in general academic performance.

5. Conclusion

Over 87% of students of the participants reported not having adequate sleep at night and of this number, over 29% majorly students within age range 23 and above reported below average academic performance when compared to other colleagues. This effects cut across gender divide, thus suggesting that sleep deprivation negatively impact on student's academic performances in school. Therefore, it is recommended that if this problem can be tackled through sleep hygiene education or public enlightenment in schools to create awareness in students about the academic danger inherent in sleep deprivation, costly cognitive, emotional, physical and academic consequences can be averted and prevented and student's academic performances and wellbeing may be enhanced.

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