



CORRELATION RESEARCH BETWEEN COGNITIVE IMPAIRMENT AND QUALITY OF LIFE IN PATIENTS WITH MULTIPLE SCLEROSIS.

Dr. Sumayya
Shaikh

ABSTRACT

AIM OF THE STUDY: The present study focused to correlate between cognitive impairment and quality of life (QoL) in patients with multiple sclerosis (MS).

MATERIALS AND METHODS: A descriptive , correlation research was conducted for a period of 4 months . A total of 30 patients with multiple sclerosis , both males and females, married and between the age group of 21 to 60 years with education of at least higher secondary grade and above were included in the study . Data was analyzed for cognitive impairment and QoL using mini-mental status examination (MMSE) and quality of life-54 questionnaire (MSQoL-54) respectively.

RESULTS : Among 30 subjects with MS , 8 were males and 22 were females. The gender distribution of cases studied were not significant ($p < 0.10$) for males ($p = 0.2732$) whereas it was significant for females ($p = 0.051$). The age distribution of cases studied was not significant ($p < 0.10$) for any age groups ($p = 0.42, 0.17, \text{not acceptable and } 0.14$). The value for correlation between MMSE and QoL scores was analyzed using Pearson's correlation coefficient which showed there was moderately positive correlation ($r = 0.3595$) between MMSE and QoL. Correlation was found to be significant ($p < 0.10$) as the P value was ($p = 0.051$).

CONCLUSION: The present study concluded that there was a significant positive correlation between cognitive impairment and QoL in patients with multiple sclerosis. Thus, cognitive impairment can negatively impact the quality of life in these patients.

KEYWORDS : Multiple sclerosis, cognitive impairment, quality of life .

INTRODUCTION

Multiple sclerosis (MS) is a chronic autoimmune, inflammatory neurological disease of the central nervous system . MS attacks the myelinated axons in the central nervous system, destroying the myelin and the axons to varying degrees. The course of MS is highly varied and unpredictable. In most patients, the disease is characterized initially by episodes of reversible neurological deficits, which is often followed by progressive neurological deterioration over time. MS typically presents in adults 20 to 45 years of age; occasionally, it presents in childhood or late middle age.^[1]

This pathologic condition affects women more than men (sex ratio 2.5:1) and the prevalence varies by geographic area, ranging from 120 per 100,000 individuals. The etiology of MS remains unclear, however it can be considered to be a multifactorial disease and include a genetic predisposition combined with environmental influences.^[2]

MS expresses itself in four clinical forms namely relapsing remitting MS , secondary progressive MS , primary progressive MS , and progressive relapsing MS . Approximately 87% of patients present with relapsing remitting MS, characterized by acute attacks (relapses) followed by partial or full recovery (remission) . Patients can manifest with a heterogeneous group of symptoms including changes in vision (unilateral visual loss, diplopia), weakness, incoordination, sensory loss or distortions, or changes in bowel and bladder function, cognitive changes, fatigue, and mood disturbance. Progression of disease may eventually lead to severe disability.^[3]

Cognition represents the function of several neural pathways involved in the processing of information in the brain, including several correlated and interdependent cognitive domains such as executive function, perceptual-motor function, language, learning and memory, complex attention, and social cognition. Cognitive impairment affects 40–60% of patients with multiple sclerosis.^[4]

The Mini Mental State Examination (MMSE) created by Folstein et al in 1975 is a tool that can be used to systematically and thoroughly assess mental status. It is a 11 questions measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall and language. The maximum score is 30.^[5]

Quality of Life (QoL) is a multi-dimensional construct which consists of at least three broad domains: physical, mental and social. In the field of medicine researchers and physicians have often used health-related quality of life concept which specifically focuses on the impact of an illness and/or treatment on patients' perception of their status of health and on subjective well-being or satisfaction with life.^[6] A large number of studies have demonstrated that patients with MS have poorer quality of life than that of the general population.^[7]

Multiple Sclerosis Quality of Life-54 (MSQoL-54) can be considered as the most known disease-specific instrument for the evaluation of quality of life in patients with multiple sclerosis . It was developed to combine generic quality of life aspects of the SF-36 with MS-targeted dimensions and ratings for the overall quality of life. Therefore, 18 disease-specific items were added to the original 36 items of the SF-36. The 54 items are divided into 12 multi-item and 2 single-item scale.^[8]

While the nature of the cognitive dysfunction is relatively well described, prior studies done to find relationship between cognitive impairment and QoL in MS have been contradictory.^[9]

Therefore, the present study aimed to find the correlation between cognitive impairment and quality of life in patients with multiple sclerosis.

MATERIALS AND METHODS

A descriptive , correlation study was undertaken after the approval from the institutional ethical committee. The study was conducted for a total duration of 4 months. References of 30 Patients with MS were requested from the neurologists and the multiple sclerosis society of Mumbai and pune city. The patients were included in the study through convenient sampling method. Before recruiting the subjects in the study a written informed consent was obtained from each one of them. MS patients both males and females, married and aged between 21 to 60 years with education of at least higher secondary grade and above were included in the study. Patients with any past or present history of neurological problems other than MS such as stroke, parkinsonism, traumatic brain injury etc or /and complete auditory, visual and language or speech deficits and loss of functional mobility of hand which would prevent them from writing were excluded from the study. Assessment of cognitive function

and QoL was done using MMSE and MSQoL-54 questionnaire respectively for each patient. The MMSE was initially conducted followed by MSQoL-54 questionnaire. The MMSE and MSQoL-54 questionnaire were available in both English and Hindi languages for the convenience of the patients. Scoring was then done on the pretext of the questions which the subjects have answered.

RESULTS

Statistical analysis for demographic data was done using two-tailed unpaired t-test. P values of <0.10 were considered to be statistically significant. Pearson's correlation coefficient value was used for correlation of cognitive impairment and quality of life in MS patients. P value was used to analyze the level of significance of the correlation. P value of < 0.10 was considered to be statistically significant.

Table 1

Gender	Number of Subjects (n=30)	P-value
Male	8	0.2732
Female	22	0.051

Table 1 showed demographic data which included gender distribution. P value was significant for females (p=0.051) and no significance was found for male (p=0.2732). P-value<0.10 is considered to be statistically significant.

Table 2

Age	Number of Subjects (n=30)	P-value
21-30	6	0.427
31-40	12	0.176
41-50	2	NA
51-60	10	0.143

Table 2 showed demographic data which included age distribution . P value was not significant for any age groups (p= 0.42, 0.17, not acceptable and 0.14).

Table 3

Pearson's correlation coefficient value (MMSE and MSQoL-54)	P-Value
0.3595	0.051

Graph.1

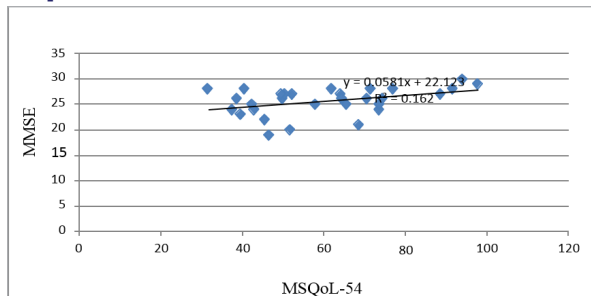


Table 3 and graph 1 showed there was moderately positive correlation between MMSE and MSQoL-54 scores . Pearson's correlation coefficient value was (r=0.3595) .The correlation was found to be significant with P value 0.051 .

DISCUSSION

The present study was targeted to correlate cognitive impairment and quality of life in patients with multiple sclerosis. The outcomes used were MMSE and MSQoL-54 questionnaire to measure cognitive function and QoL respectively in patients with MS.

There is increasing (but not yet universal) agreement that reduced processing speed is the fundamental cognitive deficit in MS. Processing speed affects the ability to maintain and manipulate information. Processing speed and working memory are the cognitive processes most likely to be affected in MS. Long-term memory function is also

commonly impaired and particularly the primary registration of information has now been identified as the core deficit in MMSE MS. People with MS have often found to be poor on tests of problem-solving, especially when flexibility is required. [10]

The results of the present study showed there was moderately positive correlation between MMSE and MSQoL-54 scores which inferred that low score on MMSE were associated with low scores on MSQoL-54 questionnaire, thereby demonstrating that cognitive impairment can result in lower QoL in MS patients.

Although a study done by Baumstarck-Barrau et al demonstrated there was weak and scarce association between cognitive impairment and QoL, the author did comment that the results needed to be confirmed with larger samples and more accurate tests of cognitive function. [9]

A study conducted by Barker Collo SL, however stated that individuals with MS experience difficulties in cognition related to information processing speed (IPS). Cognitive ability (IPS) may be predictive of health related QoL .It makes sense that slowing of IPS will impact on individual's ability to complete tasks and to cope in situations with high demands placed on IPS. [11]

Yet, another study done by Hakim EA et al emphasized that the ability to continue in gainful employment or to maintain social contacts and leisure activities correlated with the course and severity of the disease and cognitive function. Severe disability and cognitive impairment are predictors of loss of employment, decline in the standards of living and withdrawal from social and leisure activities among these patients. [12]

Depression, fatigue, family status, physical activity, and occupational status were closely associated with QoL in MS patients. [13] It is important to note that subjective cognitive impairment in MS has been linked to mood, depression, and other psychosocial factors. [14]

The findings of this study have to be seen in light of some limitations. First, the sample size was relatively small. Second, the study relied on self-reported measure for QoL assessment, increasing the chances of confounding mood-driven self-reporting bias.

CONCLUSION

The present study concluded that there was a significant positive correlation between cognitive impairment and QoL in patients with multiple sclerosis. Thus, cognitive impairment can negatively impact the quality of life in these patients.

CONFLICTS OF INTEREST

None

REFERENCES

1. Goldenberg, Marvin M. "Multiple sclerosis review." *P & T : a peer-reviewed journal for formulary management* vol. 37,3 (2012): 175-84.
2. Ghasemi, Nazem et al. "Multiple Sclerosis: Pathogenesis, Symptoms, Diagnoses and Cell-Based Therapy." *Cell journal* vol. 19,1 (2017): 1-10. doi:10.22074/cellj.2016.4867.9
3. Loma, Ingrid, and Rock Heyman. "Multiple sclerosis: pathogenesis and treatment." *Current neuropharmacology* vol. 9,3 (2011): 409-16. doi:10.2174/157015911796557911.
4. Macias Islas, Miguel Ángel, and Ethel Ciampi. "Assessment and Impact of Cognitive Impairment in Multiple Sclerosis: An Overview." *Biomedicines* vol. 7,1 22. 19 Mar. 2019,doi:10.3390/biomedicines7010022.
5. Cheah E, Rajaram S, Chua HC, et al Managing the cognitive impairment of elderly patients using the Mini Mental State Examination (MMSE) *BMJ Supportive & Palliative Care* 2011;1:95.
6. Opara, Józef A et al. "Quality of life in multiple sclerosis." *Journal of medicine and life* vol.3,4 (2010): 352-8.
7. Patti F, Pappalardo A. (2010) Quality of Life in Patients Affected by Multiple Sclerosis: A Systematic Review. In: Preezy V.R., Watson R.R. (eds) *Handbook of Disease Burdens and Quality of Life Measures*. Springer, New York, NY. https://doi.org/10.1007/978-0-387-78665-0_218.10

8. Preedy V.R. (2011) Multiple Sclerosis Quality of Life-54 Questionnaire. In: Kreutzer J.S., DeLuca J., Caplan B. (eds) Encyclopedia of Clinical Neuropsychology. Springer, New York, NY. https://doi.org/10.1007/978-0-387-79948-3_1821.
9. Baumstarck-Barrau, Karine et al. "Cognitive function and quality of life in multiple sclerosis patients: A cross-sectional study." *BMC Neurology* vol. 11 17. 2 Feb. 2011, doi:10.1186/1471-2377-11-17.
10. Dawn Langdon et al., Cognitive Impairment in Multiple Sclerosis- Recent Advances and Future Prospects. *European Neurological Review*. 2010, 5(1), 69-72.
11. Barker-Collo SL. Quality of life in multiple sclerosis: does information-processing speed have an independent effect? *Arch Clin Neuropsychol*. 2006 Feb;21(2):167-74. doi:10.1016/j.acn.2005.08.008. Epub 2005 Oct 20. PMID: 16242906.
12. Hakim EA, Bakheit AM, Bryant TN, Roberts MW, McIntosh-Michaelis SA, Spackman AJ, Martin JP, McLellan DL. The social impact of multiple sclerosis--a study of 305 patients and their relatives. *Disabil Rehabil*. 2000 Apr 15;22(6):288-93. doi:10.1080/096382800296755. PMID: 10864132.
13. Schmidt S, Jostingmeyer P. Depression, fatigue and disability are independently associated with quality of life in patients with multiple sclerosis: Results of a cross-sectional study. *Mult Scler Relat Disord*. 2019;35:262-269. doi:10.1016/j.msard.2019.07.029.
14. Kobelt, Gisela et al. "The effect of self-assessed fatigue and subjective cognitive impairment on work capacity: The case of multiple sclerosis." *Multiple sclerosis (Houndmills, Basingstoke, England)* vol. 25,5 (2019): 740-749. doi:10.1177/1352458518769837.