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The Study of the Correlation between Cognition Function and Quality of Sleep in the Elderly

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Abstract

Background/Objectives: Sleep function affects human health,Recently, studies on various variables affecting mental health management and cognitive function of elderly people are being actively conducted due to the increase of elderly population. The purpose of this study was to investigate the correlation between cognitive function and quality of sleep in the elderly.

Method/Statistical Analysis: The participation was 33 normal elders over 65-year-old. Cognition function was evaluated with the Montreal Cognitive Assessment (MoCA), and quality of sleep was evaluated with sleep Scale A. The data were then analyzed for frequency and correlation by using statistical software (SPSS 21.0).

Findings: The average age of the study subjects was 82.4 years. The average MoCA score was 17.1±3.8 and sleep scale A score was 29.6±8.9. The results of MoCA and sleep scale A showed a positive correlation($r = .417$, $p<.05$).

Improvements/Applications: The results of the study show that the lower the quality of sleep in the elderly, the lower the cognitive function. The results of this study will discuss whether sleep quality can be used to predict mental health in older adults.

Keywords: *MoCA, Sleep Scale A, Elderly, Cognition, Correlation.*

Introduction

Sleep affects various factors in human health. Sleeping an average of 7 hours a night, average sleep quality was better related to health, affect balance, satisfaction with life, and feelings of tension, depression, anger, fatigue, and confusion than average sleep quantity[1].Sleep disorders in the elderly are a common problem, show various symptoms such as difficulty sleeping and maintaining sleep, frequent arousal, frequent use of sleeping drug, and excessive daytime sleepinesss[2].

In the study of factors affecting the quality of sleep of the elderly in the community, there were significant differences in sleep quality between income, exercise time, and subjective health and higher the depression, the lower the quality of sleep[3]. As the elderly population increases, studies on various variables affecting mental health management and cognitive function of the elderly are being actively conducted. The analysis of factors related to mental health of the elderly showed that the higher quality of life, the less stress, depression, and suicidal thoughts[4].

Changes in cognitive function in old age vary from person to person, but Changes in cognitive function according to the normal aging process and disease of dementia are important social issues. Recently, studies

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on the correlation between cognitive decline and sleep in the elderly have been actively conducted. However, the majority of studies have been conducted on subjects that show decreased cognitive function, such as dementia[5-7].

We recognized the need for the study of the correlation between cognitive function and sleep quality in normal elderly people. The purpose of this study was to evaluate MOCA and sleep scale A of normal elderly, to measure cognitive function and sleep quality, and to investigate the relationship between cognitive function and sleep quality.

Method

This study is correlation study. The purpose of this study is to investigate the cognitive function and sleep quality of the elderly, to identify the correlation between cognitive function and sleep quality.

This study surveyed 40 elderly people over 65 years old. The subjects is normal elderly who performed independent activity of daily living (ADL), not have impaired hand function due to past medical history. The subjects of this study are as follows. Those who understand the purpose of this study, agree to participate, and respond appropriately to the evaluation items. We visited the senior welfare center, explained the evaluation tool and the purpose of the study to the facility manager, and received permission and cooperation to proceed with the research.

The Montreal Cognitive Assessment (MoCA) is an assessment tool developed to screen patients with mild cognitive impairment (MCI). The assessment takes 10 minutes and is a 30-point cognitive screening test. Evaluation items are as follows; Visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, orientation. MoCA is a screening tool useful for detecting mild dementia or MCI in subjects with a score of 25 or higher on the Mini-Mental State Examination (MMSE).The use of this assessment tool can identify older people at risk of developing dementia in older people who have been diagnosed with MCI[8-9].

The Sleep Scale A is a questionnaire consisting of 15 questions to measure the quality of sleep. Available for all age groups, each question describes symptoms of sleep quality. The details of the question are whether it takes long to fall asleep or sleepy after waking up in the morning. The response consists of a Likert 4 point scale, ranging from 1 point is 'almost always' to 4 point is 'almost naver'. The score is a minimum of 15 and a maximum of 60, which means that the higher the score, the higher the quality of sleep. Cronbach's αis 0.75[10].

In this study, 7 of the 40 responses were excluded from insufficient data and 33 data were analyzed. SPSS 21.0 Version program was used, and the general characteristics of the subjects, MoCA, and the quality of sleep were used descriptive statistics. The correlation between MoCA and sleep quality was analyzed by Pearson's Correlation Coefficients.

Result and Discussion

1. **General characteristics of the subjects:** The general characteristics of the study subjects are as follows. 45.5% were male and 54.5% were female. The most common age group was 80 years of age and older (60.6%). In the past year, 66.7% of patients visited the hospital, 27.9% of the subjects had arthritis. 84.8% subjects did not smoke and 75.8% did not drink alcohol[Table 1].
2. **MoCA and sleep scale A score of participants:** The MoCA and sleep scale A scores of the participant were as follows. The average score of cognitive function was 17.1±3.8, and the quality of sleep was 29.6±8.9[Table 2].

Table 1. General characteristics of participants (N = 33)

Characteristic	Categories	N(%)
Gender	Male	15(45.5)
	Female	18(54.5)
Age	70-74	6(18.2)
	75-79	7(21.2)
	More than 80	20(60.6)
Diseases	No	12(36.4)
	Arthritis	9(27.3)
	HTN	3(9.1)
	Diabetes	2(6.0)
	Heart disease	1(3.0)
	etc	6(18.2)
Smoking	No	28(84.8)
	yes	5(15.2)
Drinking	No	25(75.8)
	yes	8(24.2)

Table 2. MoCA and sleep scale A score of participants (N = 33)

Categories	M±SD
MoCA	17.1±3.8
Sleep scale A	29.6±8.9

The differences of cognitive function and sleep quality according to smoking and drinking were examined. First, the difference of cognitive function and sleep quality according to smoking status was checked. The non-smoking group had higher sleep quality score than the smoking group, but there was no significant difference. On the other hand, the smoking group showed a higher cognitive function score than the non-smoking group, but there was no significant difference. Second, the cognitive function and sleep quality according to drinking status were checked. The drinking group had higher scores of cognitive function and sleep quality than the non-alcohol group[Table 3].

Finally, the correlation between MoCA and sleep scale A scores were as follows and there was a significant positive correlation($r = .417$, $p<.05$)[Table 4].

Table 3. Differences in cognitive function and sleep quality according to smoking and drinking

Categories	Group	N	MoCA	Sleep scale A
Smoking	Non-smoking	28	16.9±3.9	29.9±9.2
	smoking	5	17.6±3.3	28.0±7.5
Drinking	Non-Drinking	25	16.64±4.0	28.92±9.0
	Drinking	8	18.38±2.8	31.63±8.8

Table 4. Correlation between MoCA and sleep scale A

	MoCA	quality of sleep
MoCA	1	.417*
Sleep scale A	.417*	1

*$P< .05$

Discussion

The results of this study find that there was a positive correlation between cognitive function and sleep quality. Recently, research on the relationship between cognitive function and sleep has been an issue. However, most of the studies were based on subjects with diseases such as chronic respiratory disease or mild cognitive impairment. This study is meaningful because it is a result of the correlation between cognitive function and sleep quality in normal elderly people.

Review the results of the preceding study. First, the analysis of the relationship between sleep quality, cognitive function, depression and daily activities of the elderly in long-term care facilities showed no correlation between sleep quality, cognitive function, depression and daily activities, but depression and cognitive function[11].

The second study confirmed the nighttime sleep polymorphism test and cognitive function in normal elderly and MCI group. As a result, there was no significant difference in nighttime sleep characteristics between the two groups, but it was confirmed that working memory was decreased in the normal elderly who had difficulty maintaining nighttime sleep. In this study, the majority of the problems of subjects with low scores on sleep quality are nighttime sleep difficulties[12].

The third study examined the correlation between sleep quality and cognitive function in patients with chronic respiratory disease and found a significant correlation between sleep patterns and cognitive function[13].

Next we will discuss the qualitative data of this study. Sleep disorders of the subjects with low scores in sleep scale A include: Sleep apnea, insomnia, often wake up at night. Two people who had low scores on sleep quality were taking sleeping pills for insomnia. Others said they could not sleep unless they consume alcohol. In a study that investigated the quality of sleep in older adults,The items with the lowest score were 'get up often' and 'it's hard to fall asleep' after waking up[3]. This is similar to the results of this study.

The suggestions of this study are as follows. First in this study, there was no statistically significant difference, but further research is needed to investigate the cognitive function and quality of life according to alcohol consumption and smoking. Second, it is necessary to study the detailed correlation between s factors of cognitive function and sleep quality. Third, based on the results of this study, we hope that future sleep quality can be used as an index for predicting mental health of the elderly.

Conclusion

The purpose of this study was to investigate the relationship between cognitive function and sleep quality in normal elderly people. MoCA was used to check

cognitive function, and Sleep Scale A was evaluated to check sleep quality.

As a result of measuring the cognitive function and sleep quality of the normal elderly, it was confirmed that there is a correlation between the cognitive function of the elderly and the amount of sleep.

The previous study also confirmed that there is a correlation between cognitive function and sleep quality. This study is meaningful in that it prepared basic data for utilizing the sleep quality of the elderly as an index for predicting mental health..

Further research is needed to determine the relationship between component of cognitive function and sleep quality.And It will need to expand the number of study subjects.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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