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Sleep quality and its correlates among adolescents schooling in north-central Nigeria

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Abstract

Objective: Sleep disturbance is common among adolescents around the world. Our study aimed to determine the prevalence of sleeping disorders among in-school adolescents in Ilorin, Nigeria.

Methods: With a cross-sectional design, sleep quality was assessed among 512 in-school adolescents using the Pittsburgh Sleep Quality Index (PSQI). A cut-off score of 5 was used. Data analysis was done with the Statistical Package for Social Sciences version 22.

Results: Three out of every five adolescents were poor sleepers (PSQI global score > 5). Only a few respondents (19%) had optimal sleep (≥9 hours), and more than half had inadequate sleep (< 7 hours). Poor sleep was associated with male gender, being the first born and residence at home. Logistic regression analysis showed that living at home, as against hostel living, was predictive of poor sleep.

Conclusion: Most respondents had inadequate sleep. Support from parents and other stakeholders could improve sleep among adolescents, as poor sleep is quite common in this age group. These concerted efforts would promote adolescent mental health in north-central Nigeria.

Keywords: Poor sleep, sleep quality, adolescent health, school mental health

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Qualité du sommeil et ses corrélats chez les adolescents scolarisés dans le centre-nord du Nigeria

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Résumé

Objectif: Les troubles du sommeil sont fréquents chez les adolescents du monde entier. Notre étude visait à déterminer la prévalence des troubles du sommeil chez les adolescents scolarisés à Ilorin, au Nigeria.

Méthodes: Avec une conception transversale, la qualité du sommeil a été évaluée chez 512 adolescents scolarisés à l'aide de l'indice de qualité du sommeil de Pittsburgh (PSQI). Un score seuil de 5 a été utilisé. L'analyse des données a été effectuée avec le paquet statistique pour les sciences sociales version 22.

Résultats: Trois adolescents sur cinq dorment mal (score global PSQI > 5). Seuls quelques répondants (19 %) avaient un sommeil optimal ($\geq$9 heures), et plus de la moitié avaient un sommeil insuffisant (< 7 heures). Le manque de sommeil était associé au sexe masculin, au fait d'être le premier né et de résider à la maison. L'analyse de régression logistique a montré que vivre à la maison, par opposition à la vie en foyer, était prédictif d'un mauvais sommeil.

Conclusion: La plupart des répondants avaient un sommeil insuffisant. Le soutien des parents et d'autres intervenants pourrait améliorer le sommeil chez les adolescents, car le manque de sommeil est assez courant dans ce groupe d'âge. Ces efforts concertés favoriseraient la santé mentale des adolescents dans le centre-nord du Nigeria.

Mots-clés: Mauvais sommeil, qualité du sommeil, santé des adolescents, santé mentale à l'école

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INTRODUCTION

Sleeping is a biological function required for physiological and psychological well-being. It is carried out on a regular, recurrent and rhythmic fashion, and is expressed differently in various life forms. For instance, brown bats need an average of 20 hours of sleep in a 24-hour day, while giraffes and elephants do well on 3 to 4 hours/day (1). Humans also express variability in habits of sleeping.

Adolescence is a remarkable phase in the life cycle of humans, being a transition between childhood and adulthood, as well as a period of rapid (and sometimes dramatic) physical, cognitive, emotional and behavioural changes. The sleep requirements are different in this phase of increased metabolism. Sleep requirements in adolescence are often unmet due to psychosocial demands and consequent changes in the bioregulatory mechanisms influencing sleep. Many adolescents have unhealthy sleeping habits (2).

Sleeping habits in adolescents are influenced by academic/vocational responsibilities, emotional engagements, substance use and internet use. Indices of good sleep include the duration, timing, continuity and quality of sleep.

There are physical and mental health effects of poor sleep among adolescents. These include the risk of obesity (3). Poor sleep is associated with depression (4), suicidal ideation (5) and anxiety, and adequate sleep may prevent anxiety in adolescents (6). Sleep quality is a mediating factor between negative coping strategies and anxiety in adolescence (7).

Many sleep problems are either undetected or mismanaged (8). Night-time sleep deprivation in adolescents can cause daytime sleepiness, which in turn can cause impaired concentration, memory lapses, mood changes and behavioural problems. These can affect productivity and cause injuries, including road traffic injuries among adolescents (9).

Most sleep studies were conducted in high-income countries. There is a need for more African-based studies to understand the local content and context of these disorders. Studying this biological function in the community would provide a relatively representative picture of the true patterns. The school is one of the most important environments for children and adolescents (10), and serves as a possible pool to determine sleeping patterns among adolescents. The objectives of this study were to determine sleeping patterns and factors associated with poor sleep quality among adolescent students in north-central Nigeria.

MATERIALS AND METHODS

Study area

The study was conducted in Ilorin East Local Government of Kwara State, Nigeria. The name 'Kwara' is the local name for River Niger, the same river from which the country was named. Kwara State has an international boundary with Republic of Benin to the West (11,12). Ilorin East is home to 204,310 inhabitants, with a ten-year population projection of 280,000 (11,13). It comprises 12 wards, with various cultures represented, particularly Yoruba, Nupe, Fulani and Hausa. Adolescents in Ilorin are typically in the secondary schools with a gross secondary school enrollment rate of 74% (14).

Study design

The objectives were met using a descriptive cross sectional study design.

Study population

The study population comprised adolescents aged between 10 and 19 years who were attending junior and senior secondary schools in Ilorin East. The student population is 23,483 (15).

Sample size calculation

The Fisher's formula for calculating sample size in populations > 10, 000 was used (16), where

$n=z^2pq/d^2$

n = the desired sample size

z = the standard normal deviate set at 1.96 [95% confidence level]

p= estimated prevalence of 50% was used, from the prevalence of poor sleep quality in a recent study (17)

q=1-p

d= absolute precision or sampling error tolerated =5%

'n' was approximately 384, and with an attrition rate of 10%, the final minimum sample size was 422. To improve the power of the study (18), a total of 520 adolescents were recruited.

Sampling technique

A three-stage sampling technique was used.

Stage 1 (Selecting Wards): With simple random technique by balloting, 4 of the 12 wards were selected.

Stage 2 (Selecting Schools): From each of the four selected wards, a senior secondary school and a junior secondary school were picked by simple random technique.

Stage 3 (calculating total number of students needed):
This was done by proportionate allocation, where the sample size of each stratum is proportionate to the population size of the stratum (19), using the following equation:

$$n_h = \frac{Nh}{N} \times n$$

where n_h is the sample size for stratum *h*, N_h is the population size for stratum *h*, N is total population size, and n is total sample size. Thus were the number of students in each school, set and class calculated. Finally, males and females to participate in each class were chosen by balloting.

Instruments
For data collection in line with the objectives, two instruments were used, as follows:

Sociodemographic Questionnaire
The sociodemographic questionnaire designed by Omigbodun in 2004 was used to obtain the biodata and other relevant background information about respondents. It comprises 40 questions, which are grouped into three categories, namely personal information, family information and school-related questions. It has been used in previous Nigerian studies (20).

Pittsburgh Sleep Quality Index (PSQI)
The PSQI is a standardised self-rated questionnaire developed by Daniel Buysse. By measuring sleep quality over a one-month period, it serves as a useful psychiatric tool applicable to clinical practice and research.

The instrument covers seven aspects of sleep, namely sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications and daytime dysfunction. These are addressed in 24 questions. Of these, 19 questions are self-rated. The remaining 5 questions, which are answered by a bed partner or roommate, are meant for clinical use and are not computed in the scoring (21).

Seven component scores are added to derive a global score of subjective sleep quality. This final score ranges from 0 to 21, and a higher score is indicative of poorer subjective sleep quality. A global score of >5 yielded a diagnostic sensitivity of 89.6% and specificity of 86.5% in determining respondents who were poor sleepers (21).

The PSQI was validated in Nigeria by Aloba et al among Nigerian university students in 2007. The psychometric value in screening young people in Nigeria was comparable to Western findings. The best cut-off score was set at 5 (22). The cut-off of 5 was used in this study. Respondents with a PSQI score of five or less had "good sleep quality", while those who scored six or more had "poor sleep quality" (17).

Ethical consideration
Ethical clearance was obtained from the Ethical Review Board in University of Ilorin Teaching Hospital Ilorin and permission obtained from the Kwara State Ministry of Education and Human Capital Development, as well as from the school principals.
Consent was obtained from participants older than 17 years and emancipated minors. For younger participants, assent was obtained from them and informed consent forms were sent ahead to their parents.

Pretest
A pretest test was conducted among 20 secondary school students in Ilorin South Local Government Area.

Procedure for the study
The researcher and trained research assistants were introduced to the students on the assembly ground in each of the selected schools. The purpose of the study was stated. The sleep questionnaire was self-administered.

Data Analysis
Data was analysed with the Statistical Package for Social Sciences (SPSS) version 22 (23). The frequency distribution of variables was generated. Chi square statistics tested the association between categorical variables, with the level of statistical significance set at less than 0.05 (i.e. $p < 0.05$). Binary logistic regression analysis determined the predictors of quality of sleep.

RESULTS
A total of 520 copies of the questionnaire were administered and 512 copies were returned in a usable condition. Eight public schools were visited for data collection. Six of them were mixed schools, while two were same-sex schools; a boys-only school and a girls-only school.
Most respondents (62.7%) were late adolescents between 15 and 19 years. A total of 332 students (64.8%) were in senior secondary schools. Only 29 of the students (5.7%) lived in hostels; all others were day students who lived at home.

A total of 224 respondents (43.8%) had a

sleeping partner, who was usually their mother or a sibling. Disorientation during sleep was the most prevalent sleep problem reported (n=173, 33.8%) (Table 1). Table 2 shows the self-reported Pittsburgh sleep quality. There were 321 poor sleepers (62.7%). Only 98 respondents (19.0%) had sleep duration of 9 hours and above, and 51.0% of respondents had sleep duration $\leq$7 hours. Nonetheless, only 3.5% of respondents reported bad subjective sleep quality.

Poor sleep was associated with male gender (χ^2=6.379, p=0.013), being the first born (χ^2=6.724, p=0.011), living at home, rather than in the hostel (χ^2=7.266, p=0.006) and being in a class with <40 pupils (χ^2=5.867, p=0.016). Logistic regression analysis showed that living at home, as against hostel living, was predictive of poor sleep (Table 3).

DISCUSSION

The respondents were mostly late adolescents. They were either Muslims or Christians. This is in line with the religious affiliations of the study setting. Most respondents reported a significant impact of religion on their personal and family lives. Thus, religion may be resourceful in developing adolescent programmes that promote good sleeping habits.

Respondents described their sleeping conditions and experience. Close to half had a sleeping partner, who was usually their mother or a sibling. In a previous Ilorin study among adolescents, the findings were similar (24). Educating communities about sleep hygiene may improve sleep habits among adolescents and help sleep partners recognise sleep problems, for prompt referral and early intervention.

Most adolescents had a global PSQI score > 5, indicating poor sleep. More than half of the students had inadequate sleep, even though they mostly reported subjective good sleep quality. This is indicative of poor knowledge about sleep requirements and implications of sleep deprivation.

Optimal sleep is rarely achieved by adolescents the world over (25). Nigeria is no exception, as authors in southeast (26) and southwest Nigeria (17) have also made this observation. Recommended sleep duration in adolescence is 8 to 10 hours (27). Optimal sleep, which was operationally defined as a sleep duration of 9 hours (28), was achieved by only 19% of respondents. Inadequate sleep among adolescents in this study may be a harbinger of mental health problems, calling for further studies to explore such associations.

Our study did not replicate the previous finding that poor sleep becomes more prevalent with increasing age, or that poor sleep is commoner among adolescent students in the senior class (2,17). This may suggest that there are other factors asides from age or class that mediate poor sleep among in-school adolescents.

Poor sleep was commoner among boys. This was surprising, given the observation from global literature that poor sleep is more prevalent among girls (29,30). Nonetheless, recent local studies found no association of sleep pattern with gender (17,24). It is possible that boys stay up late into the night using the internet. Future studies are required to establish the relationship between gender and sleep quality in the study setting.

Poor sleep was associated with being the first born. This stands to reason, as first-born children often have responsibilities conferred on them. Adolescents living at home had poor sleep compared with those living in hostels. The regimented sleep-wake routine in hostels may have helped adolescents there to achieve good sleep. In contrast, adolescents living at home have more freedom to sleep late.

CONCLUSION

Sleeping habits provide a window into the mental health status of in-school adolescents. Results of our study are consistent with the observation that many adolescents have inadequate sleep. Patterns of poor sleep as well as the predisposing and protective factors from this study may serve as a template for future interventions.

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Conflict of interest: We have no conflicts of interest to disclose.

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Table 1: Sleep Pattern of the Respondents (N= 512)

Pattern	Frequency	Percentage (%)
Sleeping partner		
No	288	56.3
Yes	224	43.8
Loud snoring		
No	350	68.4
Yes	162	31.6
Long pauses between breath while sleeping		
No	355	69.3
Yes	157	30.7
Legs twitching or jerking while sleeping		
No	390	76.2
Yes	122	23.8
Episodes of disorientation or confusion during sleep		
No	339	66.2
Yes	173	33.8
Other restlessness during sleep		
No	355	69.3
Yes	157	30.7

Table 2: Pittsburgh Sleep Quality (N=512)

Components	Characteristics	Frequency	Percentages (%)
Subjective sleep quality	Very good	298	58.2
	Fairly good	296	38.3
	Fairly bad	17	3.3
	Very bad	1	0.2
Sleep latency	0	159	31.1
	1 – 2	219	42.8
	3 -4	119	23.2
	5 – 6	15	2.9
Sleep duration	>7 hours	251	49.0
	6 – 7 hours	120	23.4
	5 – 6 hours	92	18.0
	< 5 hours	49	9.6
Habitual sleep efficiency	>85%	366	71.5
	75 – 84%	55	10.7
	65 – 74%	34	6.6
	<65%	57	11.1
Sleep disturbances	0	36	7.0
	1 – 9	234	45.7
	10 – 18	219	42.8
	19 – 27	23	4.5
Use of sleeping medication	Not during the past month	349	68.2
	Less than once a week	84	16.4
	Once or twice a week	63	12.3
	Three or more times a week	16	3.1
Daytime dysfunction	0	201	39.3
	1 – 2	221	43.2
	3 – 4	77	15.0
	5 – 6	13	2.5
Global sleep quality (PSQI score =5)	Good sleep	191	37.3
(PSQI score >5)	Poor sleep	321	62.7

Table 3: Predictors of Sleep Quality

Predictors	**Adjusted odds ratio**	**95% C.I**	**P-value**
Gender (Male vs. Female)	-0.29	0.51-1.09	0.13
Position in family (First vs. Others)	-0.51	0.39-0.92	0.18
Place of living (Home vs. Hostel)	1.16	1.06-9.55	0.04*
Number in class (<40 vs. >40)	-0.42	0.44-0.98	0.03*