

Prevalence of Fibromyalgia and Its Impact on General Health Among University Students

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ABSTRACT

Background: Fibromyalgia is a chronic pain syndrome characterized by widespread musculoskeletal pain and multidimensional impairment, yet its burden in university populations remains underexplored. **Objective:** To evaluate the prevalence of fibromyalgia among university students and to measure its impact on general health. **Methods:** A cross-sectional observational study was conducted among 370 university students aged 19–25 years using the Revised Fibromyalgia Impact Questionnaire (FIQR) and EQ-5D-3L health questionnaire. Prevalence was calculated using diagnostic criteria thresholds. Regression analyses evaluated gradients between FIQR severity and general health domains. **Results:** Fibromyalgia prevalence was 27.0%, with higher rates in females (30.3%) than males (23.8%). Moderate-to-extreme pain was reported by 62.4%, and anxiety/depression by 61.3%. FIQR severity demonstrated significant regression gradients across mobility ($R^2=0.085$), self-care ($R^2=0.160$), usual activities ($R^2=0.103$), pain/discomfort ($R^2=0.126$), anxiety/depression ($R^2=0.156$), and overall health status ($R^2=0.223$; $p<0.001$). **Conclusion:** Fibromyalgia is highly prevalent among university students and substantially impairs physical and psychological health domains, with strongest effects observed in self-care and mental health. Early screening and integrated campus-based interventions are warranted.

Keywords: Fibromyalgia; Prevalence; University Students; Quality of Life; FIQR; EQ-5

INTRODUCTION

Musculoskeletal disorders (MSDs) are a leading contributor to functional limitation, reduced productivity, and impaired wellbeing across populations, with substantial occupational and societal burden (1). In Pakistan, high frequencies of MSDs have been documented among healthcare workers, reflecting the broader regional impact of pain-related disability and work limitation (2). Fibromyalgia (FM) is a chronic pain syndrome characterized by widespread pain, multisystem symptoms, and functional impairment, and contemporary reviews emphasize central sensitization alongside neuroendocrine, immune, and psychosocial contributors (3). Population estimates commonly place FM prevalence around 2–4%, with consistently higher rates in women than men, although estimates vary with case definitions and sampling frames (4). International evidence similarly highlights sex-related differences in prevalence and symptom burden across settings and cohorts (5).

Beyond FM-specific considerations, MSDs represent a major global public health and workplace challenge, affecting work habits, absenteeism, early retirement, and quality of life (6). Systematic evidence indicates a high pooled burden of MSDs in healthcare-related professions, reinforcing the relevance of early detection and prevention strategies in health and education environments (7). Occupational stress and mental health factors are increasingly recognized as correlates of MSDs, suggesting that psychological load may amplify pain vulnerability and functional limitation (8). Mechanistic syntheses also describe

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the musculoskeletal–fascial continuum and highlight how work-related exposures and biopsychosocial stressors converge to produce persistent pain syndromes (9).

University students represent a high-risk transitional group due to academic workload, prolonged sitting, screen exposure, reduced recovery time, and psychosocial stressors; recent evidence from Canadian university settings demonstrates substantial MSD prevalence and identifies modifiable risk factors relevant to campus populations (10). Chronic pain is now recognized as a complex clinical entity within musculoskeletal disease, with persistent symptoms driving disability and downstream mental health consequences (11). Within this spectrum, FM is described as a chronic functional disorder associated with widespread pain and heightened sensitivity to stimuli perceived as nociceptive, producing disproportionate symptom severity relative to peripheral tissue findings (12). Contemporary molecular and clinical updates continue to refine FM diagnosis and management, emphasizing multidisciplinary care and the need for context-specific epidemiological data (13).

Despite evolving definitions, gaps in awareness persist among trainees and early-career populations, including limited understanding of FM among medical students in some settings (14). Etiological syntheses propose interacting triggers such as genetic susceptibility, hormonal and neuroimmune mechanisms, and stress-related exposures that may precipitate symptom onset and perpetuation (15). Current pathophysiological models similarly integrate central sensitization, altered pain processing, and dysregulated stress-response pathways as plausible mechanisms underlying chronic symptom expression (16). Adolescence and early adulthood are also developmental periods marked by major physiological and psychosocial transitions, which can influence symptom appraisal, coping, and health behaviors (17). In FM and related chronic pain disorders, interdisciplinary health education and self-management are increasingly positioned as clinically meaningful strategies to reduce disability and improve functioning (18).

FM symptom expression commonly co-occurs with headache, paresthesia, gastrointestinal complaints, sleep disturbance, exercise intolerance, and psychological comorbidity—particularly anxiety and depressive symptoms—which may worsen perceived disability and reduce participation in daily activities (19). Reviews of the psychological impact of FM emphasize heightened symptom-focused attention, maladaptive interpretations, and reciprocal amplification between negative affect and pain, contributing to sustained impairment (20). In addition, FM has been discussed as a risk factor for poorer outcomes across clinical contexts, supporting its relevance as a cross-cutting vulnerability state rather than a narrowly defined rheumatologic diagnosis (21). Emerging work on neuromuscular contributors suggests that fatigue-related impairment may manifest early during activity and contribute to instability and reduced movement confidence, which is particularly relevant for student populations required to sustain prolonged daily functioning (22). Functional limitations may extend into activities of daily living (ADLs), with distress mediating the relationship between pain and ADL restriction in older groups, indicating clinically plausible pathways that may begin earlier in life among students (23).

In educational settings, FM-like symptom clusters have also been reported in student and trainee cohorts; for example, pharmacy professionals and students have demonstrated measurable prevalence, reinforcing that FM is not confined to older clinical populations (24). Occupational health research further links bodily pain with mental health outcomes, supporting a bidirectional relationship between persistent pain and psychological wellbeing under demanding work or training environments (25). Conceptual models of health increasingly define wellbeing as adaptive capacity in the face of biopsychosocial challenges, which provides a useful framework for interpreting how chronic pain states may disrupt

students' functional and emotional resilience (26). Clinical updates on musculoskeletal pain management emphasize the importance of recognizing chronicity and targeting multidimensional contributors early to reduce long-term disability burden (27).

Within FM specifically, anxiety, depression, fear-avoidance, and reduced quality of life are frequently documented, and affective symptoms can magnify pain-related disability and functional restriction (28). University contexts may intensify this vulnerability because many students experience persistent psychological strain related to assessment pressures, competition, and constrained opportunities for restorative activities (29). In younger populations, chronic pain is also associated with absenteeism and poorer academic outcomes, underscoring the potential educational and social consequences of unrecognized FM symptomatology (30). Mechanistic studies further demonstrate that depression and trait anxiety can mediate the relationship between clinical pain and health-related quality of life, providing a plausible explanatory pathway for how FM severity could translate into multidomain impairment in student health status (31).

Despite growing literature on FM prevalence and quality-of-life outcomes across populations, comparatively fewer studies have simultaneously quantified FM prevalence across both sexes in university settings while also modeling its relationship with standardized general health domains. This knowledge gap is particularly important because university students may normalize persistent widespread pain and functional limitation as “stress-related,” delaying recognition and support, while the combined physical and emotional burden may impair mobility, self-care, usual activities, pain/discomfort status, and anxiety/depression—core dimensions of general health that can be captured using preference-based tools. Accordingly, the objectives of this study were to evaluate the prevalence of fibromyalgia among university students and to measure the impact of fibromyalgia on general health among university students.

MATERIAL AND METHODS

This cross-sectional observational study was conducted at the University of Sialkot, Pakistan, over a 6-month period following approval from the institutional research committee. Students from multiple academic departments were approached and enrolled using a non-probability convenience sampling strategy. A total sample of 370 university students aged 19–25 years was included. Eligibility required current university enrollment, age within the specified range, and self-reported interference with study, housework, or other activities of daily living, consistent with functional impact considerations used in prior fibromyalgia-related quality-of-life work (32). Students were excluded if they reported myopathy, fractures, muscular dystrophy, or cancer; if they were using medications expected to substantially alter pain perception; or if they were engaged in strenuous gym-based training likely to produce marked muscle fatigue. Participation was voluntary, written informed consent was obtained prior to data collection, and students were informed of their right to withdraw at any time without consequences.

Data were collected using a closed-ended, self-administered questionnaire packet comprising demographics, the Revised Fibromyalgia Impact Questionnaire (FIQR), and the EQ-5D-3L health questionnaire. The FIQR was used to quantify fibromyalgia symptom impact over the preceding 7 days across function, overall impact, and symptom severity domains, scored on 0–10 item scales and aggregated to a 0–100 total score, with established psychometric support including good-to-excellent test–retest reliability and cross-cultural applicability (33–35). General health status was assessed using the EQ-5D-3L descriptive system (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), each recorded at three

ordinal levels (no problems, some/moderate problems, extreme problems/unable to), together with a visual analogue scale (VAS) recorded on a 0–10 metric as implemented in the study dataset (36–39). All questionnaires were distributed and returned in-person after consent, and responses were checked at the point of collection for completeness to reduce missingness and data-entry error.

Fibromyalgia status was operationalized using the study's diagnostic criteria fields aligned with the classic tender-point framework, incorporating chronic widespread pain for at least three months and a tender point count derived from the 18-site assessment rubric; participants were classified as fibromyalgia diagnostic criteria (FMDC) positive or negative based on the study's predefined threshold applied to the trigger-point count variable. The primary exposure variable for prevalence analyses was FIQR total score (continuous). The primary outcome variables were the EQ-5D-3L domain levels (treated as ordered numeric outcomes for modeling consistency with the dataset structure) and the EQ VAS (continuous). Demographic variables (including sex and age) were summarized to characterize the sample and to support subgroup description by FMDC status.

To address potential measurement and selection bias inherent in convenience sampling and self-report instruments, standardized administration procedures were used across departments, eligibility criteria were applied uniformly, and all instruments were applied consistently in the same sequence. Data integrity procedures included manual verification of returned forms, coded data entry into SPSS, range checks aligned with each tool's scoring rules, and verification of frequency distributions to identify implausible values prior to analysis. Because the analytic dataset was complete for the included participants, analyses proceeded using complete-case evaluation without imputation.

Sample size was set at 370 based on a Raosoft calculation using a 95% confidence level, 5% margin of error, an assumed population size of 10,000, and a 50% response distribution to ensure conservative precision for prevalence estimation. Statistical analysis was performed in SPSS (version 27.0).

Descriptive statistics were used to report frequencies and percentages for categorical variables and means with standard deviations for continuous variables. Prevalence of FMDC positivity was computed overall and stratified by sex using cross-tabulation. To examine the prevalence between fibromyalgia severity and general health, regression analyses were performed with FIQR total score as the predictor and each EQ-5D-3L domain level and EQ VAS as dependent variables, reporting regression coefficients, standardized effects, model fit indices (R , R^2 , adjusted R^2), and statistical significance using two-sided testing with an alpha threshold of 0.05.

Ethical safeguards included written informed consent, confidentiality of collected data with restricted access to authorized personnel only, removal of identifying information from analytic datasets, and respect for voluntary participation including the right to withdraw without penalty.

RESULTS

A total of 370 university students were included, with equal representation of males and females (185 each). The mean age was 21.90 ± 1.52 years (range 19–25). The overall symptom impact measured by FIQR showed a mean total score of 34.55 ± 19.66 (range 0–81.67), with domain means of 8.96 ± 6.12 for function, 5.80 ± 5.13 for overall impact, and 19.79 ± 11.46 for symptoms, indicating a wide dispersion of symptom burden across the student population (Table 1).

Table 1. Sample Characteristics and FIQR Descriptive Statistics (N=370)

Variable	N	Min	Max	Mean ± SD
Age (years)	370	19.00	25.00	21.90 ± 1.52
FIQR Domain 1 (Function)	370	0.00	26.67	8.96 ± 6.12
FIQR Domain 2 (Overall Impact)	370	0.00	20.00	5.80 ± 5.13
FIQR Domain 3 (Symptoms)	370	0.00	50.00	19.79 ± 11.46
FIQR Total	370	0.00	81.67	34.55 ± 19.66

Fibromyalgia prevalence based on the study's FM diagnostic criteria was 27.0% (100/370), while 73.0% (270/370) were FMDC negative. Sex-stratified prevalence showed 30.3% (56/185) of females and 23.8% (44/185) of males were FMDC positive, and within the FMDC-positive group females comprised 56.0% (56/100) and males 44.0% (44/100), demonstrating modest female predominance within this student cohort (Table 2).

Table 2. Prevalence of Fibromyalgia (FMDC Status) Overall and by Sex (N=370)

FMDC Status	Total n (%)	Female n (%) (n=185)	Male n (%) (n=185)
FMDC Positive	100 (27.0%)	56 (30.3%)	44 (23.8%)
FMDC Negative	270 (73.0%)	129 (69.7%)	141 (76.2%)
Total	370 (100.0%)	185 (100.0%)	185 (100.0%)

The distribution of tender-point counts used in FM diagnostic classification showed that higher trigger-point counts were present in a notable subset, including 12 points in 14.3% (53/370), 14 points in 9.5% (35/370), 16 points in 2.7% (10/370), and 18 points in 0.5% (2/370). General health status on the EQ-VAS (0–10 scale used in the dataset) was concentrated in mid-range ratings, with the highest frequencies at VAS 6 (21.4%; 79/370) and VAS 4 (21.1%; 78/370); 0.3% (1/370) reported the best health state at 0 and 8.1% (30/370) reported the worst health state at 10 (Table 3).

Table 3. Trigger-Point Count (FM Diagnostic Criteria) and EQ-VAS (0–10) General Health Distribution (N=370)

Value	Trigger-point Count n (%)	EQ-VAS Score n (%)
0	57 (15.4)	1 (0.3)
1	—	7 (1.9)
2	39 (10.5)	51 (13.8)
3	—	20 (5.4)
4	30 (8.1)	78 (21.1)
5	—	23 (6.2)
6	36 (9.7)	79 (21.4)
7	—	27 (7.3)
8	44 (11.9)	45 (12.2)
9	—	9 (2.4)
10	64 (17.3)	30 (8.1)

Value	Trigger-point Count n (%)	EQ-VAS Score n (%)
12	53 (14.3)	—
14	35 (9.5)	—
16	10 (2.7)	—
18	2 (0.5)	—
Total	370 (100.0)	370 (100.0)

Note: “—” indicates not applicable because the two scales use different value structures (trigger-point counts recorded in even increments up to 18; EQ-VAS recorded from 0–10).

Table 4. EQ-5D-3L Domain Burden and Regression on FIQR Total Score (N=370)

EQ-5D-3L Domain	No Problems n (%)	Some/Moderate Problems n (%)	Extreme/Unable n (%)	R	R ²	B (Unstd.)	β (Std.)	F	p-value
Mobility	213 (57.6)	125 (33.8)	32 (8.6)	0.291	0.085	0.010	0.291	34.108	<0.001
Self-care	223 (60.3)	111 (30.0)	36 (9.7)	0.400	0.160	0.014	0.400	70.129	<0.001
Usual activities	175 (47.3)	154 (41.6)	41 (11.1)	0.321	0.103	0.011	0.321	42.411	<0.001
Pain/Discomfort	139 (37.6)	184 (49.7)	47 (12.7)	0.355	0.126	0.012	0.355	52.970	<0.001
Anxiety/Depression	143 (38.6)	150 (40.5)	77 (20.8)	0.395	0.156	0.015	0.395	67.930	<0.001

EQ-VAS regression (FIQR → VAS): R=0.473, R²=0.223, B=0.058, β=0.473, F=105.903, p<0.001.

EQ-5D-3L domain responses demonstrated substantial functional and psychological burden in the overall cohort. Mobility limitations were reported by 42.4% (157/370), self-care limitations by 39.7% (147/370), and usual-activity limitations by 52.7% (195/370). Pain/discomfort was prominent, with 62.4% (231/370) reporting moderate-to-extreme pain, while anxiety/depression was reported at moderate-to-extreme levels by 61.3% (227/370). Regression models using FIQR total score as the predictor showed statistically significant regression patterns across all five EQ-5D-3L domains (all p<0.001).

The explained variance ranged from 8.5% for mobility (R²=0.085; B=0.010; β=0.291; F=34.108) to 16.0% for self-care (R²=0.160; B=0.014; β=0.400; F=70.129), while usual activities (R²=0.103), pain/discomfort (R²=0.126), and anxiety/depression (R²=0.156) also demonstrated consistent positive gradients with increasing FIQR. The strongest regression signal was observed for EQ-VAS, where FIQR explained 22.3% of variance (R=0.473; R²=0.223; B=0.058; β=0.473; F=105.903; p<0.001), indicating progressively poorer perceived health ratings with higher fibromyalgia impact scores (Table 4).

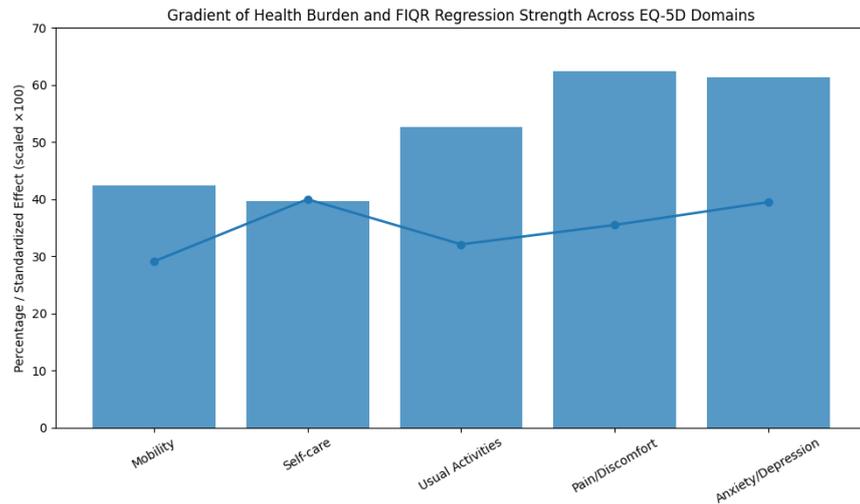


Figure 1 Gradient of Health Burden and FIQR Regression Strength Across EQ-5D Domains

The integrated visualization demonstrates a clear gradient between overall health burden (moderate-to-extreme problems) and regression strength of FIQR across EQ-5D domains. The highest clinical burden was observed in Pain/Discomfort (62.4%) and Anxiety/Depression (61.3%), followed by Usual Activities (52.7%), Mobility (42.4%), and Self-care (39.7%). Correspondingly, standardized regression coefficients (scaled $\times 100$) show the strongest FIQR predictive gradient for Self-care ($\beta=0.400$), Anxiety/Depression ($\beta=0.395$), and Pain/Discomfort ($\beta=0.355$), with comparatively lower values for Usual Activities ($\beta=0.321$) and Mobility ($\beta=0.291$). Notably, domains with higher symptom burden also demonstrate stronger regression gradients, particularly in psychological and pain-related dimensions, suggesting that fibromyalgia severity exerts a disproportionate influence on perceived mental health and pain states relative to pure mobility restriction. The divergence between burden magnitude and regression strength in Self-care indicates that although fewer students report extreme self-care limitations, FIQR escalation disproportionately amplifies deterioration in this domain, underscoring its sensitivity to symptom severity.

DISCUSSION

This study identified a fibromyalgia prevalence of 27.0% among university students aged 19–25 years, with a modest female predominance (30.3% vs 23.8%). Although global community-based estimates commonly report prevalence between 2–4% (4,60), substantially higher rates have been observed in student and professional subgroups exposed to academic or occupational stress (24,29). The elevated prevalence in this cohort may reflect heightened psychosocial load, sedentary behaviors, sleep disruption, and stress-related amplification of pain perception during early adulthood, a developmental stage characterized by significant biopsychosocial transitions (17). Consistent with broader epidemiologic trends, females demonstrated higher prevalence, aligning with sex-related vulnerability patterns described in prior studies (5,51), potentially mediated by hormonal, neuroimmune, and psychosocial differences (15,16).

The functional burden observed in this cohort was clinically meaningful. Over half of the participants reported limitations in usual activities (52.7%), while 62.4% reported moderate-to-extreme pain and 61.3% reported moderate-to-extreme anxiety/depression. These findings reinforce the multidimensional nature of fibromyalgia, extending beyond nociceptive symptoms to substantial psychosocial impairment (20,28). The high prevalence of psychological distress aligns with evidence demonstrating that depression and anxiety frequently co-occur with fibromyalgia and intensify disability (31,48). The observed burden

among university students is particularly concerning, given prior evidence linking chronic pain to absenteeism and reduced academic performance in young populations (30).

Regression analyses demonstrated statistically significant gradients between FIQR severity and all EQ-5D domains ($p < 0.001$). FIQR explained 22.3% of variance in EQ-VAS health status, indicating a substantial impact of fibromyalgia severity on perceived global health. Domain-specific regression effects were strongest for self-care ($R^2 = 0.160$) and anxiety/depression ($R^2 = 0.156$), followed by pain/discomfort ($R^2 = 0.126$), usual activities ($R^2 = 0.103$), and mobility ($R^2 = 0.085$). These patterns suggest that symptom escalation disproportionately affects psychological and functional autonomy dimensions rather than mobility alone. Previous work has shown that depression mediates the relationship between clinical pain and health-related quality of life (31), and that psychological comorbidities significantly amplify disability in fibromyalgia (38). The comparatively lower explanatory power for mobility is consistent with literature indicating that central sensitization and affective distress may account for greater variance in perceived health than mechanical restriction alone (20,27).

The prominence of anxiety/depression in this cohort reflects the reciprocal amplification loop between emotional distress and pain perception (31). Contemporary models conceptualize fibromyalgia as a stress-responsive pain amplification syndrome involving dysregulated central processing (3,16). University environments characterized by academic pressure and reduced recovery may serve as contextual triggers for symptom exacerbation (29). Importantly, the regression gradient across domains highlights that fibromyalgia severity is not limited to somatic pain but extends into self-care and psychosocial autonomy, reinforcing the need for multidimensional screening and early intervention strategies within campus health systems.

The findings contribute to emerging evidence that fibromyalgia burden is substantial in younger populations and not confined to middle-aged cohorts (24). The coexistence of high psychological distress and pain severity in this sample mirrors patterns documented in psychiatric comorbidity reviews (38,48). Given that health is increasingly conceptualized as adaptive capacity under stress (26), the observed reduction in EQ-5D domains indicates impaired resilience among affected students. These results underscore the importance of integrating musculoskeletal and mental health services in university settings, with emphasis on early identification, education, stress management, and interdisciplinary support programs (18,27).

CONCLUSION

Fibromyalgia prevalence among university students in this study was 27.0%, with higher rates in females and substantial multidimensional health burden. Increasing FIQR severity demonstrated consistent regression gradients across mobility, self-care, usual activities, pain/discomfort, anxiety/depression, and overall health status, with the strongest effects observed in psychological and self-care domains. These findings indicate that fibromyalgia in young adults significantly impairs general health beyond pain alone and highlight the need for early recognition and integrated campus-based interventions.

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DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: MF; Design: ZM; Data Collection: AA, RA, RF; Analysis: MF, ZM; Drafting: MF

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