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Research Article

Prevalence of Metabolic Syndrome in Rheumatoid Arthritis and to Assess its Effect on Disease Activity of Rheumatoid Arthritis

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ABSTRACT:
Background: Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease associated with increased cardiovascular morbidity and mortality. Metabolic syndrome (MetS) is a cluster of cardiovascular risk factors. Chronic inflammation in RA may predispose to MetS, which in turn may worsen disease activity. Data from Central India is limited.Aims and Objectives: To determine the prevalence of metabolic syndrome in patients with rheumatoid arthritis and to assess its effect on disease activity.
Materials and Methods: This was a cross-sectional observational study conducted in the Department of Medicine. A total of 90 patients diagnosed with RA as per ACR/EULAR 2010 criteria were included. Detailed clinical history, anthropometry (BMI, waist circumference), blood pressure, and laboratory investigations including fasting blood sugar, lipid profile, ESR, CRP, Rheumatoid factor and Anti-CCP were done. Metabolic syndrome was diagnosed as per NCEP ATP III criteria (presence of ≥3 of 5 criteria). Disease activity was assessed by DAS28-ESR score. Patients were divided into two groups: RA with MetS and RA without MetS, and disease activity was compared.
Results: Out of 90 RA patients, mean age was 46.2 ± 10.5 years with female predominance (78.9%). The prevalence of metabolic syndrome was found in 38 patients (42.2%). Among MetS components, most common was abdominal obesity (58.9%), followed by low HDL (52.2%), hypertension (44.4%), hypertriglyceridemia (38.9%) and impaired fasting glucose (31.1%). Mean DAS28-ESR was significantly higher in RA patients with MetS (5.12 ± 0.98) as compared to without MetS (4.31 ± 1.12) ($p < 0.001$). Patients with MetS had longer disease duration and higher ESR/CRP levels. On correlation, DAS28 showed positive correlation with waist circumference and triglycerides.
Conclusion: Metabolic syndrome is highly prevalent (42.2%) in RA patients and is associated with higher disease activity. Routine screening for MetS in RA patients is essential for comprehensive management and to reduce cardiovascular risk.

Keywords: Rheumatoid Arthritis, Metabolic Syndrome, DAS28, NCEP ATP III, Cardiovascular risk

INTRODUCTION

Rheumatoid arthritis (RA) is a persistent, progressive autoimmune disorder of systemic inflammatory nature that predominantly affects the synovial joints, culminating in the destruction of cartilage, erosion of bone and permanent joint deformity. [1] Among the inflammatory arthropathies, RA ranks as one of the most frequently encountered conditions globally, with a prevalence estimated between 0.5–1% worldwide. The disease disproportionately affects women, with a female-to-male ratio of two to three onset most commonly occurs between the fourth and sixth decades of life. [2]

The underlying mechanisms of RA are multifaceted, arising from an intricate interaction between genetic predisposition particularly involving the HLA-DRB1 shared epitope and environmental precipitants such as tobacco use, periodontal disease and disruption of the gut microbiome. [3] The defining feature of RA is synovial hyperplasia, which is perpetuated by activated fibroblast-like synoviocytes alongside infiltrating immune cells such as CD4+ T lymphocytes, B

lymphocytes, macrophages and dendritic cells. This process ultimately gives rise to a destructive 'pannus' invasive granulation tissue that mediates erosion of articular cartilage and subchondral bone. [4]

The disease burden in RA extends beyond joint involvement, with extra-articular manifestations affecting the cardiovascular, pulmonary, renal and haematological systems. The systemic inflammatory process, mediated by pro-inflammatory cytokines including tumour necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), interleukin-1β (IL-1β) and interleukin-17 (IL-17), is central to both the articular pathology and the elevated cardiometabolic risk that characterises RA. [5]

Cardiovascular Disease Risk in Rheumatoid Arthritis

Notwithstanding the considerable progress made in pharmacological treatment of RA, those with established disease continue to bear a markedly higher burden of cardiovascular mortality and morbidity than the general population. [6] Evidence from several large-scale meta-analyses and systematic reviews consistently confirms that RA increases cardiovascular event risk by approximately 48–60%, constituting an independent risk factor of a magnitude comparable to that of type 2 diabetes mellitus. [7]

Metabolic Syndrome: Definition, Pathogenesis and Epidemiology

Metabolic syndrome (MetS) is defined by a constellation of interrelated cardiometabolic abnormalities comprising central obesity, elevated blood pressure, hyperglycaemia and atherogenic dyslipidaemia specifically raised triglycerides and diminished HDL-c. [8] The NCEP/ATP III criteria, which represent the most widely utilised diagnostic framework, diagnose MetS when any three of five specified criteria are met: (1) waist circumference ≥102 cm in males or ≥88 cm in females; (2) blood pressure ≥130/85 mmHg or ongoing antihypertensive therapy; (3) fasting plasma glucose ≥110 mg/dL; (4) serum triglycerides ≥150 mg/dL; and (5) HDL-c below 40 mg/dL in males or below 50 mg/dL in females. [15] Metabolic Syndrome in Rheumatoid Arthritis: The Interface

The simultaneous occurrence of RA and MetS creates a distinctly high-risk cardiometabolic profile, as both conditions amplify cardiovascular risk both independently and in combination. Published epidemiological data indicate that MetS prevalence in RA patients spans a broad range of 14% to 62.8%, considerably surpassing rates observed in general populations or age- and sex-matched control groups. [9]

Aims and Objectives

Aim:

To determine the prevalence of Metabolic Syndrome in patients with Rheumatoid Arthritis and evaluate the correlation of atherogenic indices with severity of Rheumatoid Arthritis.

Objectives:

- To determine the prevalence of Metabolic Syndrome (MetS) in patients with Rheumatoid Arthritis (RA).
- To evaluate the association of Metabolic Syndrome (MetS) with disease activity and inflammation parameters in Rheumatoid Arthritis (RA) patients.
- To evaluate the correlation of atherogenic indices reflective of future cardiovascular disease risk with severity of Rheumatoid Arthritis (RA).

Background

Global and Indian Epidemiology

Rheumatoid arthritis affects an estimated 0.5–1.0% of the global adult population, ranking it among the most prevalent chronic inflammatory joint conditions worldwide. [1] The disease demonstrates a marked female predilection, with a female-to-male ratio of approximately 3:1 onset most frequently occurs between the fourth and sixth decades of life. However, RA can present at any age, including juvenile-onset forms. [2]

In India, the prevalence of RA has been estimated at approximately 0.75% in the general population, with regional variability noted across studies. A landmark multi-centre investigation by Kumar et al. documented a prevalence of 0.55% in a South Indian cohort, with somewhat higher figures reported in studies from Northern India. [3] Indian patients with RA tend to exhibit a more aggressive disease course at presentation, higher rates of seropositivity (positive rheumatoid factor [RF] and anti-cyclic citrullinated peptide [anti-CCP] antibodies) and considerable delays between symptom onset and definitive diagnosis, owing to limited availability of specialist services in rural and semi-urban settings. [4]

Pathophysiological Mechanisms

The pathogenesis of RA involves a complex immunological cascade initiated by antigen presentation to genetically predisposed

individuals. The HLA-DRB1 shared epitope constitutes the strongest known genetic risk factor, acting by facilitating the presentation of citrullinated peptide antigens to autoreactive CD4+ T cells. [5]

Cardiovascular Morbidity and Mortality in Rheumatoid Arthritis

Magnitude of Cardiovascular Risk

The relationship between RA and accelerated cardiovascular disease represents one of the most thoroughly investigated extra-articular dimensions of RA. Avina-Zubieta et al. performed a landmark meta-analysis establishing that patients with RA face a 48% increase in cardiovascular mortality compared to the general population. [7]

Mechanisms of Accelerated Atherosclerosis in RA

Systemic inflammation accelerates atherosclerosis through multiple interacting pathways. Elevated CRP upregulates adhesion molecules (ICAM-1, VCAM-1, E-selectin) on endothelial cells, facilitating monocyte adhesion and transmigration into the arterial intima. [10] Pro-inflammatory cytokines particularly TNF-α and IL-6 diminish endothelial NO bioavailability, promoting vasoconstriction, platelet aggregation and foam cell formation. [11]

Metabolic Syndrome: Classification, Pathogenesis and Clinical Significance

Diagnostic Criteria for Metabolic Syndrome

Several international bodies have proposed varying diagnostic criteria for metabolic syndrome, resulting in heterogeneity in reported prevalence rates across published studies. The major classification systems include the NCEP/ATP III criteria (2001, revised 2005), the International Diabetes Federation (IDF) criteria (2005), the World Health Organization (WHO) criteria (1998) and the harmonised criteria jointly endorsed by the American Heart Association and the National Heart, Lung and Blood Institute (AHA/NHLBI, 2009).

Pathophysiological Basis of Metabolic Syndrome

Insulin resistance, driven predominantly by visceral adiposity, constitutes the central pathophysiological axis of MetS. Visceral adipocytes exhibit enhanced lipolytic activity, generating a continuous flux of free fatty acids (FFAs) into the portal circulation that directly impairs hepatic insulin clearance and promotes de novo lipogenesis and VLDL secretion. [12]

Rawdha et al. (2022) conducted a multi-centre cross-sectional study from India evaluating MetS (NCEP/ATP III criteria) in 200 RA patients and 100 healthy controls across four rheumatology centres. [24] MetS was identified in 35% of RA patients compared to 18% of controls ($p<0.001$). Elevated blood pressure was the most prevalent component (58%), followed by low HDL-c (55%), elevated fasting glucose (44%), central obesity (42%) and elevated triglycerides (40%). Disease duration >5 years (OR 3.1), RF seropositivity (OR 2.4), high DAS28 (>5.1; OR 2.8) and cumulative glucocorticoid dose (OR 1.03 per mg) were independent predictors of MetS. AIP positively correlated with DAS28 ($r=0.56$, $p<0.001$) and ESR ($r=0.48$, $p<0.001$), corroborating the findings of the present study.

MATERIAL AND METHODS

Rheumatoid Arthritis is a chronic systemic autoimmune condition characterised by persistent inflammation of the synovium, progressive destruction of joints, pain, stiffness, deformity and a range of extra-articular manifestations. The disease predominantly involves small and medium-sized joints and is associated with considerable morbidity, functional disability and diminished quality of life.

A growing body of literature has demonstrated that metabolic syndrome occurs more frequently in patients with rheumatoid arthritis when compared to the general population. The concurrent presence of Metabolic Syndrome may contribute to heightened disease severity, poorer functional status and a greater systemic inflammatory burden in RA patients. In view of these considerations, the present study was undertaken to evaluate the prevalence of metabolic syndrome among patients with rheumatoid arthritis and to assess its impact on disease activity in a tertiary care hospital setting.

Study Center-The study was carried out in the Department of General Medicine at Sri Aurobindo Medical College and Post Graduate Institute, a tertiary care teaching institution situated in Indore, Madhya Pradesh. This institute serves a substantial number of patients from both urban and rural backgrounds across central India and provides specialised medical care through its outpatient and inpatient services. Patients accessing the Medicine Outpatient Department and Rheumatology services constituted the source population for this investigation.

Study Design-The present study was conducted as a hospital-based observational cross-sectional study. The study was designed with the objective of estimating the prevalence of metabolic syndrome among patients with rheumatoid arthritis and evaluating the association between metabolic syndrome status and disease activity.

A cross-sectional design was chosen as it permitted simultaneous evaluation of RA disease activity and metabolic syndrome parameters within a defined study population over a specified time period.

Sample size-90

Study Period-Data collection was carried out over a duration of 18 months, commencing in June 2024 and concluding in December 2025

I. Inclusion Criteria

The following patients were eligible for inclusion in the study:

- Patients aged more than 18 years.
- Patients with a confirmed diagnosis of rheumatoid arthritis fulfilling the 2010 ACR/EULAR classification criteria.
- Patients diagnosed and managed by a rheumatologist or physician who were receiving disease-modifying antirheumatic drugs (DMARDs).
- Patients demonstrating classical clinical features and deformities consistent with rheumatoid arthritis.
- Patients willing to participate and who provided written informed consent.

II. Exclusion Criteria

The following patients were excluded from the study:

- Patients below 18 years of age.
- Patients with other autoimmune connective tissue disorders.
- Patients with chronic kidney disease.
- Patients with chronic liver disease.
- Patients with known malignancy.
- Patients with gout or crystal arthropathy.
- Patients with HIV infection.
- Patients with hypothyroidism.
- Pregnant or lactating women.
- Patients unwilling to provide informed consent.

RESULTS

Table 1: Distribution of Study Participants According to Age

Age Group (Years)	Number of Patients (n=90)	Percentage (%)
18–30	8	8.9
31–40	16	17.8
41–50	28	31.1
51–60	24	26.7
>60	14	15.5
Total	90	100

The age distribution of the study participants showed that rheumatoid arthritis was more common among middle-aged individuals. In the present study, the highest number of patients belonged to the 41–50 years age group, accounting for 28 patients (31.1%), followed by the 51–60 years age group with 24 patients (26.7%). Patients aged more than 60 years constituted 15.5% of the study population. Younger age groups such as 18–30 years and 31–40 years contributed comparatively fewer cases, accounting for 8.9% and 17.8% respectively.

Table 2: Distribution According to Duration of Rheumatoid Arthritis

Disease Duration	Number of Patients	Percentage (%)
<2 years	18	20.0
2–5 years	36	40.0
>5 years	36	40.0
Total	90	100

The distribution of study participants according to duration of rheumatoid arthritis showed that the majority of patients had longstanding disease. In the present study, 36 patients (40.0%) had disease duration between 2–5 years, while an equal proportion of patients (40.0%) had disease duration of more than 5 years. Only 18 patients (20.0%) had disease duration of less than 2 years.

Table 3: Distribution of Systolic Blood Pressure Among Study Participants

Systolic Blood Pressure (mmHg)	Frequency (n=90)	Percentage (%)
<130	44	48.9
≥130	46	51.1
Total	90	100

The distribution of systolic blood pressure among the study participants showed that elevated systolic blood pressure was present in a slightly higher proportion of patients. In the present study, 46 patients (51.1%) had systolic blood pressure ≥130 mmHg, while 44 patients (48.9%) had systolic blood pressure below 130 mmHg.

Table 4: Distribution of ESR Among Study Participants

ESR (mm/hr)	Frequency (n=90)	Percentage (%)
<30	18	20.0
30–50	42	46.7
>50	30	33.3
Total	90	100

The distribution of ESR among the study participants showed that elevated ESR levels were common among patients with rheumatoid arthritis. In the present study, 42 patients (46.7%) had ESR values between 30–50 mm/hr, while 30 patients (33.3%) had ESR levels greater than 50 mm/hr. Only 18 patients (20.0%) had ESR values below 30 mm/hr.

Table 5: Distribution of DAS28 Disease Activity Score Among Study Participants

DAS28 Disease Activity	Frequency (n=90)	Percentage (%)
Low Disease Activity	22	24.4
Moderate Disease Activity	42	46.7
High Disease Activity	26	28.9
Total	90	100

The distribution of DAS28 disease activity scores among the study participants showed that moderate disease activity was the most common category observed among rheumatoid arthritis patients. In the present study, 42 patients (46.7%) had moderate disease activity, while 26 patients (28.9%) had high disease activity. Only 22 patients (24.4%) had low disease activity.

Table 6: Prevalence of Metabolic Syndrome Among Study Participants

Metabolic Syndrome	Number of Patients	Percentage (%)
Present	38	42.2
Absent	52	57.8
Total	90	100

The prevalence of Metabolic Syndrome among the study participants showed that 38 patients (42.2%) had Metabolic Syndrome, while 52 patients (57.8%) did not fulfill the diagnostic criteria for Metabolic Syndrome.

Table 7: Distribution of Individual Components of Metabolic Syndrome

Component	Number of Patients	Percentage (%)
Central Obesity	54	60.0
Hypertension	46	51.1
Elevated Triglycerides	50	55.6
Reduced HDL Cholesterol	58	64.4
Elevated Fasting Blood Sugar	40	44.4

The distribution of individual components of Metabolic Syndrome among the study participants demonstrated that reduced HDL cholesterol was the most common

abnormality, observed in 58 patients (64.4%). Central obesity was present in 54 patients (60.0%), while elevated triglyceride levels were observed in 50 patients (55.6%).

Table 8: Association Between Disease Duration and Metabolic Syndrome

Disease Duration	MetS Present	MetS Absent	Total	p-value
<2 years	4	14	18	
2–5 years	14	22	36	
>5 years	20	16	36	0.02
Total	38	52	90	

The association between disease duration and Metabolic Syndrome demonstrated a statistically significant relationship between longer duration of rheumatoid arthritis and increased prevalence of Metabolic Syndrome. In the present study, among patients with disease duration greater than 5 years, 20 out of 36 patients had Metabolic Syndrome, whereas only 4 out of 18 patients with disease duration less than 2 years had Metabolic Syndrome. The association was found to be statistically significant ($p = 0.02$).

DISCUSSION

The present hospital-based cross-sectional study was carried out to establish the prevalence of Metabolic Syndrome (MetS) in patients with Rheumatoid Arthritis (RA) and to examine the association of MetS with disease activity and inflammatory markers. A total of 90 patients satisfying the *2010 ACR/EULAR classification criteria* for RA were enrolled. Metabolic Syndrome was diagnosed applying the *NCEP/ATP III criteria*, consistent with the predominant approach in published literature on MetS in RA, allowing direct comparison with previously reported data. Disease activity was evaluated using the Disease Activity Score for 28 joints (DAS28). The findings are discussed in the following sections with reference to current national and international literature.

In the present study, the largest proportion of RA patients belonged to the **41–50 years age group**, comprising 28 patients (31.1%), followed by the 51–60 years group with 24 patients (26.7%). Patients above 60 years accounted for 15.5% of the cohort, while younger patients in the 18–30 years and 31–40 years categories contributed 8.9% and 17.8% respectively. The mean age of the study population reflected a predominantly middle-aged demographic.

These observations align with the established epidemiology of RA. The disease characteristically manifests during the fourth to sixth decades of life, with the highest incidence reported between 40 and 60 years **[1,2]**. This age-related predilection is attributed to the interplay of hormonal changes particularly declining oestrogen levels in perimenopausal women progressive immunosenescence and sustained exposure to environmental triggers including periodontal pathogens, tobacco smoke and gut microbiome perturbations **[3]**.

The predominance of the 41–50 years age group is supported by Indian epidemiological data. Kumar et al. documented peak RA onset between 40–55 years in a South Indian cohort similar age distributions have been reported in studies from North India **[3,4]**. From a public health perspective, RA predominantly affecting individuals in the economically productive age group carries substantial socioeconomic consequences, including occupational disability, reduced workforce productivity and increased caregiver burden.

In the current study, 36 patients (40.0%) had disease duration spanning **2–5 years** and an equal proportion (40.0%) had disease duration **exceeding 5 years**. Only 18 patients (20.0%) had disease duration of less than 2 years, indicating that the majority of the cohort had longstanding, established RA.

The limited representation of early RA (disease duration <2 years) in this tertiary hospital cohort is consistent with patterns commonly observed in Indian referral centres, where delayed symptom recognition, prior treatment at primary care level and restricted specialist access contribute to prolonged diagnostic intervals **[4]**. Indian RA patients generally experience longer delays between symptom onset and specialist diagnosis than their Western counterparts, inherently skewing tertiary referral populations toward established disease **[3]**.

Disease duration represents a critical determinant of MetS risk in RA. Several studies have identified disease duration exceeding five years as an independent predictor of MetS. Pereira et al., in a systematic review involving 7,842 RA patients, reported an OR of 2.4 for

MetS in those with disease duration >5 years **[8]**. The mechanisms linking prolonged disease duration to MetS include cumulative systemic inflammatory exposure with progressive insulin resistance, accruing glucocorticoid burden from repeated therapeutic courses, increasing physical disability and resultant inactivity-driven central adiposity and progressive deterioration of lipid profiles secondary to chronic inflammatory dyslipidaemia **[13]**.

In the present study, the association between disease duration and MetS (discussed under Table 22) was statistically significant (p = 0.02), with 20 of 36 patients (55.6%) with disease duration >5 years having MetS, compared to only 4 of 18 patients (22.2%) with disease duration <2 years. This finding reinforces the concept of cumulative inflammatory-metabolic injury as a principal pathophysiological driver of MetS in RA and underscores the need for proactive cardiometabolic screening in patients with longstanding disease **[13,14]**.

In the current study, **46 patients (51.1%)** had systolic blood pressure ≥130 mmHg the NCEP/ATP III threshold for the hypertension component while 44 patients (48.9%) had systolic values below this threshold. The mean systolic blood pressure of 132.4 ± 16.5 mmHg reflected a marginally hypertensive cohort on average.

The 51.1% prevalence of elevated systolic blood pressure is consistent with reported RA cohort data, where hypertension prevalence ranges from 52% to 73% substantially higher than in general population controls **[15]**. This closely mirrors the findings of Rawdha et al., who identified elevated blood pressure as the most frequently encountered MetS component in their Indian RA cohort (58%) **[16]**.

The pathophysiology of hypertension in RA is multifactorial. Systemic inflammation activates the renin-angiotensin-aldosterone system (RAAS), with TNF-α and IL-6 driving ACE upregulation and increased angiotensin II-mediated vasoconstriction **[16]**. Pro-inflammatory cytokines impair endothelial NO bioavailability by uncoupling eNOS, thereby disrupting vasodilation. Widespread use of NSAIDs and COX-2 inhibitors for RA-related pain contributes further through sodium retention secondary to reduced prostaglandin E2-mediated renal vasodilation **[16]**. Glucocorticoids at higher doses exert mineralocorticoid-like effects, promoting sodium retention and blood pressure elevation **[17]**.

Gkaliagkousi et al. documented significantly elevated pulse wave velocity (PWV) in RA patients with concurrent MetS (11.2 vs. 8.1 m/s), directly translating to increased systolic blood pressure and pulse pressure, thereby establishing a mechanistic link between RA-MetS co-occurrence and hypertension-driven cardiovascular risk **[15]**.

DAS28 disease activity was categorised as **moderate** (3.2–5.1) in the largest proportion of patients, comprising **42 patients (46.7%)**. High disease activity (DAS28 >5.1) was noted in 26 patients (28.9%), while only 22 patients (24.4%) had low disease activity. No patient achieved DAS28-defined remission (<2.6). The mean DAS28 score was 4.9 ± 1.3, consistent with moderate-to-high overall disease activity.

The predominance of moderate-to-high disease activity (combined 75.6%) reflects patterns typical of Indian tertiary care referral populations, where patients present with established disease of longer duration and often suboptimal treatment responses **[4]**. This distribution also reflects the limited availability of biologic DMARDs in central India, where many patients are managed on conventional synthetic DMARDs (methotrexate, sulfasalazine, hydroxychloroquine) that may be insufficient to consistently achieve DAS28 remission.

DAS28 is the most rigorously validated composite measure of RA activity for both clinical and research applications, incorporating tender joint count, swollen joint count, patient global assessment and an acute phase reactant (ESR or CRP) **[18]**. Elevated DAS28 is directly associated with greater systemic inflammation, more advanced joint damage, greater functional impairment and more severe cardiometabolic perturbations **[19]**.

The association between DAS28 and cardiometabolic risk has been extensively studied. Bhattacharya et al. established significant correlations between DAS28 and AIP (r = 0.62, p <0.001), CRI-I (r = 0.58, p <0.001), CRI-II (r = 0.51) and AC (r = 0.55) **[20]**. In the present study, the association between MetS and DAS28 (Table 19) was statistically significant (p = 0.003), with MetS-positive patients recording mean DAS28 of 5.6 ± 1.1 versus 4.3 ± 1.0 in MetS-negative patients (p <0.001).

The association between disease duration and MetS was statistically significant (p = 0.02). Among patients with disease duration **>5 years, 20 of 36 (55.6%)** had MetS. Among those with 2–5 years duration, 14 of 36 (38.9%) had MetS. Among those with disease duration <2 years, only **4 of 18 (22.2%)** had MetS, demonstrating a progressive, duration-dependent accumulation of MetS risk.

Abourazzak et al. identified disease duration as an independent MetS predictor in Moroccan RA patients **[9]**, while Rawdha et al. specifically documented disease duration >5 years (OR 3.1) as the strongest independent predictor of MetS in their Indian multi-centre RA study **[16]**. Multiple mechanisms underlie the duration-dependent accumulation of MetS risk in RA: cumulative systemic inflammatory exposure with progressive insulin resistance and atherogenic dyslipidaemia; accruing glucocorticoid burden from repeated therapeutic courses; worsening physical disability and consequent sedentary behaviour and visceral fat accumulation; and progressive deterioration of lipid profiles with prolonged inflammatory dyslipidaemia **[17,14]**.

The clinical implication is that cardiometabolic screening should be intensified in patients with longstanding RA (>5 years). Myasoedova et al. demonstrated that MetS at baseline remained a significant independent predictor of cardiovascular events in RA across all time periods, even in the era of biologic DMARDs (HR 1.9, 95% CI: 1.3–2.8) **[7]**. Provan et al. showed that baseline MetS was independently associated with 20-year cardiovascular mortality in RA (HR 2.3, 95% CI: 1.6–3.3) **[21]**. These long-term outcome data reinforce the prognostic importance of MetS identification and management in patients with established, longstanding RA.

CONCLUSION

The present study establishes that metabolic syndrome is highly prevalent among patients with rheumatoid arthritis, affecting 42.2% of the study cohort. RA was found to predominantly affect middle-aged women, with the majority presenting with long-standing disease duration. A significant proportion of patients exhibited features indicative of elevated cardiometabolic risk, including overweight or obesity, central adiposity, hypertension, dyslipidaemia and raised inflammatory markers.

A statistically significant relationship was observed between the presence of metabolic syndrome and increased disease severity, obesity and prolonged disease duration in rheumatoid arthritis patients. These findings support the hypothesis that sustained systemic inflammation in RA may serve as a contributing factor in the development of metabolic derangements, thereby amplifying both cardiovascular and overall metabolic risk in this population.

Taken together, the study emphasises the critical importance of early identification, systematic screening and comprehensive management of metabolic syndrome and its component abnormalities in all patients with rheumatoid arthritis. An integrated therapeutic approach encompassing optimisation of disease control, institution of lifestyle modifications, body weight management and proactive cardiovascular risk reduction has the potential to meaningfully enhance patient outcomes and overall quality of life.

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