Original Article

The effect of Sleep Quantity on Performance of Students in Public Universities, Kenya

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ABSTRACT
The purpose of this study was to examine the subject in public universities. A total of 100 undergraduate students were involved in the study. The study used survey research design. A structured questionnaire was used to collect data from the respondents. Data was analyzed with the help of Statistical Packages for Social Sciences. Descriptive statistics specifically frequencies and percentages, and inferential statistics particularly Pearson's Product Moment Correlation were applied in data analysis.The study achieved a response rate of 92%. The results indicated that majority (54%) had a cumulative average of a B. The study also revealed a positive correlation between sleep quantity and academic performance with a coefficient of 0. 326 (at 0.01 significance level). The study concludedthat lack of adequate sleep negatively affects the performance of students in public universities in Kenya. The main cause of insufficient sleep among university students was stress which resulted from family problems, inadequate pocket money and broken relationships. Therefore, public university students need to evaluate their experience of stress, learn and use effective stress management strategies to deal adequately with it.
Key words: sleep quantity, performance, public university

INTRODUCTION

Sleep plays a very important role in a human being's health. Sleep loss not only makes people feel sleepy in the daytime, it is even a possible risk factor for Alzheimer's disease (Slats, Claassen, Verbeek, & Overeem, 2013). Most sleep specialists indicate that adult humans require approximately 8 hr of sleep per day (Carskadon, 2002). It has been reported that the history of sleep research can be traced back to the 19thcentury (Pelayo & Guilleminault, 2009).Researchers have investigated the relationship between sleep deprivation (a term meaning loss of sleep) and two variables, task performance and individual productivity (Koslowsky&Babkoff, 1992; Snyder, 2003). Additionally, sleep deprivation has been negatively related to academic performance. 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). Adolescents suffer fromincreasing school, family and social pressure andfrom an environmentally induced delay of sleeptiming, together with changes of intrinsicregulatory (both circadian and homeostatic) processes.Taken together, these altered sleep patterns lead to a marked increase in sleepinessthat usually facilitates cognitive, emotional, behavioural and academic failure (Carskadon et al., 2004). Surprisingly, notmuch data exists regarding the specific effects ofinadequate sleep and sleepiness on daytime functioningin children. Nevertheless, some experimentalevidence reinforces the common belief thatdisrupted or poor sleep is usually followed byinefficient daytime behaviour and variability inperformance. Within these activities, academicperformance and/or school achievement shouldbe carefully taken into consideration. As recentlypointed out in some literature reviews (Wolfson & carskadon, 2003) learningabilities and consequent academic performanceare particularly dependent on sleep patterns andsleepiness levels. These impairments in neurocognitivefunctioning can be observed in several kindsof learners: from school to university students, Most of students in public universities in Kenya are either addicted to drugs, social

networking or both. Previous studies indicate that drugs such as alcohol, cigarettes and khat as well as addiction to social networking including facebook and twitter affects sleep quality and quantity. Thus, it is reasonable to suppose that those university students that develop such sleep patterns may suffer consequences over their academic performance. According to Mesquita (2011) smoking alters the normal sleeping pattern and causes poor sleep quality. Non-smokers had a better sleep quality than smokers. Non-users of social networking, such as Facebook and twitter, had a better sleep quality than users. However, those using social networking for 0.5-2 hours a day had the best sleep quality among the groups.

The relationships between sleep and performance have been studied in many different fields such as human science, medicine, psychology, education, and business. However, few studies have investigated the effects of sleep on academic performance using university students as subjects as opposed to elementary or high school students (Curcio et al., 2006). This study focused only on undergraduate students from various departments in public universities in the Kenya.

MATERIALS AND METHODS
The study adopted a survey research design. A sample of 100 fourth year students selected from 6 public universities in Kenya namely; Chuka, Nairobi, Jomo Kenyatta, Egerton, Kenyatta and Meru were engaged in the study. The study focused only on fourth year students'in order to establish their performance trends.The cumulative average of each student for the three years was also computed and correlated with average sleep quantity. The study used a structured questionnaire to collect the required data. Descriptive and inferential statistical tools were used to analyze the collected data with the aid of Statistical Package for Social Sciences computer programme. The mean, frequencies and percentages were used to describe the variable characteristics while Pearson's product moment correlation was run to analyze the correlation between the dependent and independent variables.

RESULTS AND DISCUSSIONS
Profile of the Respondents
The study engaged fourth year students from public universities in Kenya namely; Meru, Chuka, Kenyatta, Jomo Kenyatta, Nairobi and Egerton. The study achieved a response rate of 92%, since out of 100 sets research instruments that were distributed, 92 were filled in and returned. An analysis of the respondents' characteristics revealed that 66% of the respondents were male while 34% were female, their ages ranged from 19 to 26 years although most of them were 24 years old. The respondents were from different departments; 23% were undertaking BSc in Community Development, 23% Bsc in Psychology, 8% Bsc Aged, 11% Medicine, 30% Bed Arts and 3% interior Design.
Sleep Quantity
The quantity of sleep of the respondents was measured both during the weekdays and over weekends. According to the results, 13% of the respondents slept for 4 hours every night during weekdays, 33% slept for 5 hours, 23% slept for 6 hours, 15% slept for 7 hours, 9% slept for 8 hours and 8% slept for more than 8 hours as presented in Table 1. This shows that majority of the respondents (56%) slept for between 5 and 6 at night during week days. Experts recommend that young adults aim to achieve 7-9 hours of sleep every night (Carskadon, 2002). This therefore, indicates that majority of the students did not have adequate sleep. According to Anderson (2003), cutting just one hour of sleep drops mental alertness by one-third.

Table 1: Sleep quantity during weekdays

Number of hours of sleep/day	Frequency	Percent
4 Hours	12	13.0
5 hours	30	32.6
6 hours	21	22.8
7 hours	14	15.2
8 hours	8	8.7
More than 8 hours	7	7.6
Total	92	100.0

When asked to indicate their quantity of sleep during the weekends, 14% of the respondents slept for 4 hours every night during weekends, 25% slept for 5 hours, 23% slept for 6 hours, 29% slept for 7 hours, 2% slept for 8 hours and 7% slept for more than 8 hours as presented in Table 2. This shows that most of the students (52%) slept between 6 and 7 hours, meaning the students slept for more during the

weekends. This confirms the findings of Anderson, (2003) which indicate that as teens lose more sleep during the week, they try to make it up on the weekends, and this actually disrupts their sleep cycles even more because the body is not allowed to maintain a consistent sleep pattern.

Table 2: Sleep quantity during weekends

Number of hours of sleep/day	Frequency	Percent
4 Hours	13	14.1
5 hours	23	25.0
6 hours	21	22.8
7 hours	27	29.3
8 hours	2	2.2
More than 8 hours	6	6.5
Total	92	100.0

Inadequate Sleep and Lecture Absenteeism
As regards to the frequency of lecture absenteeism due to lack of adequate sleep at night, majority of the respondents (60%) indicated that they never missed while 40% pointed out that they missed lectures less frequently due to insufficient sleep at night as illustrated in Figure 1.This implies that inadequate sleep contributed to lecture absenteeism in the public universities.
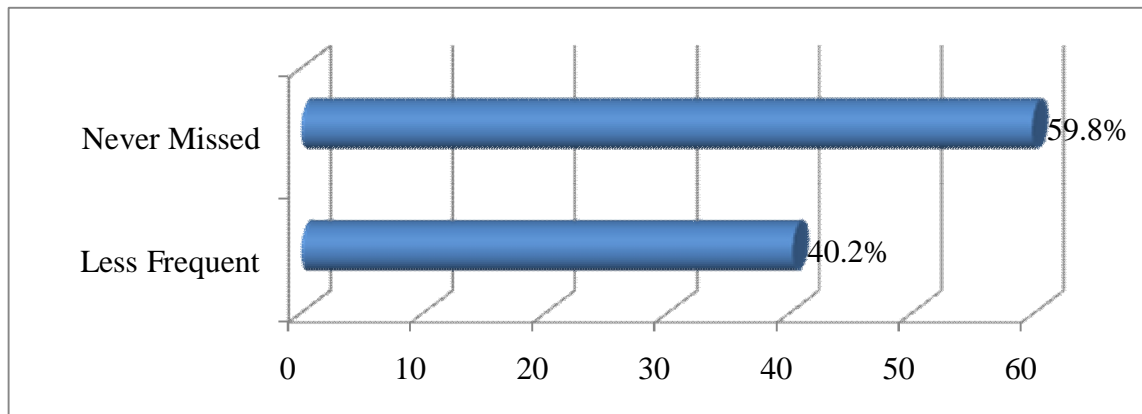

Figure 1: Inadequate sleep and lecture absenteeism

Causes of Inadequate Sleep among University Students
An assessment of the causes of lack of adequate sleep in the universities revealed that stress was the major cause as indicated by a mean response of 3.2174, other factors included social media (2.6087), drug abuse (2.5978), assignments (2.9783) and social relationships (2.5978) as shown in Table 3. The standard deviation indicates the level of scatteredness of the responses from the mean response. The deviations ranged from 0.90150 to 1.29181 which implies that responses were slightly dispersed from the mean scores.

Table 3: Causes of Inadequate Sleep among University Students

Cause of lack of adequate sleep among University students	Mean scores	Standard deviation
Addiction to computer games	2.6848	1.29181
Social media	2.6087	1.11883
Drug abuse	2.5978	1.24088
Stress	3.2174	0.99257
Assignments	2.9783	0.90150
Social relationships	2.5978	0.96145

Causes of Stress among students
Further, the study revealed that the main causes of stress among university students were inadequate pocket money as stated by 54% of the respondents, relationships break ups as pointed out by 60% and family problems as claimed by (80.4%) of the respondents as presented in Table 4. Such stress and anxiety can lead to sleepproblems. In fact, the quality and quantity of sleep ofmany students might change after enrollment into auniversity (Pilcher, 1997).

Table 4: Stress factors that contribute to lack of sleep

Causes of stress	Yes		No	
	freq	%	freq	%
Inadequate pocket money	50	54.3	42	45.7
Relationships break ups	56	60.9	36	39.1
Family problems	74	80.4	18	19.6
Inadequate learning facilities	14	15.2	78	84.8

Performance of Public University Students

The performance of students was measured using; a 4 point likert scale where the respondents were given a set of statement and asked to indicate their level of agreement with them. Specifically, academic performance of the students was measured using cumulative average (grades A, B, C, D and F).

In a scale of 1- 4 where 1= Strongly Disagrees, 2= Disagrees, 3=Agrees, 4= strongly Agrees; the respondents were given a set of statements regarding the effect of sleep on academic performance and asked to indicate the extent to which they agreedthem.According to the results in Table 5, inadequate sleep made students unable to actively participate in class activities as supported by a mean response of 3.6196 (strongly agreed). The respondents also indicated that inadequate sleep made one be unable to stay focused on a task the following day (3.1087); influenced short-term and long term retention of newly learned content (3.4783) and resulted daytime sleepiness that is also correlated with poor academic performance. It also emerged that sleep loss is associated with a decreased ability to control inhibit or change emotional response (3.5543). Although, there was a slight deviation in the responses as indicated by the standard deviations which ranged from 0.48815 to 0.70253, the deviation of 0.488 implied that the responses were closer to the mean as compared to those of 0.70253.

Table 5: Effect of sleep on performance of university students

Statement/item	Mean scores	Standard deviation
Inadequate sleep make students unable to actively participate in class activities	3.6196	.48815
Sleeplessness make one be unable to stay focused on a task	3.1087	.70253
Sleep loss is associated with a decreased ability to control inhibit or change emotional response	2.8152	.55330
Inadequate sleep influences short-term and long term retention of newly learned content	3.4783	.56410
sleep deprivation results in daytime sleepiness that is also correlated with poor academic performance	3.5543	.49976

Students' Participation in Extracurricular Activities

The results also show that majority of the students (47%) participated in ball games, 8% participated in athletics, 12% in music and 34% did not participate in any extracurricular activity as depicted by Figure 2. This shows that a significant number of students in the public universities do not participate in extracurricular activities.
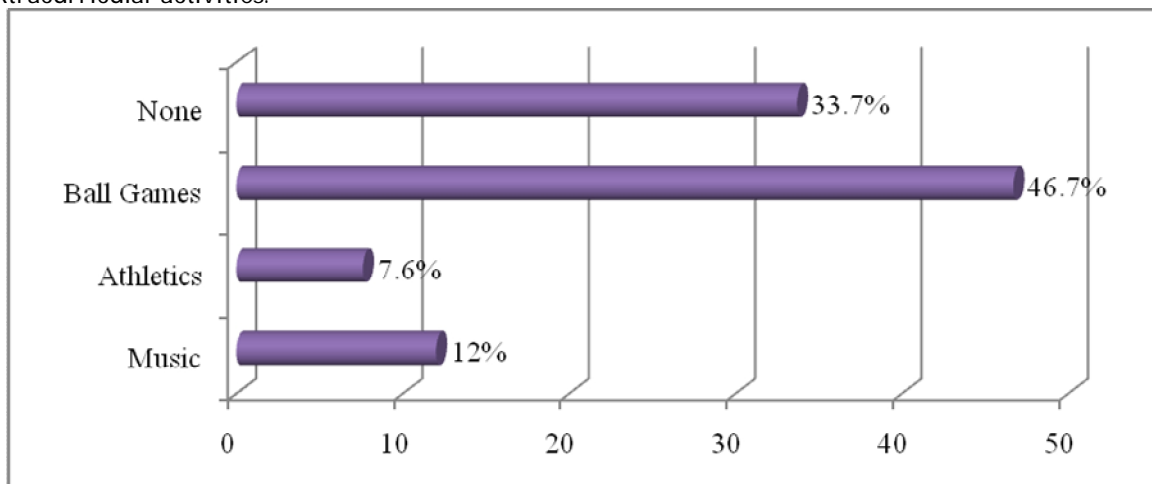
Figure 2: students' participation in extracurricular

Students' Academic Performance

An analysis of the academic performance of the respondents indicated that majority (54%) had a cumulative average of a B, 5% had an A, 29% had an average of C and 11% had an average of a D as illustrated in Figure 3. The findings in Table 6 indicate that sleep quantity is positively correlated with performance and therefore, those who had Ds and Cs had lesser hours of sleep than the recommended. As Mitru et al. (2002) explain, students who fail or do poorly in school get less sleep than those receiving As and Bs. According to Carpenter (2003), students receiving Cs, Ds, and Fs routinely got twenty-five minutes less sleep than their classmates receiving As and Bs.
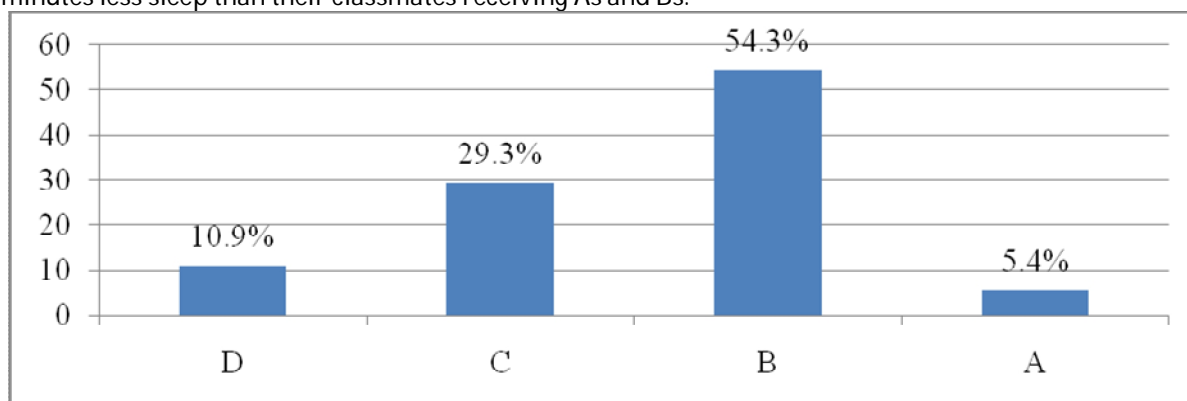

Figure 3: Academic performance of the respondents

Hypothesis Testing

There is no significant correlation between sleep quantity and academic performance of students in public universities in Kenya. The study had hypothesized that sleep quantity had a significant contribution on academic performance of students in public universities. A Pearson Product Moment Correlation test was therefore run to test the hypothesis. As shown in Table, there was a positive correlation between quantity and academic performancewith a coefficient of 0. 326. The hypothesis was tested at a 0.01 significance level. The p-value is 0.001 and thus, less than the alpha of 0.01 hence establishing a high significant relationship between variables. The findings are in agreement with those of previous studies. For instance As an indirect link between sleep and academic performance, it was shown that students with more regular sleep-wake patterns (shorter sleep latencies, fewer night awakenings, later school rise times, earlier rise times on weekends) reported higher GPA, (Gray & Watson, 2000; Lowry et al., 2010).Poor sleep orsleep deprivation might impair memory and learningprocess among students (Curico et al., 2006). Therefore, it is believedthat university students who suffer from sleep disordershave a major risk of poor academic performancecompared to those who have had an adequate amountof sleep (Veldi et al., 2005).

Table 6: Correlation analysis between sleep quantity and academic performance

		Sleep quantity	Academic performance
Sleep quantity	Pearson Correlation	1	.326(**)
	Significance(2-tailed)	.	.001
	N	92	92
Academic performance	Pearson Correlation	.326(**)	1
	Significance(2-tailed)	.001	.
	N	92	92

** Correlation at 0.01(2-tailed):

CONCLUSION AND RECOMMENDATIONS

Majority of university students slept between 5 and 6 hours every night during weekdays and 6 and 7 hours per night over weekends and therefore had irregular sleep-wake patterns. It is evident that lack of adequate sleep negatively affected the performance of students in public universities in Kenya, although, most of the students had a cumulative average of B.Inadequate sleep made students unable to actively participate in class activities; unable to stay focused on a task the following day, influenced short-term and long term retention of newly learned content, and resulted daytime sleepiness that is also correlated

with poor academic performance. The main cause of insufficient sleep among university students was stress which resulted from family problems, inadequate pocket money and broken relationships. Other causes of inadequate sleep included social media drug abuse, assignments and social relationships.Stress and sleep problems were strongly linked and hence students needs to evaluate their experience of stress, learn and use effective stress management strategies. This would help them establish and adopt a regular and healthy sleeping routine that did not compromise their academic performance.

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