

## Anemia and its correlation with disease activity in patients with Osteoarthritis and Rheumatoid Arthritis

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### Abstract:

**Background:** Hematological manifestations in Arthritis can be generally categorized into areas of anemia, thrombocytosis, neutropenia, thrombocytopenia, eosinophilia, and hematological malignancies. Anemia in rheumatoid arthritis (RA) is multifactorial. Patients with arthritis may present with hematological abnormalities either at the time of diagnosis, or during the course of their illness. The cause of anemia in RA is multifactorial including disease activity, drug-induced, dietary, gastrointestinal bleeding, bone marrow suppression, and ineffective erythropoiesis activity. **Objective:** the objective of this study is to analyze severity of anemia and its association with disease activity. **Material & methods:** This prospective study was carried out on 130 Arthritis patients (Osteoarthritis and Rheumatoid arthritis) from both sex's male and female from different age group during January 2020 to January 2022, at NIMS&R Hospital, Shobha Nagar, NIMS University, Jaipur (Rajasthan). **Results:** In the current study, the majority of Arthritis patients (both male and female) had low hemoglobin levels. The percentage of normal hemoglobin in male arthritis patients was 66.66 %, while the lower level was 33.33 %. The percentage of normal hemoglobin in female arthritis patients was 55.22%, while the lower threshold was 44.77 %. Result shows, Severity of anemia. 37 (55.22%) women and 42 (66.66%) men have normal hemoglobin value (Non-anemic). 9 (13.43%) women and 14 (22.22%) men suffer from Mild anemia. Whereas 17 (25.37%) women and 6 (9.52%) men suffer with moderate anemia and severe anemia in which 4 (5.97%) are women and 1 (1.58%) are men. **Conclusion:** In this research, laboratory investigations revealed Patients with arthritis showed excellent hematologic responses. Anemia is common in arthritis patients.

**Key Words:** Hemoglobin, MCV (Mean cell volume), MCH (Mean cell hemoglobin), MCHC (Mean cell hemoglobin concentration, Arthritis, OA (Osteoarthritis), RA (Rheumatoid arthritis), World health organization.

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### I. Introduction

Arthritis and other rheumatic conditions are a significant public health issue, and are estimated to affect more than 21% of adults.<sup>1</sup> Arthritis affects one or more joints, causing swelling and discomfort. Joint pain and stiffness are the most common symptoms of arthritis, and they usually get worse as you get older. Osteoarthritis and rheumatoid arthritis are the most frequent types of arthritis.<sup>2</sup> Osteoarthritis has been shown to have high prevalence.<sup>3</sup> Rheumatoid arthritis (RA) is a chronic systemic auto-immune inflammatory disease that presents as weight loss, tiredness, and anaemia in addition to articular and extra-articular manifestations.<sup>4</sup>

Patients with arthritis may present with hematological abnormalities either at the time of diagnosis, or during the course of their illness.<sup>5</sup> The cause of anemia in RA is multifactorial including disease activity, drug-induced, dietary, gastrointestinal bleeding, bone marrow suppression, and ineffective erythropoiesis.<sup>6</sup>

The types of anemia in RA may include anemia of chronic disease, iron-deficiency anemia, vitamin deficiency anemia, aplastic anemia, or hemolytic anemia.<sup>7</sup> Anemia of chronic disease (ACD) typically Normocytic Normochromic type observed in RA, where it as a rule associates with the infection movement. However, anaemia is the most common extra-articular manifestation of RA. It normally correlates with disease activity. It can affect 60% of all patients with RA at least once during their lifelong disease course.<sup>8</sup> Anemia was strongly associated with poorer physical function and cognitive function.<sup>9</sup> However, it would be useful to know more about anemia; particularly because severe anemia might contribute independently to the burden of RA and might be treatable with erythropoietin.<sup>10</sup>

## II. Material and Methods

Newly diagnosed recent onset Arthritis, patients were clinically examined and necessary investigations were done including Hemoglobin, Red blood cell count (RBC), red blood cell indices and PBF, among patient with OA and RA. According to World Health Organization (WHO) criteria for anemia were defined as hemoglobin threshold of <12 g/dl in females and <13 g/ dl in males.<sup>11</sup> The study was conducted in NIMS&R Hospital, Sobha Nagar, NIMS University, Jaipur (Rajasthan) after taking ethical approval, for period from January 2020 to January 2022. It included 130 patients with Osteoarthritis and Rheumatoid arthritis. Laboratory investigation done on automated hematology analyzers (Erba Mannheim- Elite 580). Full medical history and clinical examination were done for all patients. The data were collected through direct interview and using prepared questionnaire.

### Inclusion criteria:

- Patient should be RA test positive.
- Patients who met the 2010 ACR-EULAR classification criteria for Rheumatoid Arthritis.
- Patient should be Osteoarthritis attending NIMS Hospital, Rajasthan.

### Exclusion criteria:

- Any cause of anemia not related to Arthritis.
- The patients who were negative for RA test.

**Statistical Analysis:** The results of subjects are framed in Excel sheet, put into in a table, evaluated with percentage. The data analyses were done by using SPSS (Statistical Package for Social Sciences).

## III. Results

Total 130 patients with arthritis were included in present research with different age groups, out of 130, 67 (51.53%) were females and 63 (48.46%) were males.

**Table no 1:** Distribution of Hemoglobin level in arthritis patients

		No. of patients	Normal %	No. of patients	Decrease %	No. of patients	Increase %	Total No. of patients	Total %
<b>Hemoglobin</b>	Male	42	66.66%	21	33.33%	0	00 %	63	100%
	Female	37	55.22%	30	44.77%	0	00 %	67	100%

In the current study, the majority of Arthritis patients (both male and female) had low hemoglobin levels. The percentage of normal hemoglobin in male Arthritis patients was 66.66 %, while the lower level was 33.33 %. The percentage of normal hemoglobin in female Arthritis patients was 55.22%, while the lower threshold was 44.77 %.

**Table no 2:** Distribution of Red blood cell indices (MCV, MCH and MCHC)

RBC Indices	No. of patients	Normal %	No. of patients	Decrease %	No. of patients	Increase %	Total No. of patients	Total %
MCV	69	53%	47	36%	14	10%	130	100%
MCH	83	63.84%	25	19.23%	22	16.92%	130	100%
MCHC	81	62.30%	10	7.69%	39	30%	130	100%

In our study, it was observed that 53% of patients had normal MCV values, 36% had decreased MCV values, and 10% had increased MCV values. MCH values were found to be normal in 63.30 % of patients, decreased in 19.23 % of patients, and increased in 16.92 % of patients. MCHC 62.30 % of patients had a normal MCHC value, 30% had a higher value, and 7.69 % had a lower value.

**Table no 3:** Distribution of Anemia severity in arthritis patients

Type of Severity	No. of Female patients	%	No. of male patients	%
Non Anemia	37	55.22%	42	66.66%
Mild Anemia	9	13.43%	14	22.22%
Moderate Anemia	17	25.37%	6	9.52%
Severe Anemia	4	5.97%	1	1.58
	67	100%	63	100%

Table no. 3 represents the severity of anemia. 37 (55.22%) women and 42 (66.66%) men have normal hemoglobin value (Non-anemic). 9 (13.43%) women and 14 (22.22%) men suffer from Mild anemia. Whereas 17 (25.37%) women and 6 (9.52%) men suffer with moderate anemia and severe anemia in which 4 (5.97%) are women and 1 (1.58%) are men.

#### IV. Discussion

Hematological manifestations in Arthritis can be generally categorized into areas of anemia, thrombocytosis, neutropenia, thrombocytopenia, eosinophilia, and hematological malignancies. Anemia defined by the World Health Organization (WHO) as a hemoglobin concentration below 12 g/dl in women and 13 g/dl in men, is common in people with arthritis.<sup>12</sup> The significance of these findings is entirely dependent on the hemoglobin concentrations were measured in matched normal population. But in the developed countries the values indicate anemia in approximately 65% of women and 45% of men suffering from rheumatoid arthritis. The erythrocyte sedimentation rate (ESR) and hemoglobin concentration can correlate with disease activity and linked to hemoglobin content. But there is not usually a correlation with the duration of the disease.<sup>13</sup>

**Hemoglobin:** In this study, the majority of the patients had decreased hemoglobin level in both females as well as males. Present study shows 44.77% Female Arthritis patients and 33.32% male arthritis patients belongs to anemia. The result was close to that of Wilson A et al<sup>(14)</sup> who reported the anemia to be ranged of 33-66% among RA patients.<sup>(15)</sup> Other studies found higher prevalence which reached up to 70.6%. Zlateva et al<sup>(16)</sup> also stated that significant associated of arthritis with anemia. Swaak A et al<sup>(17)</sup> stated that estimated lifetime prevalence of anemia (hemoglobin, Hb, < 12 g/dl) was 51%, 34% in men and 58% in women. At lower cut-points (Hb < 11 g/dl) the prevalence is 20% in men and 33% in women. Refael Segal et al<sup>(18)</sup> also stated that frequency of anemia was high: 49%, 46%, and 35%, in Rheumatoid arthritis.

**Mean cell volume (MCV):** in our study it was found that, 53% patients had normal MCV, 36% patients had decreased and remaining 10% patients had increased MCV value. **Mean cell hemoglobin (MCH):** in this study 63.84% with normal MCH value, 19.23% patients found with low MCH value, and remaining 16.92% found with high MCH. **Mean cell hemoglobin concentration (MCHC):** in our study it was found that 62.30% patients had normal MCHC value, while 30% patients had increased value whereas 7.69% patients had decreased MCHC value. R. Arul et al<sup>(19)</sup> stated that MCV, Hb, MCH and MCHC have higher values in anemic patients than non-anemic patients. p value was significant.

#### V. Conclusion

Information on the impact of anemia in arthritis populations is also limited, although there is evidence that anemic RA patients have more severe arthritic disease than non-anemic patients. The prevalence of anemia among RA patients was comparable to that found in other studies and it was two times common than the normal healthy peoples. Anemia of chronic diseases was the most common type of anemia among RA patients.

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