

Sleep Quality
And Psychological
Wellbeing Of Boarding
Secondary School
Students In Uganda

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ABSTRACT

There are increasing numbers of secondary school students in Uganda suffering from poor sleep quality and psychological wellbeing problems. There have been many complaints from students and teachers about boarding secondary students sleeping and others dozing in class when lessons are going on. Increased competition for academic excellence has caused most boarding secondary schools in Uganda to have school schedule requirements which necessitate students to study the whole day, partly at night and very early in the morning. These tendencies appear to be affecting sleep quality adversely thereby influencing psychological wellbeing and the resulting standards of academic performance. The study, therefore, sought to: analyse sleep quality, examine the factors affecting sleep quality, assess the psychological wellbeing and investigate the association between sleep quality and psychological wellbeing of boarding secondary school students in Uganda. Cross-sectional survey design was adopted and the specific methods were questionnaire survey, interviews, observations and focus group discussions. A sample of 617 students aged 12-17 years in 24 boarding secondary schools in Uganda, 72 teachers and 4 inspectors of schools were used in the study that employed a multi-stage random cluster sampling design, stratified, systematic and purposive sampling procedures and data were collected through self-administered questionnaires. Sleep quality was analysed using Pittsburgh Sleep Quality Index (PSQI) and psychological wellbeing was assessed using emotional wellbeing questionnaire. Correlations between variables were analysed using spearman's correlation to determine the relationship between variables and sleep quality and linear regression was used to establish the linkage between the sleep quality variable and psychological wellbeing variable. The findings revealed that more than half (59.2%) of the students were experiencing poor sleep quality and a majority of the students (50.3% who had poor sleep quality also suffered poor psychological wellbeing. The study also established that good sleep quality significantly predicted good psychological wellbeing ($\beta=0.778$, $p=0.02$) and poor sleep quality significantly predicted poor psychological wellbeing ($\beta=-0.640$, $p=0.03$) and that 53.9% change in the psychological wellbeing among students was attributed to the quality of sleep. The study, therefore, generated and developed measures that could be used improve the quality of sleep in order to enhance psychological wellbeing for better standards of academic performance. Awareness must also be created among school community in order to derive the full significance of the study. This study contributes to the model of quality of life by supporting the claims for the importance of good sleep quality in relation to a student's ability to achieve overall psychological wellbeing.

Key words: Sleep quality, psychological wellbeing, boarding secondary schools

1. INTRODUCTION

Sleep is essential for a person's health and well-being, yet millions of people do not get enough sleep and many suffer from the effect of lack of adequate sleep (NSF, 2005). Although the direct benefits of sleep are not well quantified across many populations, it is understood that poor sleep quality has serious health consequences

(Lavie, Pillar & Malhotra, 2002). Reductions in sleep duration and sleep quality across populations has been linked to changes in lifestyle, increasing use of technology and increased work and social demands (Chokroverty, 2009).

Sleep problems, including insufficient or poor quality sleep, are alarmingly prevalent among school-age children and can compromise a child's cognitive, emotional, behavioural, and physical functioning (Kidwell et al., 2015). The effects of sleep quality on the psychological well-being of students in boarding secondary schools in Uganda have not been documented. Students in Uganda need to be studied to find out if sleep quality has similar effects to those studied elsewhere. Given the absence of published reports that have simultaneously evaluated the prevalence and associations of sleep quality and psychological wellbeing problems among Ugandan students, the researcher developed the present study.

1.1 STATEMENT OF THE PROBLEM

Good sleep quality is an important physiological issue for human life, especially during adolescence, which is a critical period for normal growth and development, but poor sleep quality would bring serious psychological well-being problems (Lavie, Pillar & Malhotra, 2002). Lemma et al. (2012) reported that 55.8% of the students had poor sleep quality. There are increasing numbers of students in schools suffering from Poor sleep and psychological wellbeing problems (Kidwell et al., 2015). Researchers have found that poor sleep quality significantly increased the risk for declines in social, psychological, and mental health during adolescence (Roberts, Roberts & Duong, 2008). Sleep problems can trigger negative moods (anger, confusion, depression, fatigue, and tension) and increased daytime sleepiness (Lund et al., 2010), poor academic performance (Chung & Cheung, 2008) and risk taking behaviours, including drug use among adolescents (Mollaoglu et al., 2012). Owens (2007) adds that sleep loss substantially impairs physical, cognitive, and emotional function and failure to adhere to the needs for adequate amounts and appropriate timed sleep results in an increase in daytime sleepiness, fatigue and decline in daytime functioning.

Increased competition for academic excellence has caused most boarding secondary schools in Uganda to have school schedule requirements which necessitate students to study the whole day, partly at night and very early in the morning (Masinde & Nanyunja, 2015). These tendencies appear to be affecting sleep quality adversely thereby influencing psychological wellbeing and the resulting standards of academic performance. There have been many complaints from students and teachers about some students being moody, sleeping and others dozing in class when lessons are going on (Businge, 2015). The immediate and long term consequences of sleep quality and sleep disturbance are critical to the psychological wellbeing of students and studying the situation to guide interventions is essential. Researchers to date have not extensively studied the influence of sleep quality on psychological well-being among boarding secondary school students. This study therefore sought to examine the association between sleep quality and psychological wellbeing of boarding secondary schools in Uganda so

as to generate and develop a model that can improve the quality of sleep in order to enhance psychological wellbeing for better standards of academic performance.

1.2 RESEARCH OBJECTIVE

The main objective of this study was to examine the influence of sleep quality on psychological well-being of boarding secondary school students in Uganda so as to increase the awareness of the school community especially students and secondary school teachers about healthy sleep using the most appropriate sleep quality model.

1.3 RESEARCH QUESTIONS AND HYPOTHESIS

Based on the main objective the study sought to answer the following questions: What is the quality of sleep of boarding secondary school students in Uganda based on gender, age and school category? Which factors of sleep had significant effects on the quality of sleep of boarding secondary school students in Uganda? What is the state of the psychological wellbeing of boarding secondary school students in Uganda?

The study also sought to test the following hypothesis: There is a significant association between different sleep quality and psychological wellbeing among boarding secondary school students in Uganda.

2. LITERATURE REVIEW

Sleep is one of the most basic and essential functions of the human body. It plays a vital role in good health and well-being as food and water is. Getting enough quality sleep at the right times can help protect a person's mental health, physical health, quality of life and safety (NSF, 2015).

Sleep quality is a vital construct to researchers due to the high prevalence of disturbed sleep and the clear relevance of sleep quality to optimal health and functioning.

Although inadequate sleep quantity has been shown to negatively affect cognitive function and academic performance, overall sleep quality may have a more significant effect than quantity of sleep (Pilcher, et al., 1997). Almost every species requires sleep and humans, on average, spend one-third of their life asleep. It is reported that sleep is "food for the brain" (NSF, 2008). When sleep quality and/or duration are reduced, the human body responds in many ways to initiate sleep. To initiate sleep the brain will increase feelings of sleepiness, decrease a person's ability to concentrate, and in extreme cases may, without warning, force the body to sleep. Lack of sleep contributes to reduced concentration, short-term memory, learning ability, and behavioural self-control. National Institute of Health (2008) reported that decreased sleeping may lead to a decrease in total lifespan. In two studies in which subjects completed a seven-day sleep log, Pilcher, Ginter, and Sadowski (1997) found that measures of health, emotion, life satisfaction, fatigue, and sleepiness were better related to sleep quality than sleep quantity. Likewise, Pilcher and Ott (1998) reported that subjective health and well-being were found to be more closely related to sleep quality than to sleep quantity. Generally,

as both overall average and daily sleep quality deteriorated, participants were more likely to make complaints regarding both physical and psychological health and well-being.

In Lebanon, 52% of 735 students aged 18–25 years enrolled across six universities had poor sleep quality (Assaad, Costanian, Haddad & Tannous, 2014). In Ethiopia, 55.8 % of 2,551 students aged 13–18 years had poor sleep quality (Lemma et al., 2012), and in Iran, with 56% of 943 pre-university students aged 18 years (Keshavarz Akhlaghi & Ghalebandi, 2009). In Jordan, 85% of 118 of nursing college students had poor sleep quality. This was attributed to more exposure to sleep disturbances, as medical and nursing students woke up earlier as they are required to attend early morning clinical courses and had shorter sleep time and more daytime dysfunction to meet the demands of their studies compared to other groups of students (Suleiman et al., 2013).

This study examined the association between students' sleep quality measured using the Pittsburgh Sleep Quality Index (PSQI) and psychological wellbeing. Poor sleep quality was correlated with psychological wellbeing. In this research study students were asked to self-report several different sleep variables related to sleep quality including sleep efficiency (the percent of time in bed that is actually spent sleeping), sleep onset latency, time spent awake at night, and time awake after sleep onset.

Psychological well-being is often thought of as a hallmark of the educational experience because educational encounters and experiences allow students to search for meaning and direction in their lives and it is aimed at helping students realize their true potentials and actualize their human existence so as to become responsible agents who are able to participate richly in the good life (Seifert, 2005). Nonetheless, there is a need to better understand the factors that influence student's psychological well-being. To date, no research has examined psychological well-being among boarding secondary school students in Uganda and how different school experiences alter psychological well-being. To better understand psychological well-being of boarding secondary school students, the researcher focused on what occurs during school that contributes to or detracts psychological well-being. How does the school environment influence psychological well-being of students? Specifically, how does perceived sleep quality of students in the school environment influence their psychological well-being? In the general population, associations between sleep and psychological well-being have only recently begun to garner attention (Hamilton, Nelson, Stevens, & Kitzman, 2007; Howell, Digdon, Buro, 2010; Wood, Joseph, Lloyd, & Atkins, 2009). Very little attention has been paid to the relationship between sleep quality and psychological well-being in boarding secondary school students. The lack of empirical research to better understand the relationship between sleep quality and psychological well-being in boarding secondary school students drives this study.

3. RESEARCH DESIGN AND METHODOLOGY

The researcher adopted a cross-sectional survey research design using qualitative and quantitative methods of data collection and analysis. Quantitative research approach was used to collect numeric data that was

statistically analysed so as to find out the association between sleep quality and psychological wellbeing. On the other hand, the qualitative research approach and specifically thematic analysis was used to gather the views and opinions of the respondents so as to support the quantitative data.

The targeted population consisted of 24,427 respondents (24,351 students, 72 teachers and 4 inspectors of schools). Cluster, Stratified, systematic and purposive sampling techniques were used in this study. Cluster sampling was used to select the four regions (Eastern, Western, Central and Northern regions) in Uganda. The researcher proceeded to conduct random sampling of districts from which 24 (10%) of the schools were selected to participate in the study. The schools were first stratified into government aided and privately owned secondary schools. Calculation of the sample size for students was done as per Slovin's (1960) formula as cited in Yamane (1967). A sample size of 394 was obtained and to correct for the difference in design, the sample size was multiplied by the design effect (1.75); the result equalled 619. Of the 690 students sampled, 16 (2.3%) were excluded from the study because the participants exceeded the study's age requirements of 12 – 17 years. An additional 23 students (3.3%) were excluded from the study due to missing over 10% of the data. 34 students (4.9%) did not return the questionnaires. A total of 617 (89.4%) surveys were utilized for data entry. Teachers and inspectors of schools were purposively chosen to participate in the study.

3.1 RESEARCH INSTRUMENTS

The study used the Pittsburgh Sleep Quality Index (PSQI), a standardised instrument developed by Buysse et al., 1989), factors affecting sleep quality questionnaire (FASQQ) and psychological wellbeing questionnaire (PWBQ) for students to collect quantitative data. Qualitative data was collected using semi-structured interview, Focus Group Discussion and Observation guides. The researcher conducted interviews with teachers (head teachers, Directors of studies and form teachers) and inspectors of schools as key informants. Twenty four Focus group discussions and interviews were conducted with students.

To determine the reliability of the instruments for this study, Cronbach's alphas were calculated using SPSS. The Cronbach's alpha for the PSQI was 0.72, FASQQ was 0.73 and PWBQ was 0.71 which indicated moderate internal consistencies for the instruments with these specific samples.

3.2 ETHICAL PRINCIPLES OF RESEARCH.

The researcher sought and obtained ethical approval from Mbale Regional Hospital Institutional Research and Ethics Committee, Uganda National Council for Science and Technology, Ministry of Education and Sports, and assent and informed consent from participants. This research also upheld the principle of anonymity and confidentiality throughout the research period.

4. DATA ANALYSIS

Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS) 22.0 (SPSS Inc., 2009) to generate frequencies, percentages, and means and inferential statistics (t-test, chi-square, correlation

and regression analysis) in response to the study objectives. Qualitative data obtained through interviews and focus group discussions were analysed using Braun & Clarke's (2006) 6-step framework. The researcher identified themes, ideas and patterns in the open ended responses, looked at the frequency and series of texts and organised them into coherent categories that summarised and brought meaning to the text.

5. FINDINGS

Table 5.1: Demographic Characteristics of the respondents (n = 617)

Variables	Variable Description	Frequency (n)	Percentage (%)
Gender	Male	354	57.4
	Female	263	42.6
Age	12-13 years	117	19.0
	14-15 years	221	35.8
	16-17 years	279	45.2
Form	Senior 2	167	27.1
	Senior 3	189	30.6
	Senior 4	142	23.0
	Senior 6	119	19.3
School type	Government	369	59.8
	Private	248	40.2

Source: Primary data, 2018

Table 5.1 shows that (n =369, 59.8%) government and (n = 248, 40.2%) private boarding secondary school students participated in this study of which (n=354, 57.4%) were boys and (n=263, 42.6%) were girls. The largest proportion of students indicated that they were 16 to 17 years of age (n = 279, 45.2%), followed by 14 to15 year olds, (n = 221, 35.8%), and 12 - 13 year olds (n = 117, 19.0%). The majority of participants (n = 189, 30.6%) were primarily form three followed by participants in form two and four classification level students (n = 167, 27.1%; n = 142, 23.0% respectively). A total of 119 (19.3%) form six students participated in the study.

Table 5.2 Sleep Quality of Students in Boarding Secondary Schools

	N	Global Score ≤5	Chi-square p Value	Global Score >5	Chi-square p Value	SSQ	SLA	SDU	SEF	SDI	DTD	PSQI Global Score*	
Total Sample	617	252 (40.8)		365 (59.2)		1.5	1.1	1.5	1.3	1.2	1.2	7.8	
Gender			0.021		0.432								
Male	354	136 (38.4)		218 (61.6)		1.5	1.1	1.6	1.2	1.1	1.2	1.2	7.9
Female	263	116 (44.1)		147 (55.9)		1.5	1.0	1.4	1.4	1.2	1.2	7.7	
Age (years)			0.046		0.321								
12-13	117	57 (48.7)		60 (51.3)		1.5	1.1	1.4	1.3	1.2	1.1	1.1	7.8
14-15	221	88 (39.8)		133 (60.2)		1.6	1.2	1.6	1.3	1.2	1.3	1.3	7.9
16-17	279	107 (38.4)		172 (61.6)		1.4	1.0	1.5	1.4	1.3	1.2	7.7	
Form/Class													
Senior 2	167	86		81		1.4	1.0	1.4	1.2	1.2	1.2	7.6	

		(51.5)		(48.5)								
Senior 3	189	85 (45.0)	0.016	104 (55.0)	0.514	1.5	1.1	1.5	1.3	1.3	1.1	7.7
Senior 4	142	59 (41.5)		83 (58.5)		1.6	1.2	1.6	1.4	1.2	1.2	7.8
Senior 6	119	42 (35.3)		77 (64.7)		1.5	1.1	1.5	1.3	1.2	1.2	7.9
School category												
Government Aided	368	155 (42.1)		213 (57.9)		1.4	1.1	1.5	1.2	1.2	1.1	7.7
Private Owned	249	97 (39)	0.030	152 (61.0)	0.417	1.6	1.1	1.5	1.4	1.2	1.3	7.9

$p < 0.05$; *mean PSQI Global Score. SSQ: Subjective Sleep Quality, SLA: Sleep Latency, SDU: Sleep Duration, SEF: Sleep Efficiency, SDI: Sleep Disturbance, DTD: Daytime Dysfunction. Higher PSQI scores indicates greater poor sleep quality; Global scores > 5 indicate poor sleep quality. PSQI = Pittsburgh Sleep Quality Index.

The study found that more than half (59.2%) of boarding secondary school students in Uganda had poor sleep quality and overall, the mean PSQI global score was 7.8 indicating that, on average, participants met a definition for poor sleep quality (PSQI > 5) (Buysse et al., 1989). The global PSQI score cannot take values in decimals therefore the practical PSQI score in this study was 8 implying that boarding secondary school students in Uganda had poor sleep quality.

The male participants had higher global scores than female participants and a greater proportion (61.6%) of the male participants had poor sleep quality than female participants. The Chi-square test revealed a significant difference in good sleep quality between male and female students ($p = 0.021$). The chi-square test also indicated a significant difference in good sleep quality perception among the different student age-groups ($p = 0.046$).

More students in the upper classes had poor quality sleep than those in the lower classes.

A significant proportion (61.0%) of the participants in private owned boarding secondary schools had poor sleep quality than participants in government owned boarding secondary schools. The chi-square test indicated a significant difference in good sleep quality perception between students in government aided schools and those in private owned schools ($p = 0.030$).

It is evident from the results that there were no statistically significant differences between the participants' demographic variables and perception of poor sleep quality. All the observed Chi-square p -values were greater than 0.05. This indicated that the students perceived their sleep quality as poor.

Based on the interviews, the participants who regarded their sleep quality as poor, slept shorter duration, and had irregular sleep schedule and poor concentration in class. One participant responded that:

"I used to have good quality sleep but not anymore. The weekday's school academic work has restricted the amount of my sleep. My sleep schedule is very irregular. I go to bed around 12. 30 a.m. to 1.30 a.m. and wake up at 4.30 a.m. to 5.30 a.m."

Data collected from the teachers' interview guide and observation guide indicated that the common element of daytime dysfunction was daytime sleepiness. Sleepiness is the inability or difficulty in maintaining alertness during the major wake period of the day, resulting in unintended lapses into drowsiness or sleep. Most of the teachers reported that a majority of their students got inadequate sleep at night because they went to bed late and woke up early. They were seen sleeping during the morning self-study and lesson time and therefore not studying at all. One of the teacher respondents noted that:

"Some of my students seem really sleepy; they stifle yawns and struggle to keep tired eyes open especially in the morning". The students do not go to bed early, they sometimes read up to late in the night and others go to bed early and continue talking with their friends up to 1.00 a.m. It is a daily struggle to get students out of bed in the morning".

During the interview and focus group discussions a majority of the participants revealed that while insufficient sleep, irregular sleep schedules and sleepiness are highly prevalent among boarding secondary school students, little information is available on effective ways for schools to successfully disseminate information on the importance of sleep to potentially improve the sleep of students. A majority of participants were of the view that the students' poor quality sleep could be addressed by providing education about sleep health to students and teachers, create and maintain a regular bedtime routine each night, implementing lights out routine and bedtime warning, limiting caffeine intake in the afternoon and evenings, regular sleep schedule and allowing time for napping.

One of the participants explained that:

School-based sleep education programmes such as enforcing silence, maintaining regular bedtime schedule and reduced hours of operation of school activities during the late night or early morning hours should be implemented in boarding secondary schools in Uganda. Educational information on sleep should be published in the school magazines and explained during assemblies. The participant added that implementation of a quiet environment may be challenging in boarding secondary schools".

The findings show that 59.2% of the students aged 12-17 years had poor sleep quality. This percent is higher than the findings from many countries. For example, in Lebanon, 52% of 735 students aged 18-25 years enrolled across six universities had poor sleep quality (Assaad et al., 2014). In Ethiopia, 55.8 % of 2,551 students aged 13-18 years had poor sleep quality (Lemma et al., 2012), and in Iran, with 56% of 943 pre-university students aged 18 years (Keshavarz Akhlaghi & Ghalebardi, 2009).

In this study, a greater proportion (61.6%) of the male students had poor sleep quality than female students. This may be because males tend to read for longer hours to compete for academic excellence. This finding contradicts the international literature in Jeddah (Merdad et al., 2014) which found that females had significantly higher global PSQI scores than males in a study of 947 high school students aged 14-23 years. A study in Hong Kong found the same results (Chung & Cheung, 2008). In another study in Japan, it was also reported that female adolescents had shorter sleep duration than males, and more female adolescents rated their

sleep quality as poor (Munezawa et al., 2011). This may be because females are more subject to anxiety, depression, and long periods of thinking (Voderholzer, Al-Shajlawi, Weske, Feige, & Riemann, 2003).

In this study, data was obtained from both urban and rural schools with emphasis on government aided and private owned boarding secondary schools. The results of this study revealed that the prevalence rate of poor sleep quality was higher (61.0%) among students in private owned boarding secondary schools than students in government owned boarding secondary schools. However, findings reported in Chinese study indicated that students in rural schools reported good levels of sleep quality compared to students in urban schools (Haseli-Mashhadi et al., 2009).

Table 5.3 Factors affecting sleep quality of boarding secondary school students

Statement	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Total	Ratio	Chi-square test (χ^2)
Stress about school activities	185	312	5	68	47	617	4.3	$\chi^2=264.29$ df = 20 $p = 0.035$
	497 (80.6%)		5 (0.8%)	115 (18.6%)				
Excess noise	165	273	7	101	69	615	2.6	
	438 (71.2%)		7 (1.1%)	170 (27.7%)				
Worry about the future	129	203	19	183	76	610	1.3	
	332 (54.4%)		19 (3.1%)	259 (42.5%)				
Talking with friends	235	177	4	116	81	613	1.8	
	412 (67.2%)		4 (0.7%)	197 (32.1%)				
High or low Temperature	79	87	26	234	189	615	0.4	
	166 (27.0%)		26 (4.2%)	423 (68.8%)				
Light	193	295	2	72	55	617	3.8	
	488 (79.1%)		2 (0.3%)	127 (20.6%)				
Use of technology	120	114	11	342	27	614	0.6	
	234 (38.1%)		11 (1.8%)	369 (60.1%)				
Corporal punishment	62	39	28	189	294	612	0.2	
	101 (16.5%)		28 (4.6%)	483 (78.9%)				
Total frequency	1168	1500	102	1305	838	4913		
Total responses	2668 (54.3%)		102 (2.1%)	2143 (43.6%)		4913 (100%)		

$p < 0.05$

Source: Primary data, 2018.

Table 5.3 shows that a majority of the participants (n = 497, 80.6%) reported that stress affected their sleep quality. The participants attributed this to increased academic demands. One of the participants in the focus group discussion explained that:

“I am stressed due to extra teaching at night. The teachers teach during the day from 8.00 a.m. to 5.00 p.m., sometimes I go for group discussions or we are taken for practical lesson after 5.00 p.m. instead of going for co-curricular activities. I go for supper between 7.00 p.m. and 8.00p.m. and at exactly 8.00 p.m. I go for night lessons up to 10.00 p.m. and group discussions are a must up to 11.00 p.m. Very early in the morning at 4.30 a.m. I am woken up by the dormitory masters for personal reading called ‘morning prep’. Even then teachers come to teach subject content. I feel that I do not get good quality sleep due to academic stress”.

On the other hand, a majority of the Directors of studies reported that most of their academic programmes are demanding. The students were taught during the day, at night and in the morning in order to complete the syllabi on time. One of the respondents said that:

“Most of the students are not paying attention in class, others doze when teachers are teaching. We have complained about these phenomena, but the top management insists that the syllabuses for each class must be covered before every third term of the school calendar”.

The inspectors of schools said that most of the schools were not following the Ministry of Education and Sports guidelines on teaching and learning processes. One of the participants responded that:

“Complaints about teachers teaching during the day up to 6.00 p.m. and at night are on the increase. Teachers are not allowed to teach students at night or in the morning before 8.00 a.m. This may cause mental health problems and poor academic performance”.

This implies that for a student to get good quality sleep, lights should be switched off.

Another factor that greatly affected sleep quality of students was noise. A significant proportion (n=438, 71.2%) of the participants indicated that excess noise affected their sleep quality. The participants associated noise with difficulty falling back to sleep and waking up at night resulting in poor sleep quality. One of the interviewed respondents said:

“I wake up several times a night due to the noise generated by the students. They shout the whole night until the wardens and resident tutors come to tell them to be silent and sleep. I feel that I do not get enough sleep at night” (Respondent 120, 2018).

This implies that managers of boarding secondary schools should develop effective strategies and policies to reduce noise in the dormitories so as to enhance good sleep quality.

The chi-square test indicated a significant difference in the students’ perception of the various factors affecting sleep quality ($\chi^2_o=264.29 > \chi^2_c=31.41$; $p = 0.035$). The ratios revealed that the highly rated positive response was stress about school activities implying that extra night teaching, early morning prep and teaching were the factors most affecting sleep quality of boarding secondary school students in Uganda followed by presence of light and excess noise.

Table 5.4 Regression analysis showing the contribution of Sleep influencing factors on the quality of sleep (n = 617)

Adj. R ² = .357, F = 48.29, p=0.000		
Variable predicting Sleep Quality	Coefficient (Standard Error)	p-value
Constant	2.19(0.24)	0.056
Stress	-0.781(0.05)	0.019**
Light	-0.730(0.07)	0.021**
Noise	-0.712(0.08)	0.017**

**p<0.05

Stepwise multiple regression analyses were used to determine the effect of each of the influencing factors on the quality of sleep. The regression results in table 7.3 show that stress ($\beta=-0.781, p=0.019$), light ($\beta=-0.730, p = 0.021$) and noise ($\beta= -0.712, p=0.017$) had a significantly strong negative influence on sleep quality ($p<0.05$). This confirms that stress due to school activities such as extra night teaching, early morning prep and teaching, light left on at night in the dormitories and excess noise significantly affected sleep quality of boarding secondary school students in Uganda. Worry, talking with friends, temperature, use of technology, and corporal punishment variables had a low influence, with β values less than 70% and were then excluded.

Table 5.5 Psychological wellbeing of boarding secondary school students

Good Psychological Wellbeing (PPWB) score								
	Statement	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)	Total ($\sum fx$)	Mean
1	I wake up happy and refreshed	282 (45.7%)	185 (30.0%)	51 (8.3%)	37 (6.0%)	62 (10.0%)	1263	2.04
2	I am satisfied with my sleep experience	342 (55.4%)	133 (21.6%)	47 (7.6%)	61 (9.9%)	34 (5.5%)	1163	1.89
3	I am energetic during the day	205 (33.2%)	199 (32.3%)	100 (16.2%)	72 (11.7%)	41 (6.6%)	1396	2.26
	PEW total scores ($\sum fx$)	829	1034	594	680	685	3822	
Negative Psychological Wellbeing (NPWB) score								
4	I feel depressed	59 (9.6%)	52 (8.4%)	34 (5.5%)	285 (46.2%)	187 (30.3%)	2340	3.79
5	I feel anxious (restless)	46 (7.5%)	74 (12.0%)	71 (11.5%)	215 (34.8%)	211 (34.2%)	2322	3.76
6	I feel angry during the day	77 (12.5%)	56 (9.1%)	62 (10.0%)	169 (27.4%)	253 (41.0%)	2316	3.75
	NEW total score ($\sum fx$)	182	364	501	2676	3255	6978	
Ratio of NPWB : PPWB = 2 : 1								

$\sum fx$: Sum of the product of frequency and scores; $x = 1,2,3,4, \text{ and } 5$.

Source: Primary Data, 2018.

The mean score revealed that perceived depression with a mean score of 3.79 was rated the highest negative emotional state followed by anxiety and then anger was the least rated. Mean scores also show that the most affected positive emotional state was satisfaction followed by perceived happiness and then energetic feelings during the day.

The overall ratio of negative psychological wellbeing score to positive psychological wellbeing score was 2:1. This implies that most of the students had low psychological wellbeing. There was a likely double increase in the risk of having low psychological wellbeing than having high psychological wellbeing.

Based on interviews and focus group discussions, a majority of the participants revealed that lack of sleep makes them feel depressed, angry and less lively. One of the respondents explained that:

“When I am sleep deprived, lack of sleep makes me feel angry, depressed, stressed and unhappy and less able to be alert and concentrate during the day”.

This implies that poor sleep quality negatively affects the psychological wellbeing of students.

Another participant reiterated that:

“I experience unpleasant moods and feel frustrated and angry when I have not obtained enough sleep. I wake up unhappy and sometimes dodge lessons”

On the other hand, a few of the participants reported that they were satisfied with their sleep experiences; wake up happy and refreshed ready to attend lessons of the day. One of the respondents said that:

“I experience feelings of happiness, pleasant moods and remain lively and energetic during the day when I have had good night sleep. I attend all my lessons and always get good grades”

Table 5.6 Regression Analysis Showing the Contribution of the Psychological Wellbeing Indicators on Psychological Wellbeing (n = 617)

Adj. R ² = .423, F = 71.56, p=0.000		
Indicators	Coefficient (Standard Error)	p-value
Constant	3.71(0.36)	0.049
Depression	-0.973 (0.02)	0.030**
Anxiety	-0.926 (0.05)	0.042**
Anger / Irritability	-0.814 (0.13)	0.023**
Happiness	0.779 (0.11)	0.004*
Satisfaction	0.758 (0.09)	0.007*
Energy	0.722 (0.07)	0.009*

*0.01, **p<0.05

Multiple linear regression analyses were used to determine the effect of depression, anxiety and anger / irritability, happiness, satisfaction and energy on the psychological wellbeing. The regression results in table 8.3 show that depression ($\beta=-0.973, p=0.030$), anxiety ($\beta=-0.926, p = 0.042$) and anger ($\beta= -0.814, p=0.023$) had a significant negative influence on psychological wellbeing ($p<0.05$). Happiness ($\beta=0.779, p=0.004$), satisfaction ($\beta=0.758, p=0.007$), and energy variables ($\beta=0.722, p=0.009$), had a significant positive influence on psychological wellbeing. Depression, anxiety, anger, happiness, satisfaction, and energy scores resulted in a psychological wellbeing score with a model description power of (R^2) = .423. This implies that 42.3% change in the psychological wellbeing is attributed to the effect of depression, anxiety, anger, happiness, satisfaction, and energy due to the indirect causal effect of sleep quality. The 57.7% is explained by other variables beyond the scope of this study.

Overall, the findings from this research study indicate that a majority of the participants suffered from psychological wellbeing problems and there was a likely double increase in the risk of having low psychological wellbeing than having high psychological wellbeing.

6. ASSOCIATION BETWEEN THE DIFFERENT SLEEP QUALITY CATEGORIES AND PSYCHOLOGICAL WELLBEING CATEGORIES

Chi-square analysis was carried out to determine the association between the different sleep quality categories and psychological wellbeing categories. The scores for psychological wellbeing ranged from 1(never) to 5

(always). Thus, higher scores mean good psychological wellbeing and low scores mean poor psychological wellbeing. The study divided the results into two scores: poor psychological wellbeing (6-13) and good psychological wellbeing (14-30)

Table 6.1 Percentages of Good Sleep Quality, Poor Sleep Quality and Psychological Wellbeing

	Poor Psychological wellbeing scores	Good Psychological wellbeing scores	Chi-square p value
Good Sleep Quality	38(6.1%)	214(34.7%)	0.035*
poor Sleep Quality	310(50.3%)	55(8.9%)	

* $p < 0.05$

Source: Primary Data, 2018.

Table 6.1 shows the cross tabulated percentages of students with good sleep quality, poor sleep quality, good psychological wellbeing and poor psychological wellbeing scores.

Findings showed that a majority of students (n = 310, 50.3%) who had poor sleep quality also had poor psychological wellbeing while 34.7% of those who had good sleep quality had good psychological wellbeing.

Chi-square analysis shows a significant association between sleep quality categories and psychological wellbeing categories ($p = 0.035$). This means that there is a significant difference in poor psychological wellbeing between good quality sleepers and poor quality sleepers. Likewise there is a significant difference in good psychological wellbeing between good quality sleepers and poor quality sleepers.

Table 6.2 Coefficients for Sleep Quality and psychological wellbeing

N=617, R ² =0.539, F=24 5.830, p=0.00		
Variable predicting Psychological Wellbeing	Coefficients (Standard Error)	p-value
Sleep quality (GPSQI)	0.751(0.065)	0.02
Constant	84.139(2.246)	0.34

$p < 0.05$

a. Dependent Variable: Psychological wellbeing

The regression analysis results in table 6.2 indicate that psychological wellbeing significantly predicts sleep quality ($\beta=0.751, p=0.02$). The p value is less than the set value 0.05. This indicates that the association between sleep quality and psychological wellbeing is statistically significant.

In order to determine the rate at which the independent variable predicts or explains the dependent variable, adjusted R square was considered. The adjusted R square obtained was .539 which was translated into 53.9 percent. Adjusted R square is a measure of how much variability in sleep quality accounted for changes in psychological wellbeing. All combined, the variations of sleep quality components predicts 53.9 percent of variations in psychological wellbeing of boarding secondary school students in Uganda. This means that a 53.9 percent change in the psychological wellbeing of students is attributed to a change in the quality of sleep. The

46.1percent is explained by other factors other than sleep quality. Therefore, considerations of changes in sleep quality have a positive contribution to the achievement of good psychological wellbeing.

Table 6.3 Multinomial logistic regression model for using Poor sleep quality and good Sleep quality to predict Psychological wellbeing

N=617, R ² =0.539		
Variables predicting Psychological Well being	Coefficient (Standard Error)	p-value
Good Sleep Quality	0.778 (0.17)	0.02*
Poor Sleep Quality	-0.640 (0.12)	0.03*
Constant	0.667(0.120)	0.34

*p<0.05

a Dependent Variable: Psychological wellbeing

Source: Primary Data, 2018.

Multinomial logistic analysis was performed to investigate the influence of Sleep quality categories to psychological wellbeing. The mode fitted significantly. Poor quality sleepers are likely to significantly get poor psychological wellbeing (p=0.03) compared to the good quality sleepers. Good sleep quality is likely to significantly increase the rating of psychological well-being (p=0.02), yet poor sleep quality was likely to significantly reduce the rating of psychological well-being.

The positive beta value of 0.778 for good sleep quality shows that the more students had good sleep quality the higher their psychological wellbeing while the negative beta value of -0.640 indicates that poor sleep quality is associated with lower level of psychological wellbeing. This implies that good sleep quality significantly and positively predicts good psychological wellbeing ($\beta=0.778, p=0.02$) and poor sleep quality significantly and predicts poor psychological wellbeing ($\beta=-0.640, p=0.03$). The p values are less than the set value 0.05. Therefore, the alternative hypothesis that there is a significant association between different sleep quality and psychological wellbeing among boarding secondary school students in Uganda is therefore confirmed and supported.

Table 6.4 Summary of beta coefficients used for the development of the model

S/NO.	Variables	β Coefficients
1	Sleep quality→ Psychological wellbeing	0.751
2	Good Sleep quality→ Psychological wellbeing	-0.440
3	Poor Sleep quality→ Psychological wellbeing	-0.778
4	Stress→Sleep Quality	-0.781
5	Light→Sleep Quality	-0.730
6	Noise→Sleep Quality	-0.712
7	Depression → Psychological wellbeing	-0.973
8	Anxiety → Psychological wellbeing	-0.926
9	Anger → Psychological wellbeing	-0.814
10	Happiness → Psychological wellbeing	0.679
11	Satisfaction → Psychological wellbeing	0.558
12	Energy → Psychological wellbeing	0.522

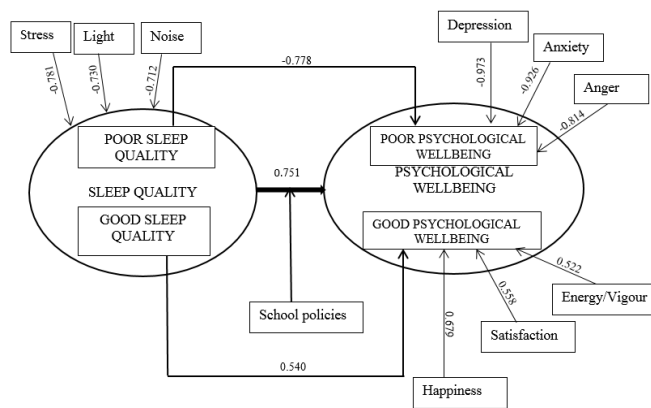


Figure 1 shows Individual influence of the indicators on the research variables

The arrows in the figure point in the direction of influence of one variable upon the other, while the value that is attached to each one of the arrows signifies the magnitude of that influence.

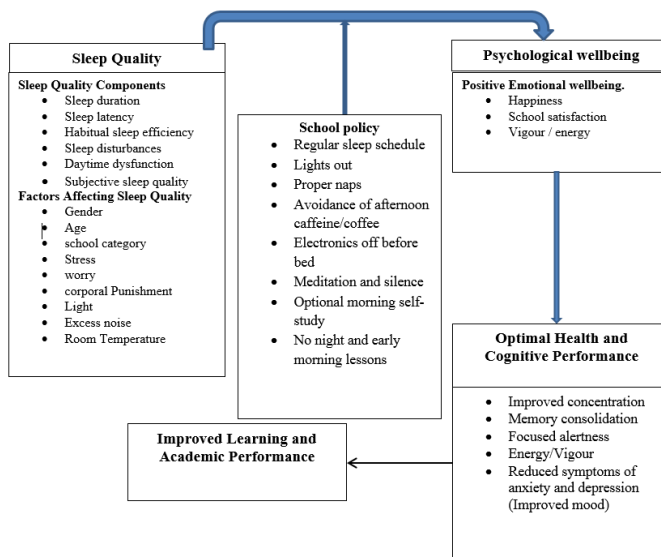


Figure 2 shows the Sleep Quality Awareness Model (SQAM)

The study found that there was a positive significant association between sleep quality and psychological wellbeing. The study, therefore, generated and developed measures that can be used to improve the quality of sleep in order to enhance psychological wellbeing for better standards of academic performance.

The model asserts that managers of boarding secondary schools should set up school sleep policies to improve the students' sleep quality. These include policies such as maintenance of regular sleep schedule, lights out at night, taking proper naps, avoidance of afternoon drinks that contain caffeine, maintaining silence at night, having optional morning self-study and scrapping off night and early morning lessons.

School managers are encouraged to express concern to their students and teachers who may be over-engaged in academic activities as night teaching and learning, early morning teaching and learning, and students' personal study time which extends beyond midnight due to the increasing academic demands to produce the

best results. It may be wise to review hours of going to bed to 10.00 p.m. and waking up time to be 6.00 a.m. in the morning to help promote better sleep and psychological wellbeing.

7. CONCLUSIONS

This study explored the association between sleep quality and psychological wellbeing among boarding secondary school students in Uganda. The study established that poor sleep quality was associated with poor psychological wellbeing and good psychological wellbeing was associated with good psychological wellbeing. The magnitude of effect was more substantial and significant for participants with poor sleep quality. Therefore, it could be helpful to increase awareness of the observed poor sleep quality and psychological health outcomes. Improved sleep quality will likely benefit boarding secondary school students in their psychological being status, cognitive and academic performance.

8. RECOMMENDATIONS

Based on the findings, the study recommends that students, teachers, resident tutors, school counselors, wardens and matrons increase their awareness about healthy sleep patterns, sleep needs and consequences of poor sleep. This could be done through school-based sleep education programmes, school magazines and assemblies. The School administrators should review and put into place policies that are sleep promoting. Suggestions include setting and enforcing quiet hours, reduced hours of operation of school activities during the late night or early morning hours and maintain regular bedtime schedule to give students the average eight hours of sleep. It could be wise to review hours of going to bed to 10.00 p.m. and waking up time to be 6.00 a.m. in the morning to help promote better sleep and psychological wellbeing.

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