

Original Article

Psychological Profile in Musculoskeletal Disorders and Its Relationship with Socio-Demographics, Perceived Social Support and Quality of Life in A Tertiary Care Hospital in India – A Cross-Sectional Study

Raveesh Bevinahalli Nanjegowda¹, Suhas Bhargav Achatapalli Venkata Rao¹, Manjunatha Nagaraja², Ravindra Neelakanthappa Munoli³

¹Department of Psychiatry, Mysore Medical College and Research Institute, Mysuru, Karnataka, India;

²Department of community medicine, Mysore Medical College and Research Institute, Mysuru, Karnataka, India;

³Department of Psychiatry, Kasturba Medical College, Manipal, Karnataka, India

Abstract

Objectives: This study explores the psychological aspects of Musculoskeletal Disorders (MSDs) in India, examining personality traits, social support, and sociodemographic factors. It also investigates the relationship between multi-site MSDs, common mental disorders, perceived social support, and quality of life. **Methods:** Conducted at an Indian tertiary care hospital, 205 participants (≥ 18 years) with MSDs associated with chronic distress in the form of pain, underwent personality assessment using the Big Five model. Multi-site MSDs were identified via the Nordic Musculoskeletal Questionnaire, and logistic regression analyzed Common Mental Disorder Questionnaire (CMDQ), Multidimensional Scale of Perceived Social Support (MSPSS), and Stark Quality of Life (QoL). **Results:** Associations were found between MSDs and CMDQ subscales, particularly anxiety, somatoform, and depressive disorders. Multi-site MSDs were prevalent in 74.6% of participants, with neuroticism as the predominant personality trait. Participants reported low to moderate perceived social support levels, impacting their quality of life. **Conclusions:** This research underscores addressing psychological and social factors in MSDs associated with chronic pain. Multi-site MSDs significantly affect mental health and quality of life, emphasizing the need for timely screening and psychiatric intervention in effective management.

Keywords: Common mental disorders, Musculoskeletal disorders, Perceived social support, Psychological profile, Quality of life

Introduction

Musculoskeletal disorders (MSDs) are a major source of pain and disability worldwide, ranking second globally in disability burden with 1,720 DALY rates per 100,000 individuals¹. MSDs negatively impact society in terms of direct costs to the healthcare system and indirect costs from reduced productivity and employment². Worldwide, approximately 1.71 billion individuals experience MSDs, with prevalence ranging from 14% to 42%, and India reporting rates from 20% to 90% in certain professions³. MSDs often drive individuals to seek primary care. Mental distress and depression related to musculoskeletal pain may influence care-seeking, factoring in symptom severity and duration⁴.

Chronic pain, a biopsychosocial phenomenon, involves complex interactions between social, psychological, and biological factors, often associated with psychopathological conditions⁵. Patients with chronic illness may face

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Corresponding author: Dr. Suhas Bhargav AV, Junior Resident, Department of Psychiatry, KR Hospital, Mysore Medical College and Research Institute, Irwin Road, Mysuru, 570001, India

E-mail: suhas.bhargav95@gmail.com

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mood changes due to heightened somatic awareness, misinterpretation, or autonomic arousal. Depression and anxiety can worsen symptoms, impacting treatment outcomes and healing⁶. Numerous studies emphasize psychological factors and maladaptive coping in chronic illness development. Complex links between personality traits and chronic conditions affect individuals' responses. Personality traits may predict psychiatric symptoms like depression and anxiety, potentially aiding in predicting musculoskeletal issues. Past research connected traits like hypochondriasis and hysterical tendencies to psychological distress in musculoskeletal problems⁷. In both developed and developing countries, lower back, neck, shoulder, and upper limb MSDs are common which impact work performance in labour-intensive nations like India. Assessing QoL is a global health priority, considering psychiatric comorbidity⁸. The UN and WHO assigned the Bone and Joint Decade (2000-2010) to tackle MSDs and enhance affected individuals' quality of life. Existing literature inadequately examines India's intricate psychosocial aspects concerning MSDs and mental illnesses. Health encompasses biological, psychological, and social dimensions, with social factors influencing disease occurrence, prevalence, and duration⁹.

Limited research addresses psychological variations among distinct MSDs. This study explores the connection between multisite MSDs and psychiatric conditions, aiming to construct psychological profiles, examine associations with common mental disorders, and identify patterns in multisite MSDs.

Materials and methods

This was a cross-sectional hospital-based observational study conducted in a tertiary care Government hospital of MMCRI and ran for over 18 months, from August 2021 to February 2023. Convenience sampling was employed, and the minimum sample size of 205 was determined based on a 15% proportion of musculoskeletal autoimmune disease patients with anxiety disorder as per a study by Härter et al in 2002¹⁰ and at 5% absolute error and 5% significance level. Institutional ethical clearance was secured, and participants provided consent.

Tools

Sociodemographic data

A semi-structured proforma in order to collect basic sociodemographic data of the subjects was explicitly developed for the study.

Common mental disorder screening

The screening instrument used was the (CMDQ)¹¹. The survey had 36 questions on somatoform disorders, anxiety, depression, alcohol misuse, and general well-being. It used a five-point Likert scale (0 to 4) except for alcohol-related questions (binary: 0/1). Quadratic-weighted Kappa coefficients ranged from 0.42 (0.68 – 0.16) to 0.98 (1.00

– 0.70), indicating strong internal consistency (Cronbach's alpha = 0.94).

Personality traits

The Big Five/FFM¹² assessed personality traits, including Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Internal consistency scores were satisfactory: Neuroticism ($\alpha = 0.83$), Extraversion ($\alpha = 0.82$), Openness ($\alpha = 0.79$), Agreeableness ($\alpha = 0.82$), Conscientiousness ($\alpha = 0.90$). Predominant personality traits were determined for each participant.

Perceived Social Support

The (MSPSS)¹³. The subjects completed 12 questions relating to the extent to which they felt they had support on a Likert scale of 1-7. Cronbach's coefficient alpha, a measure of internal reliability, was obtained for the scale as a whole. The reliability of the total scale was .88. These values indicated good internal consistency for the scale as a whole.

Site of Musculoskeletal Pain

The Nordic Musculoskeletal Questionnaire (NMQ)¹⁴. Utilized as a structured interview, NMQ is reliable, repeatable, and useful for screening and surveillance. Test-retest showed 0-23% variation, and validity against clinical history exhibited 0-20% disagreement. NMQ identified pain sites and categorized subjects into Multisite and Non-multisite MSDs.

Measuring Quality of Life

The Stark Quality of Life (QoL)¹⁵, a short and picture-based questionnaire was used to measure QoL. It demonstrates good reliability for its two main components: Mental and Physical Quality of Life. The Stark QoL questionnaire shows good psychometric properties. The Mental Component displays a Cronbach's alpha of about .77, the Physical Component of about 0.74.

Methods of data collection

The study included patients aged 18 or older diagnosed with musculoskeletal disorders by an orthopaedic or a general physician with a duration of pain of a minimum of 3 months duration without prior cognitive impairments or psychiatric illnesses. The basic sociodemographic parameters were collected using the semi-structured proforma following which the study tools were administered. The tools such as CMDQ, BIG-Five and MSPSS were read out verbatim to individuals who were found to be illiterate and it was ensured as to interviewee picked the final response and assistance was only provided for their comprehension in their local dialect. The Site of pain and QoL was assessed using picture-based questionnaires.

Statistical Analysis

Statistical analyses were performed using Microsoft Excel and R software. Significance level: $P < 0.05$. Descriptive

Table 1. Distribution of sociodemographic data of study participants.

Variables	Categories	Frequency (N = 205)	Percentage (%)
Age (in years)	19-29	38	18.6
	30-39	43	21
	40-49	38	18.5
	50-59	38	18.5
	>60	48	23.4
Gender	Male	121	59
	Female	81	41
Religion	Hinduism	179	87.3
	Islam	22	10.7
	Christianity	4	2
Marital status	Single	43	21
	Married	131	63.9
	Divorced/ /Separated	1	0.5
	Widow	30	14.6
Literacy	Illiterate	70	34.1
	Up to 10 th standard	64	31.2
	Up to 12 th standard	24	11.7
	Graduate	45	22
	Postgraduate	2	1
Occupation	Unemployed	60	29.3
	Unskilled	35	17.1
	Semi-skilled	76	37.1
	Professional	34	16.6
Family income (in INR)	<10,000	2	1
	10,000-24,000	33	16.1
	25,000-40,000	47	22.9
	41,000-55,000	28	13.7
	>55,000	95	46.3
Comorbidities	Yes	85	41.5
	No	120	58.5
Family history of Medical Illness	Yes	23	11.2
	No	182	88.8
Family history of Mental Illness	Yes	23	11.2
	No	182	88.8
Treated by Specialist	Physician	12	5.9
	Orthopedist	107	52.2
	Psychiatrist	2	1
	Physician + Orthopaedist	72	35.1
	Physician + Psychiatrist	3	1.5
	Physician + Orthopaedist + Psychiatrist	1	0.5
	Orthopaedist + Psychiatrist	8	3.9
MSDs diagnosed in study subject	Rheumatoid arthritis	21	10.2
	Osteoarthritis NOS	70	34.1
	Disorders of ligament, unspecified	18	8.8
	Cervical spondylosis	12	5.9
	Lumbar spondylosis	25	12.2
	Ankylosing spondylitis	4	2
	Thoracolumbar disc displacement	22	10.7
	Sciatica, unspecified	2	1
	Tenosynovitis	10	4.9
	Lateral epicondylitis	2	1
	Injury of nerves at the forearm level	2	1
	Muscle sprain	13	6.3
	Costochondritis	4	2

INR, Indian National Rupees; MSDs, Musculo-skeletal disorders.

Common mental disorders	Screened positive for common mental disorders N (%) ^a	Sociodemographic variables Odds Ratio (Confidence intervals) ^b	p value ^c
Anxiety disorder	85(41.40)	2.44 (2.12-3.43)	<0.05
Depressive disorder	83(40.48)	1.04 (0.99-2.13)	>0.05
Somatoform disorder	114(55.60)	3.02 (2.11-4.56)	<0.05
Alcohol use disorder	111(54.10)	0.98 (0.87-1.98)	>0.05
Illness worries	112(54.60)	1.12(0.77-2.34)	>0.05

a= N (%), b= OR adjusted for various sociodemographic variables, c= p values based on F statistics.

Table 2. Association between sociodemographic variables and psychiatric morbidity in study participants.

Variables	Multisite musculoskeletal disorders (N=153)		Non-multisite musculoskeletal disorders (N=52)		F	p value
	Mean, SD	Screened positive for common mental disorders N (%)	Mean, SD	Screened positive for common mental disorders N (%)		
Anxiety symptoms	5.79, 3.74	63(41.17)	4.73, 3.56	22(42.30)	1.44	0.231
Somatoform symptoms	5.79, 3.74	93(60.78)	4.73, 3.56	21(40.38)	0.568	0.452
Illness worries	1.90, 1.66	85(55.55)	1.96, 1.65	25(48.07)	0.4	0.842
Depressive symptoms	2.35, 2.27	66(43.13)	2.36, 2.55	17(32.69)	4.91	0.028
Alcohol use	1.70, 1.64	87(56.86)	1.81, 1.68	24(46.15)	0.241	0.624
Perceived social support	4.56, 1.31	H=52(33.90)	4.46, 1.19	H=14(26.92)	1.32	0.251
		M=82(53.59)		M=35(67.30)		
		L=19(12.41)		L=03(5.76)		
Big five inventory	3.78, 1.42	E=42(27.45)	4.26, 1.36	E=25(48.07)	1.67	0.197
		N=52(33.98)		N=09(17.30)		
		O=9(5.88)		O=5(9.61)		
		A=5(3.26)		A=2(3.84)		
		C=25(16.33)		C=5(9.61)		
		MIX=20(13.07)		MIX=6(11.53)		

A, Agreeableness; C, conscientiousness; E, Extraversion; H, High; L, Low; M, Medium; MIX, Mixed; N, Neuroticism; O, Openness; SD, Standard deviation.

Table 3. Association between Psychological profiles and psychiatric illness of multi-site and non-multisite musculoskeletal disorders.

statistics, Chi-square, and logistic regression explored associations.

Results

The socio-demographic variables and the distribution of MSDs diagnosed in the study participants collected using

the semi-structured proforma has been presented in Table 1. The average duration of illness wherein the patient was experiencing pain was found to be about 38 months [mean (Standard deviation), 38.29(61.69)].

The study subjects screened for common mental disorders using CMDQ showed a significant association

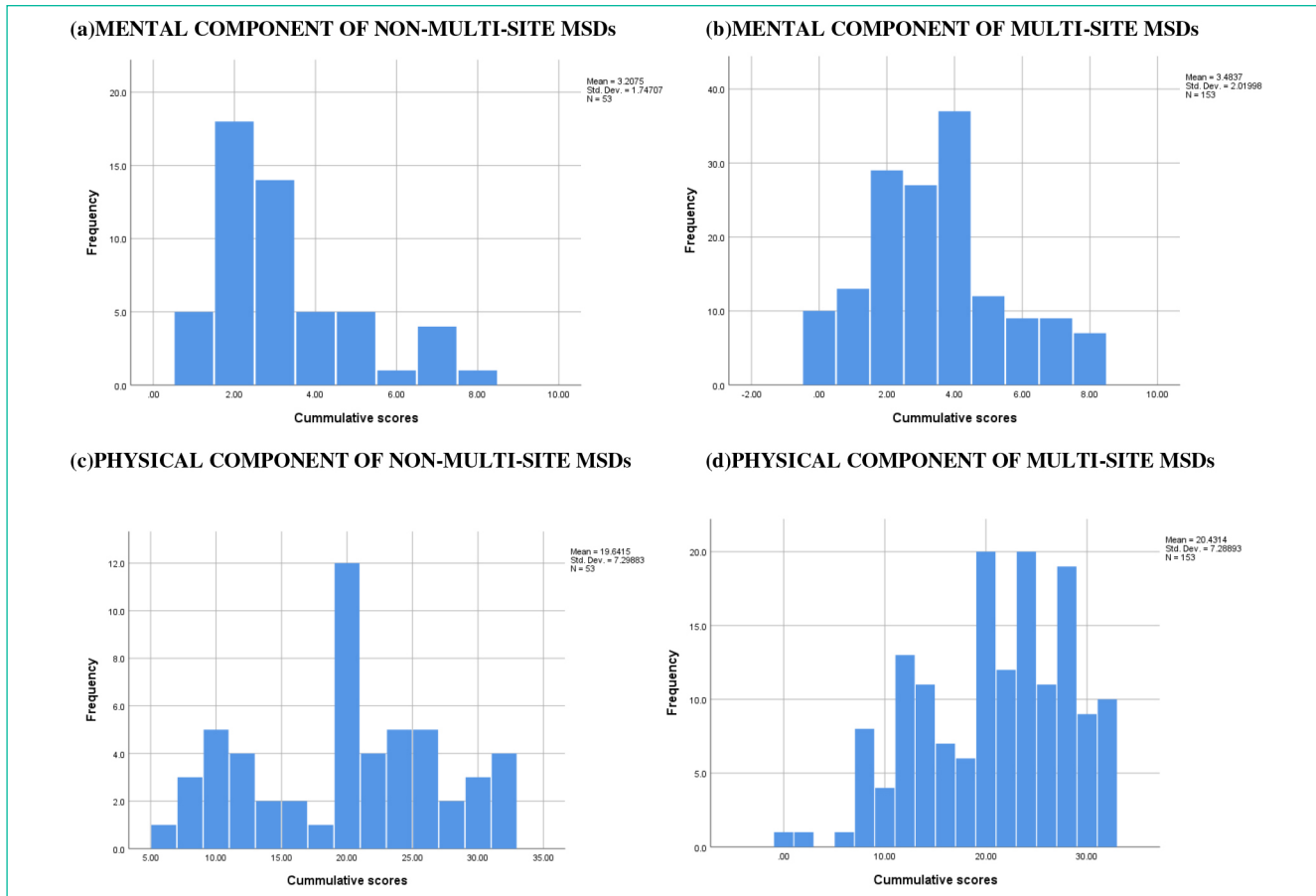


Figure 1. Graphical representation of cumulative scores of mental and physical components of Stark's QoL.

between anxiety disorder (2.44, $p < 0.05$) and somatoform disorder (3.02, $p < 0.05$) subscales of CMDQ when adjusting for sociodemographic variables as expressed in Table 2.

Based on the NMQ study participants were divided into multi-site and non-multi-site MSDs. The association between psychological profiles and psychiatric illness of multi-site and non-multisite musculoskeletal disorders has been presented in Table 3.

The QoL of study participants assessed using Stark's QoL scale has been graphically represented in Figure 1. The multi-site MSDs had higher cumulative scores in both mental and physical components as compared to non-multi-site MSDs.

Discussion

Chronic pain, a complex phenomenon, necessitates recognizing multiple factors. The bio-psycho-social model, extensively explored in literature, is vital in comprehending persistent conditions like MSDs.

Biological factors

Age - There is evidence that older age groups are independently susceptible to MSDs¹⁶. Older age groups exhibit a sharp increase in the incidence of MSDs¹⁷, according to numerous studies conducted globally and in India, both in terms of a specific population and the general population¹⁸. Our research echoes this, revealing 41.9% aged >50, with 23.4% >60. Aging causes crucial non-modifiable MSD risk factors¹⁹.

Gender - Most studies show gender differences in MSDs, often distressing to women due to job and parenting demands²⁰. In our study, males (59%) outnumbered females (41%), deviating from typical MSD research. This may relate to the hospital-based, cross-sectional design and women's reduced healthcare-seeking behaviour in developing nations like India²¹.

Comorbidities - A meta-analysis by da Costa. R et al. (2009) reported reasonable evidence that co-morbid medical illness is a risk factor for developing MSDs²². The presence of co-morbid chronic medical illness in 41.5% of individuals in the present study strongly correlated with a

study by Kishore J et al. (2019) in a similar population²³.

Nature of Illness - Osteoarthritis (34.1%) and spine issues (12.2%) were prevalent, akin to Mendhe et al.'s 2016 hospital-based study. This distribution relates to the region, job ergonomics, and population. Common pain sites included the lower body (back, knee, thighs) at 18.91%, 18.91%, 14.1%, and the upper body (shoulder) at 10.16%, aligning with other studies in India²⁴.

Duration of illness - Our study subjects experienced chronic distress due to the MSDs with the mean duration being about 38 months [mean (Standard deviation), 38.29(61.69)]. The same is suggestive of chronic pain associated with psychological distress as found in various studies both in India²⁴, as well as worldwide²².

Multisite distribution - About 74.6% reported pain in multiple body regions, surpassing global and Indian rates for multisite involvement²⁵. Possibly due to rural, physically labor-intensive participants, this distribution is more common in this population²⁶. The multisite involvement was a significant independent risk factor for distress among MSDs²⁷.

Psychological factors

Psychiatric morbidity - Poor self-perceived health and QoL result from severe musculoskeletal issues and mental problems, as affirmed by global disease burden research²⁸. Depression, a common mood disorder linked to MSDs, occurred in 40.4% generally and 43.1% in the multisite group, akin to Zaream et al.'s (2021) multicentric study²⁹. Anxiety levels of 41.1% and illness worry of 55.5% are explainable by Luchetti: G et al. (2012)³⁰ and their fear-avoidance model for explaining distress in MSDs.

In the multisite group, 60.7% showed somatoform disorder symptoms, versus 40.3% in the non-multisite group, reinforcing the complex nature of these symptoms³¹. Alcohol use exacerbated distress, seen in 56.8% of multisite vs. 46.1% non-multisite, correlating with MSDs, similar to Kangas-kaila et al. (2018)³².

Personality factors - Neuroticism, marked by poor stress coping and a propensity to complain, predicts distress in co-occurring psychiatric morbidity and MSDs, as seen in our multisite group (33.9%)³³.

Social support - The social support perceived by the individual is an essential factor that impacts psychiatric morbidity and its progression and prognosis³⁴. Our study being unique measured this aspect, with a noteworthy 12.4% reporting low levels, in contrast to 5.7% in both groups.

Socioeconomic status - About 34.1% of subjects had no formal education in the present study, comparable with a study in a population in south India by Majumdar A. et al. (2015)³⁵. MSDs are prevalent in semi-skilled and unskilled laborers (37.1% and 17.1%), consistent with studies, like Khan et al. (2018)³⁶ and in tertiary care hospital set-up by Mendhe G et al. (2016)²⁴. Studies conducted across the

globe have shown that low-income regions have reported a higher prevalence of MSDs because of nature and long hours of work with minimal rest³⁷.

Marital status - Marital status can independently predict psychological stress and morbidity due to family dynamics, also providing crucial support as MSDs progress.³⁵

Bio-psycho-social model – In action

Multiple factors impact MSD development and progression, including psychiatric conditions that become more prevalent with age, chronicity of the distress, varying by social support and socioeconomic status. Neuroticism, lack of support, and comorbidities worsen distress, especially in multisite MSD patients, affecting their QoL.

Strengths

This study was unique in measuring the impact of personality and social factors on psychological distress in MSDs and exploring the multisite nature. Identifying a significant treatment gap opens new avenues for consultation and liaison services.

Limitations

As a hospital-based study, the results may not apply to the general population. The study's cross-sectional nature limits the ability to determine outcome changes and QoL due to interventions.

Conclusion

This comprehensive study revealed the interplay between MSDs and common mental disorders, influenced by lesser-explored factors like personality and social support. The multisite nature of MSDs contributes to reduced quality of life. It emphasizes the urgent need to screen and intervene from a psychiatric perspective to address these issues effectively.

Ethics approval

The research was approved by the institutional ethics committee of Mysore medical college and research institute vide approval letter No. [MMC EC 62/2020].

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