

Fibromyalgia and Obesity

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ABSTRACT

Introduction: Fibromyalgia (FM) is the second most common rheumatic disease after osteoarthritis. The main feature of FM is chronic widespread pain, accompanied with other symptoms. There are currently no studies showing prevalence of FM in Saudi Arabia using new preliminary diagnostic criteria. Obesity has been identified as a comorbid condition with FM. This association can be observed from different perspectives and it is not yet fully investigated. The aims of this study are to examine the prevalence of FM and obesity in Saudi Arabia, and to investigate the relationship between these two clinical entities.

Methods: The cross-sectional online survey was created using Google Docs in Arab language and spread using social networks: Facebook, WhatsApp, and Twitter. The survey contained: 1 – questions needed to make preliminary diagnosis of FM using The American College of Rheumatology (ACR) diagnostic criteria, 2 – questions regarding anthropometric characteristics of participants, 3 – demographic characteristics. We estimated the prevalence of FM and. We compared presence of FM in obese and non-obese participants. Furthermore, we also compared mean WPI, SS score, and presence of somatic symptoms in obese and non-obese patients with FM. Statistical analysis was performed using software SPSS for Windows.

Results: Of total 1153 participants aged between 16 and 63 years, there were 875 (75.9%) females and 278 (24.1%) males. We have identified 132 (11.4%) patients with FM. Persons with FM were more frequently obese than persons without FM. Mean BMI in patients with FM (27.3 ± 7.40) was significantly higher than in patients without FM (25.3 ± 6.18). Correlation analysis showed highly significant correlation between presence of FM and obesity. Vomiting, numbness, and wheezing were significantly more common in obese than in non-obese patients with FM.

Conclusion: Prevalence of FM in Saudi Arabia is higher than average. There is a strong relationship between obesity and FM. Furthermore, obese patients have more severe clinical presentation of FM.

Keywords: Fibromyalgia, Symptom Severity, Osteoarthritis, Rheumatic, Widespread Pain Index

I. INTRODUCTION

Fibromyalgia (FM) is a common condition listed among rheumatic disorders. Global mean prevalence of FM is estimated to 2.7 %, while there are substantial differences in prevalence between different countries (1). It is the second most common rheumatic disease after osteoarthritis (2). The main feature of FM is chronic widespread pain, accompanied with other symptoms, such as sleeping disorders, fatigue, irritable bowel syndrome, memory and concentration problems, depressive symptoms, and headache (3). The disease is more common in women than in men, with female-to-male ratio of 3 : 1 (1). Being hard to diagnose, because

of wide range of symptoms with variable expression and the lack of clinical tests to confirm the diagnosis, criteria for diagnosis of FM changed frequently during the past few decades (1). Until recently, many authors had controversial opinions on whether FM should be classified as a distinct clinical condition (4).

As a large number of people worldwide experience some of the symptoms of FM, there was a need to develop simple preliminary diagnostic criteria which would not require detailed clinical examination. This was accomplished by The American College of Rheumatology for the purpose of screening, which can be conducted in primary and secondary care, and even

without direct contact with the potential patients (5). To our knowledge, there are currently no studies showing prevalence of FM in Saudi Arabia using new preliminary diagnostic criteria.

Obesity has been identified as a comorbid condition with FM. Current evidences state that 40 % of FM patients are obese and 30 % are overweight (6). This association can be observed from different perspectives. While authors generally agree that obesity aggravates the symptoms of FM (7, 8), some of them suggest that both conditions are the consequence of disturbances in central nervous system. Namely, hypersensitivity to painful stimuli as a result of disturbed central pain modulation has been found in obese humans and animals (9). Furthermore, disturbances in hypothalamic-pituitary-adrenal axis and immunological disorders, which are commonly found in obese patients, have also been noted in patients with FM (10).

The aims of this study are to examine the prevalence of FM and obesity in Saudi Arabia, and to investigate the relationship between these two clinical entities.

II. METHODS AND MATERIAL

Design

This cross-sectional survey was conducted at Taif University in the period between July 1 and December 1, 2015.

Subjects

An online survey was created using Google Docs in Arab language and spread using social networks: Facebook, WhatsApp, and Twitter. The survey included the agreement for using information in educational and publication purposes signed by each participant, and it was designed not to accept incomplete forms.

Setting

The survey contained: 1 – questions needed to make preliminary diagnosis of FM using The American College of Rheumatology (ACR) diagnostic criteria (5), 2 – questions regarding anthropometric characteristics of

participants in order to assess nutritional status, 3 – demographic characteristics of participants.

The criteria for preliminary diagnosis of fibromyalgia use two parameters: Widespread Pain Index (WPI) and Symptom Severity (SS) score, which are determined through three steps.

Part 1: WPI – the number of body areas in which the patient has experienced pain during the past week. The value ranges between 0 and 19. The body areas include:

- Shoulder girdle, left
- Shoulder girdle, right
- Upper arm, left
- Upper arm, right
- Lower arm, left
- Lower arm, right
- Hip (buttock) left
- Hip (buttock) right
- Upper leg left
- Upper leg right
- Lower leg left
- Lower leg right
- Jaw left
- Jaw right
- Chest
- Abdomen
- Neck
- Upper back
- Lower back

Part 2a: grading severity of the three symptoms during the past week. The symptoms included: fatigue, waking unrefreshed, and cognitive symptoms. To each symptom, grades 0 – 3 are assigned:

0 – no problem

1 – slight or mild problems, generally mild or intermittent

2 – moderate, considerable problems, often present and/or at a moderate level

3 – severe: pervasive, continuous, life-disturbing problems

Part 2b:

Grading severity of somatic symptoms by assigning grades:

0 – if no symptoms are present

1 – if 1-10 symptoms are present

2 – if 11-24 symptoms are present

3 – if 25 or more symptoms are present

The somatic symptoms include:

- Fatigue/tiredness
- Thinking or remembering problem
- Itching
- Wheezing
- Raynaud's

- Muscle weakness
- Headache
- Pain/cramps in abdomen
- Numbness/tingling
- Dizziness
- Insomnia
- Depression
- Constipation
- Pain in upper abdomen
- Nausea
- Nervousness
- Chest pain
- Blurred vision
- Fever
- Diarrhea
- Dry mouth
- Hives/welts
- Ringing in ears
- Vomiting
- Heartburn
- Oral ulcers
- Loss/change in taste
- Seizures
- Dry eyes
- Shortness of breath
- Loss of appetite
- Rash
- Sun sensitivity
- Hearing difficulties
- Easy bruising
- Hair loss
- Frequent urination
- Painful urination
- Bladder spasms

SS score is calculated as a sum of the severity of the three symptoms (Part 2a) and somatic symptoms (Part 2b). The value ranges between 0 and 12.

In order to make preliminary diagnosis of FM, there are 3 required criteria: 1 – WPI ≥ 7 and symptom severity SS score ≥ 5 , or WPI in range 3 – 6 and SS score ≥ 9 ; 2 – persistent presence of symptoms for at least 3 months; 3 – the patient does not suffer from any other condition that would explain the symptoms.

We used Body Mass Index (BMI) to assess the nutritional status, according to National Institutes of Health (NIH) practical guideline (11) as follows:

- Underweight < 18.5 kg/m²
- Normal weight 18.5–24.9 kg/m²
- Overweight 25–29.9 kg/m²
- Obese 30–34.9 kg/m²

Methods

We estimated the prevalence of FM and obesity among participants of the survey. We compared presence of FM in obese and non-obese participants. Furthermore, we also compared mean WPI, SS score, and presence of somatic symptoms in obese and non-obese patients with FM. We calculated statistical significance of differences

between parameters in obese and non-obese individuals. Correlation between FM presence and BMI level was also assessed. Statistical analysis was performed using software SPSS for Windows.

III. RESULT AND DISCUSSION

Of total 1153 participants aged between 16 and 63 years (mean = 24 ± 9.46), there were 875 (75.9%) females and 278 (24.1%) males (Table 1). The most prevalent age category was 20 – 29.9 years with 782 (67.8%) subjects, while only 155 (13.4%) subjects were aged 40 years or more (Table 1). Using criteria for preliminary diagnosis of FM, we have identified 132 (11.4%) patients with FM, of which there were 108 (12.3%) women and 24 (8.6%) men (Table 1). Other demographic characteristics of participants are shown in Table 1.

Of total number of participants, 247 (21.4%) were obese and 38 (15.4%) of them had FM, according to criteria for preliminary diagnosis. We have found that persons with FM were more frequently obese than persons without FM ($P < 0.05$; Table 2). Furthermore, there was highly significant difference in presence of FM among obese than among non-obese persons ($P < 0.001$; Table 2). Although the results show high percentage of overweight persons with FM, 36 (12.7%), statistical significance was not reached. Prevalence of FM in obese women with (17.4%) was higher than that in obese men (11.6%), but there was no statistically significant difference (Table 2).

By comparing mean age between persons with FM (29.8 ± 10.25) and persons without FM (27.0 ± 9.31), we have found that subjects with FM were significantly older than subjects without FM ($P = 0.001$; Figure 1).

Mean BMI in patients with FM (27.3 ± 7.40) was significantly higher than in patients without FM (25.3 ± 6.18) ($P = 0.001$; Figure 2). Correlation analysis showed highly significant correlation between presence of FM and BMI ($P = 0.001$) and significant correlation between presence of FM and obesity ($P < 0.05$).

Comparison of components of criteria for preliminary diagnosis of FM (WPI, SS 2a, SS 2b, SS score) in obese and non-obese patients with FM showed higher mean values in obese patients, but without statistical

significance (Table 3). However, when comparing these parameters in obese and non-obese participants regardless of FM status, we found significantly higher values in obese patients for: WPI ($P < 0.001$), SS 2a ($P < 0.01$), SS 2b ($P < 0.01$), and SS score ($P < 0.01$).

We also compared presence of somatic symptoms in obese and non-obese patients with FM. Vomiting was significantly more frequent in obese than in non-obese patients with FM ($P < 0.05$; Figure 3). Wheezing was significantly more frequent in non-obese than in obese patients with FM ($P < 0.01$; Figure 3). Numbness was significantly more frequent in non-obese than in obese patients with FM ($P = 0.001$; Figure 3). As a contradictory finding, hair loss and headache were significantly more frequent in non-obese than in obese patients with FM ($P < 0.05$; Figure 3).

Discussion

In our study, of 1153 participants, 132 (11.4%) satisfied criteria for preliminary diagnosis of FM (Table 1). This prevalence is slightly higher than expected, giving that worldwide mean prevalence of FM is 2.7 and ranges between 0.4% in Greece (12) and 9.3% in Tunisia (13). As this is the first study addressing the prevalence of FM in Saudi Arabia, further research is needed to support the findings of our study. The prevalence was higher in women than in men (108 (12.3%) vs. 24 (8.6%); Table 1), which confirms findings of other studies conducted using ACR criteria (14-16). Incidence of FM significantly increased with increasing age (Figure 1). This is also in accordance with results of other studies (14, 15).

Recent studies have noticed a not yet fully investigated link between obesity and FM (17). Results of previous studies confirmed association between obesity and other rheumatological conditions, such as carpal tunnel syndrome (18), osteoarthritis (19), and chronic low back pain (20). We have examined the relationship between obesity and components of FM using ACR criteria for preliminary diagnosis (5). We have found both that persons with FM were significantly more frequently obese than persons without FM and that FM was significantly more common among obese than among non-obese persons (Table 2). Mean BMI was significantly higher in persons with FM than in persons

without FM (Figure 2). Relationship between high BMI and increased prevalence of FM were also found in other studies (10, 21). Correlation analysis showed highly significant correlation between presence of FM and BMI and significant correlation between presence of FM and obesity. Another study found similar results after assessing correlation between BMI and Health Assessment Questionnaire (HAQ) scores (8).

In our study, patients with FM had higher values of components of criteria for preliminary diagnosis of FM (WPI, SS 2a, SS 2b, SS score), but the statistical significance was not reached (Table 3). However, differences in these parameters between obese and non-obese participants, regardless of FM status were statistically significant. These findings confirm the relationship between pain and obesity which was well documented in earlier studies (22, 23). Different authors explain this relationship by different mechanisms. Inflammatory cytokines level is increased in a great number of obese patients (24, 25), which may aggravate chronic pain conditions such as fibromyalgia. Disturbances in central pain modulation have been found in obese humans and animals, and they can result in hypersensitivity to painful stimuli (9). Imbalance of hypothalamic-pituitary-adrenal axis and immunological disorders have also been noted both in patients with FM and in obese individuals (10). However, the direction of this link is still not yet fully investigated, as there is a vicious circle which includes pain leading to decreased physical activity, leading to obesity, which in turn aggravates the pain (26, 27).

Of 40 somatic symptoms assessed, vomiting, numbness, and wheezing were significantly more common in obese than in non-obese patients with FM (Figure 3). Another study had noticed increased symptoms of fibromyalgia in obese and overweight patients with FM (28).

IV. CONCLUSION

In conclusion, prevalence of FM in Saudi Arabia according to our study results is higher than average. The lack of epidemiological evidences suggests that more research is needed to reassess the prevalence of FM in Saudi Arabia population.

There is a strong relationship between obesity and FM. Although the nature of this relationship is not yet fully investigated, we can conclude that obese patients fulfill the ACR criteria for preliminary diagnosis of FM more frequently than non-obese patients. Furthermore, obese patients have more severe clinical presentation of FM.

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