

ORIGINAL ARTICLES

Sleep quality among youngster in Danang city, Vietnam: A cross-sectional study

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ABSTRACT

Objectives: Sleep is a normal physiological process of the body. Sleep impacts on many aspects of health and quality of life at all ages. There are many risk factors associated with sleep deprivation or poor sleep quality: physical health problems such as diabetes and cardiovascular disease; mental health issues like depression; traffic and occupational accident. The study was conducted with the aims of understanding the sleep quality situation of youngster aged 16-30 years in Da Nang City, Vietnam, and determining the factors related to the sleep quality of the study participants.

Methods: A descriptive cross-sectional study was conducted on adolescents living in Da Nang City, Vietnam. The information was collected by using a structured questionnaire. Multivariate logistic regression analysis was used to identify the risk factors associated with the sleep quality among adolescents.

Results: The proportion of the adolescents who suffered from poor sleep quality was 31.1%. The results of multivariate logistic regression analysis indicated that there were the relationships between sleep quality and living in Hoa Vang District; occupations were student, worker, or officer; finishing working/studying time after 7 pm; regularly use and dependent on the internet; having stress; having pressure on study/work, overeating before going to bed, rarely or sometimes staying up late, lying postures were laying up, lie on the left side and other postures; hand posture when sleeping.

Conclusion: The proportion of adolescents living in Da Nang City with good sleep quality was not high. The government needs to propagandize and mobilize people, especially young people in terms of the impacts of sleep quality on health, thereby improving sleep quality to help young people in good condition, helping the country and defending the country.

Keywords: Sleep quality, adolescents, Da Nang City

INTRODUCTION

Sleep is the normal physiological process of the body. It is a quiet time to rest and recover from the stresses of everyday life, but studies have shown that sleep is an activity in which many

important processes take place (1). Sleep affects many aspects of health and quality of life of all ages. There are many risk factors associated with sleep deprivation or poor sleep quality: physical health problems such as diabetes and cardiovascular disease; mental health issues like



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depression; traffic and occupational accident (2). The quality of sleep is determined by a person's satisfaction with their sleep patterns, including the time at which sleep starts, sleep retention, the total of sleep time, and the time it takes to actually wake up (3). A decrease in sleep duration and quality of sleep are related to changes in living habits, abusing of technology, working a lot, and social needs (4). The above reasons are often seen in young people. Studies on sleep quality among university students illustrated that rates of poor sleep quality were increasingly interest. The proportion of students with poor sleep quality in Nigeria in 2011 was 32.5% (3); in Ethiopia, in 2012 was 55.8% (5); in Malaysia in 2013 was 32.9% (6); in Iran in 2016 was 61.7% (7); In Vietnam, the percentage of students with poor sleep quality was 60% at Hanoi University of Public Health in 2014 (8); 49.4% at Hue University of Medicine and Pharmacy in 2016 (9).

There are many reasons lead to the situation of poor sleep quality, including illness, disability, hormone levels, negative environmental influences, physiological disorders, lifestyle behaviors... Nowadays, a cause becoming the highest concern is the Internet addiction, especially among young people.

Young people are powerful social workforce with great potentials and they would contribute to the development of the country. Every country should not only pay attention to physical health, but it also needs to improve mental health, especially in terms of improving the quality of sleep to contribute to the prevention of serious health consequences (1). There have been many studies on sleep quality but most of them are clinical medical studies, there are still few public health studies on sleep quality, especially among adolescents. Therefore, we conducted the research: "Sleep quality among the adolescents in Da Nang City,

Vietnam" with the following two objectives: 1) Describe the quality of sleep of adolescents living in Da Nang City, Vietnam, and 2) Find out some factors related to the sleep quality of research participants.

METHODS

Study design

This study applied the cross-sectional study design

Time and location

Study from March 2017 to June 2017 among youngster aged 16-30 years old living in Da Nang City, Vietnam for at least 12 months.

Sample size and selection of participants

The sample size was calculated by using the formula to estimate population ratios:

$$n = Z^2_{(1 - \alpha/2)} \frac{p(1-p)}{d^2}$$

With $\alpha = 0.05$, $Z^2_{(1 - \alpha/2)} = 1.96$, $d = 0.05$, $p = 0.6$. According to similar research by Le Hoang Minh Son et al., the proportion of students who suffered from bad sleep quality was 60%.

Sample-size was: Since the cluster sampling method is used during the sampling process, therefore, the sample size is multiplied by a design factor of 2. Plus 10% of the sample size to prepare for missing data or case refusals. Therefore, the minimum sample size for the study was 820 people. In fact, the study was conducted on 856 people.

Research variables

The dependent variable: Sleep quality of adolescents within 1 month followed the PSQI scale including 7 parts based on 19 questions (10).

The independent variables:

- Socio-demographic characteristics: age, gender, living area, people living with, education level, occupation, marital status, part-time job, income.
- Internet addiction: Based on IAT (Internet addiction Test). Levels of internet addiction were divided into 3 levels: normal (20 – 39 scores), mild (40 – 69 scores), severe (70 –100 scores).

In this study, we divided into 2 levels: controlled level and uncontrolled and dependent level. (11).

- Depression, anxiety, and stress: Using DASS-21 to assess (3).
- Negative psychological occasion: A negative situation caused by one or many bad events occurring within 1 month such as quarreling with family members, quarreling with a partner, working/studying stress (yes/no).
- Others: Habits before sleeping, staying up late, smoking, consuming alcohol, sleep posture.

Data collection

Data collection process included 2 stages. In the first stage, a center district was chosen randomly (representative for urban area) in 6 center districts and an outside district (representative for rural area) in 2 rural districts. In the second stage, choosing randomly 2 wards in each selected district. We made a list of all the people aged 16-30 years and selected subjects in the study sample by single random method.

Data analysis and statistical method

SPSS version 18.0 was used for all statistical analyses. The differences between sleep quality and respondents' features were compared by using the Chi-square test. We conducted multiple regression analyses to address factors associated with levels of sleep quality.

Ethical consideration

The ethical approval of our study was obtained from the Ethical Committee of Hue University of Medicine and Pharmacy in Vietnam (Decision No H2016/047). Participation in this study was voluntary. All study participants were fully informed about the study objectives, the main content, and their rights to withdraw at any time without any threats or disadvantages.

RESULTS

Socio-demographic characteristics of the study population

Among 856 participants living in Da Nang City, the percentages of male and female were 46.8% and 53.2%, respectively. The mean age was 21.04 ± 3.96 years old, group age of 16-19 years accounted for the highest proportion, the youngest was 16 and the oldest was 30 years old. The number of people living in Hai Chau and Hoa Vang District was similar. Most of participants attended high school or college, being single and living with family members. About 45.7% and 40.1% of respondents were supported by family and earned their own income respectively. In terms of occupation, the highest proportion was students (58.8%) (Table 1).

Table1. Social-economic status of study participants

Features		n	%
Age	16 - 19	370	43.2
	20 - 24	282	32.9
	25 - 30	204	23.8
Gender	Male	401	46.8
	Female	455	53.2
Living area	Hai Chau District	430	50.2
	Hoa Vang District	426	49.8
Education Level	Under primary school	4	0.5
	Secondary school	66	7.7
	High school	379	44.3
	College	361	42.2
	Postgraduate	46	5.4
Marital status	Single	715	83.5
	Married	136	15.9
	Divorced	5	0.6
People living with	Alone	61	7.1
	Family members (parents or partner)	770	90.0
	Relatives	12	1.4
	Friends	12	1.4
	Others	1	0.1
Income	Earn by themselves	343	40.1
	Support from family	391	45.7
	Both	122	14.3
Occupation	Unemployment	19	2.2
	Students	503	58.8
	Workers	158	18.5
	Officers	63	7.3
	Others	113	13.2

Sleep quality among adolescents in Da Nang City and the related factors

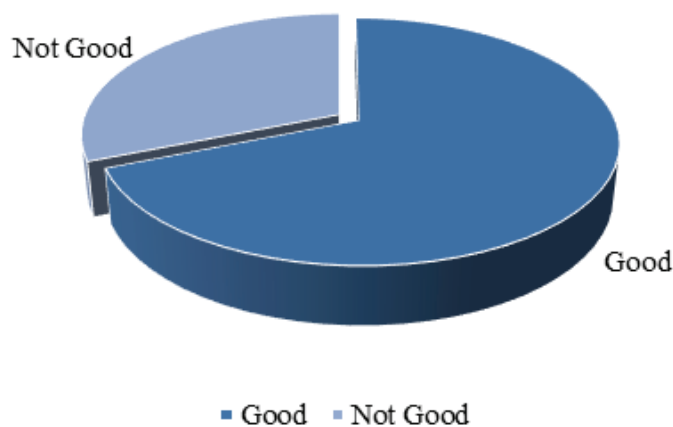


Figure 1. Sleep quality among youngster aged 16-30 years in Da Nang City

In general, among 856 adolescents living in Da Nang City, there were 266 study participants (31.1%) had poor sleep quality.

The result also showed the mean score of PSQI was 3.53 ± 2.57 .

Table 2. Multivariate logistic regression examined the related factors associated with sleep quality among adolescents

Independent variables		OR	95% CI
Living area	Hai Chau District	1	
	Hoa Vang District	1.84	1.20 – 2.82
Occupation	None	1	
	Students	5.52	1.12 – 27.16
	Workers	2.22	1.33 – 3.72
	Officers	2.43	1.32 – 4.48
	Others	2.25	0.94 – 5.41
The end time for study/work	Before 19:00	1	
	After 19:00	0.39	0.26 – 0.57
Level of using Internet	Control usage	1	
	Frequent use and dependence	1.57	1.01 – 2.44
Stress	Normal	1	
	Mild	18.36	4.27 – 79.06
	Moderate	12.77	2.80 – 58.17
	Severe	7.57	1.58 – 36.27

Study/work pressure	No	1	
	Yes	2.04	1.36 – 3.05
Overeating within 2 hours before sleeping	No	1	
	Yes	1.65	1.08 – 2.51
Stay up late	No	1	
	Rarely	3.34	1.27 – 8.73
	Sometimes	2.01	1.16 – 3.48
	Always	1.23	0.81 – 1.86
Sleep posture	On the stomach	1	
	Lay up	7.42	1.13 – 48.72
	Lie on the left side	7.64	1.25 – 46.76
	Lie on the right side	6.09	0.98 – 37.93
	Other postures	10.44	1.59 – 68.56
Hand position	Hands around the head	1	
	Hands stretching down the body	0.058	0.00 – 0.87
	Two hands hugging things	0.062	0.00 – 0.93
	Other hand positions	0.061	0.00 – 0.91

Overall, there were the relationships between sleep quality and living area in Hoa Vang District (OR: 1.84; 95%CI: 1.20-2.82); occupations were students (OR: 5.52; 95%CI: 1.12-27.16), workers (OR: 2.22; 95%CI: 1.33-4.48), or officers (OR: 2.43; 95%CI: 1.32-4.48); finishing working/studying time after 7 pm (OR: 0.39; 95%CI: 0.26-0.57); regularly use and dependent on internet (OR: 1.57; 95%CI: 1.01-2.44); having stress with mild level (OR: 18.36; 95%CI: 4.27-79.06), moderate level (OR: 12.77; 95%CI: 2.8 – 58.17), severe level (OR: 7.57; 95%CI: 1.58-36.27); having pressure on study/work (OR:1.65; 95%CI: 1.36-3.05), overeating before going to bed (OR: 1.65; 95%CI: 1.08-2.51); rarely (OR:3.34; 95%CI: 1.27-8.73) or sometimes (OR:2.01; 95%CI: 1.16-3.48) staying up late, lying postures were laying

up (OR:7.42; 95%CI: 1.13-48.72), lie on the left side (OR:7.64; 95%CI: 1.25-46.76) and other postures (OR:10.44; 95%CI: 1.59-68.56); hand posture when sleeping with hands stretching down the body (OR: 0.058; 95%CI: 0.00-0.87), two hands hugging things (OR: 0.062; 95%CI: 0.00-0.93), and other hand positions (OR: 0.061; 95%CI: 0.00-0.91).

DISCUSSION

Socio-demographic characteristics of research participants

According to the results, the proportion of female respondents was higher than that of male ones, 53.2% and 46.8%, respectively. These results were similar to study of Le

Hoang Minh Son, with 73.6% female and 26.4% male. However, Begum Dag's study showed that there was 42.2% females, by 15.6% lower than males. The average age was 21.04 ± 3.96 , the lowest age was 16 and the highest age was 30 years old. Table 1 showed that 43.2% of research respondents were aged 16-19; the figures for age group 20-24 years and 25-30 years were 32.9% and 23.8%, respectively. Lemma's research showed that the average age was 21 years, the lowest age was 17 years and the highest age was 35 years; in which the age group from 20-24 years old accounted for the highest proportion (88.6%), the group aged 15-19 years accounted for only 5.3% and the group aged 25 and older accounted for 6.2%. There was difference in terms of living area of research subjects. Table 1 also indicated results for the living area that there were 50.2% of participants lived in Hai Chau district (urban area) and 49.8% lived in Hoa Vang district (rural area). While research respondents in Le Hoang Minh Son's study mostly lived in rural areas (52.5%), the remaining lived in urban areas (35.0%) and mountainous areas (12.5%) (8), (9), (12).

In terms of education level, there was 44.3% of research respondents had high and secondary education; 42.2% had college and university degrees; 7.7% had secondary school education; 5.4% had postgraduate qualifications and 0.5% was illiteracy and primary education. Regarding marital status, 83.5% of research respondents were still single; 15.9% got married and 0.6% were separated or divorced. However, this variable was not specifically described in the author's studies because the majority of those studies were done on students.

Table 1 also showed that the majority of research subjects lived with their families,

accounting for 90%. Meanwhile, the result of Le Hoang Minh Son's study showed that a large number of respondents lived alone (8).

The sleep quality among adolescents in Da Nang City

Figure 1 showed the proportion of poor sleep quality among adolescents in Danang City was 31.1%. According to other national studies on sleep quality, this number was quite high. Le Hoang Minh Son's research on students of Hanoi University of Public Health gave a poor rate of sleep quality in this group was 60% (8). Another study on students at Hue University of Medicine and Pharmacy by Nguyen Thi Khanh Linh showed that the proportion of unsatisfactory sleep quality was 49.4% (9). Our research results were much lower than the results of these two studies. The reason for the difference was that the studies of other authors focused on students, and specifically rather than medical students, who are at high risk and more susceptible to learning pressure that affects their sleep quality.

With similar studies on sleep quality using the same PSQI scale of the authors in the world, we have not found any clear research on 16 to 30-year-old people. The majority of the studies also researched on the student group and the results of the incidence of poor quality were quite high. According to a study by Abdullah I. Almojali on 756 medical students of KSAU - HS, the rate of students with poor quality of sleep quality was 76% (13). In different disciplines at two US universities (Sharjah and Gulf Medical Universities), 67.2% of students had poor quality of sleep (14). The rate in the Ethiopian study of 2817 students at the two school campuses was 55.8% (9). This result was similar to that of Le Hoang Minh Son and Nguyen Thi Khanh Linh, but it was much higher than our research results with

the same interpretation when compared with two studies in Vietnam, due to differences in the study participants. Begum DAG's study showed that the sleep quality ratio was not as good as our research with 36.4%. But this study was conducted on a group of junior high school students aged 14-20 years (12).

Factors related to the sleep quality of adolescents in Da Nang City

Living area

According to the multivariate logistic regression model results in Jinsong Chang's study, 26766 participants in Hunan province of China lived in rural areas related to insomnia (15). This was consistent with our research results. Similar results from multivariate analysis (Table 2) showed that people living in Hoa Vang District had 1.8 times higher of poor sleep quality compared to those living in Hai Chau district (OR = 1.84; 95% CI: 1.20 - 2.82). The main reason for this difference could be due to the concentration of industrial factories in the city. Therefore, the production in these factories might affect the sleep quality of the people.

Occupation

The student group had a high rate of sleep unsatisfactory by 5.5 times higher than the non-working or non-studying group (OR = 5.52; 95% CI: 1.12 - 27.163) (Table 2).

The results of this association were similar to those of Wenji Sun among 181,616 participants aged 18-65 years old in China. The study concluded that sleep duration and sleep quality varied among people with different careers in China. Farmers had a longer sleep time than government officials and also farmers had better sleep quality than workers. While this study was not conducted on a similar group with our study in terms

of age and occupational group, the results of this association also reminded an interest in sleep hygiene and labor time in different professions.

End time for study/work

Due to the non-standard distribution results, we selected the 19-hour score as the cutoff point to split into two groups: ≤ 19 hours and > 19 hours for multivariate analysis. The results were given in the multivariate logistic regression model assessing the relationship between the incidence of poor quality of education and the end time of study or work recorded a relationship between these two factors ($p = 0.000$; OR = 0.39; 95% CI: 0.26 - 0.57) (Table 2).

Although there was still no evidence in national and international studies to prove this relationship, we believed that the sooner the study or job ends, the sooner the subject will have time to relax. The extension of time to study or work can put pressure on and sleep quality effect. There should be more studies on this factor on the quality of participants in different age groups or occupational groups to be able to have appropriate study/job end times to ensure the quality of job quality.

Internet dependency level

Table 2 also noted the relationship between the level of Internet dependence and sleep quality of the participants. The risk of bad sleep quality was nearly 1.6 times higher than the group who could control the use of the Internet ($p = 0.046$; OR = 1.57; 95%CI: 1.01 - 2.44). A study in Peru showed that sleep quality among Internet addicts was 30% higher than that of ordinary people. Engaging in activities at night will lead to an increase in melatonin and lead to mental health problems such as depression, stress, and sleep disorders. According to the

research results of Melvyn W.B. Zhang about youth Internet addiction and sleep quality, 21.2% of the participants was diagnosed with Internet addiction; 26.7% of internet addicts also reported that they had difficult sleeping; 77.2% of these participants learned the direction to seek medical care (16).

Stress

The results of multivariate analysis noted the relationship between stress and sleep quality of participants, the participants with mild stress were 18 times more likely to be at risk of poor quality than the normal group ($p < 0.001$; OR = 18.36; 95% CI: 4.27 - 79.06). This relationship was also coincides with Abdullah I. Almojali's study ($p < 0.001$) (17).

Staying up late

Le Hoang Minh Son's study showed that the rate of poor quality of sleep in the group who stayed up late (68.9%) was higher than the group that did not stay up late (8). Through multivariate analysis, the results showed that staying up late was related to sleep quality ($p < 0.001$; OR = 2.79; 95%CI: 1.87 - 4.14). Edward's study also showed there was association between staying up late and sleep quality. However, this study used the ESS scale to evaluate the quality of participants (18).

Sleeping posture

There was a statistically significant correlation between sleep quality and sleeping postures (lying, hands, legs) ($p < 0.05$). The rate of participants who had poor sleep quality with lying on the left when sleeping was higher than the remaining positions (39.9%). This may be explained by the left side-lying affecting the heart, which can interfere with the metabolism and other physiological processes that occur during sleep, leading to the impact of sleep

quality. Through the literature review, we had not found many documents on the relationship between sleeping position and sleep quality. Only the study of Cornelia Wrzus was found, showing the relationship between changing the sleeping position by the hour, the average time of a sleeping position, the number of sleeping positions in 1 hour (each posture lasts more than 15 minutes) ($p < 0.05$) (19). While the results of our research were based on subjective opinions of study subjects about their sleeping position, in addition, how position changed during sleeping, our study did not record. However, within the limitation of a cross-descriptive study, we found that this result could be suited and used as a reference for further future studies on this association.

The bedtime routine

Table 2 showed a statistically significant relationship between sleep quality and the habits of participants such as overeating within 2 hours before going to bed, using a mobile phone, listening to soft music, taking a warm bath. No link with a mild exercise routine was found. This was coincides with the results of Colette S Kabrita (20).

The limitations of this research: The study interviewed subjects directly, so it depended directly on how to assess sleep quality and some behavioral factors. However, we believe that these factors are reduced by the unnamed respondents in the questionnaire and proven toolkit.

CONCLUSIONS AND RECOMMENDATIONS

The rate of poor sleep quality among adolescents was 31.1%. The factors related to the sleep quality of adolescents included living area; occupation; end time for study/

work; Internet usage level; stress level; study/work pressure; overeating within 2 hours before going to bed; staying up late; lying posture and hand posture.

Recommendation: Young people themselves should proactively and actively devise appropriate sleep hygiene measures. Families and relatives need to care, motivate and avoid the pressure on young people, give advice and help when young people have sleep problems. There is also a need for coordination in the implementation of sleep hygiene measures for young people.

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