

Original Article

Prevalence and determinants of fibromyalgia syndrome among females at Jouf university, Saudi Arabia

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ABSTRACT

Fibromyalgia syndrome (FMS) is known as a chronic, diffused musculoskeletal pain. The primary symptoms of this condition are stiffness in muscles and joints, sleeplessness, exhaustion, changes in mood, cognitive impairment, anxiety, and general sensitivity. To examine the incidence of FMS in females at Jouf University and analyze the relationship between individuals who meet the positive criteria for FMS and their socio-demographic factors. This cross-sectional study included 448 female employees and students of Jouf University, their ages ranged from 18 to 55 years old. A questionnaire was used for the evaluation of FMS, which is formed of 3 sections, including demographic data, the Wide Pain Index (WPI), and the Symptom Severity Scale (SSS), with the total score ranging from 0 to 12. Participants were instructed to fill out the questionnaire by themselves. The fibromyalgia has a high prevalence (10.5%) at Jouf University. The mean $\pm$ SD of WPI and total SS among participants was 4.04 ± 0.72 and 9.06 ± 0.64 , respectively. Additionally, a significant association of FMS with age, weight, marital status, occupation, special habits and chronic illness ($p < 0.05$) was found. While no significant association was recorded between FMS, and working hours ($p > 0.05$). There is a high prevalence of FMS among students, employees at Jouf University. Age, weight, marital status were significant predictors of FMS. So, a rehabilitation program should be conducted for these participants based on these predictors.

Keywords: Prevalence, Fibromyalgia syndrome, Females, Jouf university

Introduction

Fibromyalgia syndrome (FMS) is a recurrent, diffuse, non-inflammatory musculoskeletal discomfort of unclear cause that primarily affects women [1]. Fibromyalgia is the second most

familiar "rheumatic" illness after osteoarthritis [2]. People with FMS suffer from practical and cognitive impairments in addition to general pain, paresthesia in the limb and somatic symptoms. Muscle and joint stiffness, fatigue, insomnia, mood disorders, sleep disturbances, headache, and sensitive areas of the body, include the neck, thigh, shoulders, back, buttocks, arms, and legs. Psychological disorders that significantly affect life and work performance [3].

Usually, an illness develops after an event such as a bodily injury, cut, infection, or severe emotional distress [4]. In other situations, there is no single precipitating cause, and symptoms progressively worsen over time. Also, it is not related to muscle, nerve, or joint destruction or severe physical lesion or illness. In terms of risk factors, pathophysiology is significantly influenced

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by psychological stress and sleep deprivation [5, 6]. Women are especially susceptible to FMS, with incidence 7 to 9 times greater than those of men [7]. Other significant risk factors include age between 20 and 60 years, rheumatological disorders, and a family history of FMS [8].

There are currently no clear diagnostic tools for diagnosing fibromyalgia. Diagnosis of FMS is usually based on physical exam allegations and exclusion of other similar conditions. No particular lab or radiological exam is present for examination FMS [9].

The main characteristic of FMS, regardless of the criteria applied, is common or multi-localized pain that lasts longer than three months [6]. It is also possible for female university students and employees to suffer from tension, nervousness, and distress when spending long periods in front of the computer and studying, and these are factors that cause FMS. Also, there is a lack of such research in the northern Kingdom of Saudi Arabia. Thus, the purpose of our research is to determine the prevalence of FMS among Jouf University employees and students as well as the variables that may influence this incidence.

Materials and Methods

This was a cross-sectional study conducted on 448 participant's university students and employees from Jouf University. Each student and employee received comprehensive written details about the research and were asked to sign the consent form if they wanted to be engaged in the study. The current study was conducted following the instructions of the Declaration of Helsinki and was approved by the Institutional Review Board of the Qurayat Health Affairs, Saudi Arabia (No: 2024- 99). All participants aged from 18 to 55 years old were included in the study [10]. Pregnant women, participants with defects in cervical and lumbar spine, and participants who had previously undergone surgery of cervical vertebrae and back were excluded from the study.

The participants were supplied with a questionnaire to fill out by themselves. The study questionnaire is consisted of 3 parts, first part asked about demographics of the participants, such as age and level of education. Additionally, body mass index (BMI), working hours per day, sleeping hours, comorbid chronic diseases, or any psychological symptoms were also inquired. Other questions were about pain: if they were taking any analgesics. They were asked whether work causes stress to them, and smoking status. The second part consists of the Wide Pain Index (WPI), which displays how many areas (0-19 counts) the participant detected as unpleasant sites throughout the previous week. The third part consists of the Symptom Severity Scale (SSS), which evaluates fatigue, alertness, and symptoms, which are the three primary features of FMS, deterioration of cognition during the previous week, and the severity of physical manifestations. The overall score (0 to 12) was also addressed [11]. The outcome was classified as positive if participants achieved a score greater than or equal 7/19 at WPI for pain areas and a score greater than or equal 5/12 at SSS, or score between

3 to 6/19 at WPI and a score greater than or equal 9/12 at SSS. Additionally, symptoms had to be present for a minimum of 3 months and there had to be no other disorder that could account for the pain [12].

Statistical analysis

The participants' demographic and measurable data were presented using descriptive statistics such as mean, standard deviation, percentages, and frequencies. While frequencies and percentages were used to summarise categorical variables, mean and standard deviation were used to summarise quantitative variables. To investigate relationships between the prevalence of fibromyalgia and characteristics of participants, chi-square tests were employed. The factors that predict fibromyalgia in the individuals were identified using logistic regression analysis. For every statistical test, the significance level was set at $p < 0.05$. The Statistical Package for Social Studies (SPSS) version 25 for Windows was used to conduct all statistical analyses.

Results and Discussion

Subjects' characteristics

The present study was carried out on 448 females from Jouf University. Participants' mean $\pm$ SD age, height, weight, and BMI were 23.13 ± 5.21 years, 159.89 ± 7.08 cm, 58.61 ± 12.27 kg, and 22.90 ± 4.44 kg/m² respectively. 381 (85%) were students and 67 (15%) worked in management. The mean working hours per day were 4.65 ± 2.64 hours. **Table 1** illustrates the participants' characteristics.

	<i>N</i>	%
Age		
18-21 years	270	60.3
22-25 years	113	25.2
26- 55 years	65	14.5
Weight status		
Underweight	66	14.7
Normal weight	268	59.8
Overweight	80	17.9
Obese	34	7.6
Marital status		
Married	76	17%
Single	372	83%
Occupation		
Students	381	85%
Management	67	15%
Work hours		
1-4 h/day	266	59.4%
> 4 h/day	182	40.6%
Special habitats		
Yes	10	2.2%
No	438	97.8%
Chronic disease		
Yes	24	5.4%
No	424	94.6%

Prevalence of fibromyalgia among participants

The fibromyalgia prevalence was 10.5% with 95% CI of 7.98-13.67% (**Figure 1, Table 2**). The mean $\pm$ SD of WPI among participants with fibromyalgia was 4.04 ± 0.72 ranging from 3 to 6. The mean $\pm$ SD of total SS among participants with fibromyalgia was 9.06 ± 0.64 with minimum of 8 and maximum of 10 (**Table 3**).

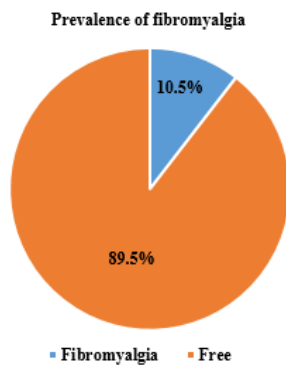


Figure 1. Prevalence of fibromyalgia among females at Jouf University

Table 2. Prevalence of fibromyalgia among females at Jouf University

Prevalence of fibromyalgia		95% CI
Prevalence	47 (10.5%)	7.98-13.67%

CI: Confidence interval

Table 3. Fibromyalgia measures in subjects with FMS.

	Mean $\pm$ SD	Minimum	Maximum
WPI	4.04 ± 0.72	3	6
SS	6.09 ± 1.84	2	9
B2	2.98 ± 1.84	1	7
Total SS	9.06 ± 0.64	8	10

SD, Standard deviation

Relationship between fibromyalgia and participant characteristics

There was a significant association of fibromyalgia with age, weight status, marital status, occupation, special habits, and chronic illness ($p < 0.05$). While, no significant association was found between fibromyalgia and working hours ($p > 0.05$).

There was a significant increase in the incidence of fibromyalgia in the 22-25 and 26-55 age groups compared to the 18-21 age group ($p < 0.001$), in individuals with underweight ($p < 0.05$), in married subjects compared to single subjects ($p < 0.001$), in management subjects compared to students ($p < 0.001$), and in subjects with special habits and chronic illness ($p < 0.01$) (**Figure 2, Table 4**).

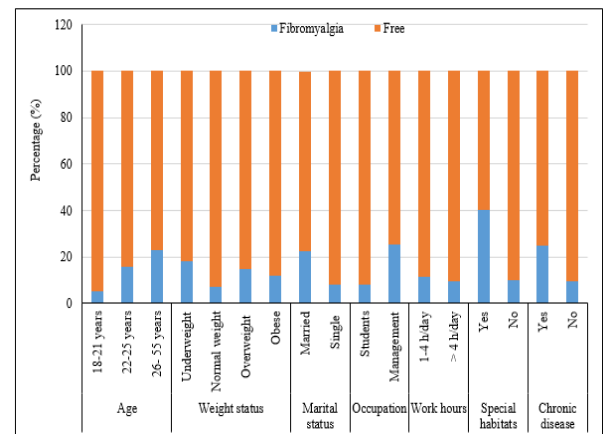


Figure 2. Association between fibromyalgia and subject characteristics

Table 4. Association between fibromyalgia and subject characteristics

	Presence of fibromyalgia		χ^2 value	p - value
	Yes	No		
Age				
18-21 years	14(5.2%)	256 (94.8%)	22.62	0.001
22-25 years	18(15.9%)	95 (84.1%)		
26- 55 years	15(23.1%)	50 (76.9%)		
Weight status				
Underweight	12(18.2%)	54 (81.8%)	9.25	0.02
Normal weight	19 (7.1%)	249 (92.9%)		
Overweight	12 (15%)	68 (85%)		
Obese	4 (11.8%)	30 (88.2%)		
Marital status				
Married	17(22.4%)	59 (77.6%)	13.75	0.001
Single	30 (8.1%)	342 (91.9%)		
Occupation				
Students	30 (7.9%)	351 (92.1%)	18.58	0.001
Management	17(25.4%)	50 (74.6%)		
Work hours				
1-4 h/day	30(11.3%)	236 (88.7%)	0.43	0.51
> 4 h/day	17 (9.3%)	165 (90.7%)		
Special habitats				
Yes	4 (40%)	6 (60%)	9.48	0.002
No	43 (9.8%)	395 (90.2%)		
Chronic disease				
Yes	6 (25%)	18 (75%)	5.68	0.01
No	41 (9.7%)	383 (90.3%)		

χ^2 : Chi squared value

p value: Probability value

Prediction of fibromyalgia among the participants

To identify the factors that can anticipate fibromyalgia in the subjects, a binary logistic regression was conducted. Age, weight status, and marital status were significant predictors for fibromyalgia while occupation, special habits, and chronic disease were not significant predictors for fibromyalgia.

Fibromyalgia was 2.91 times more common in participants aged 22-25 years than in those aged 18-21 years (Odds Ratio = 2.91, 95% CI 1.33-6.37, $p = 0.008$). Additionally, it was 3.23 times more common in participants with underweight than those with normal weight (Odds Ratio = 3.23, 95% CI 1.39-7.48, $p = 0.006$). Moreover, it was more common in married subjects 2.54 times more than in single participants (Odds Ratio = 2.54, 95% CI 1.09-5.88, $p = 0.03$) (Table 5).

Table 5. Predictors of fibromyalgia among participants

Variables	Odds ratio	95% CI		P-value
Age				0.01
22-25 years	2.91	1.33	6.37	0.008
26- 55 years	1.12	0.22	5.65	0.88
Weight status				0.02
Underweight	3.23	1.39	7.48	0.006
Overweight	1.79	0.78	4.12	0.166
Obese	0.68	0.18	2.48	0.558
Marital status (married)	2.54	1.09	5.88	0.03
Occupation (management)	3.33	0.81	13.75	0.096
Special habitats	2.31	0.54	9.89	0.260
Chronic disease	2.2	0.73	6.61	0.160

CI: Confidence interval; p value: Probability value

In the current study, the authors assessed the incidence of FMS among students and employees at Jouf University, a group particularly vulnerable to stress due to their work environment [13]. To the best of the authors' knowledge, this is the first study to investigate the incidence of FM at Jouf University, Saudi Arabia .448 female participants were included. A self-administered questionnaire was used to evaluate the incidence of FMS, the results of the present study revealed that the prevalence of FM among females in the Jouf University community was considerably high (10.5%). This result is supported by a study conducted by Bawazir, 2023, who found that the prevalence of FMS in Saudi Arabia was high [14], and this is in contrast to the finding of Tharwa, 2023, who found that the prevalence of FMS in Egyptian university students was low [15].

The findings of the present study reported a significant association between FMS and age ($P < 0.05$). As age increases, individuals are exposed to more physical, emotional, and environmental stressors, which can contribute to the onset or exacerbation of FMS symptoms. Chronic stress and trauma have been related to the deterioration of symptoms of FMs. This result is in line with the findings of a previous study carried out by Althobaiti *et al.* (2022), who found a significantly higher incidence of FMS in subjects 40 years old or older [16].

In addition, the current study reported a significant association between FMS and chronic diseases ($P < 0.05$) as systemic inflammation and immune system malfunction are features of chronic illnesses like lupus and rheumatoid arthritis. Even while FMS doesn't cause inflammation, chronic inflammation in these illnesses might cause modifications in the central nervous system, which can exacerbate FMS symptoms. This result is supported by

Haliloglu *et al.* 2022, who found a high prevalence of FMS rheumatologic diseases patients, for vasculitis (25 %), systemic lupus erythematosus (13.4 %), ankylosing spondylitis (12.6 %), Sjögren's syndrome (12 %), osteoarthritis (10.1 %), familial Mediterranean fever (7.1 %), polymyalgia rheumatic (6.9 %), rheumatoid arthritis (6.6 %), Behçet's disease (5.7 %), and gout (1.4 %) [17].

Furthermore, the current study found a significant association between FMS and occupational status ($P < 0.05$). This result was consistent with a previous study carried out by Samman *et al.* 2021, who revealed that 9.6% of medical students were diagnosed with FMS [1]. The present findings also found that there is a significant association with underweight ($P < 0.05$), this may be due to the fact that underweight individuals may experience deficiencies in essential nutrients such as vitamins D, B12, and magnesium, which are critical for muscle and nerve function. These deficiencies can contribute to pain sensitivity, fatigue, and other FMS symptoms [18].

This finding contradicts with the research conducted by Mathkhor and Ibraheem, 2023, who found that 61.81% were overweight/obese females [19]. Participants with special habits showed a significant increase in the fibromyalgia prevalence ($p < 0.01$), and this is supported by the research conducted by Pamuk *et al.* 2009 who found a relationship between smoking and FMS [20].

Limitations and Recommendations

The current study has a number of limitations including the sample included in the study was only females, also the self-filled questionnaire was used to diagnose FMS, and no laboratory testing was performed. Additionally, collecting bias was unavoidable because all evaluations relied on self-assessment. Moreover, tiredness, sleeplessness, and other symptoms of FMS can be caused by a wide range of medical conditions, it is recommended that future studies should include male participants and other populations such as sedentary housewives and other occupations with different types of stresses (physical and mental)

Conclusion

FMS is highly prevalent (10.5%) in students, and employees at Jouf University. There being a significant relationship of fibromyalgia with age, weight status, marital status, occupation, special habits and chronic illness. While, no significant association was found between fibromyalgia and working hours. Planners must to take the high frequency of FMS in Jouf community into serious consideration and implement measures to manage its symptoms.

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Conflict of interest: None

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Ethics statement: The present study was carried out based on the Declaration of Helsinki and was approved by the Institutional Review Board of the Qurayat Health Affairs, Saudi Arabia (No: 2024- 99).

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