Research Paper
The Role of Stroop Performance in Predicting Sleep Quality and Quality of Life in the Elderly

*Esmaeil Sadri Damirchi[1] ⬤, Taghi Akbari[2] ⬤, Arezoo Mojarrad[1] ⬤, Sanaz Behbuei[3] ⬤

1. Department of Counseling, Faculty of Educational Sciences and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.
2. Department of Educational Sciences, Faculty of Educational Sciences and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.
3. Department of Psychology, Faculty of Education and Psychology, University of Tabriz, Tabriz, Iran.

ABSTRACT

Objectives Today, the life expectancy of elderly people has increased all over the world. The purpose of this study was to investigate the role of attention performance in predicting the elderly's sleep quality and quality of life.

Methods & Materials The research design was descriptive correlational. The statistical population consisted of all elderly men over 60 years of age who live in the nursing homes of Ardabil City, Iran, in 2017. Out of them, a sample of 200 individuals was selected by the available sampling method. Pittsburg sleep quality questionnaire, the World Health Organization quality of life and Stroop questionnaire were used for data collection. The obtained data were analyzed by the Pearson correlation and regression analysis in SPSS-21.

Results The findings showed that the Mean±SD of the subjects' age was 66.47±6.756 years and their quality of life and sleep quality Mean±SD scores were 73.95±21.41 and 5.55±6.36, respectively. Also, the Mean±SD scores of Stroop cards of error, correct, response, and interference were 6.54±8.52, 94.48±7.37, 121.56±61.33, and 50.44±58.08, respectively. The results of the Pearson correlation and regression analysis showed a significant relationship between performance in the Stroop test and the manner of attention with the quality of sleep and quality of life (P<0.01, β=0.351), and the way in which attention is given in the Stroop test can predict the quality of sleep (P<0.001) and quality of life (P<0.001, β=0.308).

Conclusion The performance of the Stroop test in the elderly by conducting training and performing different therapeutic classes will improve their quality of life and sleep quality.

Extended Abstract

1. Objectives

Aging is a natural process of life that occurs due to gradual changes in metabolic activities of the organs and the inability of cell regenerative capacity. According to the World Health Organization (WHO) report, there are currently 600 million elderly people living around the world and their number is expected to be doubled by 2025 and reach 2 billion by 2050 [1]. So WHO has named this century for aging and its slogan for 2012 was "Good health adds life to years" [2, 3]. Considering the increasing population of the elderly and the many problems that associate with this population, the purpose of this study was to investigate the

* Corresponding Author:
Esmaeil Sadri Damirchi, PhD.
Address: Department of Counseling, Faculty of Educational Sciences and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.
Tel: +98 (45) 31505644
E-mail: e.sadri@uma.ac.ir

role of attention performance in predicting the quality of sleep and quality of life in people aged over 60 years.

2. Methods & Materials

This is a descriptive correlational study. The study population consisted of all older adults aged over 60 years living in the elderly nursing homes in Ardabil City, Iran in 2017. Using a convenience sampling method, 200 older people were selected as study samples. For collecting data, the following tools were used:

Stroop effect test

This test was introduced by Stroop in 1935 for measuring selective attention and cognitive flexibility. Since then, different types of test have been presented. The reliability of this test for the first and second cards is 0.88 and for the third and fourth cards is 0.80 [4].

Pittsburgh Sleep Quality Index (PSQI)

This questionnaire was designed by Buysse and his colleagues in 1989 and has 18 items scored from 0 to 3, where score 3 indicates negative state and 0 positive state. For measuring sleep quality, their scores are summed up, where the scores 0-4 indicate good quality and score 5 or greater shows poor quality [5]. PSQI has an internal consistency coefficient of about 0.80, and the test-retest reliability of its Persian version is between 0.93 and 0.98 reported by Pakpour et al. [6, 7].

The World Health Organization Quality of Life (WHOQOL)-BREF

This questionnaire has 26 items rated based on 5-point Likert-type type scale. The score of each domain ranged from 0 to 100; higher scores show a better quality of life. Reliability of its Persian version for normal people in Teh-

ran was reported more than 0.70 which proves the repeatability of this test. It also has a Cronbach α coefficient of more than 0.70. The validity of this questionnaire is also acceptable in all domains [8].

The collected data were analyzed using regression analysis and the Pearson correlation test, where the significance level was set at 0.05 ($P<0.05$).

3. Results

The Mean±SD age of the participants (married) was 66.47±6.576 years. Table 1 presents descriptive statistics for the variables of Sleep Quality (SQ), Quality of Life (QOL), and Stroop effect test components. As seen, the Mean±SD QOL score was 73.95±21.41, and the Mean±SD SQ score was 5.55±6.36. After performing Stroop task, the obtained Mean±SD scores of error, correct answer, reaction, and interference were 6.54±8.52, 94.48±7.37, 121.56±61.33, and 50.44±58.08, respectively.

The Pearson correlation test was carried out to examine the relationship between QOL and SQ with Stroop performance. Before that, the normality of data distribution was confirmed by the Kolmogorov-Smirnov test. Table 2 presents the results of the Pearson correlation test. According to the results, there is a significant relationship between error, correction, and interference in the Stroop test and QOL, while SQ had a significant correlation with error and correction in the Stroop test. Hence, with the increase of attention in performing Stroop test, sleep quality and quality of life of older adults can be improved and vice versa.

For examining the role of Stroop performance in predicting QOL and SQ among subjects, regression analysis was used (Table 3). The coefficient of determination in the regression model for OOL and SQ were 0.390 and 0.690, respectively. Based on beta coefficient values, one unit in-

Table 1. The mean and standard deviation of study variables

Components	Mean	SD
QOL	73.95	21.41
SQ	5.55	6.36
Error (Stroop task)	6.54	8.52
Correct (Stroop task)	94.48	7.37
Reaction time (Stroop task)	121.56	61.33
Interference (Stroop task)	50.44	58.08

QoL: Quality of Life, SQ: Sleep Quality.

Table 2. The Pearson correlation test results for comparing QOL and SQ with Stroop performance

Stroop Performance	QOL	SQ
Error	-0.868*	0.946*
Correct	0.568*	-0.595*
Reaction	-0.110	0.044
Interference	-0.223*	0.083

QoL: Quality of Life, SQ: Sleep Quality

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*P<0.01

Table 3. Regression analysis results for predicting QOL and SQ based on Stroop performance

Dependent Variable	Independent Variables	B	SE	β	t	R²	P
Stroop performance	QOL	0.106	0.031	0.308	3.38	0.390	0.001
	SQ	0.405	0.105	0.351	3.86	0.690	0.000

QoL: Quality of Life, SQ: Sleep Quality.

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crease in Stroop performance increases QOL and SQ levels 30.8% and 35.1%, respectively.

4. Conclusion

Based on the results, Stroop performance is significantly related to sleep quality. This result is consistent with the results of Tsapanou et al. [9] and Engleman and Douglas [10]. It was also found out that Stroop performance had a relationship with quality of life which is in agreement with the findings of Gathright et al. [11] and Ediebah et al. [12] studies. The Stroop performance was able to predict sleep quality and quality of life of the elders. Therefore, by providing training programs and performing different group therapies, the Stroop performance can be improved in the elderly, thereby indirectly increasing their quality of life and sleep.

Ethical Considerations

Compliance with ethical guidelines

In order to comply with the research ethics, after selecting study samples, the purpose of study was explained to the participants and they were free to withdraw from participation in the study at any time.

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