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REPORTING OF THE UNDERDIAGNOSED; FIBROMYALGIA PREVALENCE AMONG MEDICAL STUDENTS; A CROSS-SECTIONAL DESCRIPTIVE STUDY

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ABSTRACT

Background: Fibromyalgia is a disease characterized by chronic, widespread musculoskeletal pain, disturbed sleep, and problems with mental processing. For a long time, it was ignored by the medical community but now due to its increased prevalence, the situation has changed. Genetic and environmental factors like stress are related to its etiology. The present study aimed to assess the prevalence, and severity of fibromyalgia in medical students and the factors causing the disease.
Methods: This study is a cross-sectional descriptive study conducted in Holy Family Hospital. Through convenience sampling methodology, 196 medical students of all five years of MBBS were included. The standard questionnaire, the Multidimensional Health Assessment Questionnaire (MDHAQ), was used. Students with trauma or inflammatory rheumatology diseases were excluded.
Results: A total of 196 medical students were included of whom 54.6% (107/196) were females and 45.4% (89/196) were males. The total prevalence of fibromyalgia was calculated to be 68%, whereas 32% had no fibromyalgia or were in remission stage. The mean score for fibromyalgia calculated was 2.38 ± 1.81. There was a significant relationship between gender and having fibromyalgia (p = 0.000) with females (26.1%) suffering more from high severity fibromyalgia as compared to males (23.3%). Among our subjects with fibromyalgia symptoms, 72% reported that they did not exercise daily. Job or work status was found to significantly contribute to fibromyalgia (p = 0.003). Many functional and psychological

problems were faced by people with fibromyalgia.
Neck and back pain are the most significant.
Conclusions: Fibromyalgia is alarmingly prevalent in medical students, affecting their social, functional, and daily lives. Patients with fibromyalgia suffer from a wide range of disorders, from psychological to severe physical pains, and the most important thing is that they frequently go undiagnosed. Medical students who face grinding education and training along with meagre psychological support are more prone to it. The issue at hand is worth the time and consideration of education policymakers.

INTRODUCTION

Fibromyalgia (FM) is a prevalent rheumatic disorder characterized by chronic widespread musculoskeletal pain, disturbed sleep, exhaustion, and cognitive impairment [1]. It has been demonstrated that it is associated with psychological issues such as stress, anxiety, depression, irritable bowel syndrome, and other functional gastrointestinal disorders [2]. Prior to the development of health evaluation measures to diagnose FM, it was diagnosed by assessing tender spots [1].

In the general population, FM is highly common, with prevalence rates varying from 7.3% to 12.9% in different countries [3]. FM is predicted to affect an average of 2.7%of the world's population. With a 3:1 female to male ratio, it is more common among women [4]. In Pakistan, a public hospital's frequency was determined to be 33.3% in a sample population of 750 patients [5].

Recent research has identified genetic and environmental background as contributing factors, even though the etiology and pathophysiology of fibromyalgia are poorly known [6]. Numerous cross-sectional studies have demonstrated a connection between fibromyalgia and life stress, emotional trauma, and workload [7]. Given how stressful and hard medical school is, medical students deserve special attention [7]. They are particularly vulnerable to stress because of the enormous quantity of information available, the constant drive for better patient care, and the lack of free time [7]. According to a literature study, using the American College of Rheumatology (ACR) 1990 diagnostic criteria, the prevalence rate of FM was 1.48 percent among healthcare workers in Japan and 2 percent among medical students in Turkey [8].

This disorder carries a lot of stigmas even among the medical community of the world. For a long time, it was not considered a medical disorder. However, the air around it is changing, and many social organizations are campaigning to increase the funding for more robust research and classify FM as a neurological condition [9].

Pakistan's system of medical education is just as demanding and busy as any other. As a result, this research aims to paint a realistic image of the prevalence of potential FM among Pakistani medical students and to determine the associations between FM and factors such as sex and year of study. Additionally, it aims to identify the causes of fibromyalgia.

METHODOLOGY:

This study is a cross-sectional descriptive study. It was conducted at conducted at Rawalpindi medical university during the year 2022 from June to November (6 months).

Study population was the students in the First to Final year. First-year students were included as they had spent 5 months in the first year, so they were also among the exposed. Students with trauma or inflammatory rheumatology diseases were excluded. The sample size was calculated using Cochran’s Formula with a p-value of 9.6 [10].

Sample size: 188 with a 95% confidence interval. Females were 54.6% (107/196) and 45.4% (89/196) were males.

There were a total of 196 medical students with 22 (11.2%) from 1st year, 55 (28.1%) from 2nd year, 26 (13.3%) from 3rd year, 76 (38.8%) from 4th year, and 17 (8.7%) from 5th year

Questionnaire

The Multidimensional Health Assessment Questionnaire was used as it was shown that this questionnaire along with the Rapid3 ((Routine Assessment of Patient Index Data) assessment is an effective way to diagnose potential fibromyalgia non-clinically according to a research published in the journal of American College of Rheumatology [9].

Multidimensional Health Assessment Questionnaire (MDHAQ):

Content: The questionnaire consisted of an introductory paragraph explaining the purpose of the research and taking the consent of the participant. MDHAQ includes RAPID3, Items reflecting psychological distress, visual analog scales to assess pain, Rheumatology Attitude Disease Activity Index (RADAI), and a list of common symptoms and recent medical history.

Response Scale:

Physical Function: Ten activities are rated on a 4-point scale where 0=without any difficulty, 1=with some difficulty, 2=with much difficulty, 3=unable to do

- **Pain Visual Numerical Scale:** from 0-10.0= no pain and 10= pain as bad as it could be
- **Patient Global Assessment:** from 0-10.0 = very well and 10 = very poor
- **Rheumatology Attitude Disease Activity Index**: joint pain is rated on a 4-point scale and the scoring options are none, mild, moderate, and severe.
- **Fatigue Scale:** from 0-10. 0=fatigue is no problem and 10= fatigue is a major problem.

Practical Application:

Method Of Administration: self-administration.

Scoring:

RAPID3 scoring: Physical Function (FN) score: 0-10. Pain (PN) score: 0-10. Patient global assessment (PTGE) score: 0-10. TOTAL RAPID3 score=0-30. Add the total score from FN, PN, and PTGE and enter them as RAPID3 cumulative score.

Score Interpretation: RAPID3 scores range from 0-30 and after converting them by using the conversion table, scores range from 0-10(16) where:

Near remission= scores between 0-1, Low severity= scores from 1.3-2, moderate severity=scores from 2.3-4, High severity= scores from 4.3-10.

Respondent Burden: The time to complete is 5 minutes.

Validity: The MDHAQ and HAQ have been shown to be highly correlated however average MDHAQ scores have been shown to be 0.34 lower than HAQ scores. MDHAQ also eliminates the floor effects shown by HAQ [9]. It also includes psychological questions to screen for psychological stress in patients.

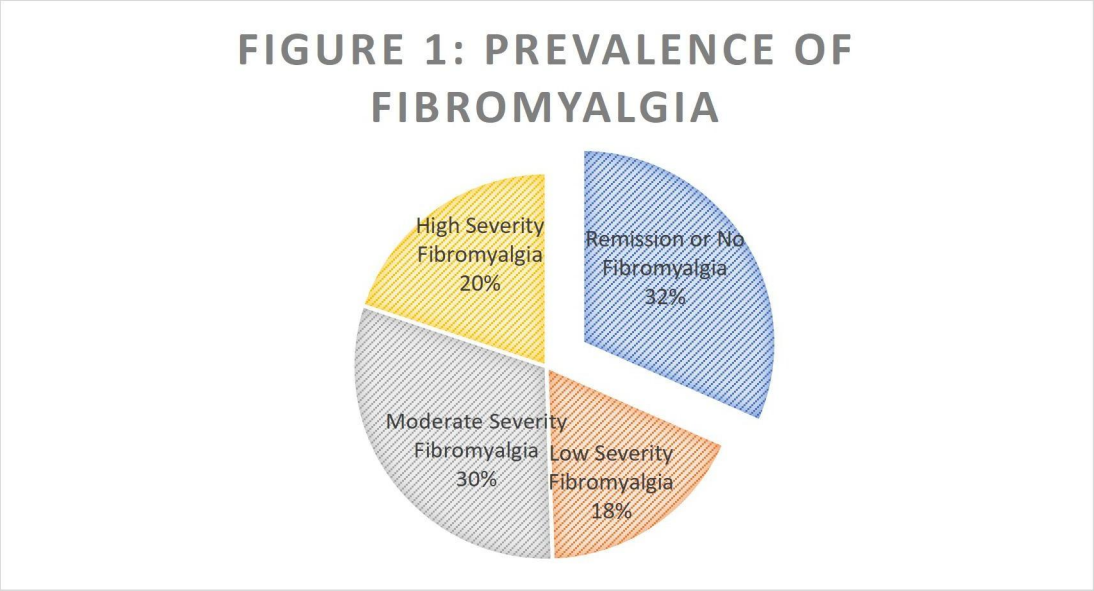
Statistical Analysis

Data was analyzed using SPSS- 28 and the relation between different variables such as gender, and other factors such as job, marital status etc. with scores of fibromyalgia were assessed using the chi-square test. Mean value of score of fibromyalgia was calculated along with standard deviation. Multivariate logistic regression was also calculated.

Ethical Consideration

Each student was asked to give consent if they wished to participate in the study included. All students who agreed to participate in the study were included. The anonymity and confidentiality of the participants were maintained.

The synopsis of the study was submitted to the Ethical Review Board for ethical approval. We were given ethical permissions for the research.



RESULTS:

A total of 196 medical students were included in the analysis. Among them 54.6% (107/196) were females and 45.4% (89/196) were males. Among the students, 31.6% were not suffering from FM, 30.6% had moderate severity fibromyalgia, 19.9% had high severity FM, and 17.9% had low severity fibromyalgia ($p < 0.000$). The mean score for fibromyalgia score calculated was 2.38 ±1.81. The total prevalence of fibromyalgia was calculated to be 68% whereas 32% had no fibromyalgia or were in remission stage. To assess the effect of the academic level on the development of FM symptoms, we analyzed the prevalence (TABLE 1)

of FM among different academic levels. 14/22 (63.6%) of 1st year were found to be suffering from FM, 37/55 (67.27%) of second year, 20/26 (76.9%) of 3rd year, 49/76 (64.4%) of fourth year, and 14/17 (82.3%) of fifth year. No significant difference was found between these groups ($p = 0.524$).

There was a significant relationship between gender and having FM ($p < 0.000$) with females (26.1%) suffering more from high severity fibromyalgia as compared to males (23.3%). 47.1% of males did not have FM whereas only 18% of women did not have fibromyalgia

Table 1 Relation of Gender with Fibromyalgia

TABLE 1		Remission or No Fibromyalgia	Low Severity Fibromyalgia	Moderate Severity Fibromyalgia	High Severity Fibromyalgia	Total	P value
Gender	*Female*	20	18	41	28	107/196	0.000 (significant)
	Male	42	17	19	11	89/196	
Total		62	35	60	39	196	

When evaluating the sleeping hours of the participants and other psychological problems, 10% (10/99) of those with FM and 0% of those without FM reported that they were unable to get a good night's sleep over the last week, 26% (26/99) with FM reported that they slept with much difficulty, 37% with FM reported that they slept with some difficulty and only 26% with FM reported that they were able to get good night's sleep without any difficulty Whereas of those without FM 65% reported that they were able to get a good night's sleep over the last week. The results were significant ($p<0.000$). Other psychological problems encountered by FM patients were anxiety and depression.

To assess which areas are particularly involved in FM, we asked them to rate the pain in each area with neck and back pain being the most prominent in FM.

Among our subjects with FM symptoms, 72/99 (72%) reported that they did not exercise daily, 8% reported exercising one or two times per month, 10% reported exercising one or two times per week and 9 (9%) reported they exercised three or more times per week. No significant relation was found between these variables ($p = 0.116$).

While assessing the impairments caused by FM, 48% of the participants suffering from FM reported feeling stiff after waking up in the morning, 46% with FM reported not feeling stiff, 3% reported feeling tired, and another 3% reported mild fatigue. 82% of those without FM reported not feeling stiff in the morning, and only 15% of those not with FM reported feeling stiff. The relationship is significant ($p < 0.000$) (Table 2).

Table 2 Functional Impairments Due to Fibromyalgia

	Without Any Difficulty (out of 196)	With Some Difficulty (out of 196)	With Much Difficulty (out of 196)	Unable To Do (out of 196)	P value (<0.05 =significant)
1) Were You Able to Dress Yourself, Including Tying Shoelaces and Doing Buttons?	69	27	1	2	0.000
Were You Able to Get in and Out of Bed?	32	42	21	4	0.000

Were You Able to Lift a Full Cup or Glass to Your Mouth?	81	16	1	1	0.003
Were you able to Walk outdoors on flat ground?	66	29	4	0	0.000
Were you able to Bend down to pick up clothing from the floor?	8	41	35	15	0.000
Were you able to Wash and dry your entire body?	65	26	7	1	0.000
Were you able to Turn regular faucets on and off?	47	39	12	1	0.000
Were you able to Get in and out of a car, bus, train, or airplane?	47	39	12	1	0.000
Were you able to Walk two miles or three kilometers, if you wish?	69	28	1	1	0.000
Were you able to Participate in recreational activities and sports as you would like, if you wish?	31	37	27	4	0.000
Get A Good Night's Sleep	26	37	26	11	
Able To Deal With Feelings Of Depression	7	38	23	12	
Able To Deal With Feelings Of Anxiety	19	44	24	13	

While assessing the factors causing FM, we asked about the changes in their lives over the last week. We found that 16% with FM reported that they had an operation or new illness over the past week (p = 0.027); 10% reported having an injury or accident (p = 0.019); 18% reported having a new symptom or medical problem (p = 0.01); 3% reported having cigarettes regularly (p = 0.084); 12% reported having an address change (p = 0.041); 9% reported change in marital status (p = 0.080); and 24% reported a change of job work, retirement or change in work status (p = 0.001) (Table 3).

Table 3 Factors Associated With Fibromyalgia

Factors	No (out of 196)	Yes (out of 196)	P value
Have You Had an operation or New Illness	83	16	0.027 (significant)
Have You Had a Medical Emergency or Stay Overnight in Hospital	90	9	0.162
Have You Had a Fall or Any Accident or Trauma	89	10	0.019 (significant)
Have You Had an Important New Symptom or Medical Problem	81	18	0.010 (significant)
Have You Been Smoking Cigarettes Daily	96	3	0.084

Have You Had Changes of Address	87	12	0.041 (significant)
Have You Had Changes in Arthritis or Medication	95	4	0.4
Have You Had Changes of Marital Address	90	9	0.08
Have You Had Changes in Job, Work Status, or Retirement	76	23	0.001 (significant)
Have You Had Changes of Medical Insurance	95	3	0.976

Among the 194 medical students, 28.1% students reported no pain in body joints over the last week, 47% reported mild pain, 24% reported moderate pain and 1.5% reported severe pain.

Multivariate Logistic Regression

Logistic regression was used to analyze the relationship between fibromyalgia and change in job or work status (work hours, retirement, etc.). The data were normally distributed. There was no multi-co-linearity between the variables (P values less than 0.7). Job or Work Status was found to significantly contribute to Fibromyalgia (0.003)

Residual R2 came out to be 6.7%% with Significance P=0.013, this means that the models explain a 6.7% variance in Fibromyalgia

ANOVA test also showed significance (p = 0.013, F = 2.267) and the slope of the line was 0.

(Table 4)

Table 4 Results of Multivariate Logistic Regression

Hypothesis	Beta Coefficient	R2	F	P value (significant as less than 0.05)	t value (Significant as greater than 1.96)	Hypothesis Supported
1) Over The Last Week, You Changed Job, Work Duties, Retired or Quit Work	0.218	0.067	2.267	0.003	3.019 (greater than 1.96)	Change in Job or Work Status significantly contributes to Fibromyalgia

DISCUSSION:

Fibromyalgia, a disorder marked by widespread chronic pain along with depression and sleep issues, can interfere with daily activities and social interactions [1]. From the surface, the person appears healthy, but they are always in pain. It cannot be rectified by any stance, pose, or position [11].

It negatively affects a person's quality of life as well as interactions with other people because it tires a person not only physically but also emotionally and cognitively [1]. Famous singer-songwriter Sinead O'Connor had to prematurely halt her singing career due to the severe pain and exhaustion caused by fibromyalgia [12].

The prevalence of fibromyalgia was found to be higher in first year students as compared to other years. This high prevalence may be because they have to adjust to a different environment at the university. Also, it may be due to the introduction of taking more responsibility for their learning and a shift from the traditional teacher-centered teaching methodology to self-directed, student-centered teaching methodology [13].

There are numerous circumstances that either seem to precipitate the beginning of this disease or exacerbate its symptoms.

Fibromyalgia risk factors include genetic factors, any form of post-traumatic stress, mental or physical abuse, anxiety, and despair [14].

Fibromyalgia is characterized by somatic pain along with additional conditions like gastrointestinal issues, sleep issues, neurological symptoms, inflammatory issues, etc. [1]. Patients with fibromyalgia have a significant incidence of Irritable Bowel Syndrome (IBS) [15]. IBS is 1.5 times more common in those who have fibromyalgia than in the general population [16].

Symptoms of cognitive deterioration, such as memory loss, lack of concentration or focus, and forgetfulness, are frequently reported by people with fibromyalgia. The phrase "fibro-fog" is used to describe these symptoms [17].

More than 80% of those who have fibromyalgia report persistent fatigue, which goes beyond simple tiredness and persists even after sleep or rest [18]. Additionally, fatigue has been identified as the third-most upsetting symptom among FM women over 50 [17].

Due to their hypersensitivity to sensory stimuli, fibromyalgia patients report difficulties falling asleep, early morning awakenings, and feeling exhausted [19]. In our study, 10% of students with FM reported lack of good sleep.

Hormonal imbalances brought on by fibromyalgia can result in painful symptoms like painful periods, pelvic discomfort, and vulvar pain [20]. Gender should be taken into consideration as an important issue, as evidenced by the increased occurrence of fibromyalgia in women [21]. Additionally, testosterone treatment of pain in females helps to reduce discomfort and may even have a preventive impact against this form of chronic pain [20].

Mild exercise may benefit patients with persistent pain symptoms, according to many researchers [22]. According to Sieczkowska et al., patients who exercised frequently had greater QoL (quality of life) than those who did not exercise, as well as better outcomes in terms of happiness, absences from work, and depression [22].

Along with exercise and medicines, patients should also consider cognitive-behavioral therapy, relaxation techniques, biofeedback, and other complementary and alternative medicine (CAM) methods (such as Qigong, Tai Chi, and acupuncture) [23].

Research done in Poland also showed that the prevalence of FM in medical students seems to be considerably higher than in the general population, with an overall prevalence of 10.48% [24].

Also, the prevalence of fibromyalgia (FM) in physicians in training (PIT) in Saudi Arabia is considerably high [25].

It took ages for the medical community to recognize FM [1] and that is why awareness of this disease is lacking. It affects people in every sphere of life [17]. This stigma may lead to FM being undiagnosed. Patients might feel invalidated and made to believe that the symptoms are not real [11].

STRENGTHS AND LIMITATIONS:

This study will help to determine the prevalence of FM among medical students who are subjected to high stress during their academic years along with the causative factors of fibromyalgia. Presently, there is a lack of awareness, even among medical masses, regarding FM which may result in untimely diagnosis and delay in the appropriate treatment. Thus, this study will increase the awareness of FM among people as well as highlight the importance of its timely diagnosis and treatment to improve the quality of life. An interesting finding of our study is that females are more vulnerable to this disorder as compared to males. However, this was a single institute study, and a lot more work is required before the results can be generalized. The sample size is not appropriate to make assumptions for the whole population. Also, the questionnaire used is unable to make diagnosis of FM as they were not clinically assessed, so this study only provides an insight into the potential of developing FM.

RELEVANCE AND IMPLICATIONS:

Our study implies that fibromyalgia is indeed prevalent among medical students and that stress is one of the leading causes of fibromyalgia. Hence, proper research should be conducted to further study this disease as well as invent new treatments and therapies to relieve the symptoms of this condition. A broader study, targeting all the medical colleges will give a much clearer view of the status quo, and then further steps can be taken for the proper management of this disorder, mainly by increasing awareness and encouraging people to have themselves tested and treated when experiencing the symptoms of this condition.

16 CONCLUSIONS:

Fibromyalgia is alarmingly prevalent in medical students affecting their social, functional, and daily lives. From psychological to severe body pains, patients of FM suffer from many disorders and the important thing is it often goes undiagnosed. Medical students who face grinding education and training along with meager psychological support are more prone to it. The issue at hand is worth the time and consideration of education policymakers.

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17a CONFLICTS OF INTEREST: None

REFERENCES:

[1] R. Grayston, G. Czanner, K. Elhadd, A. Goebel, B. Frank, N. Üçeyler, R.A. Malik, U. Alam, A systematic review and meta-analysis of the prevalence of small fiber pathology in fibromyalgia: Implications for a new paradigm in fibromyalgia etiopathogenesis, Semin. Arthritis Rheum. 48 (2019) 933–940. https://doi.org/10.1016/j.semarthrit.2018.08.003.

[2] A. Ghafoor, U.- Rehman, M. Ansari, S. Aslam, ASSOCIATION OF DEPRESSION, ANXIETY AND STRESS WITH FIBROMYALGIA IN PAKISTANI POPULATION: soi: 21-2017/re-trjvol02iss01p55, Rehabil. J. 2 (2018) 55–57. https://doi.org/10.52567/trj.v2i01.37.

[3] Epidemiology of fibromyalgia - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/12946289/ (accessed August 7, 2022).

[4] Fibromyalgia: an update on clinical characteristics, aetiopathogenesis and treatment - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/33024295/ (accessed August 7, 2022).

[5] M.A. Arif, F. Syed, R. Niazi, S.A. Arif, U.E.L. Hashmi, Z. Shah, The oracle study - fibromyalgia, prevalence and severity in the hospital setting in the Pakistani population, JPMA J. Pak. Med. Assoc. 71 (2021) 1357–1368. https://doi.org/10.47391/JPMA.1000.

[6] J.N. Ablin, D. Buskila, Update on the genetics of the fibromyalgia syndrome, Best Pract. Res. Clin. Rheumatol. 29 (2015) 20–28. https://doi.org/10.1016/j.berh.2015.04.018.

[7] Work stress and incidence of newly diagnosed fibromyalgia: prospective cohort study - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/15581643/ (accessed August 7, 2022).

[8] Prevalence of fibromyalgia: literature review update - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/28743363/ (accessed August 7, 2022).

[9] J. Schmukler, S. Jamal, I. Castrejon, J.A. Block, T. Pincus, Fibromyalgia Assessment Screening Tools (FAST) Based on Only Multidimensional Health Assessment Questionnaire (MDHAQ) Scores as Clues to Fibromyalgia, ACR Open Rheumatol. 1 (2019) 516–525. https://doi.org/10.1002/acr2.11053.

[10] A.A. Samman, R.A. Bokhari, S. Idris, R. Bantan, R.R. Margushi, S. Lary, R.M. Sait, Y.M. Bawazir, The Prevalence of Fibromyalgia Among Medical Students at King Abdulaziz University: A Cross-Sectional Study, Cureus. 13 (2021). https://doi.org/10.7759/cureus.12670.

[11] 7 People with Fibromyalgia Describe What It Feels Like, GoodRx. (n.d.). https://www.goodrx.com/conditions/fibromyalgia/what-fibromyalgia-feels-like (accessed August 7, 2022).

[12] 5 Celebrities with Fibromyalgia, Healthline. (2017). https://www.healthline.com/health/celebrities-fibromyalgia (accessed August 7, 2022).
[13] Stress among First and Third Year Medical Students at University Kebangsaan Malaysia, (n.d.). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4386180/ (accessed February 2, 2023).
[14] L. Rath, Causes of Fibromyalgia, WebMD. (n.d.). https://www.webmd.com/fibromyalgia/guide/fibromyalgia-causes (accessed August 7, 2022).
[15] S. Erdrich, J.A. Hawrelak, S.P. Myers, J.E. Harnett, A systematic review of the association between fibromyalgia and functional gastrointestinal disorders, Ther. Adv. Gastroenterol. 13 (2020) 1756284820977402. https://doi.org/10.1177/1756284820977402.
[16] T.-Y. Yang, C.-S. Chen, C.-L. Lin, W.-M. Lin, C.-N. Kuo, C.-H. Kao, Risk for Irritable Bowel Syndrome in Fibromyalgia Patients: A National Database Study, Medicine (Baltimore). 96 (2017) e6657. https://doi.org/10.1097/MD.0000000000006657.
[17] C.R. Shillam, K. Dupree Jones, L. Miller, Fibromyalgia symptoms, physical function, and comorbidity in middle-aged and older adults, Nurs. Res. 60 (2011) 309–317. https://doi.org/10.1097/NNR.0b013e31822bbdfa.
[18] C.L. Overman, M.B. Kool, J.A.P. Da Silva, R. Geenen, The prevalence of severe fatigue in rheumatic diseases: an international study, Clin. Rheumatol. 35 (2016) 409–415. https://doi.org/10.1007/s10067-015-3035-6.
[19] B. Çetin, E.A. Sünbül, H. Toktaş, M. Karaca, Ö. Ulutaş, H. Güleç, Comparison of sleep structure in patients with fibromyalgia and healthy controls, Sleep Breath. Schlaf Atm. 24 (2020) 1591–1598. https://doi.org/10.1007/s11325-020-02036-x.
[20] M. Schertzinger, K. Wesson-Sides, L. Parkitny, J. Younger, Daily Fluctuations of Progesterone and Testosterone Are Associated With Fibromyalgia Pain Severity, J. Pain. 19 (2018) 410–417. https://doi.org/10.1016/j.jpain.2017.11.013.
[21] B.E. Cairns, P. Gazerani, Sex-related differences in pain, Maturitas. 63 (2009) 292–296. https://doi.org/10.1016/j.maturitas.2009.06.004.
[22] Does physical exercise improve quality of life in patients with fibromyalgia? - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/31165347/ (accessed August 7, 2022).
[23] Nonpharmacologic treatment for fibromyalgia: patient education, cognitive-behavioral therapy, relaxation techniques, and complementary and alternative medicine - PubMed, (n.d.). https://pubmed.ncbi.nlm.nih.gov/19647150/ (accessed August 7, 2022).
[24] A. Patel, A. Al-Saffar, M. Sharma, A. Masiak, Z. Zdrojewski, Prevalence of fibromyalgia in medical students and its association with lifestyle factors - a cross-sectional study, Reumatologia. 59 (2021) 138–145. https://doi.org/10.5114/reum.2021.106908.
[25] M.A. Omair, S. Alobud, M.H. Al-Bogami, R. Dabbagh, Y.K. Altaymani, N. Alsultan, A. Alhazzani, M.A. Omair, Prevalence of fibromyalgia in physicians in training: a cross-sectional study, Clin. Rheumatol. 38 (2019) 165–172. https://doi.org/10.1007/s10067-018-4313-x.