

Original Article

Sleep Hygiene Practices And Their Relationship With Sleep Quality Among Secondary School Adolescents In Yenagoa, Bayelsa State, Nigeria

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ABSTRACT

Sleep hygiene is an important factor that affects sleep quality. These are behavioural and environmental practices that promote/maintain good sleep. This study aims to identify the sleep hygiene practices of adolescents in Yenagoa and to determine the relationship between sleep hygiene and sleep quality. A multistage sampling of 877 adolescents from secondary schools in Yenagoa Local Government Area Bayelsa State was done. This cross-sectional study was from March to May 2024. Data were collected using questionnaires that contain questions adopted from the sleep hygiene index and the Pittsburg sleep quality index. Data analysis was done using Chi-square and Pearson's correlation. Significant level was set at $p < 0.05$. The prevalence of poor sleep hygiene in this study was 77.8%. The sleep practices associated with sleep quality included: going to bed at different times of the day; getting out of bed at different times of the day; doing things before bedtime such as playing video games that may wake someone up; going to bed angry, nervous or upset; using the bed for things other than sleeping; sleeping in an uncomfortable bedroom; doing important work such as studying before bedtime and thinking/ worrying or planning while in bed. Sleep quality had a weak positive correlation with sleep hygiene. Poor sleep hygiene practices are day to day activities people engage in that can affect their sleep health. Health education on good sleep hygiene should be incorporated in policies and regularly taught in schools to enlighten the adolescents on practices that affect sleep.

Keywords: Adolescents, Nigeria, Relationship, Sleep Hygiene, Sleep Quality, Yenagoa

INTRODUCTION

Sleep hygiene practices are behavioural and environmental factors that promote and maintain good sleep.¹ They are series of healthy sleep habits and daily routines that improve one's ability to fall asleep and promote consistent uninterrupted sleep.^{2,3} Good sleep hygiene includes having a consistent bedtime and wake up time even during weekends; avoiding large meals, caffeine and alcohol before bedtime; putting off all electronic devices at least 30 minutes before bedtime; ensuring the bedroom is quiet, dark and at a comfortable temperature, and getting some exercise during the day which can make falling asleep at night easy but not close to bedtime amongst others.⁴

The sleep-wake cycle can be influenced by the use of electronic devices (such as television and phones) as well as ingestion of stimulants. The use of electronic devices in the bedroom reduces the sleep time due to the likelihood of prolonged usage of the device, increases exposure to

external stimuli (the sound of television (TV) or audio in mobile phones) and reduces melatonin release (due to the bright screen light).⁵ Ingestion of stimulants such as caffeine close to bedtime with its half-life of 2-12 hours can increase sleep latency by blocking the adenosine A1 and A2A receptors and reduce the feeling of sleepiness.^{5,6}

Sleep hygiene has been studied among children and adult populations in different climes. In Ethiopia, Molla and Wondie⁷ reported poor sleep hygiene in 48.1% of medical students in 2021, noting that 18.1% of them used their bed for things other than sleeping and 15.3% went to bed at different times from day to day. Peter *et al*⁸ reported that 62.9% of children watched TV or played games up till less than an hour before bedtime while 31.2% took coffee or other stimulants close to bedtime in their study in Kano Nigeria in 2017.

Maladaptive/poor sleep hygiene practices results in poor sleep quality as seen in different studies.^{1,8,9} Ali *et al*¹⁰

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documented that students in Qatar with good sleep hygiene were four times more likely to have good sleep quality in comparison to those with poor sleep quality. This finding is similar to the observation on Iranian students by Yazdi *et al*¹. In Abakaliki, Nigeria, Orji *et al*¹¹ also found that poor sleep quality was significantly associated with poor sleep hygiene practices such as smoking within 2 hours of going to bed or taking stimulants like coffee before sleep, watching television close to bed time alongside other poor sleep hygiene practices in children/adolescents 2-16 years of age.

This study aims to determine the sleep hygiene practices of adolescents and to identify the sleep hygiene practices that affect the sleep quality of secondary school adolescents in Yenagoa LGA, Bayelsa State, Nigeria.

MATERIALS AND METHODS

Study Setting

This cross-sectional study was conducted among 877 secondary school students aged 10-19 years across 20 secondary schools in Yenagoa LGA of Bayelsa State, Nigeria. Bayelsa State is located in the Niger Delta region between Delta and Rivers States. Yenagoa LGA is one of the eight LGAs in Bayelsa State, and it also harbours the state capital. Adolescents who had chronic disorders such as obstructive sleep apnoea which could disturb their sleep and those on medications such as anticonvulsants were excluded from the study.

Study Procedure

The students were recruited by multistage sampling. Data was collected using self-administered questionnaires containing questions on their sociodemographic characteristics and questions from the sleep hygiene index which comprises 13 questions for assessing sleep hygiene practices with responses graded on a Likert scale from 0=never to 4=always. Total scores obtainable = 52. Scores of 16 and above are regarded as poor sleep hygiene.¹² Their sleep quality was assessed using the Pittsburg sleep quality index which a self-rated standardised questionnaire used widely to assess sleep quality of an individual in the past one month.¹³ A global score of >5 suggests poor sleep quality while a global score of ≤ 5 suggests good sleep quality.

Data Analysis

Retrieved questionnaires were entered into Microsoft Excel office 2019. Analysis was done using IBM Statistical Product and Service Solutions (SPSS) version 25. Data analysis was by Chi-square test to determine the sleep hygiene practices that are associated with sleep quality and Pearson correlation to determine the relationship between sleep quality scores and sleep hygiene scores. Significant level was set at $P \leq 0.05$

Ethical Considerations

Ethical clearance was obtained from the Ethics and Research Committee of the Federal Medical Centre Yenagoa as well as from the Bayelsa State Ministry of Education. Parental consent and assent from older students were obtained before enrollment in the study.

RESULTS

The students were aged 10-19 years. More than one-third, 323 (36.8%) respondents were aged 14 and 15 years while

only a few, 33 (3.8%) were aged 18 and 19 years. (Figure 1). Six out of every ten of the adolescents came from families of low socioeconomic status while only 62 (7.1%) were of the high socioeconomic class.

3.1 Sleep hygiene practices of the adolescents.

The sleep hygiene practices of the adolescents are presented in table I. About half, 443 (50.5%) of the participants sometimes took daytime naps for two hours or more. One quarter, 226 (25.8%) always went to bed at different times and about one-fifth, 184 (21%) also got out of bed at different times from day to day. Majority 791 (90.2%) never took alcohol, caffeine or tobacco within four hours of bedtime. The practice of doing somethings before bed time such as playing video games or use of phone that may wake them up from sleep was reported by 228 (26%) as frequently or always. Over half (55.4%) of the adolescents sometimes, frequently or always went to bed angry, upset or nervous. Three hundred and twenty-three (25.4%) of the adolescents sometimes exercised to the point of sweating within one hour of bedtime. Many of them 545 (62.1%) never had uncomfortable beds for sleeping while 307 (35%) reported that their bedrooms were sometimes too hot or too cold. Use of their bed sometimes for things other than sleeping was reported by 344 (39.2%) as well as doing important things such as studying before going to bed. Also, one third, 295 (33.6%) sometimes thought or planned while in bed whereas 194 (22.1%) always practiced same.

Prevalence of Poor Sleep Hygiene among the Adolescents.

Using the sleep hygiene index, it was found that 682 (77.8%) of the adolescents had poor sleep hygiene and while only 195 (22.2%) of them had good sleep hygiene as shown in figure 2. The mean sleep hygiene score was 20.8 ± 6.9 .

The Association between Sleep Hygiene and Sleep Quality among the Adolescents.

Generally, 152 (77.9%) of those with good sleep hygiene had good sleep quality which was significantly higher than 356 (52.2%) of those students with poor sleep hygiene who had good sleep quality ($p=0.001$). Sleep hygiene practices that were significantly associated with sleep quality were: going to bed at different times of the day; getting out of bed at different times of the day; doing things such as playing video games before bedtime that may wake someone up from sleep; going to bed angry, nervous or upset; using the bed for things other than sleeping; sleeping in an uncomfortable bedroom; doing important work such as studying before bedtime and thinking, worrying or planning while in bed. Most, 138 (66.7%) adolescents who never or rarely went to bed at different times and 177 (64.6%) adolescents who never or rarely got out of bed at different times from day to day significantly had good sleep quality ($p=0.001$ and 0.024 respectively). Good sleep quality was reported by 244 (66.7%) of those who never or rarely used internet, phones or television within one hour of sleep time ($p=0.001$). Majority, 269 (70.4%) of those who never or rarely went to bed angry /upset and 199 (72.6%) of those who never or rarely used their bed for other things significantly had good sleep quality ($P=0.001$). Adolescents who never or rarely had uncomfortable bedrooms or studied before going to bed or

worry/plan while in bed also significantly had good sleep quality ($p=0.001, 0.044$ and 0.001 respectively). Table II.

Relationship between sleep quality scores and sleep hygiene scores.

Figure 3 shows that as the quality scores increase (which indicates poor sleep quality), the sleep hygiene scores also increase (which indicates poor sleep hygiene). The correlation coefficient $r=0.29$ indicates weak positive correlation of sleep quality with sleep hygiene and this was statistically significant ($p=0$).

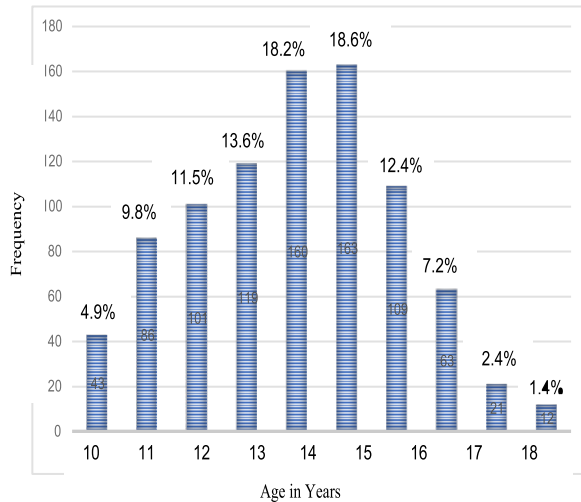


Figure 1: Age distribution of adolescents in secondary schools in Yenagoa LGA, Bayelsa state.

Table 1: The response pattern to statements that investigate sleep hygiene among adolescents in secondary schools in Yenagoa LGA, Bayelsa.

Characteristics	Responses – Frequency N=877 (%)				
	Never	Rarely	Sometimes	Frequently	Always
I take daytime naps two hours or more.	134 (15.3)	148 (16.9)	443 (50.5)	67 (7.6)	85 (9.7)
I go to bed at different times from day to day.	99 (11.3)	108 (12.3)	336 (38.3)	108 (12.3)	226 (25.8)
I get out of bed at different times from day to day.	142 (16.2)	132 (15.1)	312 (35.6)	107 (12.2)	184 (21.0)
I exercise to the point of sweating within 1 hour of bedtime.	362 (41.3)	134 (15.3)	223 (25.4)	70 (8.0)	88 (10.0)
I stay in bed longer than I should, 2 -3 times a week	230 (26.2)	149 (17.0)	312 (35.6)	93 (10.6)	93 (10.6)
I use alcohol, caffeine, tobacco within 4 hours of going to bed or after going to bed.	791 (90.2)	20 (2.3)	40 (4.6)	13 (1.5)	13 (1.5)
I do something that may wake me up before bedtime e.g play video games, use of phones and internet.	300 (34.2)	69 (7.9)	280 (31.9)	83 (9.5)	145 (16.5)
I go to bed feeling angry, upset nervous or angry.	240 (27.4)	142 (16.2)	400 (45.6)	57 (6.5)	38 (4.3)
I use my bed for things other than sleeping e.g eat, read, watch television.	203 (23.1)	71 (8.1)	344 (39.2)	113 (12.9)	146 (16.6)
My bed is uncomfortable for sleeping e.g poor mattress or pillow, too much or not enough blankets.	545 (62.1)	87 (9.9)	121 (13.8)	46 (5.2)	78 (8.9)
My bedroom is uncomfortable for sleeping e.g too hot, too cold, too stuffy, too noisy.	279 (31.8)	112 (12.8)	307 (35.0)	83 (9.5)	96 (10.9)
I do important work such as Studying before bedtime.	169 (19.3)	83 (9.5)	346 (39.5)	107 (12.2)	172 (19.6)
I think, worry or plan when I'm in bed.	201 (22.9)	81 (9.2)	295 (33.6)	106 (12.1)	194 (22.1)

■ Good Sleep Hygiene ■ Poor Sleep Hygiene

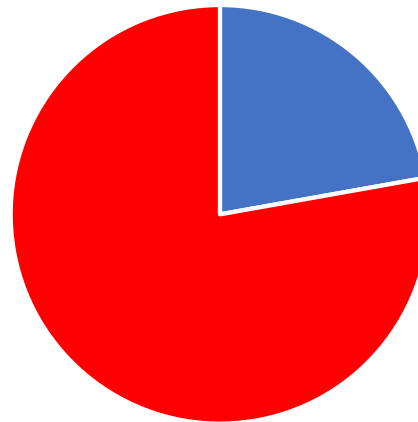


Figure 2: Prevalence of poor sleep hygiene among secondary school adolescents in Yenagoa LGA, Bayelsa state.

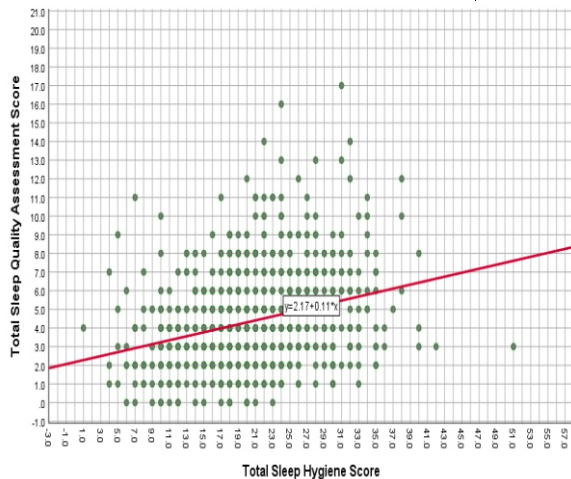
Table 2: Association between sleep hygiene practices and sleep quality among adolescents in secondary schools in Yenagoa LGA, Bayelsa.

Characteristics	Sleep Quality			Chi-square test (pValue)
	Total N=877	Good N=508 (%)	Poor N=369 (%)	
Sleep Hygiene Categories				
Good sleep hygiene	195	152 (77.9)	43 (22.1)	41.25 (0.001*)
Poor sleep hygiene	682	356 (52.2)	326 (47.8)	
I take daytime naps two hours or more				
Never/Rarely	282	176 (62.4)	106 (37.6)	3.45 (0.178)
Sometimes	443	248 (56.0)	195 (44.0)	
Frequent/Always	152	84 (55.3)	68 (44.7)	
I go to bed at different times from day to day				
Never/Rarely	207	138 (66.7)	69 (33.3)	17.76 (0.001*)
Sometimes	336	205 (61.0)	131 (39.0)	
Frequent/Always	334	165 (49.4)	169 (50.6)	
I get out of bed at different times from day to day				
Never/Rarely	274	177 (64.6)	97 (35.4)	7.42 (0.024*)
Sometimes	312	169 (54.2)	143 (45.8)	
Frequent/Always	291	162 (55.7)	129 (44.3)	
I exercise to the point of sweating within 1 hour of bedtime				
Never/Rarely	496	292 (59.1)	203 (40.9)	1.27 (0.530)
Sometimes	223	122 (54.7)	101 (45.3)	
Frequent/Always	158	93 (58.9)	65 (41.1)	
I stay in bed longer than I should, 2 -3 times a week				
Never/Rarely	379	232 (61.2)	147 (38.8)	3.87 (0.144)
Sometimes	312	178 (57.1)	134 (42.9)	
Frequent/Always	186	98 (52.7)	88 (47.3)	
Use alcohol, caffeine, tobacco within 4 hours of going to bed or after going to bed				
Never/Rarely	811	470 (58.0)	341 (42.0)	0.28 (0.869)
Sometimes	40	22 (55.0)	18 (45.0)	
Frequent/Always	26	16 (61.5)	10 (38.5)	
I do something that may wake me up before bedtime e.g play, video games, use of phones and internet				
Never/Rarely	369	244 (66.1)	125 (33.9)	19.41 (0.001*)
Sometimes	280	153 (54.6)	127 (45.4)	
Frequent/Always	228	111 (48.7)	117 (51.3)	
I go to bed feeling angry, upset nervous or angry				
Never/Rarely	382	269 (70.4)	113 (29.6)	46.65 (0.001*)
Sometimes	400	201 (50.3)	199 (49.7)	

Frequen t/Always	95	38 (40.0)	57 (60.0)	
I use my bed for things other than sleeping e.g eat, read, watch, television				
Never/Rarely	274	199 (72.6)	75 (27.4)	41.37 (0.001*)
Sometimes	344	191 (55.5)	153 (44.5)	
Frequent/Always	259	118 (45.6)	141 (54.4)	
My bed is uncomfortable for sleeping e.g poor mattress or pillow, too much or not enough blankets.				
Never/Rarely	632	371 (58.7)	261 (41.3)	3.25 (0.197)
Sometimes	121	74 (61.2)	47 (38.8)	
Frequent/Always	124	63 (50.8)	61 (49.2)	
My bedroom is uncomfortable for sleeping e.g too hot, too cold, too stuffy, too noisy.				
Never/Rarely	391	255 (65.2)	136 (34.8)	15.45 (0.001*)
Sometimes	307	161 (52.4)	146 (47.6)	
Frequent/Always	179	92 (51.4)	87 (47.6)	
I do important work such as studying before bedtime				
Never/Rarely	252	151 (59.9)	101 (40.1)	6.27 (0.044*)
Sometimes	346	183 (52.9)	163 (47.1)	
Frequent/Always	279	174 (62.4)	105 (37.6)	
I think, worry or plan when I'm in bed.				
Never/Rarely	282	197 (69.9)	85 (30.1)	30.34 (0.001*)
Sometimes	295	169 (57.3)	126 (42.7)	
Frequent/Always	300	142 (47.3)	158 (52.7)	

*Statistical Significance

Figure 3: Relationship between Sleep quality and Sleep hygiene scores among adolescents in secondary schools in Yenagoa LGA, Bayelsa state. Correlation co-efficient (r) = 0.29; p – 0.001; r² – 0.083



DISCUSSION

This study observed a high prevalence of poor sleep hygiene among adolescents. The prevalence of poor sleep hygiene in this study is higher than 47.4% reported by Kanyadi *et al*¹⁴ among medical students in Belagavi, India; 44.1% prevalence documented by Sari and Annisa¹⁵ among adolescents in Padang, Indonesia and the 6% prevalence documented by Lakshme *et al*¹⁶ among Malaysian university students. Sari and Annisa¹⁵ utilised the relative delineated testing to gather their data with a poll unlike this study that utilised a standardised validated tool for assessing sleep hygiene. Although the Malaysian study made use of the same tool for assessing sleep hygiene as used in the index study, they used a cut off of 35 or more to indicate poor sleep quality unlike this study that used a cut-off of 16 which is the cut-off validated for use in Nigeria by Seun-Fadipe *et al*.¹² These could have contributed to the marked variation in the prevalence observed in the different studies. This high poor sleep hygiene prevalence among

adolescents in this study requires increased awareness and interventions on good sleep hygiene practices.

In response to the questions that assessed sleep hygiene, majority of the adolescents never took alcohol or smoked within 4 hours of going to bed which is similar to the findings of Singh *et al*¹⁷ and Vinodhini *et al*.¹⁸ The adolescents in this study engaged always or frequently in these poor sleep hygiene practices: going to bed or getting out of the bed at different times from day to day, doing things that may wake them up from sleep, using their beds for things other than sleeping, having uncomfortable bedroom for sleeping, doing important work such as studying before bedtime and thinking or worrying while in bed which is not so different from the reports of Singh *et al*¹⁷ and Balamurugan *et al*.¹⁸ These sleep hygiene practices mentioned above were significantly associated with sleep quality as those who never or rarely engaged in them had good sleep quality.

Additionally, and consistent with previous studies,^{1,5,19,10,11} good sleep hygiene was associated with good sleep quality among adolescents in this study. Lakshme *et al*¹⁶ documented that students with good sleep hygiene had 4.3-fold higher odds of having good sleep quality. Irrespective of the cut-off used in determining sleep hygiene on the sleep hygiene index scale or the type of scale used in assessing sleep hygiene, the above studies show that good sleep hygiene is associated with good sleep quality. Sleep quality was found to be positively correlated with sleep hygiene in this study. As the sleep scores increased, indicating poor sleep quality, the sleep hygiene scores increased too. This means that the poorer the sleep quality gets, the poorer the sleep hygiene practices observed. Gawade *et al*²⁰ Vinodhini *et al*¹⁸ reported higher positive correlation coefficients of 0.46 and 0.57 respectively when compared with 0.29 observed in this study. Gawade *et al*²⁰ studied adults aged 18-25 years while Vinodhini *et al*¹⁸ used a structured questionnaire rather than the PSQI for assessing sleep quality which may have affected their sleep quality scores and in turn the association between sleep quality and sleep hygiene. Also, the weak correlation of sleep quality with sleep hygiene in this study suggests that there could be other factors other than sleep hygiene practices that affect sleep quality which should be explored.

Limitation

The limitation of this study is in its cross-sectional nature that gives a snapshot of their sleep quality, therefore a longitudinal study where these adolescents will be health educated on good sleep hygiene practices and monitored over a period of time to determine if their sleep quality would improve will not be out of place.

CONCLUSION

Sleep hygiene is an important factor affecting sleep quality and awareness on this should be created among the populace. The findings of this study go a long way to suggest that good sleep hygiene practices must be advocated and adopted to reduce poor sleep quality and improve the overall health of the adolescents.

RECOMMENDATIONS

We recommend that parents should ensure that the sleep environment of their adolescents are conducive and

encourage consistent bed time and wake time. Parental supervision and limitation of use of electronics and internet access could help improve their sleep hygiene and consequently their sleep health.

Conflict of Interest

The authors declare that no form of financial or non-financial interest in this study exists.

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