

## Quality of life in physically active students affected by fibromyalgia

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### Abstract

**Aim of the work:** To investigate the frequency of fibromyalgia syndrome (FMS) in a group of physically active university students and to assess their quality of life. **Methods:** Fibromyalgia Survey Questionnaire, based on the 2010 American College of Rheumatology (ACR) fibromyalgia classification criteria for FMS, was used to determine the frequency of FMS using an online survey. All affected students were further examined by a rheumatologist to verify the diagnosis of FMS. Pain severity and impact were assessed using the chronic pain grade questionnaire. Quality of life was assessed using the World Health Organization (WHO) brief Quality of Life Scale (WHOQOL) (Arabic version). **Results:** The current study included 425 students; 194 females (45.6%) and 231 males (54.4%). 50 participants (11.8%) fulfilled the 2010 ACR criteria for FMS: 60% (n=30) females and 40% (n=20) males (F: M 1.5:1). The percentage of FMS in the female participants was 15.5% and 8.7% in male. 164 (38.6%) students had previous knowledge about FMS. There was a significant difference between FMS affected and the unaffected group as regards female sex, longer duration of traveling, and computer use with no difference as regards previous Covid-19 diagnosis. There was a significant difference ( $p < 0.0001$ ) between those with and without FMS in all pain items including rate and intensity over the past 6 months and also the interference with the daily, recreational, social, and family activities, in addition to the ability to work. There was a significant difference between FMS affected and the unaffected groups as regards to all domains of quality of life. When the Linear Regression model was done for the quality of life among participants, FMS was associated with low quality of life. **Conclusion:** Fibromyalgia is highly frequent even in physically active university students; it has a strong negative impact on all aspects of the quality of life that necessitate special medical and rehabilitation programs with social and psychological support.

**Keywords:** *Quality of life; fibromyalgia; physically active*

## **Introduction**

Interest in the concept of quality of life emerged after the middle of the twentieth century, which began to be studied first through economic and political research, then social and psychological research, thereafter ended with medical and health studies. And therefore, it is difficult to give a unified definition of quality of life due to the different indicators that are inferred from the different previous fields, so it is found that each definition approximately defines the quality of life according to the subject studied (15)(19)(40)(46). It is a broad and sprawling concept that reflects the relationship of people with the environment in which they live and the extent of this interaction. Thus, the quality of life in industrial societies differs from the quality of life that prevails in third-world societies, and in this context, a basic fact emerges that refers to the agreement of the quality of life on the nature of the needs that should be satisfied, but it differs in terms of the order of these needs and in terms of their priorities and importance in relation to other needs (5)(6)(31).

Quality of life has now become an issue related to mental and physical health, and in recent years it has been a focus of many research and studies, so that issues related to mental and physical health are currently being addressed under a more general and broader term, which is "Quality of life" (2)(41). Attention to the quality of life, associated with health care, is also directed to the quality of life through how a particular disease affects the patient, and to what degree that patient enjoys his life potential, and achieves his personal goals, aspirations, and reflections despite being injured or suffering from a particular disease (41).

Fibromyalgia syndrome (FMS) is a disorder that causes widespread pain in the musculoskeletal system that is accompanied by fatigue, sleep, memory, and mood disturbances, but researchers believe that FMS increases pain sensation by affecting the way the brain and

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spinal cord process painful and painless signals (3)(47). It was first identified as a pain syndrome without specific symptoms or controls, and was later identified as myofascial pain syndrome; patients identified areas of intense pain also known as tender points. It is usually encountered in health practice, accounting for (5:8%) of primary care consultations and (10:20%) of specialized rheumatology consultations. The total prevalence of FMS among the general population was estimated at (1.78%). This syndrome appears more prevalent in females than males 2: 1 and patients are usually between 20 and 55 years old, but it can develop at any age(39). FMS has been recognized as a disease that causes significant morbidity worldwide. FMS-affected patients are usually affected by physical, social, and psychological variables, which negatively affect the ability to work and the quality of life (39)(48).

Since the university stage is one of the most important stages of education in human life, and it is also one of the crucial stages in the life of individuals, as it often determines the course of their professional future as well as the general context of their behavior and the way they interact with others; it is an important period in which the student lives a set of experiences, including experiences of success and failure, satisfaction and other discontent, cases of depression and other happiness, as well as exposure to social pressures. Moreover, they may also suffer from multiple environmental problems, which may affect their health and physical aspect The most widespread of these phenomena was the exposure to the Corona Virus (COVID-19) pandemic since 2019 and its continuation until now. Therefore, the study of quality of life and fibromyalgia syndrome among university students is very important because of the dimensions of the quality of life scale (physical, psychological, social, and environmental), which are the same variables that are affected by FMS.

### **Objective**

This research aims to assess the frequency of FMS in a sample of Physical Education Faculty students and to assess the quality of life in this group of physically active students affected by FMS.

### **Research questions**

- 1- What is the frequency of FMS in a sample of Physical Education Faculty students?
- 2- How can FMS affect the quality of life in this sample of physically active students?
- 3- Which aspects of the quality of life could be affected more than others by FMS?

### **Methods**

This cross-sectional study was conducted on students of the Physical Education faculty, in Kafrelsheikh University. It was approved by the local ethical committee in Kafrelsheikh University Hospital with approval code: MKSU 50-12-26. Students were provided with detailed data about the study and those who agreed to be involved, were enrolled. Students with a previous history of trauma, current rheumatologic disease, or any chronic illness were excluded. An online survey was conducted, including the Fibromyalgia survey questionnaires (48), based on 2010 ACR criteria for FMS. It includes an assessment of the widespread pain index (WPI) and the symptom severity scale (SSS). To diagnose FMS, a WPI of  $\geq 7/19$  and SSS of  $\geq 5/12$ , or a WPI between 3-6/19 and SSS of  $\geq 9/12$  with symptoms being present for at least three months duration and that no other disease explains the pain. All patients who fulfilled the criteria of FMS were further referred to the rheumatology clinic to confirm the diagnosis and receive proper treatment. Demographic characteristics, including gender, academic level, mode and duration of traveling,

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sleeping hours at night, duration of studying and physical activity, use of electronic devices, and history of COVID-19 infection were obtained from all students. They were asked about FMS knowledge and the source of their information. Pain severity and impact were assessed by a chronic pain grade questionnaire (13). Quality of life was assessed using the WHO brief Quality of Life Scale (WHOQOL) (Arabic version)(11). It is a 26-item self-report measure that was designed to measure the impact of disease and impairment on daily activities and behavior, perceived health, disability, and functional capacity. It measures four factors: physical health, psychological health, social relationships, and environment.

**Statistical analysis:** Sorting and analysis of data were performed by using Statistical Package for Social Sciences (SPSS) version 21. In this study the qualitative variables were prescribed using number and percent, Chi-square test was used for analysis or Fisher's exact test and Monte Carlo exact test (if more than 20% of expected cell value less than 5). Numerical variables were expressed as means and standard deviations or median and interquartile ranges (IQR), Mann-Whitney U-test was used for comparison between groups (for non-normal distributed data). Simple linear regression analysis was done to assess the effect of fibromyalgia on quality of life among the study participants. P-value ( $< 0.05$ ) was adopted as the level of significance.

### Results

The current study included 425 students; 194 females (45.6%) and 231 males (54.4%) from two academic levels: third year (183, 43.1%) and fourth year (242, 56.9%). 50 participants (11.8%) fulfilled the 2010 ACR criteria: 60% (n=30) females and 40% (n=20) males (F: M 1.5:1). The percentage of FMS in the female participants was 15.5% and 8.7% in male. The frequency of FMS at various academic levels

was as follows: fifteen (8.2%) students were in the third year, and 35 (14.5%) were in the fourth year. Table 1 shows the sociodemographic data of those with and without FMS. 164 (38.6%) students had previous knowledge about FMS. Their source of information was social media in 67.7%, physicians in 25%, web pages in 11%, and friends in 8.5% of the participants. There was a statistically significant difference between FMS affected and the unaffected groups as regards female sex, longer duration of traveling, and computer use with no difference as regards previous Covid-19 diagnosis.

The frequency of FMS-related symptoms among the FMS, and among all participants, was assessed as many of the latter had FMS symptoms but did not fulfill the diagnostic criteria. All symptoms were significantly increased ( $p < 0.001$ ) in those with FMS (Table 2). Regarding the chronic pain grade questionnaire, there was a significant difference ( $p < 0.0001$ ) between those with and without FMS in all pain items including rate and intensity over the past 6 months and also the interference with the daily, recreational, social, and family activities, in addition to ability to work. (Table 3). There was a statistically significant difference between FMS affected and the unaffected group in regards to all domains (overall quality of life and general health, physical health, psychological health, social relationship, and environment) of WHOQOL (Table 4). When the Linear Regression model was done for the quality of life among participants, FMS was associated with low quality of life (Table 5).

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**Table 1: Socio demographic data of all participants**

Socio demographic data		Total (N=375)	Fibromyalgia detected cases (N=50)	P-value
Sex	Male	211(56.3%)	20(40.0%)	0.030*
	Female	164(43.7%)	30(60.0%)	
BMI	Under weight	22(5.9%)	4(8.0%)	0.130
	Normal weight	320(85.3%)	38(76.0%)	
	Over weight	28(7.5%)	8(16.0%)	
	Obese	5(1.3%)	0(0.0%)	
Duration of study	<1 hours/day	56(14.9%)	10(20.0%)	0.878
	1-3 hours/day	288(76.8%)	37(74.0%)	
	>3 hours/day	31(8.3%)	3(6.0%)	
Duration of computer use	<4 hours/day	214(57.1%)	21(42.0%)	0.044*
	4-7 hours/day	161(42.9%)	29(58.0%)	
Duration of sleep	<4 hours/day	19(5.1%)	6(12.0%)	0.266
	4-7 hours/day	214(57.1%)	27(54.0%)	
	8-11 hours/day	131(34.9%)	16(32.0%)	
	>11 hours/day	11(2.9%)	1(2.0%)	
Covid-19 past infection	Positive	217(57.8%)	33(66.0%)	0.272
	Negative	158(42.2%)	17(34.0%)	
Frequency of travelling	Daily	316(84.3%)	45(90.0%)	0.695
	Twice a week	33(8.8%)	3(6.0%)	
	Once a week	21(5.6%)	2(4.0%)	
	Once a month	5(1.3%)	0(0.0%)	
Duration of travelling	<60min/day	77(20.5%)	5(10.0%)	<0.001*
	60-180min/day	147(39.2%)	11(22.0%)	
	180-240min/day	94(25.1%)	8(16.0%)	
	>240min/day	57(15.2%)	26(52.0%)	
Transport method	Car	221(58.9%)	7(10.9)	0.135
	Bus	89(23.7%)	17(34.0%)	
	Bicycle	7(1.9%)	0(0.0%)	
	Others	58(15.5%)	3(6.0%)	

\*Significant. -Values are presented as number (%).

- Chi-squared test (or Monte Carlo exact test) were used as appropriate.

**Table 2: Summary statistics of all individual items in the fibromyalgia survey questionnaire**

Fibromyalgia symptoms questionnaire items	Total (N=375)	Fibromyalgia detected cases (N=50)	<i>P value</i>	
Section I (over the past week)	Do you have fatigue (1-3)	1.2±0.9	<0.001*	
	Do you have trouble thinking or remembering (1-3)	1.2±1.0	<0.001*	
	Do you wake up tired (unrefreshed)(1-3)	1.4±1.0	<0.001*	
	<i>Subtotal score in Section I</i>	3.9±2.4	7.2±1.5	<0.001*
Section II (During the past 6 months have you had any of the following symptoms)	Abdominal pain or cramps(yes)	168(44.8%)	42(84.0%)	<0.001*
	Headache(yes)	300(80.0%)	48(96.0%)	0.006*
	Depression(yes)	219(58.4%)	46(92.0%)	<0.001*
	<i>Subtotal score in Section II</i>	1.8±1.0	2.7±0.5	<0.001*
Section III During the past 7 days have you had any pain in these areas	No pain	74(19.7%)	0(0.0%)	0.002*
	Neck	32(8.5%)	22(44.0%)	<0.001*
	Shoulder	88(23.5%)	39(77.0%)	<0.001*
	Back	21(5.5%)	41(82.0%)	<0.001*
	Hip	47(12.5%)	22(43.0%)	<0.001*
	Leg	44(11.4%)	33(66.5%)	<0.001*
	Arm	13(3.4%)	31(62.0%)	<0.001*
	Chest/abdomen	7(2.8%)	23(46.0%)	<0.001*
<i>Subtotal score in Section III</i>	1.3±1.9	6.8±3.7	<0.001*	
Section IV Overall, were the symptoms listed in section III above generally present for at least 3 months	Yes	128(34.1%)	50(100.0%)	<0.001*
	No	247(65.9%)	0(0.0%)	<0.001*

\*Significant.

-Values are presented as number (%) and mean±SD.

- Chi-squared test (or Fisher's exact test (FE)) and Mann–Whitney U test were used as appropriate.



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**Table 3: Summary statistics of all individual items in the chronic pain grading questionnaire among the fibromyalgia group**

Chronic pain grading questionnaire items		Total (N=375)	Fibromyalgia detected cases (N=50)	<i>P</i> value
How would you rate your pain	<i>Mean</i> <i>±SD</i>	3.9±1.8	5.5±1.6	<0.001*
	<i>Median</i> ( <i>IQR</i> )	4.0(3.0-5.0)	5.0(4.7-7.0)	
In the past six months, how intense was your worst pain	<i>Mean</i> <i>±SD</i>	4.4±2.1	6.3±2.0	<0.001*
	<i>Median</i> ( <i>IQR</i> )	4.0(3.0-6.0)	7.0(5.0-8.0)	
In the past six months, on the average, how intense was your pain	<i>Mean</i> <i>±SD</i>	4.1±1.9	5.6±1.7	<0.001*
	<i>Median</i> ( <i>IQR</i> )	4.0(3.0-5.0)	5.0(5.0-7.0)	
In the past six months, how much has pain interfered with your daily activities	<i>Mean</i> <i>±SD</i>	4.0±1.9	5.5±2.0	<0.001*
	<i>Median</i> ( <i>IQR</i> )	4.0(3.0-5.0)	5.0(4.0-7.0)	
In the past six months, how much has pain changed your ability to take part in recreational, social and family activities	<i>Mean</i> <i>±SD</i>	4.0±2.1	4.9±1.9	0.006*
	<i>Median</i> ( <i>IQR</i> )	4.0(2.0-5.0)	5.0(3.0-7.0)	
In the past six months, how much has pain changed your ability to work	<i>Mean</i> <i>±SD</i>	3.9±2.2	5.0±2.0	0.005*
	<i>Median</i> ( <i>IQR</i> )	3.5(2.0-5.0)	5.0(3.0-6.0)	

\*Significant.

- Mann-Whitney U test was used for comparison.

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**Table 4: WHO Quality of Life Scale-Brief in the studied groups**

Fibromyalgia symptoms questionnaire items		Total (N=375)	Fibromyalgia detected cases (N=50)	<i>P value</i>
Overall quality	How would you rate your quality of life?	3.3±1.0	2.7±0.9	<0.001*
	How satisfied are you with your health?	3.7±1.2	3.1±1.3	0.004*
Physical health	To what extent do you feel that physical pain prevents you from doing what you need to do?	3.7±1.2	3.1±1.3	<0.001*
	How much do you need any medical treatment to function in your daily life?	3.3±1.2	2.6±1.1	<0.001*
	Do you have enough energy for everyday life?	2.8±1.1	2.6±1.2	0.050*
	How well are you able to get around?	3.1±1.1	3.0±1.1	0.370
	How satisfied are you with your sleep?	3.1±1.2	2.4±1.3	0.001*
	How satisfied are you with your ability to perform your daily living activities?	3.0±1.1	2.7±1.2	0.001*
	How satisfied are you with your capacity for work?	3.4±1.1	3.3±1.3	0.120
	Sub-score	3.3±0.7	2.8±0.8	<0.001*
Psychological	How much do you enjoy life?	3.4±1.0	2.4±1.1	0.017*
	To what extent do you feel your life to be meaningful?	3.1±1.1	2.5±1.2	0.004*
	How well are you able to concentrate?	2.7±1.1	2.3±1.1	<0.001*
	Are you able to accept your bodily appearance?	3.2±1.2	3.0±1.2	0.031*
	How satisfied are you with yourself?	3.1±1.2	3.3±1.3	0.002*
	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	3.4±1.2	1.8±1.2	<0.001*
	Sub-score	3.1±0.7	2.5±0.8	<0.001*
Social relationships	How satisfied are you with your personal relationships?	3.6±1.2	3.0±1.4	0.001*
	How satisfied are you with your sex life?	3.8±1.2	3.2±1.4	0.361
	How satisfied are with the support you get from your friends?	3.7±1.3	2.8±1.2	0.002*
	Sub-score	3.5±0.9	3.0±0.8	<0.001*

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Envi ron men t	How safe do you feel in your daily life?	3.5±1.2	2.4±1.1	<0.001*
	How healthy is your physical environment?	3.4±1.1	2.5±1.1	0.001*
	Have you enough money to meet your needs?	3.9±1.1	3.1±1.2	0.266
	How available to you is the information that you need in your daily-to-day life?	2.9±1.0	2.9±1.1	0.197
	To what extent do you have the opportunity for leisure activities?	3.9±1.1	2.3±1.0	0.017*
	How satisfied are you with the condition of your living place?	2.9±1.2	3.6±1.4	0.122
	How satisfied are you with your access to health services?	3.1±1.3	2.3±1.1	0.001*
	How satisfied are you with your transport?	2.7±1.3	2.3±1.3	<0.001*
	Sub-score	3.2±0.7	2.7±0.8	<0.001*
<b>Total score</b>		13.2±2.6	11.2±2.8	<0.001*
<b>Transformed scale (%)</b>		57.9±16.8	45.0±17.7	<0.001*

\*Significant.

- Mann-Whitney U test was used for comparison.

**Table 5: Linear Regression model for quality of life among the fibromyalgia group**

Variables	B	95% CI	Std. Error	P -value
Fibromyalgia detected cases	-2.1	(-2.8- -1.3)	0.4	<0.001*
Intercept	13.3	(12.9-13.5)	0.1	<0.001*

\*Significant.

## Discussion

The purpose of the current work was to assess the quality of life in a group of physically active students affected by FMS. It was postulated that regular physical activity, implied as a prerequisite for the achievement of the academic study in the Physical Education faculty, may improve patients' symptoms and quality of life, but this

may be challenging because of pain, stiffness, and fatigue in FM patients, therefore, in the current study, all selected patients were practicing physical exercise for at least one hour daily, for at least 5 days weekly, as part of their learning program at the Faculty of Physical Education, while no one of them was diagnosed previously as FMS patient. A role in pain perpetuation is associated with muscle microtrauma and repair related to regular exercise, that may be primarily connected to various biochemical abnormalities in muscle tissue in accordance with deconditioning, which is a common finding in FM patients. Aerobic and strength exercises may help to alleviate FMS pain by modulating some of these findings (10) (12) (14) (26) (36) (42) (43).

The current study included 425 students, 50 participants (11.8%) fulfilled the 2010 ACR criteria: 60% (n=30) females and 40% (n=20) males (F: M 1.5:1). The percentage of FMS in the female participants was 15.5% and 8.7% in male. This frequency is higher than that estimated in the East Mediterranean general population which was reported to be between 0.69 % and 8.3 % with the pooled estimate of FMS prevalence being 4.43 % (18). F Inanıcı et al found a much lower frequency of FMS among sports professionals (4 out of 185 with a rate of 2.16%) (20).

Even more, Andary et al. evaluated 641 college student-athletes and found that only one met the 1990 ACR criteria for FMS (1). Both studies used the 1990 criteria which included tender point count. The latter is no longer required for diagnosis after the publication of the 2010 criteria that changed the definition of FMS changed from a primarily chronic pain condition to a multi-symptom disorder (48)(49)(51), and this of course partially explains the contradictory results. While the current study dealt with physically active students, the latter two studies dealt with professional athletes which may justify also partially to the frequency difference. A recent study done at the

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same university among medical students revealed a frequency of 12.5 % (27). This striking resemblance of the FMS frequency, regardless of the physical activity level, necessitates a cross-sectional study of FMS frequency in the general population in Egypt. The total prevalence of fibromyalgia worldwide in women was estimated as 3.98 % (2.8–5.2 %) compared to 0.01 % in men. Almost all previous prevalence studies reported higher affection in females than in males (17)(32)(33)(44). and this is the same as in the current work. As regards previous COVID-19 infection, there was no significant difference between FMS-affected and non-affected students. Although it was expected that clinical features of FMS might be more common in patients who recovered from symptomatic COVID-19, the results were not supporting the expectations, and no difference was found between the affected and non-affected; and this might be due to the time lag between the beginning of the pandemic and the current study, so almost all individuals might be affected by COVID with milder infection forms. This result is in contrast to many other studies that reported more affection with FMS in post-COVID-19 individuals (16)(22)(37).

As regards the relationship between FMS and quality of life, the current work reported a higher level of quality of life, which reached ( $57.9 \pm 16.8\%$ ) in the non-affected students in the Faculty of Physical Education, with a lower level of ( $45.0 \pm 17.7\%$ ) in the FMS affected students, a difference of (12.9) in favor of the non-affected students, meaning that FMS negatively affects the level of quality of life that was confirmed in the regression analysis. This is consistent with the study of Türkoğlu G et al (45) and Bernard AL et al (4). The quality of life is one of the variables of vital importance in clinical studies of chronic diseases, where it was found that FMS patients show an inability to perform in many dimensions of life, whether physical health, or psychological, and social relations, or environmental relations. Many studies have shown a decrease in the level of quality of life in patients with chronic diseases (21)(23)(29)(34). Many other

studies reported the deterioration of QOL in FMS patients with different instruments (7)(8)(24)(25)(28)(50). It was reported that FMS (as one of the chronic pain syndromes) patients might have lower life quality even more than other systemic disorders such as insulin-dependent diabetes mellitus and chronic obstructive pulmonary disease (28). This confirms that FMS has a significant impact on the quality of life in all its dimensions as FMS is a disorder that causes widespread pain in the musculoskeletal structure and is accompanied by fatigue, sleep disorders, memory, and mood changes, that affects health associated with quality of life, which in turn overlaps with many professional, social, family and other dimensions.

The above results confirm a robust correlation between FMS and lower quality of life. Based on the above, we should pay attention to the quality of life of these patients, especially with regard to health-related quality of life; precisely the aspect of life that is concerned with the extent to which health affects an individual's perception of their quality of life.

As regards, the rate and intensity of pain, on average, over the past 6 months and also the interference of pain with the daily, recreational, social, and family activities, in addition to ability to work over the past 6 months, there was a significant difference between those with and without FMS. It was suspected that FMS could affect the productivity and level of performance among participants. This was in accordance with the finding of previous studies (9)(30)(35)(38) which stated that people with FMS experienced a high impact on families and employment with a high possibility of workability deterioration. This was also established by a recent study on medical students (29) at the same university.

164 (38.6%) students had previous knowledge about FMS. The source of their information was as follows: 67.7% from social media, 25% from their physician, 11% from web pages, and 8.5% from

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friends. This emphasizes the utmost need to implement programs to educate students about FMS and other chronic pain syndromes during their early years in health science education study.

The main advantage of this work is its cross-sectional study design, which was based on a specialist diagnosis. It adds to the limited literature on FMS among physically active university students that may enhance other research to investigate numerous potential risk factors and characteristics of FMS among university students. The state of COVID-19 impact was taken into consideration to illustrate the possible effect of the pandemic. The main limitation is the restricted number of participants. A multicenter research involving Physical Education students from different universities is highly recommended in future studies.

### Conclusions

1-Fibromyalgia is highly frequent even in physically active university students.

2-Fibromyalgia has a strong negative impact on all aspects of the quality of life. **Recommendations**

1-Fibromyalgia, as one of the chronic pain and fatigue causes, should be incorporated in the academic study of Physical Education health sciences curriculum to raise the students awareness about this highly prevalent disease.

2- Special medical and rehabilitation programs with social and psychological support should be offered for all fibromyalgia affected students.

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