

## The Effects of Quality of Life and Occupational Performance on Quality of Sleep in College Students

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### Abstract

*The purpose of this study is investigate the effects of quality of life and occupational performance on quality of sleep in college students. Data had been collected from Sep. 1 to Sep. 30, 2021. The subjects of this study were students majoring in occupational therapy at C College situated in C region. For analysis, 103 copies of questionnaire were used. As study instruments, a structured questionnaire incorporating questions about general characteristics, and measurement scales for quality of life, quality of sleep, and occupational performance evaluation were applied. Subjective sleep quality and sleep latency of study participants had lower scores than other components. According to the analysis on different quality of sleep depending on general characteristics, women had more sleep disturbances as they didn't have any part-time job. In terms of the correlation between quality of sleep and quality of life, physical health and total score (quality of life) had correlations with daytime dysfunction. With regard to influential factors on quality of sleep, rest & sleep as a domain of occupational performance and work affected quality of sleep. Students' quality of sleep will be improved if they keep regular habits of living, have rest appropriately for alleviating their stress, and do their jobs with interest and successfully according to a procedure. It is expected that the results of this study will be helpful to care for the health of would-be experts in charge of national health care.*

**Keywords:** *Quality of sleep, Quality of life, Occupational performance, College students*

### 1. INTRODUCTION

Sleep plays a critical role in keeping one's physical and psychological health, and helps to recover from fatigue of the brain and physical cells, to conserve energy and to maintain healthy activities of daily living [1]. American Occupational Therapy Association [2] independently classified the category 'rest and sleep' for healthy and active participation in a different occupational category, and added the activities for sleep and related to sleep participation into the category of occupation in order to emphasize the category of sleep. Sleep is required for physical and mental well-being. Inadequate sleep increases fatigue, anxiety, and other mental disorders, and causes problems with learning and memory ability [3]. As such, sleep is important to all people doing activities of daily living. Therefore, it is necessary to measure 'quality of sleep' in order to see if people have their adequate sleep. Quality of sleep incorporates sleep quantity, sleep latency, the number of awakenings at night, the time to sleep again after awakening, and general satisfaction with sleep [4]. It is

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required to keep good quality of sleep in order to maintain and promote one's health and enjoy activities of daily living. In the present society of information, the quality of sleep in late adolescence and early adulthood emerges as one of common health issues [5, 6].

College students are in the transitional period of their lives, during which they try to establish their identity by being independent on their parents and to prepare to determine a future career [7]. In addition, by adapting themselves to a new environment, they face many different difficulties, with interpersonal relationship, academic achievement, financial stress, employment, and so on [8]. With an increase in their social and academic jobs to do in the period, they are awake late at night. Such living habits as the use of digital products (computer or smartphone) and heavy caffeine intake lead to their sleep pattern changes, including lack of nighttime sleep and dozing in the daytime [6]. In particular, students in the field of health care, like those at department of occupational therapy, are under a lot of stress, compared to students in other fields, due to heavy load of curriculum and learning, fear and burden of clinical practice, and psychological heaviness for state examinations [9]. Anxiety and depression as symptoms related to stress are the most common mental health issues. The more anxiety and depression college students feel, the more their academic ability is decreased. The lowered academic ability increases their anxiety and depression again, triggering a vicious cycle and degrading the quality of sleep [10]. According to a study on college students, the more depression they felt, the lower their quality of sleep was [11]. These problems decrease their quality of life overall, and have the risk of lowering efficiency in their occupational performance. In this aspect, it is important to look into college students' sleep patterns and to find how their quality of sleep affects their quality of life and occupational performance directly in order to raise healthy human resources in the field of health care.

Therefore, this study tries to measure the quality of sleep that students at department of occupational therapy, as one of health care departments, to analyze how quality of life and occupational performance affects their quality of sleep, and thereby to provide a fundamental material that helps these students improve their quality of sleep and keep their physical and psychological health.

## **2. METHODS**

### **2.1 Research period and study subjects**

In this study, a questionnaire survey had been conducted with students at department of occupational therapy in C College situated in Chungcheong province, from Sep. 1 to Sep. 31, 2021. The survey was aimed at finding how quality of life and occupational performance affects quality of sleep. The study subjects selected were those who agreed to participate in the survey and were able to answer questions in the questionnaire. The number of questionnaire copies distributed was 120. A total of 105 copies were collected directly, among which two copies with insincere answers and omitted answers were excluded. Finally, a total of 103 copies were used for analysis.

### **2.2 Instruments**

#### **2.2.1. Korean Version of Pittsburgh Sleep Quality Index (PSQI-K)**

Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse et al. [12] in order to measure quality of sleep. In this study was used Korean version of Pittsburgh Sleep Quality Index (PSQI-K) adapted by Shon et al. [13] in line with domestic environments on the basis of the PSQI. PSQI-K is a subjective assessment instrument to find one's one-month sleep, consisting seven components and ten items. Each component has a three-point scale ranging from 0 to 3. Total score of seven components ranges from 0 to 21. The higher score,

the lower quality of sleep. These seven components are ‘Subjective sleep quality’, ‘Sleep latency’, ‘Sleep duration’, ‘Habitual sleep efficiency’, ‘Sleep disturbances’, ‘Use of sleeping medication’, and ‘Daytime dysfunction’. Over 5 points mean that one’s sleep is problematic. For the reliability of the instrument, Cronbach’s  $\alpha = .83$ . At the time of adaption, Cronbach’s  $\alpha = .84$  [13].

### **2.2.2. WHOQOL-BREF**

WHOQOL-BREF as an instrument to assess quality of life is an abbreviated version of WHOQOL-100 (100 items) suggested by World Health Organization. Domestically, Korean Version of WHOQOL-BREF was developed by Min et al. [14]. WHOQOL-BREF is a self-administered instrument to assess one’s quality of life subjectively for two weeks. It has a total of 26 items: 24 items in four domains (‘Physical health’, ‘Psychological’, ‘Social relationships’, and ‘Environmental’) and two items (overall quality of life). For the reliability of the instrument, Cronbach’s  $\alpha = .89$  [14].

### **2.2.3. Evaluation of Occupational Performance**

For occupational performance, a questionnaire was designed on the basis of ‘Occupational therapy practice framework: Domain and process’ defined by American Occupational Therapy Association [2]. It consists of 32 items in the following domains: ‘Basic activity of daily living’ (8 items), ‘Instrumental activity of daily living’ (8 items), ‘Rest and sleep’ (3 items), ‘Education’ (3 items), ‘Work’ (5 items), ‘Leisure’ (2 items), and ‘Social participation’ (3 items). Each items have a five-point scale ranging from 1 to 5, and the total score ranges from 32 to 160. The higher score, the more independent occupational performance.

## **2.3 Analysis Methods**

For data analysis, SPSS Version 24.0 was used. Descriptive statistics was applied for the mean and standard deviation in each assessment instrument. To find different quality of sleep depending on general characteristics of the participants, independent t-test and ANOVA were conducted. To analyze correlations between quality of sleep, quality of life, and occupational performance, Pearson correlation coefficient was applied. In addition, multiple regression analysis was conducted to look into how quality of sleep affects quality of life and occupational performance. The significance level of statistics was .05.

## **3. RESULTS**

### **3.1 General characteristics of participants**

The analysis on the general characteristics of participants showed the following results: Women (71.8%) outnumbered men. Students aged 22 accounted for the highest percentage (29.1%), followed by those aged 23 (18.4%) and those aged 21 (16.5%). Third-year students accounted for the highest percentage (29.1%), followed by second-year students (26.2%) and first-year students (23.3%). Students who did not have any part-time job (60.2%) outnumbered those who did. Students living with their family accounted for the highest percentage (68.9%) (Table 1).

**Table 1. General Characteristics of Participants (N=103)**

Variable		N(%)
<b>Gender</b>	Male	29(28.2)
	Female	74(71.8)
<b>Age</b>	20	22(21.4)
	21	17(16.5)
	22	30(29.1)
	23	19(18.4)
	≥24	15(14.6)
<b>School year</b>	1	24(23.3)
	2	27(26.2)
	3	30(29.1)
	4	22(21.4)
<b>Whether to do a part-time job</b>	Yes	41(39.8)
	No	62(60.2)
<b>Type of residence</b>	Living with family	71(68.9)
	Living alone	28(27.2)
	Living in dormitory	4(3.9)

### 3.2 Sleep quality score

Table 2 presents seven components of Pittsburgh Sleep Quality Index and the total score. Subjective sleep quality scored  $1.04 \pm 0.66$ ; sleep latency  $1.30 \pm 0.91$ ; sleep duration  $0.41 \pm 0.73$ ; habitual sleep efficiency  $0.37 \pm 0.62$ ; sleep disturbances  $0.87 \pm 0.43$ ; use of sleeping medication  $0.10 \pm 0.46$ ; daytime dysfunction  $0.47 \pm 0.69$ . Subjective sleep quality and sleep latency of the study participants had lower scores than other components (Table 2).

**Table 2. Pittsburgh Sleep Quality Index**

Quality of sleep	M±SD
Subjective sleep quality	$1.04 \pm 0.66$
Sleep latency	$1.30 \pm 0.91$
Sleep duration	$0.41 \pm 0.73$
Habitual sleep efficiency	$0.37 \pm 0.62$
Sleep disturbances	$0.87 \pm 0.43$
Use of sleeping medication	$0.10 \pm 0.46$
Daytime dysfunction	$0.47 \pm 0.69$
Total	$4.59 \pm 0.69$

### 3.3 Different sleep quality depending on general characteristics

The quality of sleep is different depending on general characteristics. The participants' quality of sleep was significantly and statistically different depending on their gender and whether to do a part-time job. For more details, subjective sleep quality was significantly different depending on gender ( $p < .05$ ). Women's subjective sleep quality was low. Depending on whether to do a part-time job, sleep disturbances was significantly different ( $p < .05$ ). Those who did not any part-time job experienced more sleep disturbances (Table 3).

**Table 3. Quality of Sleep According to General Characteristics**

Characteristics	PSQI-K															
	Subjective sleep quality		Sleep latency		Sleep duration		Habitual sleep efficiency		Sleep disturbances		Use of sleeping medication		Daytime dysfunction		Total	
	Mean±SD	p	Mean±SD	p	Mean±SD	p	Mean±SD	p	Mean±SD	p	Mean±SD	p	Mean±SD	p	Mean±SD	p
<b>Gender</b>																
Male	0.75±0.68	.005**	1.03±0.82	.064	0.44±0.82	.791	0.24±0.43	.096	0.86±0.44	.865	0.06±0.25	.606	0.51±0.68	.707	3.89±1.93	.084
Female	1.16±0.61		1.40±0.93		0.40±0.70		0.43±0.68		0.87±0.43		0.12±0.52		0.45±0.70		4.86±2.73	
<b>Age</b>																
20	1.13±0.77		1.13±1.08		0.31±0.71		0.18±0.39		0.81±0.50		0.00±0.00		0.36±0.58		3.95±2.49	
21	1.11±0.48	.346	1.41±1.06	.595	0.52±0.71	.192	0.79±0.19	.065	1.00±0.00	.726	0.00±0.00	.362	0.70±0.17	.345	5.23±2.30	.434
22	1.03±0.55		1.46±0.86		0.33±0.60		0.62±0.11		0.83±0.53		0.23±0.77		0.77±0.14		5.00±3.09	
23	1.15±0.68		1.10±0.87		0.73±0.99		0.73±0.16		0.89±0.31		0.10±0.31		0.45±0.10		4.52±2.26	
≥24	0.73±0.79		1.33±0.61		0.20±0.56		0.41±0.10		0.86±0.51		0.13±0.35		0.89±0.23		4.06±2.01	
<b>School year</b>																
1	1.00±0.78		1.12±0.99		0.41±0.71		0.25±0.44		0.79±0.50		0.04±0.20		0.45±0.72		4.08±2.56	
2	1.18±0.62	.675	1.29±1.06	.602	0.51±0.84	.727	0.37±0.68	.109	0.96±0.33	.502	0.18±0.62	.739	0.51±0.70	.970	5.03±2.68	.586
3	1.00±0.58		1.46±0.86		0.30±0.59		0.60±0.62		0.83±0.46		0.10±0.54		0.43±0.62		4.73±2.61	
4	1.00±0.69		1.27±0.70		0.45±0.80		0.22±0.68		0.90±0.42		0.09±0.29		0.50±0.80		4.40±2.38	
<b>Part-time job</b>																
Yes	0.97±0.68	.366	1.19±1.03	.343	0.56±0.77	.107	0.48±0.67	.152	0.75±0.43	.026*	0.04±0.21	.230	0.39±0.66	.314	4.41±2.49	.570
No	1.09±0.64		1.37±0.83		0.32±0.69		0.30±0.58		0.95±0.42		0.14±0.56		0.53±0.71		4.70±2.61	
<b>Type of residence</b>																
Living with family	1.07±0.66	.885	1.35±0.94	.641	0.40±0.76	.441	0.38±0.61	.914	0.88±0.39	.672	0.09±0.41	.819	0.46±0.67	.729	4.66±2.48	.681
Living alone	1.00±0.72		1.21±0.91		0.50±0.69		0.39±0.68		0.82±0.54		0.14±0.59		0.53±0.79		4.57±2.91	
Living in dormitory	1.00±0.00		1.00±0.00		0.00±0.00		0.25±0.50		1.00±0.00		0.00±0.00		0.25±0.50		3.50±1.00	

\*p<.05, \*\*p<.01, Mean±SD are the comprehensive points of evaluation tool. PSQI-K: Korean Version of Pittsburgh Sleep Quality Index

### 3.4 Correlation between quality of sleep and quality of life

According to the analysis on the correlation between quality of sleep and quality of life, physical health and total score (quality of life) had negative correlations with daytime dysfunction ( $r=-.226, p<.05$ ) (Table 4).

**Table 4. Correlation of Quality of Sleep and Quality of Life**

PSQI-K	WHOQOL-BREF				
	Physical health	Psychological	Social relationships	Environmental	Total
Subjective sleep quality	-.155	-.085	.022	-.057	-.132
Sleep latency	-.069	-.057	.130	-.014	-.053
Sleep duration	.042	.042	-.033	-.011	.018
Habitual sleep efficiency	-.057	.072	.152	.097	.064
Sleep disturbances	-.040	-.140	-.040	-.035	-.122
Use of sleeping medication	-.127	-.189	.027	-.020	-.132
Daytime dysfunction	-.226*	-.163	.017	-.133	-.226*
Total score(Quality of sleep)	-.162	-.113	.083	-.046	-.140

\* $p<.05$ , \*\* $p<.01$  PSQI-K: Korean Version of Pittsburgh Sleep Quality Index

### 3.5 Correlation between quality of sleep and occupational performance

The correlation between quality of sleep and occupational performance was analyzed. BADL had significant correlations with sleep duration( $r=-.208$ ), sleep disturbance( $r=-.265$ ), use of sleeping medication( $r=-.395$ ), daytime dysfunction( $r=-.194$ ), and total score( $r=-.303$ ). IADL had significant correlations with sleep disturbance( $r=-.297$ ), daytime dysfunction( $r=-.329$ ), and total score( $r=-.289$ ) ( $p<.05, p<.01$ ). Rest & sleep had significant correlations with subjective sleep quality( $r=-.302$ ), sleep latency( $r=-.291$ ), sleep disturbance ( $r=-.340$ ), use of sleeping medication( $r=-.357$ ), daytime dysfunction( $r=-.297$ ), and total score( $r=-.471$ ) ( $p<.05, p<.01$ ). Education had significant correlations with subjective sleep quality( $r=-.232$ ), sleep disturbance ( $r=-.423$ ), use of sleeping medication( $r=-.217$ ), daytime dysfunction( $r=-.399$ ), and total score( $r=-.381$ ) ( $p<.05, p<.01$ ). Work had a correlation with daytime dysfunction( $r=-.274$ ) ( $p<.01$ ). Leisure had correlations with subjective sleep quality( $r=-.203$ ), sleep disturbance( $r=-.315$ ), daytime dysfunction( $r=-.322$ ), and total score( $r=-.300$ ) ( $p<.05, p<.01$ ). Social participation had correlations with subjective sleep quality( $r=-.228$ ), sleep disturbance( $r=-.348$ ), and total score( $r=-.203$ ) ( $p<.05, p<.01$ ) (Table 5).

### 3.6 Influential factors on quality of sleep

To find influential factors on sleep quality, multiple regression analysis was conducted in the condition where quality of life and occupational performance were set as independent variables, and quality of sleep as a dependent variable. First of all, multi-collinearity of each variable was verified, and thereby all variables had a smaller Variance Inflation Factor (VIF) than 10, which means that independent variables are mutually independent and there is no problem with multi-collinearity. A value of F, which represents goodness-of-fit of a model, was 4.046, statistically significant ( $p<.001$ ). The variables affecting quality of sleep were physical health ( $\beta=-.222, p<.05$ ) as a domain of quality of life, and rest & sleep ( $\beta=-.452, p<.01$ ) and work ( $\beta=.274, p<.05$ ) as domains of occupational performance (Table 6).

**Table 5. Correlation of Quality of Sleep and Occupational Performance**

PSQI-K	Occupational performance							
	BADL	IADL	Rest & sleep	Education	Work	Leisure	Social participation	Total
Subjective sleep quality	-.037	-.128	-.302*	-.232*	-.072	-.203*	-.228*	-.202*
Sleep latency	-.059	-.085	-.291**	-.190	-.012	-.150	-.117	-.143
Sleep duration	-.208*	-.072	-.162	-.013	.023	-.001	.037	-.070
Habitual sleep efficiency	-.181	-.130	-.147	-.106	.062	-.045	-.021	-.096
Sleep disturbances	-.265**	-.297**	-.340**	-.423**	-.121	-.315**	-.348**	-.378**
Use of sleeping medication	-.395**	-.174	-.357**	-.217**	-.034	-.228	-.063	-.255**
Daytime dysfunction	-.194*	-.329**	-.297**	-.399**	-.274**	-.322**	-.133	-.384**
Total score	-.303**	-.289**	-.471**	-.381**	-.104	-.300**	-.203*	-.364**

\* $p < .05$ , \*\* $p < .01$  PSQI-K: Korean Version of Pittsburgh Sleep Quality Index

**Table 6. Influential Factors on Quality of Sleep**

Independent variables	Unstandardized Coefficients		Standardized Coefficients	<i>p</i> -value	
	B	Std.Error	Beta( $\beta$ )		
WHOQOL-BREF	Physical health	-.134	.065	-.222	.043*
	Psychological	.020	.086	.032	.812
	Social relationships	.188	.158	.134	.235
	Environmental	.027	.073	.041	.711
Occupational performance	BADL	.022	.114	.024	.848
	IADL	-.054	.083	-.084	.514
	Rest & sleep	-.660	.203	-.452	.002**
	Education	-.356	.185	-.354	.058
	Work	.149	.065	.274	.025*
	Leisure	.279	.287	.177	.334
	Social participation	-.023	.121	-.018	.852

Dependent variable: Quality of sleep

$R^2 = .328$ , Adjusted  $R^2 = .247$ ,  $F(p) = 4.046^{***}(.000)$

\* $p < .05$ , \*\* $p < .01$

#### 4. DISCUSSION

This study tried to find how college students' quality of life and occupational performance affect their quality of sleep in college students. As shown in the average score for quality of sleep, the study participants' subjective sleep quality and sleep latency were scored lower than other components. Unlike their adolescence, school life in college changes their behavioral ways or living patterns much. For example, their daily schedule is free and they drink and smoke more often [15]. In addition, since they perform academic tasks late and leisure activities late at night or until the break of day, they are easily apt to have the habit of irregular sleeping

[16]. Spending more time using smartphones for internet or mobile games is highly related to their poor quality of sleep [17]. In particular, using a smartphone before sleep is known to trigger brain arousal and negatively affect sleep [18]. The results from these studies prove the result of this study according to which college students' subjective sleep quality and sleep latency were scored low.

Different quality of sleep was analyzed depending on general characteristics. Quality of sleep was statistically and significantly different depending on gender and whether to do a part-time job. Women's subjective sleep quality was scored lower than that of men. The study participants who didn't have any part-time job had more sleep disturbances. According to the study on stress of students in a college of health, conducted by Park [7], female students had a higher level of stress than male ones. The factors causing stress included economic state, academic record, getting a job, and relationship with the opposite sex, and were more vulnerable to female students. The more stress, the lower quality of sleep, and the higher obesity rate and the higher risk of cardiovascular diseases. Given that, it is necessary to pay attention to stress control of female students in a college of health, who feel a high burden of learning. This study was conducted in the COVID-19 circumstance where students had non-contact school life, and many students failed to do external activities due to social distancing. Buyn [19] researched female adults' quality of sleep. According to his study, the more frequency of workout per week, the shorter sleep latency and the higher subjective sleep quality. Due to COVID-19, most students lessened their external activities and physical activities. In such a situation, students who did a part-time job had social life and physical activities. Therefore, they had fewer sleep disturbances than those who stayed at home.

The correlation between quality of sleep and quality of life was analyzed. Among domains of the quality of life, physical health and total score (quality of life) had negative correlations with daytime dysfunction. Irregular life and doing tasks and other activities late at night cause the problem of physical health, which can lead to dozing in the daytime [20]. Daytime sleepiness generates the habit of napping and reluctance to get up, which causes sleep disturbances in a long time. The repetition of such a pattern not only causes students' lack of concentration, but the problem with their learning ability, which induces students' stress in a long time. In short, a vicious circle continues. Daytime sleepiness can be overcome through the behavior therapy to correct one's behavioral habit of disturbing sleep [21]. It is necessary to educate the students with the problem attentively.

The correlation between the components of quality of sleep and the domains of occupational performance was analyzed. Most of them had negative correlations. Based on the result, influential factors on quality of sleep were analyzed. Rest & sleep and work, among the domains of occupational performance, particularly affected quality of sleep. According to the study conducted by Kang [22], rest gives people opportunities to keep physical strength and health, to reduce stress, to recover concentration and willingness, and to get adapted to social life. Adequate rest helps to obtain peace of mind, and to improve quality of life through relaxed mind. In Korea, 43.1% of adults who felt depression were found to think of suicide. Among them, a lot of people had short sleep hours (1 to 4 hours). It is found that people's emotional problem greatly affects their quality of life and quality of sleep. Students going to college of health have a lot of burden in the processes of preparing to obtain a license, such as harsh curriculum and employment, and thus they feel anxiety and depression in school life [23]. Adequate rest is the most important for their positive mental state. It is necessary to provide information on rest in health and make steady support.

In various domains of occupational performance, work significantly affects people's quality of life as well as their physical and psychological health. The domains of the work surveyed in this study included 'participation in what is interested, doing jobs according to time and procedure, and search for voluntary work and participation'. Querstret and Cropley [24] analyzed the relation between quality of sleep and work, and



revealed that poor quality of sleep increased fatigue at the time of doing a job. In other words, the failure to securing quality of sleep increases fatigue at work, and leads to poor work ability, which supports the result of this study. People's work efficiency and quality of sleep are improved if they do jobs with interest and successfully according to a procedure.

This study has the following limitations. The study participants are limited to Chungcheong province. Therefore, it is hard to generalize the study results for all students at department of occupational therapy across the nation. The future research will be conducted with students majoring in occupational therapy in the nation. Moreover, the subjects of the study will be expanded to students at different departments representing college of health in order to find influential factors on sleep. Such research is expected to help would be experts on national health care manage their health.

## 5. CONCLUSION

This study tried to measure college students' quality of sleep, and to find how their quality of sleep affects their quality of life and occupational performance. Given the quality of sleep scores, the study participants' subjective sleep quality and sleep latency had lower scores than other components. As shown in the results from the analysis on different quality of sleep depending on general characteristics, women and those who did not have any part-time job experienced more sleep disturbances. According to the correlation between quality of sleep and quality of life, physical health and total score (quality of life) had correlations with daytime dysfunction; quality of sleep had correlations with most domains of occupational performance. Influential factors on quality of sleep were rest & sleep and work. In conclusion, if students keep their regular habit of living, reduce their stress through adequate rest, and do their jobs with interest and successfully according to a procedure, their quality of life will be improved.

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