

Metabolic Syndrome in the Rheumatology Department of the Tsévié Regional Hospital

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Abstract

Introduction: Metabolic syndrome is an important risk factor for rheumatic diseases. **Objective:** The aim of the study was to determine the frequency of metabolic syndrome associated with rheumatic diseases in hospital consultations in Togo. **Materials and Methods:** We conducted a descriptive and analytical cross-sectional study in the rheumatology department of the Tsévié Regional Hospital, Togo, from January to December 2023. Metabolic syndrome was defined according to the NCEP-ATP III 2005 criteria. Sociodemographic data, clinical characteristics, metabolic parameters, and rheumatic diagnoses were analyzed. Categorical variables were compared using Pearson's chi-square test or Fisher's exact test, as appropriate, and continuous variables using Student's t-test or the Mann-Whitney U test, depending on distribution. A p-value < 0.05 was considered statistically significant. **Results:** During the study period, 1184 patients were evaluated. Among them, 812 (68.6%) had at least one metabolic abnormality. Overall, 167 patients fulfilled the criteria for metabolic syndrome, corresponding to a hospital frequency of 14.1%. Among patients with at least one metabolic abnormality, the prevalence of metabolic syndrome was 20.6%. Patients with metabolic syndrome were predominantly female (88.0%), with a mean age of 49 years ± 10 years. Degenerative rheumatic disorders, particularly spinal osteoarthritis and knee osteoarthritis were the most frequent conditions observed in this group. Significant associations were found between metabolic syndrome and knee osteoarthritis, as well as combined spinal and knee osteoarthritis. **Conclusion:** Metabolic syndrome

was frequent in this hospital's rheumatology population. It was mainly observed in women and commonly found in patients with degenerative rheumatic conditions. These findings support the importance of routine metabolic screening in rheumatology practice. Further multicenter studies are needed to better characterize these associations.

Keywords

Metabolic Syndrome, Rheumatic Diseases, Risk Factors, Togo

1. Introduction

Metabolic syndrome (MS) is a group of metabolic disorders that is rapidly expanding worldwide [1]. It represents a major public health challenge because of its growing prevalence, particularly in low- and middle-income countries [2].

In rheumatology, the links between metabolic syndrome and musculoskeletal disorders, such as osteoarthritis, gout, spondyloarthropathies, and rheumatoid arthritis, are increasingly well documented [3]. In Egypt, Afifi *et al.* [4] reported a prevalence of metabolic syndrome of 83.3% in patients with knee osteoarthritis. Abourazzak *et al.* [5] in Morocco observed a prevalence ranging from 24.6% to 30.7% in patients with rheumatoid arthritis, depending on the diagnostic criteria applied. In Togo, a study by Oniankitan *et al.* [6] revealed a significant association between the components of metabolic syndrome (abdominal obesity, hypertension, dyslipidemia) and the severity of knee osteoarthritis.

These associations are often mediated by a low-grade chronic inflammatory state, characteristic of metabolic syndrome, which could exacerbate the inflammatory and degenerative processes of rheumatological diseases [7].

The objective of our study was to determine the frequency of metabolic syndrome in rheumatology consultations at CHR-Tsévié.

2. Patients and Methods

We conducted a descriptive and analytical cross-sectional study over a 12-month period, from January to December 2023, in the rheumatology department of Tsévié Regional Hospital (CHR-Tsévié), an intermediate-level hospital in Togo.

The study population consisted of all patients seen in the rheumatology department during the study period. Data were collected from patient medical records. We included all patients whose records contained sufficient information to assess metabolic abnormalities and metabolic syndrome. Patients with missing key data and those who did not consent to the use of their data were excluded.

Data were collected using a standardized data collection form designed for the study. Metabolic syndrome was defined according to the 2005 National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) criteria, namely the presence of at least three of the following five components: waist circumfer-

ence > 102 cm in men or >88 cm in women; triglycerides ≥ 1.50 g/L; HDL cholesterol < 0.40 g/L in men or <0.50 g/L in women; blood pressure $\geq 130/85$ mmHg; and fasting blood glucose ≥ 1.0 g/L. Waist circumference was measured with a tape measure placed around the abdomen at the level of the umbilicus at the end of expiration. Body mass index (BMI) was classified according to World Health Organization criteria [8]. The variables analyzed included age and sex, reason for consultation, personal and family medical history, anthropometric and clinical measurements (weight, height, BMI, and blood pressure), general physical examination findings, laboratory test results, and final rheumatologic diagnoses.

Data were entered into Microsoft Excel and analyzed using RStudio version 2024.04.1 + 748. Categorical variables were expressed as frequencies and percentages and were compared using Pearson's chi-square test or Fisher's exact test, as appropriate. Continuous variables were summarized as means \pm standard deviations or medians with ranges, according to their distribution, and compared using Student's t-test or the Mann-Whitney U test. A p-value < 0.05 was considered statistically significant.

The study was conducted in accordance with institutional requirements for research involving patient data. All data were anonymized before analysis, and confidentiality was maintained throughout the study.

3. Results

During the study period, 1184 patients were included. Among them, 812 (68.6%) had at least one metabolic abnormality. Overall, 167 patients met the criteria for metabolic syndrome, corresponding to a hospital frequency of 14.1%. In the subgroup of patients with at least one metabolic abnormality, the proportion with metabolic syndrome was 20.6%. They comprised 147 women (88%) and 20 men (12%), with a sex ratio of 0.14. The mean age was 49 years \pm 10 years, with a range of 22 to 82 years. The most represented age group was 50 - 60 years. **Table 1** shows the distribution of metabolic syndrome frequency. It was observed in 88% of women ($p < 0.001$). Patients who regularly consumed alcohol presented with metabolic syndrome in 61% of cases ($p = 0.07$). The most frequent reason for consultation was mechanical low back pain in 66% of cases ($n = 111$). A BMI between 30 and 34.9 kg/m² was the most common, occurring in 59.3% of cases, with an average BMI of 35.1 kg/m² \pm 4.4 kg/m² (range 29.1 to 58 kg/m²). The mean waist circumference was 106.8 cm \pm 9.2 cm, with a range of 88 to 136 cm. The mean systolic blood pressure was 156 mm Hg \pm 20 mm Hg (range 115 - 234 mm Hg), and the mean diastolic blood pressure was 94 mm Hg \pm 13 mm Hg (range 70 - 139 mm Hg). The mean blood glucose level was 1.1 g/L \pm 0.4 g/L (range 0.7 - 2.9 g/L).

The mean triglyceride and HDL cholesterol levels were 1.22 g/L \pm 0.65 g/L (range 0.39 - 2.96 g/L) and 0.65 g/L \pm 0.18 g/L (range 0.26 - 1.21 g/L), respectively.

Table 2 shows that knee osteoarthritis ($p < 0.05$) was present in 62 (37%) patients, spinal osteoarthritis in 69 (41.3%), periarticular pathology in 21 (13%), and coxopathies in 9 (5.4%) of patients with metabolic syndrome.

Table 1. Comparison of the main characteristics of patients with and without metabolic syndrome among the 812 patients with at least one metabolic abnormality.

	Metabolic Syndrome			P-Value ¹
	Absent (n = 645)	Present N = 167 (%)	Total, N = 812 (%)	
Mean Age (in Years)	53	49	52	<0.001
Sex				<0.001
Female	402 (62)	147 (88)	549 (68)	
Male	243 (38)	20 (12)	263 (32)	
Occupation				0.3
Student	11 (1.7)	0 (0)	11 (1.4)	
Civil Servant and Retiree	140 (22)	32 (19)	172 (21)	
Reseller	208 (32)	53 (32)	261 (32)	
Manual Laborers	285 (44)	81 (49)	366 (45)	
Metabolic Disorders				
High Blood Pressure	168 (26)	58 (89)	226 (93)	0.2
Type II Diabetes	25 (3.9)	11 (6.6)	36 (4.4)	0.6
Regular Alcohol Consumption	248 (71)	62 (61)	310 (69)	0.070
Smoking	25 (7.1)	2 (2.0)	27 (6.0)	0.054
PAS > 130 mmHg	315 (48.8)	161 (96.4)	476 (58.6)	<0.001
PAD > 85 mmHg	252 (39.1)	122 (73.1)	374 (46.1)	<0.001
Blood Glucose > 1.0 g/L	46 (7.1)	37 (22.2)	83 (10.2)	<0.001
Triglycerides > 1.5 g/L	66 (10.2)	82 (49.1)	148(18.2)	0.188
HDL Cholesterol (g/L)				-
Female < 0.40	7 (1.1)	10 (6.0)	17 (2.1)	
Male < 0.50	13 (2)	1 (0.6)	14 (1.7)	
Waist Measurement (in cm)				<0.001
Female ≥ 88	5 (0.8)	147 (88)	152 (18.7)	
Male ≥ 102	59 (9.1)	20 (12)	79 (9.7)	

¹chi-square test of independence; Fisher's exact test.

Table 2. Distribution of degenerative rheumatic diseases according to metabolic syndrome status among the 812 patients with at least one metabolic abnormality.

	Metabolic Syndrome			p-Value ²
	Absent N = 645 (%)	Present N = 167 (%)	Total N = 812 (%)	
Coxopathies	33 (5.1%)	9 (5.4%)	42 (5.2%)	0.9
Knee Osteoarthritis	117 (18%)	62 (37%)	179 (22%)	<0.001
Osteoarthritis of the Spine	459 (71%)	69 (41.3%)	570 (70%)	0.2

Continued

Infectious Disease	6 (0.9%)	2 (1.2%)	8 (1.0%)	0.7
Microcrystalline Pathology	1 (0.2%)	2 (1.2%)	3 (0.4%)	0.11
Periarticular Pathology	60 (9.3%)	21 (13%)	81 (10.0%)	0.2
Tumor Pathology	8 (1.2%)	2 (1.2%)	10 (1.2%)	>0.9
Inflammatory Rheumatism	4 (0.6%)	0 (0%)	4 (0.5%)	0.6
Osteoarthritis of the Spine + Knee Osteoarthritis	38 (5.9%)	25 (15.0%)	63 (7.8%)	<0.001
Spinal Osteoarthritis + Hip Pathology	10 (1.6%)	5 (3.0%)	15 (1.9%)	0.2
Spinal Osteoarthritis + Periarticular Pathology	21 (3.3%)	11 (6.7%)	32 (3.9%)	0.048

²chi-square test of independence; Fisher's exact test.

Table 3 includes metabolic disorders, metabolic syndrome, and associated disorders according to degenerative conditions.

Table 3. Metabolic disorders, metabolic syndrome, and associated disorders are associated with degenerative diseases.

	Total Number of Patients with Metabolic Disorders	Number of Patients with a Single Disorder	Number of Patients with 2 Metabolic Disorders	Number of Patients with Metabolic Syndrome	Types of Disorders	Associated Metabolic Disorders
Degenerative Spinal Pathology	275	249	26	117	HTA = 209 TT = 30 DT = 09 TG = 1 HDL = 0	HTA + TT = 10 HTA + DT = 14 TG + HDL = 1 HTA + HDL = 1
Gonarthrosis	80	70	10	59	HTA = 50 TT = 16 DT = 3 TG = 01 HDL = 0	HTA + TT = 04 HTA + DT = 04 HTA + HDL = 1 TT + DT = 1
Coxarthrosis	23	18	5	9	HTA = 17 TT = 01 DT = 0 TG = 0 HDL = 0	HTA + DT = 02 HTA + TT = 02 TG + HDL = 1
Periarticular Pathologies	38	37	1	10	HTA = 32 TT = 04 DT = 01 TG = 0 HDL = 0	HTA + TT = 1

Continued

						HTA = 05	
						TT = 0	
Infectious Diseases	5	5	0	2		DT = 0	
						TG = 0	
						HDL = 0	
						HTA = 03	HTA + TT = 1
						TT = 0	HTA + HDL = 1
Tumor Pathologies	5	3	2	1		DT = 0	
						TG = 0	
						HDL = 0	
						HTA = 0	HTA + TG = 01
						TT = 0	
Microcrystalline Pathologies	1	0	1	1		DT = 0	
						TG = 0	
						HDL = 0	
						HTA = 02	
						TT = 0	
Inflammatory Diseases	2	2	0	1		DT = 0	
						TG = 0	
						HDL = 0	

TT: Waist circumference; TG: Hypertriglyceridemia; HDL: Hyper HDL-cholesterolemia; DT: Hyperglycemia or diabetes; HTA: Hypertension.

4. Discussion

This study shows the high frequency of metabolic syndrome in rheumatic diseases. It was observed in 167 patients (20.6%) according to the NCEP-ATP III classification. More data suggest that systemic metabolic dysregulation and inflammation are underlying factors in the pathogenesis of osteoarthritis. However, our results are higher than those of Savadogo *et al.* in Burkina Faso [9].

The female predominance observed in our study (88%) is consistent with African rheumatology data, where women account for most patients with degenerative joint diseases and associated cardiometabolic comorbidities. In Togo, a hospital-based study of osteoarthritis reported that knee osteoarthritis occurred predominantly in women, with obesity being very common among affected women [10]. Similarly, in Moroccan women with knee osteoarthritis, metabolic syndrome was highly prevalent, affecting 48.5% of cases [5]. Taken together, these findings suggest that, in African rheumatology settings, female patients with osteoarthritis frequently accumulate metabolic risk factors, although the mechanisms underly-

ing this overlap cannot be established by cross-sectional studies alone. The results of Savadogo *et al.* are higher (89.1%) than those of our study (84%) [11].

The mean age of 49 years \pm 10 years in our series, with a predominance of the 50 - 60 year age group, is also in line with previous African observations. In the Togolese osteoarthritis series reported by Oniankitan *et al.*, the mean age at onset of knee osteoarthritis was 50.3 years, which is close to our findings [10]. This concordance suggests that metabolic syndrome in rheumatology practice may cluster in middle-aged adults, particularly in those presenting with degenerative musculoskeletal conditions [12]. Nevertheless, age should be interpreted as a marker of accumulated exposure and not as an independent causal explanation in the absence of adjusted longitudinal analyses.

The predominance of mechanical low back pain, spinal osteoarthritis, and knee osteoarthritis among patients with metabolic syndrome is clinically relevant. In our study, mechanical low back pain was the most frequent reason for consultation, spinal osteoarthritis accounted for 41.3% of cases, and knee osteoarthritis for 37%. Although literature specifically linking metabolic syndrome to spinal osteoarthritis remains limited, data from African osteoarthritis cohorts show that degenerative joint disease is strongly associated with obesity and cardiometabolic risk. In South African adults with advanced knee and hip osteoarthritis, increasing cardiometabolic risk factor accumulation was associated with a more adverse behavioral risk profile, particularly greater sedentary time [13]. These data support the interpretation that degenerative rheumatic disorders and cardiometabolic abnormalities often coexist in African clinical settings.

The significant association between metabolic syndrome and knee osteoarthritis in our study is supported by data from Morocco. In a cross-sectional study of women with radiographic knee osteoarthritis, the accumulation of metabolic syndrome components was associated with greater pain independently of age and body mass index, and specific components such as hyperglycemia, large waist circumference, high triglycerides, and elevated systolic blood pressure were linked to worse clinical outcomes [5]. This is noteworthy because our own results showed elevated mean BMI, waist circumference, blood pressure, triglycerides, and fasting glucose among patients with metabolic syndrome. Although we did not assess pain severity or disability scores in the same way, the Moroccan findings strengthen the clinical plausibility of the association observed in our patients with knee osteoarthritis.

The metabolic profile observed in our study also deserves emphasis. Patients with metabolic syndrome had a mean BMI of 35.1 kg/m², a mean waist circumference of 106.8 cm, a mean blood pressure of 156/94 mmHg, and frequent disturbances in triglycerides, HDL cholesterol, and fasting glucose. Similar cardiometabolic clustering has been reported in other African rheumatology populations. In Cameroonian patients with newly diagnosed gout, metabolic syndrome was present in 19.7% of patients, and its main components were increased waist circumference, obesity, hypertension, and diabetes mellitus [14]. In South African

women with rheumatoid arthritis, metabolic syndrome was also common, with a prevalence of 30.8% in black women, and blood pressure emerged as an important cardiometabolic feature [15]. These studies do not involve the same rheumatic diagnoses as ours, but they consistently show that cardiometabolic abnormalities are frequent in African rheumatology populations and should be actively screened for.

Our findings on hypertension and metabolic clustering are also consistent with broader African rheumatology data. In Black South Africans with established rheumatoid arthritis, hypertension was present in 70% of patients and type 2 diabetes in 15.4%, confirming that rheumatology patients often carry a substantial cardiometabolic burden [16]. Therefore, even though our study focused mainly on degenerative disorders rather than inflammatory arthritis, it fits into a wider African pattern in which rheumatic disease and metabolic risk frequently coexist. This reinforces the relevance of integrated cardiovascular and metabolic assessment in everyday rheumatology practice.

Obesity remains one of the most influential risk factors in the prevalence of osteoarthritis. It is known for its catabolic and pro-inflammatory properties, thus maintaining low-grade inflammation. Data from Africa have shown an increased prevalence of obesity, indicating an apparent well-being of women within society [11] [17] [18]. This obesity leads to knee osteoarthritis, creating a vicious cycle where the only non-pharmacological treatment is weight loss.

This study has several limitations. First, its cross-sectional design does not allow causal inference. Second, it was conducted in a single rheumatology department, which may have introduced selection bias and may limit the generalizability of the findings. Third, some biochemical parameters may not have been available for all patients, leading to incomplete metabolic assessment. Fourth, the absence of a comparison group outside the rheumatology setting limits broader interpretation of the observed hospital frequency.

5. Conclusions

Metabolic syndrome is a cluster of closely related risk factors, including abdominal obesity, high blood pressure, lipid abnormalities, and impaired glucose metabolism. It is a major risk factor for cardiovascular disease and type 2 diabetes. In rheumatology, its involvement in musculoskeletal conditions such as osteoarthritis, gout, spondyloarthropathies, and rheumatoid arthritis is increasingly being studied.

Metabolic syndrome affected one in five patients, with a higher prevalence in those under sixty-five years of age. Degenerative spinal diseases and peripheral osteoarthritis remained the most frequently encountered conditions.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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