

## Variety and contribution of different rheumatic diseases at rheumatology clinic of a general hospital

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This study was designed to reveal the variety and contribution of different rheumatic diseases in a non-referral rheumatology outpatient clinic. In this retrospective cross-sectional study, the data in medical records of all patients visited for the first time in the rheumatology clinic of a general hospital from the beginning of April 2016 to the end of March 2017 was gathered and evaluated for demographic characteristics, complaints, and diagnoses. A total of 2063 medical records were assessed. Among them, 2006 individuals were diagnosed with a rheumatologic disease. The mean age of patients was  $48.72 \pm 15.51$ , and females constituted 74.88% of patients. The distribution of diseases was as follows: 345 (17.20%) inflammatory, 1594 (79.46%) non-inflammatory, and 67 (3.34%) both groups. The most common diagnosis was knee osteoarthritis (29.42%). Frequency distribution of other common diagnoses was in the following order: periarticular disease (15.53%), nonspecific generalized pain (8.75%), lumbar discopathy (6.24%), and rheumatoid arthritis (6.20%). The most frequent complaints were knee pain (30.96%), back pain (10.18%), and hand pain (9.35%). Among periarticular diseases, plantar fasciitis (17.27%), carpal tunnel syndrome (16.36%), and rotator cuff tendinitis (12.05%) were the most frequent disorders. More than half of the diseases included degenerative joint diseases, periarticular diseases, nonspecific musculoskeletal pain, and low back pain. The most prevalent diseases should be prioritized in the curriculum of medical education for undergraduate students. Proper policies for patient education, public health programs, and modified lifestyle may reduce morbidity among patients and costs forced upon healthcare providers and governments.

**Keywords:** Diagnosis, Epidemiology, Knee osteoarthritis, Musculoskeletal diseases, Osteoarthritis, Periarthritis, Plantar fasciitis, Rheumatic diseases

### Introduction

Musculoskeletal disorders are known to be one of the most prevalent chronic health problems accompanied by prolonged disabilities, which are reported to consume approximately 20% of the health care resources in the adult population [1, 2]. With their high burden, these diseases have considerable impacts on both society and healthcare providers [3]. Despite difficulties in classifying musculoskeletal disorders due to undefined etiology and heterogeneous presentations, it is widely accepted that these diseases can be classified into two main groups, i.e. inflammatory and non-inflammatory diseases [4]. This classification is predominantly based upon the common clinical presentation and laboratory findings. As there is no certain test for rheumatic disease diagnosis, classification and diagnostic criteria play specific roles in guiding physicians. Epidemiologic studies of rheumatic diseases

deal with the prevalence, incidence, and distribution of diseases and their usage to control disorders in different human populations and have shown that both inflammatory and non-inflammatory rheumatic diseases have different epidemiologic patterns in communities [5, 6]. These studies provide valuable information for health policy makers to efficiently distribute resources with limited accessibility.

To provide specific epidemiologic information that can represent the epidemiologic pattern of rheumatic diseases, COPCORD (Community Oriented Program for Control of Rheumatic Diseases) studies have been performed in different areas of the world [7]. However, the prevalence and distribution of rheumatic and musculoskeletal disorders may not be the same in different developed or less developed regions of a country or city. Therefore, this study

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was designed to reveal the variety and contribution of different rheumatic diseases in the rheumatology outpatient clinic of a general hospital in a less developed region (from a socioeconomic view) of a city.

## Materials and Methods

The cross-sectional approach was employed to study the data collected from the recorded documents of all patients who visited for the first time at a community-based rheumatology outpatient clinic between April 2016 and March 2017. On a regular basis, there is a recorded profile dedicated to each patient containing their demographic information (age and sex), diagnostic information (chief complaint, number of visits during the first year of follow up, physical examination findings, and final diagnosis). All patients were visited and diagnosed by a single rheumatologist. The diagnoses were made according to the international rheumatology criteria for each specific disease [8-19]. However, it should be noted that some patients may have had more than one complaint or been diagnosed with more than one disease; thus, frequency of diagnosed diseases was not equal with the frequency of patients. The patients gave informed consent before enrolling in the study. The ethical considerations taken into account were compatible with the 1964 Declaration of Helsinki and its later amendments and approved by a local ethics committee. A set of variables, including age and gender, chief complaint, and clinical features in the first clinical assessment, final diagnosis, number of following clinical visits in the first year after the first visit, adherence to follow up, and admission suggestion, were extracted from patient records. Adherence to follow up was defined as the willingness of patients to be visited at a set time for mechanical diseases or at least every 3-6 months for inflammatory diseases. Also, patients with a referral letter were listed.

This study was compatible with the 1964 Helsinki Declaration and its later amendments. All patients gave informed consent before enrolling.

### Statistical Analysis

The data was transcribed in Microsoft Excel 2013 and then analyzed using SPSS for windows statistics version 24 to determine the frequency of different rheumatic diseases, mechanical or non-mechanical disease, different clinical complaints related to rheumatic diseases, admission suggestions, the distribution of patients with regards to gender, and to calculate features including mean age and mean number of visits in the first year.

## Results

Two thousand sixty-three patients were registered from April 2016 to the end of March 2017 in medical records. Fifty-seven patients were excluded from this study, as they were not affected by a musculoskeletal disorder. Among these, 39 individuals had rheumatologically non-relevant complaints, including itching, heartburn, chest pain, weight loss, kidney stones, chronic cough, constipation, colon polyps, varicose, abdominal pain, hemorrhoids, and

nausea and vomiting. Patients with a positive family history of rheumatic diseases, who came for a consultation without having any clinical signs or symptoms, were also considered as patients with non-relevant chief complaints. At the end, 2006 patients were determined to have relevant rheumatologic chief complaints and at least one rheumatologic diagnosis. From the total number of patients, 504 (25.12%) were males and 1502 (74.88%) were females. The mean age for all patients was  $48.90 \pm 15.29$  (mean  $\pm$  standard deviation) ranging from 4 to 91 years. The mean ages for males and females were  $49.09 \pm 17.87$  and  $48.84 \pm 14.35$ , respectively. Among them, 1594 patients (79.46%) had a mechanical disease, 345 (17.20%) had an inflammatory disease, and 67 patients (3.34%) had both concurrently. Of the total patients, 2627 specific diagnoses were attributed, of which 2197 (83.63%) were non-inflammatory diseases and 430 (16.37%) were inflammatory diseases (some patients had more than one specific diagnosis). Totally, 110 patients (5.48%) were referred to the clinic by other physicians. Twenty-nine patients (1.44%) were recommended for hospitalization to obtain a definite diagnosis and treatment plan.

From the total number of patients, 62 patient records (3.14%) showed no age, 9 (0.45%) showed no clinical complaint, 8 (0.40%) were without clinical features, 19 (0.95%) had no definite diagnosis due to patient not following up, 21 (1.05%) had no recorded treatment plan, and 5 (0.25%) showed no date of first visit. A total of 1696 (84.55%) patients had one or two visits. Overall 68.09% of patients were known as adherents to treatment, who returned for follow up at the set time for mechanical diseases or at least every 3-6 months for inflammatory diseases.

In total, 2,810 chief complaints were recorded for patients at the first visit (some individuals had more than one complaint). The most prevalent reason for people attending the clinic was knee pain, which constituted 30.96% of all complaints. Back, hand, and foot pain were the next most common complaints. The relevant chief complaints, their respective total number, and their frequencies are presented in [Table 1](#).

The most prevalent non-inflammatory disease was knee degenerative joint disease with a frequency of 29.42%, whereas rheumatoid arthritis (RA) was found to be the most frequent inflammatory disease (6.20%) ([Table 2](#)). The diseases which were found in only a single patient and were not included in [Table 2](#) are septic arthritis, Churg-Strauss syndrome, complex regional pain syndrome (CRPS), foot drop, diffuse idiopathic skeletal hyperostosis (DISH), erythema multiform, lister marginal hernia, charcot joint, primary Raynaud's phenomenon, ligament laxity, juvenile idiopathic arthritis (JRA), anterior ischemic optic neuropathy, central retinal vein occlusion, rheumatic heart disease, avulsion fracture, lumbar spine fracture, hypoparathyroidism, hyperparathyroidism, palpable purpura due to non-rheumatologic disease, hemarthrosis due to hemophilia, pigeon chest, and scleritis.

**Table 1.** Frequency distribution of different chief complaints

Chief Complaints	Frequency (%)	
<b>Upper extremity</b>	Hand or wrist pain	263 (9.35)
	Joints of hand or wrist swelling	86 (3.06)
	Elbow pain	69 (2.45)
	Elbow Swelling	22 (0.78)
	shoulder pain	173 (6.16)
	Upper Extremity paresthesia	40 (1.42)
	Upper Extremity pain	23 (0.82)
<b>Lower Extremity</b>	Foot, ankle, heel or calcaneal pain	222 (7.90)
	Joints of foot or ankle swelling	94 (3.34)
	knee pain	870 (30.96)
	Knee Swelling	109 (3.88)
	Hip pain	85 (3.02)
	Lower Extremity paresthesia	13 (0.46)
	Lower Extremity pain	55 (1.96)
	Leg swelling	5 (0.18)
	Limb paresis or numbness	18 (0.64)
	Lower limb claudication	1 (0.03)
	<b>Axial skeleton</b>	Back pain
Cervical pain		58 (2.06)
Generalized musculoskeletal pain		155 (5.52)
<b>Generalized</b>	Joints pain	10 (0.35)
	Joints swelling	4 (0.14)
<b>Oral cavity</b>	aphthous stomatitis or oral ulceration	19 (0.68)
	Xerostomia	13 (0.46)
	Skin lesion	37 (1.32)
<b>Connective tissue</b>	Raynaud's phenomenon	8 (0.28)
	Skin thickness	6 (0.21)
	Eye Complaint (Red eye, xerophthalmia)	16 (0.57)
<b>Specific complaints</b>	Dyspnea	3 (0.11)
	Nasal Septal Perforation	1 (0.03)
	Hematuria and proteinuria	1 (0.03)
	Fever	1 (0.03)
	Scrotum swelling	1 (0.03)
<b>Others<sup>1</sup></b>	43 (1.53)	

It was worthwhile to list notable rare diseases diagnosed in our population: Five cases of overlap syndromes including polymyositis plus systemic lupus erythematosus (SLE), RA plus scleroderma, and RA plus SLE; variations of RA including one case of Felty's syndrome and a case of Still's disease; thirteen cases of Sjogren's disease, of which eight were primary and the others were secondary

due to RA, systemic scleroderma, and SLE; seven cases with erythema nodosum, three of which were primary and the others were secondary due to undifferentiated seronegative arthritis, sarcoidosis, and reactive arthritis; eight patients were diagnosed as Raynaud's phenomenon of which just one was primary and the others were secondary to systemic scleroderma and overlap syndrome;

Eleven Baker’s cysts were found in patients, of which 8 cases were associated with knee osteoarthritis (OA) and 3 cases with RA.

The total number of diseases with low back pain which were separated into spondylolisthesis, non-specific low back pain, lumbar discopathy, lumbar OA, ankylosing spondylitis (AS), and spinal cord stenosis was 364 (13.86%) (Table 2).

A total of 20 cases with vasculitis (0.77%) were diagnosed, including one with Churg–Strauss syndrome, two with Wegner’s granulomatosis, eight with Behcet’s disease, three cases of polyarteritis nodosa, two of

leukocytoclastic vasculitis, two of nonspecific vasculitis, and two cases of secondary urticaria (Table 2).

Two hundred thirty patients (8.75%) were suffering from a nonspecific generalized musculoskeletal pain, sixty-three of whom were diagnosed as fibromyalgia according to ACR criteria [12] (Table 2).

The frequency distribution of different periarticular disorders is summarized in Table 3. Among these disorders, the most common was plantar fasciitis (17.27%) followed by carpal tunnel syndrome (CTS) (16.36%) and rotator cuff tendinitis (12.05%).

**Table 2.** Frequency distribution and mean age of rheumatic diseases

Disease	Frequency (%)	Female (%)	Mean age ± SD	
<b>Non-inflammatory disease</b>				
<b>Osteoarthritis</b>	Knee OA	773 (29.42)	602 (77.88)	54.69 ± 13.94
	Lumbar OA	42 (1.60)	28 (66.67)	61.84 ± 11.54
	Hand OA	42 (1.60)	28 (66.67)	49.60 ± 16.13
	Ankle OA	16 (0.61)	11 (68.75)	40.60 ± 13.22
	Cervical OA	11 (0.42)	9 (81.82)	57.91 ± 11.97
	Foot OA	4 (0.15)	3 (75)	54.50 ± 6.24
	Shoulder OA	3 (0.11)	2 (66.67)	70.33 ± 4.04
	Elbow OA	3 (0.11)	2 (66.67)	62.67 ± 4.01
<b>Periarticular disorders (soft tissue rheumatism)</b>	408 (15.53)	323 (79.17)	48.37 ± 13.38	
<b>Nonspecific musculoskeletal pain, fibromyalgia</b>	230(8.75)	203 (88.26)	42.68 ± 11.41	
<b>Lumbar Discopathy</b>	164 (6.24)	117 (71.34)	46.15 ± 14.12	
<b>Osteoporosis</b>	79 (3.00)	70 (88.61)	60.22 ± 13.93	
<b>Nonspecific BP</b>	62 (2.36)	37 (59.68)	41.21 ± 13.33	
<b>Hallux Rigidus</b>	46 (1.75)	40 (86.96)	49.93 ± 15.85	
<b>Lumbar spine Stenosis</b>	42 (1.60)	29 (69.04)	57.76 ± 10.46	
<b>Cervical Discopathy</b>	33 (1.26)	26 (78.79)	48.18 ± 14.97	
<b>Genu Varus</b>	34 (1.29)	24 (70.59)	54.42 ± 21.54	
<b>Osteopenia</b>	37 (1.41)	29 (78.38)	61.06±11.72	
<b>Spondylolisthesis</b>	17 (0.65)	15 (88.23)	57.82 ± 15.40	
<b>Genu Valgus</b>	15 (0.57)	13 (86.67)	35.87 ± 17.30	
<b>Chondromalacia (knee)</b>	13 (0.49)	10 (76.92)	27.31 ± 8.27	
<b>Hallux Valgus</b>	11 (0.42)	8 (72.73)	51.45 ± 20.09	
<b>Leg pain (nonspecific)</b>	5 (0.19)	2 (40)	24.60 ± 15.63	
<b>Coccydynia</b>	5 (0.19)	3 (60)	39.20 ± 10.18	
<b>Pelvic pain</b>	4 (0.15)	2 (50)	52.00 ± 12.96	
<b>Genu recurvatum</b>	2 (0.08)	1 (50)	12.00 ± 7.07	
<b>Osgood schlutter</b>	2 (0.08)	1 (50)	11.00 ± 00.00	
<b>Inflammatory disorders</b>				
<b>RA</b>		163 (6.20)	134 (82.21)	52.98 ± 14.93
	Undifferentiated Seronegative rheumatism	60 (2.28)	42 (70)	48.48 ± 17.71
	AS	37 (1.41)	17 (45.94)	46.59 ± 14.80

<b>Seronegative spondyloarthropathies</b>	Reactive Arthritis	12 (0.46)	9 (75)	41.75 ± 9.77
	PsA	9 (0.34)	7 (77.78)	49.78 ± 11.23
	IBD	5 (0.19)	3 (60)	33.80 ± 10.83
<b>Gout</b>		30 (1.14)	9 (30)	50.63 ± 16.36
<b>Vasculitis</b>	Behcet's disease	8 (0.30)	5 (62.5)	38.00 ± 11.48
	PAN	3 (0.11)	2 (66.67)	37.00 ± 10.82
	Vasculitis (not specific)	2 (0.08)	1 (50)	27.50 ± 4.95
	Wegner's granulomatosis	2 (0.08)	2 (100)	54.50 ± 21.92
	Leukocytoclastic vasculitis	2 (0.08)	2 (100)	42.00 ± 15.56
	Secondary Urticaria	2 (0.08)	1 (50)	36.00 ± 18.38

**Table 3.** Frequency distribution of periarticular diseases

Periarticular disease	Frequency (%)
Plantar fasciitis	76 (17.27)
Carpal tunnel syndrome	72 (16.36)
Rotator cuff tendinitis	53 (12.05)
Shoulder adhesive capsulitis	47 (10.68)
Trigger finger	32 (7.27)
Tennis elbow	26 (5.91)
Sub malleolar bursitis	24 (5.45)
Tenosynovitis	21 (4.77)
Ganglion	17 (3.86)
Golf elbow	10 (2.27)
Retro calcaneal bursitis	10 (2.27)
Greater trochanter enthesitis	8 (1.82)
Flexor tendinitis	8 (1.82)
Guyon tunnel syndrome	7 (1.60)
Tendon rupture <sup>1</sup>	7 (1.60)
Anserine bursitis	5 (1.14)
Biceps tendinitis	3 (0.68)
Ischial bursitis	2 (0.45)
Olecranon bursitis	2 (0.45)
Tarsal tunnel syndrome	2 (0.45)
Popliteal tendinitis	1 (0.23)
Prepatellar bursitis	1 (0.23)
Achill tendinitis	1 (0.23)
Finger nodule	1 (0.23)
Ankle tendinitis	1 (0.23)
Dupuytren's contracture	1 (0.23)
Sub acromion bursitis	1 (0.23)
Iliopsoas bursitis	1 (0.23)

## Discussion

There have been many epidemiological studies designed to survey the distribution of rheumatologic diseases; however, gathering data in referral rheumatology clinics does not provide a sufficient measure to reflect the epidemiology of these diseases in a given society. Moreover, COPCORD studies designed to gather data directly from the community are excessively costly and time-consuming. Therefore, the current study was performed in a non-referral rheumatologic clinic, which may be more representative of the pattern of rheumatologic diseases in the society.

The sample size in this study was comparable with other studies. Over a one-year time span, 2006 patients were studied. Other researchers had studied a similar number of patients, however some for a longer time period such as Malemba and Mbuyi-Muamba with 2370 cases over 14 years, Cimmino et al. with 3537 cases over 1 year at six rheumatological centers, Owlia et al. with 5187 cases over one year at two rheumatology centers, Sheppard et al. with 500 cases during 3 years, Vanhoof et al. with 3751 cases over one year, Singwe-Ngandeu et al. with 536 cases during a 1-year period, and Ng et al. with 4180 patients during 4 months [20-26]. An important feature of the current study, the same as Sheppard's survey, was that these two studies aimed to investigate patients of non-referral rheumatology clinics, whereas all of the other mentioned studies were conducted in sub-specialty referral rheumatology clinics [26]. In the current study, only 5.48% of the patients were referred, and this feature makes our data more capable of reflecting the real epidemiologic pattern of rheumatic diseases in the community. Similar to all previous studies, including both community-based and clinic-based investigations, the current study showed that more than half of the patients suffering from rheumatologic diseases were females [20-27]. The mean age of patients in this study was 48.90 years, similar to the patients in the study of Malemba et al.'s study, younger than those of Cimmino et al., Vanhoof et al., Singwe-Ngandeu et al., and Ng et al., and older than those in Owlia et al.'s and COPCORD surveys [20-25, 27].

Similar to the current survey, the majority of other studies revealed that degenerative joint diseases, mainly knee OA, were the most frequent musculoskeletal diseases. The exceptions were studies by Cimmino et al., Vanhoof, Singwe-Ngandeu et al., and Ng et al., in which RA and spine OA, mechanical diseases of the spine, and RA were the most frequent diagnoses, respectively [20-27]. As the second and third most prevalent diseases, the findings were more divergent than those of Malemba et al. (soft tissue rheumatism 16.1% and gout 9.3%), Cimmino et al. (generalized OA 7.4% and unspecified arthralgia 5.9%), Vanhoof et al. (RA 23% and osteoporosis 16%), Sheppard et al. (inflammatory joint disease 29.4% and soft tissue rheumatism 9.4%), Singwe-Ngandeu et al. (osteoarthritis of limbs 20.48%, regional musculoskeletal disorders 15.45%), Ng et al. (osteoarthritis 10.8%, crystal arthritis

10%), and COPCORD surveys (low back pain 15.4% and soft tissue rheumatism 4.6%) [20, 21, 23-27]. The above results were comparable with the current findings in which soft tissue rheumatism (15.53%) and nonspecific musculoskeletal pain (8.75%) were the second and third most common diseases.

In the present study, OA of the knee, lumbar discopathy, and hallux rigidus were the most prevalent degenerative diseases, respectively, while Vanhoof et al. and Cimmino et al. obtained different results. Spine OA (25%), hand OA (8%), and knee OA (5%) were the most common degenerative disease in Vanhoof et al.'s study; however, the results of Cimmino et al. were: knee OA (2.3%), hand OA (3.1%), cervical spine OA (1.2%), and generalized OA (7.4%) [21, 23].

The frequency of osteoporosis in this study was less than 6%, which was similar to other studies; however, it was 16% in the study by Vanhoof et al. [20-23, 25].

The frequencies of soft tissue disease determined by Vanhoof et al., Cimmino et al., Owlia et al., and Ng et al. were 1388 (37%), 656 (18.5%), 647 (12.47%), and 155 (3.7%), respectively [21-23, 25]. However, some of them defined "soft tissue disease" differently by including fibromyalgia under this category [21-23]. The commonest periarticular disease was plantar fasciitis in the present study. However, scapulohumeralis (423, 11%) in Vanhoof et al.'s study and rotator cuff dysfunction (268, 11.3%) in Malemba and Mbuyi-Muamba's study were the most prevalent ones. CTS had the greatest proportion in the study by Owlia et al. [20, 22, 23].

RA appropriated the greatest proportion of inflammatory diseases in the present and previous studies, except for the research of Singwe-Ngandeu et al., in which unclassified arthritis comprised the most inflammatory diseases [20-25, 27]. The percentage of this disease was lower in the present study compared to previous studies, which may be a result of the non-referral nature of the population studied in the present survey compared to the referral nature of the population studied in other investigations. Owlia et al. found the frequency of AS to be about 1%, similar to the current study [22]; however, it was 4% and 9.1% in studies by Vanhoof et al. and Singwe-Ngandeu et al., respectively [23, 24]. Behcet's disease showed the highest frequency among vasculitis disorders in our study (Table 2). This finding was in accordance with the results of Owlia et al. [22], whereas this group of rheumatologic diseases was not yielded in other studies mentioned above, perhaps due to the very low prevalence. Moreover, the percentage of SLE was 0.46% in the present survey, which was less than the others (Malemba et al., 0.9%; Vanhoof et al., 1%; Owlia et al., 1.44%; Cimmino et al., 3.4%; Singwe-Ngandeu et al., 9.1%; and Ng et al., 9.9%) [20-25].

The non-referral nature of the patients in our rheumatology outpatient clinic may be more representative of the real variety of the patients in society, and this was one of the advantages of the current study. However, running the survey in a single center may also be one of the limitations.

## Conclusion

More than fifty percent of patients in our community-based rheumatology clinic comprised degenerative joint diseases, especially knee OA, soft tissue and periarticular disorders, nonspecific generalized musculoskeletal pain (including fibromyalgia), and low back pain. These diseases were directly related to human lifestyle conditions, obesity, physical activity, occupation, etc. Therefore, arranging proper policies for patient education, public health programs, modifying lifestyle, and intervention before the occurrence of these diseases or at the first stages of their development logically may reduce the expenses imposed on healthcare providers and society. Ultimately, concentrating on the most prevalent diseases must be prioritized in the curriculum of education for medical students.

Main points: 1) The most common non-inflammatory rheumatic diseases in our region are OA (particularly, knee OA), periarticular diseases (mainly plantar fasciitis, CTS, and rotator cuff tendinitis), nonspecific generalized pain (fibromyalgia), and low back pain. These diseases should be given special attention and priority in the educational

curriculum of rheumatology for undergraduate medical students. 2) The most common inflammatory rheumatic diseases are RA, seronegative rheumatism, AS, and gout, which should be noted with priority in the educational curriculum of rheumatology for medical students. 3) Planning proper government policies for selfcare, patient education, public health programs, and lifestyle modification for the most common rheumatic diseases (especially mechanical or non-inflammatory diseases) should be given more attention and emphasis.

## Compliance with ethical standards

This survey was approved by the local ethical committee (IR. TUMS. REC. 1395.1573).

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## Conflict of interest

The authors declare that they have no conflicts of interest to report

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