

Frequency of Obesity among Patients of Rheumatoid Arthritis

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Arthritis

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ABSTRACT

Objective: The aim of this study was to determine the frequency of obesity in rheumatoid arthritis patients of Quetta and evaluate the associated risk factors.

Study Design: Prospective, Cross-Sectional Study

Place and Duration of Study: This study was conducted at the outpatient department (OPD) of Internal medicine in Sandeman Provincial Hospital, Quetta from October 2015 to May 2016.

Materials and Methods: Patients of both genders, of age 30 years or more, diagnosed with rheumatoid arthritis for at least 12 months were included. Their socio-demographic characteristics and body mass index (BMI) was determined. Data was entered and analyzed using SPSS v. 20.0.

Results: There were 103 patients of RA with mean duration of disease 15.6 ± 0.6 months. There were more females than males (79% vs. 21%). Their mean age was 48.1 ± 7.7 years. BMI ≥ 30 kg/m² was seen in 56 (54.4%) patients. Obesity in RA was statistically associated with female gender, older age, and lower socio-economic status ($p \leq 0.05$).

Conclusion: More than half of our RA patients were obese. Obesity was associated with RA in female gender, older age, and lower socio-economic status.

Key Words: rheumatoid arthritis, obesity, body mass index, gender, Pakistan

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INTRODUCTION

Rheumatoid arthritis (RA) is an autoimmune systemic disease. It comprises of underlying synovial inflammation and resultant destruction of the bone and cartilage. It has a global prevalence of 1-2%. For every one man, three women are affected by RA [1]. There is symmetric inflammation of synovial tissue of hand, feet, and wrist joints. It may also involve non-articular structures including tendons, fascia, and ligaments. It has a higher risk of co-morbid cardiovascular complications, lung diseases, and neoplasia [2].

Systemic inflammation is also greatly contributed by obesity and high body mass index (BMI). Proinflammatory adipokines are secreted by fat tissue which increased expansion of adipose tissues and this positive feedback is a vicious cycle of tissue inflammation and secretion of adipokines [3].

In a large cohort, it was observed that obese patients had higher C-reactive protein (CRP), tumor necrosis factor (TNF)- α , amyloid A levels, white blood cells (WBCs), and interleukin-6 (IL-6) in comparison to controls with body weight-to-height ratio [4].

The pathogenesis of RA is not clear; both genetic and environmental factors play a crucial role¹. Previously, literature has shown evidence of an association between high BMI and increased risk of development of RA [5-7]. On the other hand, some literature has shown little to no association between the two entities [8,9]. The Quantitative Standard Monitoring of Patients with Rheumatoid Arthritis (QUEST-RA) trial concluded a significant association of high BMI and obesity with RA in women but not in men [10]. Similar results were also seen in a local study [11]. The aim of this study was to determine the frequency of obesity in rheumatoid arthritis patients of Quetta and evaluate the associated risk factors.

MATERIALS AND METHODS

A prospective, cross-sectional study was conducted in the outpatient department (OPD) of Internal medicine in Sandeman Provincial Hospital, Quetta. The study duration was from 3rd October 2015 to 15th May 2016. The study was conducted after approval from institutional review board. All patients were included after attaining informed consent.

Patients of both genders, of age 30 years or more, diagnosed with rheumatoid arthritis for at least 12 months were included. Patients with clinical suspicion

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of osteoarthritis – involvement of distal interphalangeal joints– were excluded. Non-probability consecutive sampling technique was utilized and all patients fulfilling the inclusion criteria during the study period were included.

All patients of rheumatoid arthritis satisfied at least 4 of these 6 criteria (criteria 1 to 4 must have been present for ≥6 weeks):

1. **Morning stiffness:** Lasting ≥1 hour before maximal improvement.
2. **Arthritis (swelling) of 3 or more joint areas:** 14 possible areas are right or left proximal interphalangeal (PIP), metacarpophalangeal (MCP), wrist, elbow, knee, ankle, and metatarsal phalangeal (MTP) joints
3. **Arthritis (swelling) of hands:** At least 1 involve area in a wrist, MCP, or PIP
4. **Symmetric arthritis**
5. **Rheumatoid nodules:** Presence of subcutaneous nodules over bony prominences or extensor surfaces.
6. **Positive serum rheumatoid factor**

For all patients, weight and height were measured within the OPD. In order to record patient information, a semi-structured questionnaire was constructed. It included sociodemographic characteristics and BMI. BMI was calculated by dividing weight (kg) by the square of height (m). BMI ≥30 kg/m² was taken as “high” in this study.

The data was entered and analyzed with the help of statistical package for social sciences version 20 (SPSS v. 20.0). Demographic data will be presented as simple descriptive statistics giving mean and standard deviation for age and duration of disease.

For qualitative variables like gender, marital status, socioeconomic status, and BMI were presented as frequency and percentages. Effect modifiers were controlled through stratification of age, gender, marital status and socioeconomic status to the effect of these on high BMI. Chi square test was applied; p ≤0.05 was taken as significant.

RESULTS

There were 103 patients of RA included in this study. The mean duration of disease for these patients was 15.6 ± 0.6 months. There were more females than males (79% vs. 21%). Their mean age was 48.1 ± 7.7 years. Their socio-demographic characteristics are shown in table 1.

Of all the patients, 56 (54.4%) had BMI ≥30 kg/m². BMI was stratified with patient characteristics as shown in table 2. Although, overall RA was more common in women, high BMI in RA was statistically associated with female gender. Oldest group of study participants were more prone to have high BMI and similar was the case with lower socio-economic status participants (Table 2).

Table No.1: Baselines characteristics of the patients (N=103)

| Patient Characteristics | Frequency n (%) |
|------------------------------|-----------------|
| Gender | |
| Male | 22 (21.4%) |
| Female | 81 (78.6%) |
| Age in years | |
| Mean ± SD | 48.1 ± 7.7 |
| 31-40 | 24 (23.3%) |
| 41-50 | 34 (33.0%) |
| 51-60 | 45 (43.7%) |
| Marital status | |
| Single | 3 (2.9%) |
| Married | 100 (97.1%) |
| Socio-economic status | |
| Lower class | 52 (50.5%) |
| Middle class | 31 (30.1%) |
| Upper class | 20 (19.4%) |

Table No.2: Correlation of body mass index with patient characteristics (N=103)

| Patient characteristics | Body Mass Index ≥30 kg/m ² | | P value |
|------------------------------|---------------------------------------|-----------------|---------|
| | Yes (N=56; 54.4%) | No(N=47; 45.6%) | |
| Gender | | | |
| Female | 49 (87.5%) | 32 (68.1%) | 0.017 |
| Male | 7 (12.5%) | 15 (31.9%) | |
| Age in years | | | |
| 31-40 | 4 (10.3%) | 20 (31.3%) | 0.003 |
| 41-50 | 10 (25.6%) | 24 (37.5%) | |
| 51-60 | 25 (64.1%) | 20 (31.3%) | |
| Marital status | | | |
| Single | 54 (96.4%) | 46 (97.9%) | 0.664 |
| Married | 2 (3.6%) | 1 (2.1%) | |
| Socio-economic status | | | |
| Lower class | 24 (42.6%) | 28 (59.6%) | 0.009 |
| Middle class | 15 (26.8%) | 16 (34.0%) | |
| Upper class | 17 (30.4%) | 3 (6.4%) | |

DISCUSSION

Over the years, the prevalence of obesity is on a constant rise. In this study among the rheumatoid arthritis patients, 55% were morbidly obese with BMI ≥30 kg/m². Among obese patients, 88% were women, 64% were of age 51-60 years, and 43% were of lower economic class. Chronic and morbid obesity is an important risk factor for RA. It is responsible for 54% of the recent rise in RA incidence [5].

In a large prospective cohort, the risk of RA increased by 1.37 times in 40-70% overweight and obese women [3]. In the QUEST-RA trial, RA women who were overweight and obese had higher disease activity scores (DAS) as compared to normal weight women and men with parallel BMIs [10]. In a larger German cohort, 21-23% RA patients were overweight to obese [12]. In a local study from Peshawar, 36% RA were obese (BMI ≥27 kg/m²). The odds ratio (OR) for obesity in RA females was 2.7 (p=0.008) [11]. RA has an overall lesser

incidence in men; hence, the impact of obesity in RA is also lesser in men as compared to women [5]. Results from Danish National Patient Registry showed that the overall risk of RA increased by 10% for every 5% increase in total body fat and 5% for every 5cm increase in waist circumference for women. The risk was 50% greater in obese women as compared to normal BMI women. No such correlations were seen for men [13]. The relationship of female gender with obesity in RA is not clear as yet. RA, in general, is also more common in women.

In our study, old age RA patients were more likely to be obese. However, in a large cohort, women who were overweight and obese at 18 years of age had a higher risk of RA as compared to older women [3]. In an analysis from United States, among old arthritis patients (≥ 65 years) 29.4% were obese in 2009 and 34.3% were obese in 2014. The relative obesity increase was statistically significant over time ($p=0.001$). They concluded that obesity significantly increased over time among their older adults with arthritis [14].

Comorbid obesity in RA patients has gained much attention because it has negative impacts on the prognosis and outcome the disease. In a large multi-center cohort, overweight and obese RA patients were 25% and 47% less likely to attain sustained remission in three years, respectively, as compared to patients with normal BMI [15]. Other negative impacts of obesity on RA patients include worsened DAS, raised inflammatory markers, tender joints, and worse patient global evaluation, physical function, and pain scores [16]. Obesity itself is a disastrous systemic condition. It not only increases the risk of RA but also worsens its outcome and prognosis. Maintaining a body weight higher than the normal range of BMI increases the risk of developing RA and in women who have already developed it, it plays a negative role in disease outcome and drug response.

CONCLUSION

More than half of our RA patients were obese. Obesity was associated with RA in female gender, older age, and lower socio-economic status. High risk groups which includes obese RA women should be recognized by public health experts and must be professionally helped in reducing their weight to counter the negative effects of obesity on disease outcome and drug response.

Author's Contribution:

| | |
|----------------------------|--|
| Concept & Design of Study: | Maria Abid Gulandam, Kaleemullah Kakar |
| Drafting: | Mohammed Atif Gulzar, Sara Jafar |
| Data Analysis: | Maria Abid, Gulandam |
| Revisiting Critically: | Maria Abid |
| Final Approval of version: | Maria Abid |

Conflict of Interest: The study has no conflict of interest to declare by any author.

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