

Effects of Depressive Symptoms on Cognition in Patients with Fibromyalgia

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ABSTRACT

Objective: To study the effects of depressive symptoms on cognition in patients with fibromyalgia in our tertiary care hospital.

Study Design: Comparative cross-sectional.

Place and Duration of Study: Department of Medicine and Rheumatology, Combined Military Hospital, Malir Karachi Pakistan, from Jan to Jun 2023.

Methodology Two hundred and fifty diagnosed fibromyalgia patients were stratified into 02 groups: Group-A included patients having clinical depression, while Group-B included patients without depression. Cognitive functions were checked in both groups using the Montreal Cognitive Assessment Test (MoCA), and scores among two groups were compared.

Results. Out of 250 patients, 150(60%) were categorized into Group -A (with depression) and 100(40%) were categorized into Group-B (without depression). One hundred and thirty-eight (55.2%) were males, while 112(44.8%) were females. Median age with IQR of patients in our study was 50.5 (15.0) years. The Montreal Cognitive Assessment Test (MoCA) scores were calculated for both groups and their medians were compared. The overall median MoCA scores were 16(7.0). The median MoCA score in Group-A was 13.5(6.0), whilst Group-B had a score of 19.5(4).

Conclusion: Patients of fibromyalgia with depression had impaired cognitive functions as compared to fibromyalgia patients without depression.

Keywords: Cognitive Decline, Depression, Fibromyalgia, Memory Impairment, Mood.

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INTRODUCTION

Fibromyalgia is a recognized health issue associated with aches at multiple sites, tiredness, sleep disturbance, memory impairment, thus affecting quality of life.^{1,2} Prevalence of fibromyalgia ranges from 2% to 4% in most of populations.^{3,4} Depression is commonly associated with fibromyalgia and prevalence may be as high as 25% among fibromyalgia patients.⁵ The association between fibromyalgia and depression is complex and multifactorial. Genetically predisposed population has increased incidence of fibromyalgia and fibromyalgia in turn increases the possibility of depression.⁶

Cognitive manifestations are frequent in fibromyalgia patients. Patients have issues regarding concentration, recall and multi tasking.⁷ Cognitive impairment in turn is associated with greater myalgias, stiffness, poor sleep quality, anxiety and depression. A number of neuropsychological tests are deployed to evaluate different aspects of cognitive function.⁸ As compared to subjective difficulties, the proof supporting objective cognitive dysfunction is

conflicting, signifying an overestimation of cognitive problems and therefore, requiring further studies.⁹

Cognitive impairment in fibromyalgia is classically based on self-reported questionnaires, however recent studies have failed to establish a association between subjective assessments of cognitive impairment and broader objective assessment of cognitive functioning. One study established Montreal Cognitive Assessment Test (MoCA) to be a satisfactory screening test for the cognitive assessment in fibromyalgia.¹⁰

We conducted this study to study the effects of depressive symptoms on cognition in patients with fibromyalgia in our tertiary care hospital.

METHODOLOGY

This comparative cross-sectional study was done at the Department of Medicine, Combined Military Hospital Malir, Karachi, Pakistan from Jan to Jun 2023. Prior to the commencement of the study, approval from the Institutional Ethical Review Committee was sought (IERB # A/28/02/23).

Inclusion Criteria: All fibromyalgia patients, of either gender, with and without clinical depression, with the age range of 18 to 65 years, reporting to our department were included.

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Exclusion Criteria: Patients with uncontrolled metabolic diseases, acute or chronic infections at the time of reporting, pregnant or lactating women or with rheumatological or immune mediated illnesses like Rheumatoid Arthritis (RA) and Systemic Lupus Erythmatosus (SLE) were excluded.

Sample size was calculated using WHO calculator taking reported prevalence of fibromyalgia as 4%.³ The total recommended sample size came to 250 patients. Sample was collected by non-probability consecutive sampling. Informed consent form was signed by every patient.

Patients in our study were placed into two groups: Group-A (150 patients) included fibromyalgia patients diagnosed with clinical depression and currently under treatment of psychiatrist, while Group-B (100 patients) included fibromyalgia patients without clinical depression. The Montreal Cognitive Assessment Test (MoCA) was used for screening of cognitive dysfunction in all study participants.

Statistical Package for Social Sciences version 24.0 (SPSS) was used for data analysis. Percentage and frequency were calculated for the qualitative variables. Median along with IQR were calculated for age and for Montreal Cognitive Assessment Test (MoCA). The scores were compared using Mann Whitney U test, and a *p*-value less than and equal to 0.05 was considered to be statistically significant.

RESULTS

Out of 250 patients, 150(60%) were categorized into Group-A (with depression) and 100(40%) were categorized into Group-B (without depression). One hundred and thirty-eight (55.2%) were male while 112(44.8%) were female. Median age with IQR of patients in our study was 50.5(15) years. Gender wise distribution of age showed males had median age 53.5 (19) years, while females had 44.5(16.75) years.

The Montreal Cognitive Assessment Test (MoCA) scores were calculated for both groups and their medians were compared. The overall median MoCA scores were 16(7.0). Gender wise distribution of (MoCA) scores showed males had median scores 14.59 (6.25), whereas females had median scores 18.59 (9.25). The median MoCA score in Group-A was 13.5(6.0), whilst Group-B had a score of 19.5 (4.0). The difference in the scores of the two groups were compared and were statistically significant (*p*=0.02), which can be seen in Table-I.

Table-I: Comparison of Montreal Cognitive Assessment Test (MoCA) Scores Across Groups (n=250)

Groups	n	Median Moca Scores (IQR)	<i>p</i> -value
Group-A	150	13.5 (6.0)	0.02
Group-B	100	19.5 (4.0)	

DISCUSSION

Fibromyalgia is a chronic disorder that causes aches and tenderness at multiple sites, tiredness, sleep disturbance and memory impairment.¹¹ Prevalence of fibromyalgia ranges from 2% to 4% in most populations, however, establishing an accurate diagnosis is still challenging. It is often associated with various other disorders like autoimmune diseases, cognitive impairment and psychiatric illnesses.¹²

Depression is commonly associated with fibromyalgia, and prevalence may be as high as 25% among fibromyalgia patients, though more than 50% of them suffer major depressive episode during their lifetime.^{12,13} The association between fibromyalgia and depression is complex and multifactorial. A population that is genetically predisposed to depression has an increased incidence of fibromyalgia, and fibromyalgia in turn increases the possibility of depression. High levels of inflammatory cytokines like IL-6 and IL-8 are found in patients with fibromyalgia as compared to healthy subjects. Their level matches with the severity of fibromyalgia.^{14,15} Moreover IL-6 is linked with lethargy, pain, myalgias and depression. Raised levels of IL-8 induces neuroinflammation, leading to complex psychiatric illnesses. Enhanced function of nociceptive pathway and decreased pain threshold has been suggested as a mechanism linking fibromyalgia to depression. Somatosensory nervous system abnormalities cause inhibition of inflammation and neuronal injury leading to depressive symptoms in fibromyalgia. A study conducted in Pakistan found incidence of depression in patients of fibromyalgia to be 11.5% (mild depression), 19.5% (moderate depression) and 69% (severe depression).⁹

Cognitive manifestations, often referred to as fibrofog, are frequent in fibromyalgia patients. Patients have issues regarding concentration, recall and multitasking. Cognitive impairment in turn is associated with greater myalgias, stiffness, poor sleep quality, anxiety and depression. A number of neuropsychological tests are deployed to evaluate different aspects of cognitive function. As compared to subjective difficulties, the proof supporting objective cognitive dysfunction is conflicting, signifying an overestimation of cognitive problems and therefore,

requiring further studies. Cognitive impairment is included in the diagnostic criteria of fibromyalgia and is classically based on subjective questionnaires like the Symptom Severity Scale. Current studies have failed to establish a relationship between subjective cognitive impairment and more extensive objective assessment of cognitive decline. Elkana *et al.* in their study examined sixty-two patients of fibromyalgia by comparing the Montreal Cognitive Assessment Test (MoCA) with various computerised cognitive scores and found MoCA to be a satisfactory screening test for the cognitive assessment of fibromyalgia patients.¹⁵

Fibromyalgia patients commonly have cognitive issues, but it's not clear whether it represents CNS dysfunction or factors linked with fibromyalgia, like depression, anxiety and sleep disturbance. Fibromyalgia is associated with widespread diffuse pain, often associated with fatigue, non refreshing sleep, low mood and cognitive impairment. Various studies have shown cognitive decline in fibromyalgia patients as compared to normal healthy population, with the former demonstrating problems with memory processing, attention and executive functions along with processing speed.^{15,16}

Multiple studies have concluded that a related pattern of memory impairment exists in both depressed and non-depressed fibromyalgia patients, especially in long-term memory tasks that need effortful processing.^{17,18} Sletvold *et al.*, and Landrø *et al.* compared cognitive function in fibromyalgia patients with healthy subjects and patients suffering from major depression and found that they exhibit an inability to process information and to recall long term memory.^{17,18} However, additional parallel studies were unable to ascertain relationship between depression and cognitive impairment.¹⁹

Martinsen *et al.* found decreased activation in caudate nucleus, temporal lobe, lingual gyrus, and hippocampus, in fibromyalgia patients as against to healthy subjects.²⁰

Our study results also maintain the fact that fibromyalgia itself leads to cognitive impairment as evidenced by low MoCA scores in Group-B. Depression leads to further decline in cognitive functions as shown by lower scores in Group-A, as compared to participants in Group-B.

LIMITATIONS OF STUDY

Our study had certain limitations, including its our inability to establish causality between depression and

cognitive impairment due to its cross-sectional study design, a relatively small sample size, and its single-center setting at a tertiary military hospital, which may limit generalizability.

CONCLUSION

We concluded that patients of fibromyalgia with depression had impaired cognitive functions as compared to fibromyalgia patients without depression.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

QC & MAN: Conception, study design, drafting the manuscript, approval of the final version to be published.

MAM & FT: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

ZZ & S: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Khan Z, Naqvi R. Prevalence of Fibromyalgia in chronic kidney disease pre-dialysis patients: Experience from a Tertiary Care Renal unit in Pakistan. *Pak J Med Sci* 2021; 37(7): 1939-1942. <https://doi.org/10.12669/pjms.37.7.4474>
2. Ruschak I, Toussaint L, Rosselló L, Aguilar MC, Fernández-Sáez J, Montesó-Curto P. Symptomatology of Fibromyalgia Syndrome in Men: A Mixed-Method Pilot Study. *Int J Environ Res Public Health* 2022; 19(3): 1724. <https://doi.org/10.3390/ijerph19031724>
3. Iqbal F, Nisa Q, Majeed S. Prevalence of Fibromyalgia Among Critical Care Nurses and Coping Strategies. *Pak J Inten Care Med* 2025; 5(2). <https://doi.org/10.54112/pjicm.v5i02.209>
4. Gau SY, Lee YH, Tsou HK, Huang JY, Chen X, Ye Z. Patients with Ankylosing Spondylitis Are Associated with High Risk of Fibromyalgia: A Nationwide Population-Based Cohort Study. *Front Med* 2021; 8: 618594. <https://doi.org/10.3389/fmed.2021.618594>
5. Loge-Hagen JS, Saele A, Juhl C, Bech P, Stenager E, Mellentin AI. Prevalence of depressive disorder among patients with fibromyalgia: Systematic review and meta-analysis. *J Affect Disord* 2019; 245: 1098-1105. <https://doi.org/10.1016/j.jad.2018.12.001>
6. Arnold LM, Fan J, Russell IJ, Yunus MB, Khan MA, Kushner I, et al. The fibromyalgia family study: A genome-wide linkage scan study. *Arthritis Rheum* 2013;65(1):1122-1128. <https://doi.org/10.1002/art.37842>
7. Andres RL, Borrás X, Feliu SA, Perez AA, Angarita ON, Moreno PP, et al. Peripheral immune aberrations in fibromyalgia: A systematic review, meta-analysis and meta-regression. *Brain Behav Immun* 2020; 87(1): 881-889. <https://doi.org/10.1016/j.bbi.2019.12.020>

8. Adams LM, Turk DC. Psychosocial factors and central sensitivity syndromes. *Curr Rheumatol Rev* 2015; 11: 96-108. <https://doi.org/10.2174/1573397111666150619095330>
9. Tahir A, Fatima DA, Khan MT. Association of Depression in Patients with Fibromyalgia Syndrome. *Pak J Rehabil* 2022; 11(1): 74-183. <https://doi.org/10.36283/pjr.zu.11.1>
10. Kratz AL, Whibley D, Kim S, Sliwinski M, Clauw D, Williams DA. Fibrofog in Daily Life: An Examination of Ambulatory Subjective and Objective Cognitive Function in Fibromyalgia. *Arthritis Care Res* 2020; 72(12): 1669-1677. <https://doi.org/10.1002/acr.24089>
11. Leavitt F, Katz RS, Mills M, Heard AR. Cognitive and Dissociative Manifestations in Fibromyalgia. *J Clin Rheumatol* 2002; 8(2): 77-84. <https://doi.org/10.1097/00124743-200204000-00003>
12. Ambrose KR, Gracely RH, Glass JM. Fibromyalgia dys-cognition: concepts and issues. *Reumatismo* 2012; 64(4): 206-215. <https://doi.org/10.4081/reumatismo.2012.206>
13. Teodoro T, Edwards MJ, Isaacs JD. A unifying theory for cognitive abnormalities in functional neurological disorders, fibromyalgia and chronic fatigue syndrome: systematic review. *J Neurol Neurosurg Psychiatry* 2018; 89(12): 1308-1319. <https://doi.org/10.1136/jnnp-2017-317823>
14. Kravitz HM, Katz RS. Fibrofog and fibromyalgia: a narrative review and implications for clinical practice. *Rheumatol Int* 2015; 35(7): 1115-1125. <https://doi.org/10.1007/s00296-014-3208-7>
15. Elkana O, Nimni JN, Ablin R, Shorer V. The Montreal Cognitive Assessment Test (MoCA) as a screening tool for cognitive dysfunction in fibromyalgia. *Plos One* 2018; 13(7). <https://doi.org/10.55563/clinexprheumatol/3yxu6p>
16. Gelonch O, Garolera M, Valls J, Rosselló L, Pifarré J. Executive Function in Fibromyalgia: Comparing Subjective and Objective Measures. *Compr Psychiatry* 2016; 66: 113-122. <https://doi.org/10.1016/j.comppsy.2016.01.002>
17. Landrø NI, Stiles TC, Sletvold H. Memory functioning in patients with primary fibromyalgia and major depression and healthy controls. *J Psychosom Res* 1997; 42(3): 297-306. [https://doi.org/10.1016/s0022-3999\(96\)00301-7](https://doi.org/10.1016/s0022-3999(96)00301-7)
18. Sletvold H, Stiles TC, Landrø NI. Information processing in primary fibromyalgia, major depression and healthy controls. *J Rheumatol* 1995; 22(1): 137-142.
19. Grace GM, Nielson WR, Hopkins M, Berg MA. Concentration and Memory Deficits in Patients with Fibromyalgia Syndrome. *J Clin Exp Neuropsychol* 2010; 21: 37-41. <https://doi.org/10.1076/jcen.21.4.477.876>
20. Martinsen S, Flodin P, Berrebi J, Lofgren M, Bileviciute-Ljungar I, Ingvar M, et al. Fibromyalgia patients had normal distraction related pain inhibition but cognitive impairment reflected in caudate nucleus and hippocampus during the Stroop color word test. *PLoS One* 2014; 9(10). <https://doi.org/10.1371/journal.pone.0108637>

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