

Research Article

Habitual and Demographic Determinants of Sleep Quality of Community Development College Students in Tanzania

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Abstract

This study intended to examine personal habits and demographic determinants of sleep quality in a sample of 640 students in the community development colleges in Tanzania. Two questions guiding the study sought to identify personal habits reported by college students that are likely to influence their sleep quality; and explain sleep problems from personal habits and demographic variables of community Development college students. Participants concurrently responded to the Sleep Quality Scale (SQS) and to the Sleep Deprivation scale (SDS). Other items in the questionnaire assessed the demographic information of the participants and personal habits presumed to determine sleep quality. Data were analyzed using techniques such as Principle Component Analysis (PCA), Pearson's Moment Correlation Coefficient, and Direct Logistic Regression Analysis with an assistance of the Statistical Package for Social Sciences (SPSS). It was found that students' sleep quality was uniquely explained by personal habits and demographic variables such as the number of times one wakes up at night, level for year of study, sleep deprivation and sex. It was concluded that sleep quality of college students is a product of a multifaceted influences including sex differences and daily habitual practices of the students. It has been recommended that policies should explicitly indicate it as a requirement for students to participate in fitness exercises, early sleep in the hostels as well as late start of studying schedules. In addition, policies should consider establishing psycho-social counselling desks where educative programs on sleep problems and their relationship with mental health should be taught.

Keywords

Sleep Quality, Sleep Deprivation, Sleep Health, Sleep Problems, Determinants of Sleep

1. Introduction

Poor sleep quality has been reported to significantly affect academic performance of students in various levels of education. The prevalence of sleep quality in the universities is reported to be 61.31 (95% CI: 56.91-65.71), 62.23 (95% CI: 54.07-70.39), 54.43 (95% CI: 47.39-61.48), and 69.59 (95% CI: 50.39-88.80) in East, North, West, and South Africa respectively [20]. This paper discusses sleep quality and its influence on college students' psychological daily functioning.

As applied in this study, the term sleep quality refers to both qualitative and quantitative domains, including daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction [23]. Specific to Tanzania, Joshua [9] reported three categories of sleep deprivation among college students: normal range (43.9%), borderline (31.6%) and abnormal sleep deprivation (23.9%). Joshua further found that female than male

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students reported abnormal sleep deprivation [$\chi^2(2, n = 114) = 7.27, p = 0.03, \text{Cramer's } V = 0.32$]. With regard to academic performance, Joshua concluded that sleep deprivation must not necessarily account for students' difference in academic performance in terms of Grade point average (GPA) where almost everyone in the sample is already sleep deprived.

The prevalence of poor sleep quality and deprivation reported [9, 20] among college and university students in Africa signifies a dangerous alarm to the continent given both actual and potential ramifications of sleep in physical, biological and psychological health conditions of individuals. Teaching in one of the colleges that composed the sample of this study, the author of this article has been observing a number of students overwhelmed by sleep to the extent that they hardly followed the lessons given their lost attention. Studies have shown that individuals deprived of sleep and experiencing poor sleep quality have been found to develop mental health issues, executive function, hormone balance, emotional control, and attentiveness. Also, these individuals usually express psychopathology symptoms, such as depression, anxiety, stress, poor attention, poor concentration, and memory issues [6, 7, 15, 9].

Sleep problems have far-reaching ramifications on human mental health that should not be ignored and left without intervention. For example, it has been established that generalized anxiety disorder is one of the most important consequences of sleep problems [2]. Having conducted a systematic review and meta-analysis study involving 345,270 respondents from 39 countries, Alimoradi et al reported a prevalence of 18% of sleep problems in a general population and established its association with psychological distress and anxiety in particular (Fisher z-score = 0.48; 95% CI: 0.41–0.54). For successful intervention, however, it is crucial to examine the determining factors of sleep problems in the country in order to come up with mitigation strategies for the same.

1.1. The Concept of Sleep Quality

The term sleep quality refers to satisfaction of sleep experience involving sleep initiation, sleep maintenance, sleep quantity, and refreshment upon awakening. These are usually reflected in specific sleep parameters sleep onset latency (SOL), total sleep time (TST), wake after sleep onset (WASO), and Sleep Efficiency (SE) [21]. Sleep onset latency (SOL) refers to the time one takes to accomplish one's transition from the state of awake to sleep. Wake after sleep onset (WASO) is another sleep parameter referring to the amount of wake time in minutes during the sleeping period, after one has achieved the sleep onset. Sleep efficiency (SE) is commonly defined as the ratio of total sleep time (TST) and time in bed (TIB). In measuring sleep quality using self reporting scales, respondents are usually asked to share their experiences in difficulty or ease to achieve these parameters and attributes of sleep quality. It is therefore a common practice to find similarity of items measuring the attributes of

sleep quality in the scales measuring sleep deprivation as well, implying the relationship between sleep deprivation and sleep quality. Although these attributes seem to be shared by both sleep quality and sleep deprivation, the two concepts (sleep quality and sleep deprivation) are not the same. Yet their similarities are inevitable given the fact that they are all the concepts born out of an attempt to address sleep problems. Thus, while the items addressing sleep problems have been measured using both Sleep Quality Scale (SQS) [24] and Sleep Deprivation scale (SDS) [16], sleep quality and sleep deprivation are not the same despite sharing some similar attributes describing them. In fact, Nelson et al [21] argues that sleep deprivation is an antecedent of sleep quality.

1.2. Plausible Explanations of Poor Sleep Quality

Theories of sleep are characterized by their role in explaining sleep as a property of several animals, including human beings, guiding the explanations of empirical studies regarding sleep deprivation and their ability to explain variations in sleep patterns across species. Oswald [22] proposed that sleep is for restoration purposes. According to restoration theory, during NREM biological processes are restored, while during REM, brain processes are renewed through protein synthesis processes. Several empirical studies have supported restorative functions of sleep with specific evidence of changes in sleep patterns over the lifespan and sleep's role in immunity functioning. According to Nelson et al [21], sleep quality is determined by several factors including physiological (e.g., age, circadian rhythm, body mass index, NREM, REM), psychological (e.g., stress, anxiety, depression), environmental factors (e.g., room temperature, television/device use) and family/social commitments. It is not then surprising that some research tools, such as Sleep Quality scale [24] consists of items evaluating restoration functions of sleep. Lopez [14] found a relationship between sleep quality and golf score performance; subjective fatigue and sleep quality; and subjective fatigue and performance and suggested that long-distance travel affected the quality of sleep.

Altun et al [3] reports that poor sleep experiences among university and college students are associated with factors such as exposure to psychological problems, stress, exposure to tobacco smoke in the sleeping room, pain, family problems, sickness, air quality of the room, strenuous physical activity, fatigue, sadness and noise that caused by other people in the room. In addition, Albinsaleh et. al [1] outlines factors like smoking four hours before bedtime, consuming caffeine three hours before sleep or immediately before bedtime, using mobile phones right before bedtime, having anxiety and depression symptoms. Hall [8] has associated loss of sleep with hours spent performing an activity considered vital.

In Brazil, Machado et al [17] reports that sleep problems are determined by factors such as female sex, age greater than or equal to 40 years, lower schooling level, depressive

symptoms, pesticide poisoning, and poor quality of life. Studies such as [5, 18, 19] have reported statistically significant associations between sleep quality, depression, stress and anxiety among university health professions students. In addition, Khan, et al [12] reported that 60.5% of undergraduate students at Karachi University had poor sleep quality and associated poor sleep quality with behavioral habits like consumption of caffeinated drinks, smoking, energy drinks, and technology use. A meta-analysis [20] found that stressed students were 2.4 times more likely to have poor sleep quality than students who were not stressed; students who were in their second year of studies were 3.1 times more likely to have poor sleep quality than students in other years of study; and that students using electronic devices at bedtime were 4 times more likely to report poor sleep quality their counterparts.

Few studies on sleep problems have been carried out in Tanzania [23, 9, 13]. Lang et al [13] found that daily physical activity significantly predicted composite sleep health among children in Tanzania ($\beta = 5.83, p = .002$) and Côte d'Ivoire ($\beta = 3.41, p = .072$), but not in South Africa ($\beta = 0.67, p > .05$). Joshua [9] reported 23.9% of abnormal sleep deprivation among students in one college; and reported that female than male students reported abnormal sleep deprivation. Shayo & Mugusi [23] found Obstructive sleep apnoea (OSA), a common cause of daytime sleepiness in 26.3% of diabetics ($p = 0.042$) and associated it with female sex, age group 45-54 years, central obesity and snoring. Curiosity on whether similar results could be consistently reported by students in other colleges with large samples in Tanzania motivated the present study. Therefore, this study sought to examine personal habitual and demographic determinants of sleep quality of community development college students. This was achieved by responding to the following questions:

What are the personal habits do community development college students report that are likely to influence their sleep quality?

To what extent do personal habits and demographic variables explain sleep problems among community Development college students?

2. Methodology

2.1. Place of Study

A study was conducted in Mara, Mwanza, Iringa, and Arusha regions of Tanzania. The regions were strategically selected given their role as homes to the sampled four colleges, namely; Buhare Community Development Training Institute (CDTI), Misungwi CDTI, Ruaha CDTI, and CDTI Monduli, respectively. The four colleges were sampled out of the eight to represent each of the administrative zones hosting the Eight CDTI colleges owned and managed by the Government under the Ministry of Community Development, Gender, Women and Special Groups. Thus, respondents from each of these four colleges were proportionally distributed, as shown in

Table 1. At the college level, a list of females was separated from that of male students to achieve proportional inclusion. However, selection of the individual respondents was systematically randomized so that individuals were picked from the first to the last count in the female or male registration list.

Table 1. Respondents by Colleges.

| College | Number of respondents | Percentage |
|----------|-----------------------|------------|
| Misungwi | 125 | 19.5 |
| Buhare | 180 | 28.1 |
| Ruaha | 200 | 31.3 |
| Monduli | 135 | 21.1 |
| Total | 640 | 100.0 |

2.2. Design, Measures and Data Collection

Cross-sectional survey design was employed, whereby both independent and dependent variables were concurrently collected. Data collection was done during free class time between May and June, 2023. The sampled students in each college stayed together in one room, researchers then distributed questionnaires, pencils and erasers. The researcher was present in person to clarify the instructions and respondents' questions if any.

2.3. Instrumentation

Participants responded to one questionnaire, which was comprised of one sleep quality measure: the Sleep Quality Scale (SQS) [24], the Sleep Deprivation scale (SDS) [16], which measured sleep deprivation. Other items in the questionnaire assessed the demographic information of the participants and personal habits presumed to be determinants of sleep quality, such as number of hours used in sleep, number of times one wakes up in the midst of night sleep, activities done in the bedroom while in bed before sleeping, time used for pre-sleep activities, as well as timing of exercise whether morning, evening late evening, etc.

Structure of The Sleep Quality Scale

According to Yi, et al, [23], SQS is a self-administered scale composed of 28 items, developed to evaluate six factors such as daytime symptoms; restoration after sleep; problems initiating and maintaining sleep; difficulty waking; and sleep satisfaction among a variety of patient and research populations. The Principle Component Analysis (PCA) in the SPSS version 26 was employed to assess the psychometric structure of the 28 items of the Sleep Quality Scale (SQS). This followed the assessment of the suitability of data for factor analysis. The correlation matrix indicated that many coefficients were 0.4 and above, with the Kaiser-Meyer-Oklind value of 0.90. This was considered adequate since it was above the

recommended value of 0.6 [10, 11]. Further, the factorability of the matrix was supported since the Bartlett's Test of Sphericity [4] reached statistical significance, $\chi^2(378, n = 640) = 3912.59, p < 0.01$. In this study, PCA of the SQS indicated five components with eigenvalues above 1, namely; daytime symptoms/interference with work (22.762%), problems initiating and maintaining sleep (8.106%), sleep satisfaction (5.218%), difficulty waking (4.378%), and Physical and cognitive symptoms (3.912%) as indicated in Table 1 and Table 2.

Internal Consistency of SQS

According to the initial evaluation of the psychometric

properties of SQS [23], internal consistency was good with Cronbach's value of an Alpha = 0.92. In this study, the Cronbach's alpha was 0.85.

The Relationship between Sleep Quality Scale (SQS) and Sleep Deprivation Scale (SDS)

The relationship between SQS and SDS was measured using Pearson's Moment Correlation Coefficient. Results indicated that there was a positive low correlation ($r = 0.43, p < 0.001$), which is indicating that the two scales were to the large proportion (81%) independent from each other. Thus, SQS measured quality as opposed to sleep deprivation measured by SDS.

Table 2. Total Variance Explained.

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings ^a |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|--|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total |
| 1 | 6.373 | 22.762 | 22.762 | 6.373 | 22.762 | 22.762 | 4.801 |
| 2 | 2.270 | 8.106 | 30.868 | 2.270 | 8.106 | 30.868 | 3.740 |
| 3 | 1.461 | 5.218 | 36.086 | 1.461 | 5.218 | 36.086 | 2.502 |
| 4 | 1.226 | 4.378 | 40.465 | 1.226 | 4.378 | 40.465 | 3.339 |
| 5 | 1.095 | 3.912 | 44.376 | 1.095 | 3.912 | 44.376 | 2.239 |
| 6 | .993 | 3.547 | 47.924 | | | | |
| 7 | .941 | 3.359 | 51.283 | | | | |
| 8 | .895 | 3.195 | 54.478 | | | | |
| 9 | .853 | 3.046 | 57.524 | | | | |
| 10 | .833 | 2.974 | 60.497 | | | | |
| 11 | .803 | 2.867 | 63.365 | | | | |
| 12 | .792 | 2.828 | 66.192 | | | | |
| 13 | .746 | 2.663 | 68.856 | | | | |
| 14 | .735 | 2.623 | 71.479 | | | | |
| 15 | .705 | 2.517 | 73.996 | | | | |
| 16 | .695 | 2.484 | 76.480 | | | | |
| 17 | .676 | 2.415 | 78.895 | | | | |
| 18 | .655 | 2.341 | 81.236 | | | | |
| 19 | .613 | 2.189 | 83.425 | | | | |
| 20 | .603 | 2.153 | 85.578 | | | | |
| 21 | .571 | 2.038 | 87.617 | | | | |
| 22 | .558 | 1.994 | 89.611 | | | | |
| 23 | .539 | 1.924 | 91.535 | | | | |
| 24 | .520 | 1.856 | 93.391 | | | | |
| 25 | .506 | 1.808 | 95.199 | | | | |

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings ^a |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|--|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total |
| 26 | .484 | 1.730 | 96.929 | | | | |
| 27 | .469 | 1.675 | 98.603 | | | | |
| 28 | .391 | 1.397 | 100.000 | | | | |

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 3. The SQS Structure Matrix.

| Item | Component | | | | |
|---|-----------|-------|------|------|-------|
| | 1 | 2 | 3 | 4 | 5 |
| Poor sleep makes me forget things more easily | .681 | | | | |
| Poor sleep makes me lose desire in all things | .669 | | | | |
| Poor sleep makes it hard to concentrate at work | .665 | | | | |
| Poor sleep causes me to make mistakes at work | .617 | | | | |
| Poor sleep makes me lose interest of work and others | .599 | | | | |
| Poor sleep makes me easily tired at work | .569 | | | | |
| Poor sleep makes it hard for me to think | .552 | | | | -.440 |
| Sleepiness interferes with my daily life | .523 | | | | |
| Poor sleep makes my life painful | .511 | | | | |
| I never go back to sleep after awakening during sleep | | -.704 | | | |
| I feel unlikely to sleep after sleep | | -.701 | | | |
| I have difficulty getting back to sleep once I wake up in the middle of night | | -.677 | | | |
| I wake up easily because of noise | | -.602 | | | |
| I have difficulty falling asleep | | -.587 | | .507 | |
| I toss and turn | | -.547 | | | |
| Poor sleep makes me lose my appetite | | -.463 | | | |
| I am satisfied with my sleep | | | .730 | | |
| My fatigue is relieved after sleep | | | .661 | | |
| I feel vigorous after sleep | | | .645 | | |
| My sleep hours are enough | | | .408 | | |
| I wake up while sleeping | | | | .755 | |
| I fall into a deep sleep | | | | .678 | |
| I would like to sleep more after waking up | | | | .593 | |
| I have difficulty getting out of bed | | | | .556 | |
| I feel refreshed after sleep | | | | | |

| Item | Component | | | | |
|---------------------------------|-----------|---|------|---|-------|
| | 1 | 2 | 3 | 4 | 5 |
| Poor sleep gives me headaches | | | | | -.677 |
| Poor sleep makes me irritated | | | | | -.623 |
| I have a clear head after sleep | | | .457 | | -.609 |

2.4. Ethical Considerations

Prior to data collection all relevant authorities including the ethical committee of the Buhare CDTI authorized the permission to proceed with the study. In addition, the respondents were adults, whose informed consent were sought prior to their acceptance to respond to the questionnaires by signing the informed consent statement in the questionnaire. In addition, the respondents were assured of the confidentiality of the to be provided information as the same would be used solely for the purpose of the study. Furthermore, the respondents were informed about their right to withdraw from responding

to the questionnaire should they decide to do so for any reason at any time.

3. Results

3.1. Respondents' Characteristics

This study was conducted among Community Development College students. A sample was heterogeneous in nature, as appears in [Table 4](#).

Table 4. Characteristics of the Respondents.

| Variables | Variable Level | Freq. | Percentage |
|----------------------------|--------------------------------------|-------|------------|
| Sex | Males | 270 | 42.2 |
| | Females | 370 | 57.8 |
| Age | Minimum | 18 | - |
| | Maximum | 47 | - |
| | Mean | 21.92 | - |
| | Standard Deviation | 3.38 | - |
| Level of Study | Level 4 | 114 | 17.8 |
| | Level 5 | 423 | 66.1 |
| | Level 6 | 103 | 16.1 |
| Marital Status | Married | 19 | 3.0 |
| | Single | 604 | 94.4 |
| | Divorced | 13 | 2.0 |
| | Separated | 1 | .2 |
| Tuition Fee Payment Status | Cohabiting | 3 | .5 |
| | Paid in full | 277 | 43.3 |
| | Not paid and not sure of getting | 159 | 24.8 |
| Prior Education Reached | Not paid, not sure of paying in time | 204 | 31.9 |
| | Form six | 8 | 1.3 |

| Variables | Variable Level | Freq. | Percentage |
|------------------|----------------------------------|-------|------------|
| Birth Order | Form four | 536 | 83.8 |
| | Not declared | 96 | 15.0 |
| | First born | 186 | 29.1 |
| | Last born | 114 | 17.8 |
| | Middle (Not first nor last born) | 340 | 53.1 |
| Religious belief | Muslim | 102 | 15.9 |
| | Christian | 533 | 83.3 |
| | Traditionalist | 4 | .6 |
| | Atheist | 1 | .2 |

More important to note from Table 2 is an acute difference of prior level of education where 83% (536) joined college with Form four level of education compared to only 1.3% (8) with Form Six entry level. This variation might be due to the fact that most form six normally prioritize joining universities over diploma education in community development colleges. Female students, rather than male students, relatively dominated the sample given the fact that females were more numerous in these colleges than male students. Explanations for this variation were beyond the scope of this paper. Another important variable worth paying attention to is the level of study. Level Four (4) in the context of these colleges refers to first-year students. These students are at liberty to exit with a certificate at the end of year one or continue with Level Five. Level five students are at the second year of their studies in these colleges, undertaking courses leading to a diploma award at the end of year three (Level Six).

3.2. Sleep Problems Experienced by Community Development College Students

The question was raised as to whether or not community development college students experienced sleep problems as measured by Sleep Quality Scale. Table 5 summarizes students' responses.

Data in Table 5 indicates a diverse distribution of the responses in each item of the SQS. For further analysis and meaningful conclusion, data were tallied, and entered into the logistic regression analysis. The model as a whole explained between 24.2% (Cox and Snell R square) and 32.3% (Nagelkerke R squared) of the variance in sleep quality and correctly classified 74.5% of respondents with sleep problems.

Table 5. Sleep Quality among College Students.

| Items | Responses | | | | | | | |
|---|-----------|------|-----------|------|-------|------|---------------|------|
| | Few/No | | Sometimes | | Often | | Almost Always | |
| | Freq. | % | Freq. | % | Freq. | % | Freq. | % |
| I have difficulty falling asleep | 4 | .6 | 341 | 53.3 | 116 | 18.1 | 179 | 28.0 |
| I fall into a deep sleep | 252 | 39.4 | 157 | 24.5 | 135 | 21.1 | 96 | 15.0 |
| I wake up while sleeping | 216 | 33.8 | 137 | 21.4 | 168 | 26.3 | 119 | 18.6 |
| I have difficulty getting back to sleep once I wake up in the middle of night | 247 | 38.6 | 130 | 20.3 | 156 | 24.4 | 107 | 16.7 |
| I wake up easily because of noise | 226 | 35.3 | 141 | 22.0 | 142 | 22.2 | 130 | 20.3 |
| I toss and turn | 232 | 36.3 | 136 | 21.3 | 145 | 22.7 | 127 | 19.8 |
| I never go back to sleep after awakening during sleep | 255 | 39.8 | 136 | 21.3 | 150 | 23.4 | 99 | 15.5 |

| Items | Responses | | | | | | | |
|---|-----------|------|-----------|------|-------|------|---------------|------|
| | Few/No | | Sometimes | | Often | | Almost Always | |
| | Freq. | % | Freq. | % | Freq. | % | Freq. | % |
| <i>I feel refreshed after sleep</i> | 196 | 30.6 | 104 | 16.3 | 164 | 25.6 | 175 | 27.3 |
| <i>I feel unlikely to sleep after sleep</i> | 263 | 41.1 | 128 | 20.0 | 140 | 21.9 | 109 | 17.0 |
| <i>Poor sleep gives me headaches</i> | 189 | 29.5 | 122 | 19.1 | 155 | 24.2 | 174 | 27.2 |
| <i>Poor sleep makes me irritated</i> | 159 | 24.8 | 141 | 22.0 | 173 | 27.0 | 166 | 25.9 |
| <i>I would like to sleep more after waking up</i> | 254 | 39.7 | 129 | 20.2 | 136 | 21.3 | 119 | 18.6 |
| <i>My sleep hours are enough</i> | 217 | 33.9 | 110 | 17.2 | 161 | 25.2 | 151 | 23.6 |
| <i>Poor sleep makes me lose my appetite</i> | 281 | 43.9 | 119 | 18.6 | 131 | 20.5 | 108 | 16.9 |
| <i>Poor sleep makes it hard for me to think</i> | 169 | 26.4 | 147 | 23.0 | 164 | 25.6 | 159 | 24.8 |
| <i>I feel vigorous after sleep</i> | 137 | 21.4 | 145 | 22.7 | 161 | 25.2 | 195 | 30.5 |
| <i>Poor sleep makes me lose interest in work and others</i> | 190 | 29.7 | 154 | 24.1 | 156 | 24.4 | 137 | 21.4 |
| <i>My fatigue is relieved after sleep</i> | 136 | 21.3 | 133 | 20.8 | 176 | 27.5 | 195 | 30.5 |
| <i>Poor sleep causes me to make mistakes at work</i> | 210 | 32.8 | 131 | 20.5 | 180 | 28.1 | 116 | 18.1 |
| <i>I am satisfied with my sleep</i> | 171 | 26.7 | 134 | 20.9 | 172 | 26.9 | 162 | 25.3 |
| <i>Poor sleep makes me forget things more easily</i> | 216 | 33.8 | 149 | 23.3 | 148 | 23.1 | 125 | 19.5 |
| <i>Poor sleep makes it hard to concentrate at work</i> | 193 | 30.2 | 152 | 23.8 | 162 | 25.3 | 133 | 20.8 |
| <i>Sleepiness interferes with my daily life</i> | 231 | 36.1 | 145 | 22.7 | 155 | 24.2 | 107 | 16.7 |
| <i>Poor sleep makes me lose desire for all things</i> | 188 | 29.4 | 137 | 21.4 | 186 | 29.1 | 128 | 20.0 |
| <i>I have difficulty getting out of bed</i> | 207 | 32.3 | 139 | 21.7 | 155 | 24.2 | 138 | 21.6 |
| <i>Poor sleep makes me easily tired at work</i> | 195 | 30.5 | 138 | 21.6 | 165 | 25.8 | 142 | 22.2 |
| <i>I have a clear head after sleep</i> | 140 | 21.9 | 133 | 20.8 | 143 | 22.3 | 224 | 35.0 |
| <i>Poor sleep makes my life painful</i> | 190 | 29.7 | 143 | 22.3 | 157 | 24.5 | 148 | 23.1 |

3.3. Personal Habits Reported by Community Development College Students

Three personal habits were assessed, and their results are presented in [Table 6](#).

Table 6. Personal Habits of College students.

| Variables/Habit | Variable Level | Freq. | Percentage |
|--|-----------------------------|-------|------------|
| Number of times one wakes up in the midst of sleep | Not waking up until morning | 84 | 13.1 |
| | Waking up once | 212 | 33.1 |
| | Waking up once 2 times | 214 | 33.4 |
| | Waking up once 3 times | 109 | 17.0 |
| | Waking up once 4 times | 19 | 3.0 |
| | Waking up once 5 times | 2 | .3 |
| In-bed pre-sleep activities | Watching TV | 43 | 6.7 |

| Variables/Habit | Variable Level | Freq. | Percentage |
|--------------------------------|--|-------|------------|
| | Charting Via phone | 133 | 20.8 |
| | Writing or reading on Laptop/Tablet | 88 | 13.8 |
| | Reading class notes or book | 213 | 33.3 |
| | Others (e.g Leisure) | 55 | 8.6 |
| | Both 3 & 4 (Reading books, class notes/ reading or writing on electronic device) | 1 | .2 |
| | Both 1 & 4 (TV watching and reading notes) | 4 | .6 |
| | Both 1 & 2 (TV watching & charting via phone) | 10 | 1.6 |
| | Doing Nothing | 93 | 14.5 |
| | No exercise | 121 | 18.9 |
| Time of the day for Exercising | Morning | 224 | 35.0 |
| | Evening | 294 | 45.9 |
| | Not declared | 1 | .2 |

Only 13.1% (84) of the respondents reported that they were not waking up until morning after sleep. Of those who reported waking up in the midst of sleep, while 33.1% reported waking up twice per night, and about 23% reported waking thrice and plus per night. This has a potential influence on sleep quality. Regarding in-bed pre-sleep activities, most respondents reported the use of electronic devices such as watching TV, charting via phone and using laptops, which all together amounts to about 264 (41.25%) followed by 213 (33.3%) who reported reading class notes and books. These habits were a potential alarm to influence sleep quality. Interestingly, most students reported engaging in fitness exercise (35% in morning hours and 45.9% in evening times), while only 93 (14.5%) reported not exercising.

3.4. Explaining Sleep Quality from Personal Habits

Direct logistic regression analysis was conducted to assess

the impact of several factors on the likelihood that college students would report acute sleep problems. The assumption was that the reported sleep problems would be determined by variables such as respondent's level of study, sex, age in years, entry level, number of times one wakes up in the midst of night sleep, pre-sleep activities, time used for pre-sleep activities and timing of exercise whether morning, evening late evening and sleep deprivation. The full model containing all predictors was statistically significant, $\chi^2(37, N = 640) = 173.496, p < 0.001, p < .001$, indicating that the model was able to distinguish between respondents who reported acute from their counterparts who reported no or low sleep problem. The model as a whole explained between 24.2% (Cox and Snell R square) and 32.3% (Nagelkerke R squared) of the variance in sleep quality, and correctly classified 74.5% of respondents with sleep problems.

Table 7. Explaining Sleep Quality from Personal Habits.

| Variables in the Equation | B | S.E. | Wald | df | Sig. | Exp (B) | 95% C.I.for EXP(B) | |
|---------------------------|-------|------|--------|----|------|---------|--------------------|--------|
| | | | | | | | Lower | Upper |
| Level/Year of study | | | 15.056 | 2 | .001 | | | |
| Level/Year of study (1) | .923 | .324 | 8.123 | 1 | .004 | 2.518 | 1.334 | 4.751 |
| Level/Year of study (2) | 1.562 | .403 | 15.004 | 1 | .000 | 4.770 | 2.164 | 10.517 |
| Sex (1) | .435 | .206 | 4.480 | 1 | .034 | 1.545 | 1.033 | 2.312 |
| Age in years | .032 | .029 | 1.229 | 1 | .268 | 1.033 | .976 | 1.093 |

| Variables in the Equation | B | S.E. | Wald | df | Sig. | Exp (B) | 95% C.I.for EXP(B) | |
|----------------------------------|---------|-----------|--------|----|-------|---------|--------------------|--------|
| | | | | | | | Lower | Upper |
| Entry Level | | | 1.912 | 2 | .384 | | | |
| Entry Level (1) | 1.120 | 1.133 | .977 | 1 | .323 | 3.064 | .333 | 28.211 |
| Entry Level (2) | 1.436 | 1.177 | 1.487 | 1 | .223 | 4.202 | .418 | 42.236 |
| Waking up after sleep | | | 43.603 | 4 | .000 | | | |
| Waking up after sleep (1) | -.568 | .279 | 4.160 | 1 | .041 | .566 | .328 | .978 |
| Waking up after sleep (2) | 1.383 | .260 | 28.249 | 1 | .000 | 3.987 | 2.394 | 6.640 |
| Waking up after sleep (3) | -20.136 | 28403.761 | .000 | 1 | .999 | .000 | .000 | . |
| Waking up after sleep (4) | -19.379 | 40192.970 | .000 | 1 | 1.000 | .000 | .000 | . |
| Frequency of wake up | .026 | .107 | .059 | 1 | .808 | 1.026 | .832 | 1.265 |
| Pre- sleeping activities | -.076 | .047 | 2.612 | 1 | .106 | .927 | .846 | 1.016 |
| Time for Pre-sleeping activities | -.002 | .002 | 1.175 | 1 | .278 | .998 | .995 | 1.002 |
| Timing of exercise | -.055 | .127 | .188 | 1 | .665 | .946 | .737 | 1.215 |
| Total Sleep deprivation | .110 | .039 | 7.808 | 1 | .005 | 1.116 | 1.033 | 1.206 |
| Constant | -4.180 | 1.428 | 8.564 | 1 | .003 | .015 | | |

As indicated in Table 7, only four independent variables were uniquely statistically significant. These are Post Sleep Waking up at night, level/Year of study, Sleep Deprivation and Sex. The strongest predictor of acute sleep problems was the level for year of study ($p < 0.001$), recording an odds ratio of 4.77. This interprets that Level Six respondents (students in the second year in Diploma Course) were over 4 times more likely to report sleep problems than Level Four respondents (students in the first year in Certificate Course), while Level IV (First year) were 2 times more likely to report sleep problems than Level six students; controlling for all other factors in the model. Unexpectedly, Level Six (being in the final year of the Diploma Course) did not predict reporting sleep problems.

This was followed by the number of times one wakes up at night ($p < 0.001$), recording an odds ratio of 3.987 interpreting that respondents who reported waking up in the midst of sleep at night between 2 and 4 times were over 3 times, more likely to report sleep problems than their counterparts who reported not waking up in the midst of sleep at night when all other factors in the model were put under control. Sleep Deprivation followed ($p < 0.01$), recorded an odds ratio of 1.116. This means that respondents who reported sleep deprivation were 1.2 times more likely to report low sleep quality than their counterparts who reported no sleep deprivation, when all other factors in the model were controlled. Sex followed in the list ($p < 0.03$), recording an odds ratio of 1.545. this means that males were 1.5 times more likely than females to report low sleep quality or sleep problems.

4. Discussion

These results come from a substantial sample of students from the community development institutes. In these colleges, students are at liberty to choose to stay either in the colleges' hostels or in the rented houses outside the colleges. Usually, most students do not willingly choose to stay in rented houses until they find that the college hostels are not sufficiently available for every student in need of them. This is because the rented rooms outside the colleges are usually more expensive than hostels in the colleges. Given students' variation in their family backgrounds in terms of economic status, not all students who miss rooms in the hostels are capable of running their lives in rented houses. Therefore, it is often necessary to have a roommate in order to be cost-efficient. They are thus, forced to start new life with the meager resources they have, in addition to learning to get along with their roommates, new environment and people, while at the same time struggling with college studies. These changes might be coupled with stress, which in turn become significant factors in circadian rhythm disruption, in turn impacting sleep quality. With increasing number of courses students have to study in second year, more tasks and assignments than available time might intensify their need to extend their working hours to the mid nights, resulting into sleep deprivation and thus, poor sleep quality. What makes students at the last year of studies to score low in reporting sleep quality than their counterparts at lower levels is so far not clear as it was

beyond the scope of this study. More need to be done to explore this in the country.

It has been found here that sleep problems are associated with the number of times one wakes up at night, level for year of study, sleep deprivation, and sex. The results are similar to other studies done outside and within Tanzania, which also reported high sleep problems among college and university students and associated sleep problems with personal habits such as strenuous physical activity [3, 23], technology use such as using mobile phones, laptops and watching TV right before bedtime [12, 1], hours spent to perform an activity considered vital before sleeping [8, 13], and demographic variables such as sex, lower schooling level [17, 9].

Generalizability of these results is worth discussing. Habitual and demographic determinants of sleep quality have been identified in this study. However, caution should be taken when interpreting these results as no causality has been established. This is because data were concurrently rather than subsequently collected via self-reporting; making us remain uninformed of the past sleep-related habits of the respondents. However, it is interesting to note that although the studies cited in this work were done in different places with different samples and, interestingly with different tools and rigorous methodologies, there has been consistency in the findings as reported in the preceding paragraphs. With the fact that the results of this study have been consistent with other previous results, these results can be generalized to college students with similar socioeconomic backgrounds.

Practical and Theoretical Implications

The potential practical implications of psychological and policy interventions to both students and teachers in community development colleges and to policy makers in community health sector are also important. Both students and teachers might utilize these results by starting to participate in fitness exercises as this has been found to improve sleep. The fact that sleep quality is influenced by the frequency of waking up at night, which interferes with sleep cycles, calls for revisiting some habits that might lead to waking up. For example, both students and teachers might attend community awareness training on the negative impacts of poor sleep and appropriate feeding schedules, which specify the appropriate timing of foods and drinks. The role of sleep in restoration and avoiding its impacts to extend from individuals to society in general has been established [23]. This is because the societal health is a property of the individuals of the society in reference. To consistently and systemically improve the sleep quality of the society at large, policies guiding sleep and their operational procedures need to be in place, with special attention given to females, whom several studies have established their dominance in reporting sleep problems.

Theoretical and methodological implications of these results are of paramount importance in this discussion, given their framework role. According to Yi et al, [24], the Sleep

Quality Scale (SQS) was developed using item analysis and factor analysis on items with content validity. The inclusion of items assessing daytime symptoms/interference with work, problems initiating and maintaining sleep, difficulty waking, and Physical and cognitive symptoms in the SQS indicates the link between SQS and the restoration function of sleep whereby brain processes are renewed through protein synthesis processes [23]. It follows then that these results support the usefulness of SQS and the restoration functions of sleep.

5. Conclusions

This study intended to examine personal habits and demographic determinants of sleep quality of students in the community development colleges. The study was guided by the two questions seeking to identify personal habits reported by college students that are likely to influence their sleep quality; and explain sleep problems from personal habits and demographic variables of community Development college students. According to the responses of the Community Development College Students' sample in Tanzania, the Sleep Quality Scale (SQS) assessed five factors, namely; daytime symptoms/interference with work, problems initiating and maintaining sleep, sleep satisfaction, difficulty waking, and Physical and cognitive symptoms. Regarding personal habits, students reported habits such as waking up at least twice per night, pre-sleeping activities such as watching TV, charting via phone and, using laptops, and reading class notes and books. Students further reported engaging in fitness exercises during the morning and evening hours. Four personal habits and demographic variables that uniquely explained sleep quality were: level/year of study, number of times one wakes up at night after sleep, sleep deprivation and sex. Following these results, it is concluded that sleep quality of college students is a product of a multifaceted influences including sex differences and daily habitual practices of the students.

6. Recommendations

Given the impacts of sleep problems discussed in this paper and the fact that a large proportion of college students have reported sleep problems, the following recommendations are made: to begin with, colleges should consider developing policies guiding personal habits that might interfere with sleep. For example, policies should explicitly indicate it as a requirement for students to participate in fitness exercises, early sleep in the hostels as well as late start of studying schedules. In addition, policies should consider establishing psycho-social counselling desks where educative programs on sleep problems and their relationship with mental health should be practised. Due to the fact that female than male respondents and second year students (Level Five in this study) have been repeatedly found to report sleep problems elsewhere, colleges should think of giving special attention to the female and second year students in

the policies to be developed.

Abbreviations

| | |
|-------|---|
| CDTI | Community Development Training Institutes |
| CDTTI | Community Development Training Institute |
| SQS | Sleep Quality Scale |
| SDS | Sleep Deprivation Scale |
| OSA | Obstructive Sleep Apnoea |
| REM | Rapid Eye Movement |
| NREM | Non-rapid Eye Movement |
| SOL | Sleep Onset Latency |
| TST | Total Sleep Time |
| WASO | Wake After Sleep Onset |
| SE | Sleep Efficiency |
| SPSS | Statistical Package for Social Sciences |
| TIB | Time in Bed |

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Author Contributions

Joel Matiku Joshua is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest

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