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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ASSOCIATION OF MPV AND RDW WITH DISEASE ACTIVITY IN PATIENT WITH RHEUMATOID ARTHRITIS

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Abstract.

Introduction: Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by inflammation of the synovial joints. Disease activity assessment plays a crucial role in guiding treatment decisions and monitoring disease progression in RA patients. Thus, the current study examines the association between Mean Platelet Volume (MPV), Red Cell Distribution Width (RDW), and disease activity in RA patients.

Methods: A total of 100 patients were included following the inclusion and exclusion criteria. All participants underwent physical examination and laboratory tests. Disease activity was assessed using the Disease Activity Score 28 (DAS28).

Result: The cut-off levels for RDW and MPV were 14.8 and 11.25, respectively. However, a significant association was observed between RDW levels and DAS28, indicating that the group with RDW ≤14.8% displayed higher DAS compared to the RDW >14.8% group. Also, MPV levels did not exhibited statistically significant variations. RDW levels did not show significant disparities among patients with different comorbidities.

Conclusion: There is a significant correlation exists between RDW and disease activity in RA exists. Moreover, RDW can be utilized in clinical settings to monitor disease activity effectively. Since RDW is routinely included in standard blood tests, it is cost-effective and more convenient for treating RA cases.

Key words. Rheumatoid arthritis, disease activity, red cell distribution, mena.

Introduction.

Rheumatoid arthritis (RA) is a common autoimmune inflammatory disorder that significantly impacts the synovial joint lining, leading to increased disability, premature death, and significant socioeconomic challenges [1,2]. It affects 0.5–1% of adults, with a threefold higher prevalence in women than men [3]. This persistent inflammatory condition, of uncertain etiology, manifests as joint tenderness, swelling, and stiffness, causing gradual deterioration of cartilage and bone structure [4]. Around 40% of RA individuals experience extra-articular involvement, contributing to overall pain presentation. The pathogenesis of RA is intricately linked to various inflammatory molecules [5].

In rheumatological diseases, inflammatory reactions are pivotal, leading to changes in peripheral blood cell numbers, shapes, and sizes. Complete blood cell parameters can serve as indicators of inflammation and disease activity [6]. Recent studies have investigated the relationship between RA activity and hematological parameters [7]. Studies have shown an increase in platelet count during RA flare-ups, followed by a decrease during remission, suggesting a potential association between platelet indices and disease activity in RA [8].

In assessing RA activity, clinicians evaluate tender and swollen joint counts, acute-phase reactant levels, and receive global assessments from both patients and physicians. This comprehensive evaluation reliably predicts damage and physical disability, serving as a pivotal outcome measure in clinical studies for valuable insights into RA health outcomes [9]. The assessment, including painful joints and inflammatory markers, is crucial for determining the Disease Activity Score-28 (DAS28 CRP/ESR), a widely used severity index guiding treatment adjustments [1].

The authors have shown interest in detecting platelet-associated microparticles in the synovial fluid in the cases of RA to explore potential involvement of platelets in inflammation [10]. Peripheral thrombocytosis is a recognized complementary to inflammation in RA. Red cell distribution width (RDW) and mean platelet volume (MPV), are two hemogram measures, related to inflammation and inflammatory diseases [11]. Yet, the connection among them and the clinical indices measuring disease activity in RA remains undetermined. Moreover, findings from diverse studies concerning MPV levels in different inflammatory conditions exhibit inconsistency [12].

The relationship between RDW and MPV concerning the clinical disease activity indices of RA remains uncertain. While literature provides abundant data on the link between inflammation and RDW and MPV, their clinical utility is still a subject of controversy. Despite being cost-effective and easily accessible, the applicability of these parameters is inconsistent, with conflicting results from various studies on MPV levels in different inflammatory conditions [11,12]. Therefore, the research aimed to study the relationship between MPV and RDW with disease activity among individuals with RA.

The Function of MPV and RDW in Measuring RA Disease Activity:

A quantitative indicator of variation in the size of circulating red blood cells is the red cell distribution width, or RDW. RDW may be enhanced in inflammatory disorders such as RA because

of the premature destruction or defective maturation of red blood cells caused by increased production of inflammatory cytokines and oxidative stress. RDW may thus be a useful indicator of continued inflammation and disease activity in individuals with RA.

The average size of platelets in the blood is determined by the mean platelet volume, or MPV. Inflammatory processes may have an impact on the number and reactivity of platelets, which are essential for both inflammation and immunological responses. MPV readings may rise as a consequence of platelet activation and the release of bigger, more reactive platelets in RA due to the chronic inflammatory condition. High levels of MPV have been linked to a number of autoimmune and inflammatory diseases, indicating that MPV may represent disease activity in RA.

A common aspect of a complete blood count (CBC) test, which is an accessible and reasonably priced diagnostic procedure, measures both RDW and MPV. Clinicians may get important insights into the inflammatory state and disease activity in patients with RA by assessing these parameters in combination with other clinical examinations and disease activity scores, such as the Disease Activity Score-28 (DAS28).

But it's crucial to remember that there is a complicated link between RDW, MPV, and disease activity in RA that may be impacted by a number of variables, such as the existence of comorbidities, medication usage, and unique patient features. For this reason, it is essential to interpret these indicators within the framework of a thorough clinical examination in order to make appropriate choices about therapy and disease monitoring.

Materials and Methodology.

This cross-sectional study was conducted in Saveetha Medical College and Hospital between January 2023 to January 2024. The ethical approval was taken prior to initiating the study. The study involved a total of 100 patients.

Sample Size Calculation:

Calculating Sample Size:

The G*Power program (version 3.1.9.7) was used to determine the sample size for this investigation. The impact size for the association between RDW and disease activity (DAS28) in RA patients was calculated to be around 0.3, which is regarded as a medium effect size based on prior research by Atwa ET, et al. 82 individuals were found to be the minimum needed sample size, with an alpha level of 0.05 and a power of 0.8.

However, the research goal was to enlist a larger sample size in order to account for any dropouts or incomplete data. In the end, 100 individuals made up the research, which satisfied the minimal sample size criteria and had enough statistical power to find meaningful relationships between disease activity markers, RDW, and MPV.

Criteria of inclusion:

The study included patients who met the classification criteria for RA according to the ACR/EULAR 2010 guidelines.

Criteria of exclusion:

Patients diagnosed with other rheumatologic conditions, malignancies, endocrine disorders, or blood disorders that could potentially affect RDW and MPV were excluded.

Table 1. *Study Features of RA patients (n=100).*

Characteristics	**Mean ± SD**
Age	56.21 ± 15.41
Gender	No of cases
Female	68 (68.00%)
Male	32 (32.00%)
Laboratory Findings	**Mean ± SD**
RDW (%)	18.25 ± 2.1
MPV (fL (femtoliters))	13.26 ± 0.98
CRP (mg/L)	30.31 ± 32.24
ESR (mm/hr)	60.11 ± 35.45
DAS28	4.26 (1.8–7.56)
Duration of illness	**No of cases**
<1 Y	12
(1-3) Y	58
(4-6) Y	24
(7-10) Y	16
Total	100
Anti-ccp	**No of cases**
Yes	67 (67.00%)
No	33 (33.00%)

Table 2. *Analysis of RA patients based on RDW percentages levels.*

Characteristics	**RDW ≤14.8**	**RDW >14.8**	**t value**	**P value**
	Mean ± SD	**Mean ± SD**		
Age	55.39 ± 14.23	56.45 ± 12.92	-0.023	0.86
Gender (F: M)	38:14	30:18		
DAS28	3.9 (2.5–6.1)	4.1 (2.8–6.8)	4.1	0.0003
	Mean ± SD	**Mean ± SD**		
ESR	55.21 ± 35.32	63.53 ± 34.29	-0.68	0.42
CRP	28.65 ± 32.43	33.26 ± 29.22	-0.62	0.49
	No of cases	**No of Cases**		
<1 Yr	8	14		0.53
(1-3) Yrs	22	18		
(4-6) Yrs	12	10		
(7-10) Yrs	10	6		
	52	48		
Anti CCP				
Yes	30	38		0.02
No	22	10		

A complete medical history, with a thorough general and musculoskeletal examination, was conducted, followed by the assessment of disease activity the Disease Activity Score-28 (DAS28) with erythrocyte sedimentation rate (ESR).

The DAS28 scores were categorized as follows [13]:

DAS28 Score	**Activity Status of Disease**
< 2.6	Inactivity
2.6- 3.2	Low
3.2-5.1	Moderate
> 5.1	High

Laboratory investigations included Complete Blood Picture (CBC) with a differential cell count, C-reactive protein (CRP), ESR, hemoglobin, and rheumatoid factor (RF).

Results.

The average age of 100 RA patients was 56.21 ± 15.41 years, with gender distribution of 68% female and 32% male cases.

Laboratory findings revealed elevated levels, including RDW (18.25 ± 2.1), MPV (13.26 ± 0.98), CRP (30.31 ± 32.24), and ESR (60.11 ± 35.45), indicating inflammation. The (DAS28) demonstrated a moderate disease activity level with a mean value of 4.26 (1.8–7.56). The duration of illness varied, with 21.00 % having RA for less than 1 year, 58.00% for 1-3 years, 24.00% for 4-6 years, and 16.00% for 7-10 years. And a significant majority (67.00 %) of patients tested positive for Anti-CCP antibodies.

In this study comparing RDW levels in RA patients, no significant differences in age or gender were found between RDW ≤14.8% and RDW >14.8% groups. However, RDW ≤14.8% patients had higher DAS28 scores compared to RDW >14.8% patients (3.9 vs. 4.1, P = 0.0003). Inflammatory markers (ESR, CRP) showed no significant variations, but there was variability in illness duration distribution. The RDW >14.8% group had a higher prevalence of anti-CCP antibodies.

In this comparative investigation based on MPV levels, no significant differences were found in age and gender distribution. Also, there were no significant disparities in DAS28 between the two groups. The distribution of cases across different durations of illness showed some variability, but no consistent pattern emerged.

Table 4 revealed that there were no significant differences in RDW levels between patients with or without diabetes mellitus (DM), hypertension (HTN), and coronary artery disease (CAD). Similarly, MPV levels did not show statistically significant variations across these comorbidities. Specifically, for DM, HTN, and CAD, the t-tests for RDW and MPV did not yield significant p-values.

In medication usage, relation to RDW and MPV, the data indicates that there were 88 cases with the use of steroids and 12 cases without, showing no significant impact on RDW. Similarly, for MPV, there were 46 cases with steroid use and 8 cases without. In the case of (DMARDs), 100 cases were observed for both RDW and MPV.

The correlation analysis between RDW and MPV in RA patients revealed notable associations. There were no significant correlations between RDW and age or between MPV and age. A significant positive correlation was observed between RDW and disease activity (DAS). Both RDW and MPV showed positive correlations with inflammatory markers (ESR and CRP). Additionally, a positive correlation was found between RDW and CRP levels, indicating a relationship between elevated RDW and higher CRP levels. However, the correlation between MPV and CRP did not reach statistical significance.

Table 3. *Evaluations of RA patients according to MPV levels.*

Characteristics	**MPV≤11.25**	**MPV≥11.25**	**t value**	**P value**
	Mean ± SD	**Mean ± SD**		
Age=	54.24 ± 13.54	55.36 ± 14.21	-0.24	0.72
Gender (F: M)	39:13	29:19		
DAS28	3.5 (2.6-6.5)	3.8 (2.4-6.9)	0.32	0.81
	Mean ± SD	**Mean ± SD**		
ESR	32.12 ± 19.20	37.36 ± 21.5	-1.8	0.19
CRP	22.6 ± 23.3	16.41 ± 18.22	2.24	0.31
<1 Yr	9	18		0.08
(1-3) yrs	20	12		
(4-6) Yrs	10	11		
(7-10) Yrs	13	7		
	52	48		
Anti CCP	No of cases	No of Cases		
Yes	28	30		0.38
No	24	18		

Table 4. *Variation in RDW and MPV with different comorbidities.*

Comorbidities	**RDW**	**t, p value**	**MPV**	**t, p value**
DM	(Mean ± SD)		(Mean ± SD)	
No	15.63 ± 6.23 (64)	t =2.30, p=0.31	13.25 ± 4.41 (60)	t=0.32, p=0.81
Yes	17.53 ± 6.15 (36)		14.21 ± 3.2 (40)	
HTN				
No	16.41 ± 7.21 (76)	t= -0.52, p=0.71	14.24 ± 6.24 (72)	t= -0.69, p=0.58
Yes	15.36 ± 6.84 (34)		12.58 ± 4.98 (28)	
CAD				
No	16.21 ± 7.25 (88)	t = -0.91, p =0.96	13.37 ± 5.21 (82)	t= -1.23, p=0.33

Table 5. *Medication taken in RDW and MPV.*

Medications	**RDW**	**MPV**
Steroid	**No of cases**	**No of cases**
Yes	88	85
No	12	15
DMARDS	100	100

Table 6. *Associations of RDW (%) and MPV with Demographics, Disease Characteristics, and Laboratory Results.*

	RDW		**MPV**	
Variables	r	p	r	p
Age	0.062	0.82	0.042	0.83
DAS	0.67	0.0001	0.015	0.98
ESR	0.51	0.0049	0.32	0.021
CRP	0.49	0.042	0.25	0.063

Discussion.

Establishing RDW and MPV Cutoff Values:

Receiver operating characteristic (ROC) curve analysis was used to establish the cutoff values for RDW and MPV. A binary classifier system's diagnostic capacity is visually represented by a ROC curve, which plots the true positive rate (sensitivity) versus the false positive rate (1-specificity) at different threshold values.

The cutoff value for RDW was determined to be 14.8%. AUC (area under the ROC curve) was 0.72 at this threshold, suggesting a passable capacity to distinguish individuals with high and low disease activity (DAS28 score). At this threshold, the sensitivity and specificity were 68% and 64%, respectively.

Likewise, for MPV, 11.25 fL was shown to be the ideal cutoff threshold. With an AUC of 0.58, MPV seems to have little discriminating power when assessing disease activity. However, the sensitivity and specificity were 62% and 54%, respectively, at the cutoff of 11.25 fL.

For the purpose of further research and comparison of disease activity measurements and other factors, these cutoff values were used to divide the patient population into two groups.

Using ROC curve analysis to determine cutoff values is a commonly used, statistically sound technique. It facilitates the interpretation of test findings and their diagnostic or prognostic significance by assisting in the identification of threshold values that optimise the trade-off between sensitivity and specificity.

"In the utilization of medications in the context of MPV, the data shows that there were 85 cases with the application of steroids and 15 cases without."

Inflammatory processes in rheumatic diseases lead to alterations in peripheral blood cell counts, morphology, and sizes. As a result, blood cell indices are regarded as indicators of inflammation and markers of disease activity. Ratios among hematological indices have proven to be valuable tools for assessing inflammatory activity in different autoimmune conditions, such as ulcerative colitis and Familial Mediterranean Fever [14]. Therefore, the present study investigated the correlation between these RDW and MPV and disease activity in RA.

In the present study, the average age of patients diagnosed with RA was 56.21+ 15.41 years. Notably, 68% of these patients were female, while 32% were male. In a study conducted by Farouk AM et al. [8] the mean age of RA patients was reported as 50.40 + 11.94 years and 77.3% were females, whereas 22.7% were males. Similarly, in another study by Moghimi J et al. [15] the mean age was 49.5 ± 12.3 years. Whereas 85.0% of the participants in this study were female, while 15.0% were male. These findings consistently underscore a notable predominance of females among RA patients across various investigations.

In the present investigation, laboratory assessments revealed elevated levels indicative of inflammation, including RDW at 18.25 ± 2.1, MPV at 13.26 ± 0.98, CRP at 30.31 ± 32.24, and ESR at 60.11±35.45. The DAS28 reflected a moderate disease activity level, with a mean value of 4.26. Regarding the duration of illness, a spectrum was observed, with 21.00% of individuals having RA for less than 1 year, 58.00 % for 1-3 years, 24.00% for 4-6 years, and 16.00 % for 7-10 years. Notably, a substantial majority (67.00 %) of patients tested positive for Anti-CCP antibodies. In another research study by Sunar I et al. [9] the mean values for ESR and CRP were 25.0 ± 19.5 and 10.0 ± 13.5, respectively. The DAS28 aligned closely, indicating moderate disease activity with a mean of 3.3. Furthermore, the mean duration of disease was reported as 160.1 ± 99.9. These comparisons highlight consistent trends in inflammatory markers and disease activity levels among RA patients, though slight variations may exist across different studies.

In the current investigation, a significant correlation emerged between RDW levels and DAS28, where the group with RDW ≤14.8% exhibited higher DAS28 scores compared to the RDW >14.8% group (3.9 vs. 4.1, P = 0.0003). Additionally, a higher prevalence of anti- CCP antibodies was noted in the RDW >14.8% group. In a study by Atwa ET et al. [3] similar findings were reported, indicating that RA patients with RDW levels exceeding 14.85% showed significantly higher DAS28. Furthermore, RDW values were found to positively correlate with DAS28, ESR, and CRP in their study. However, unlike in the present investigation, no significant variations were observed in inflammatory markers (ESR, CRP).

Similar findings were observed in the study by Tecer D et al. [12], which also demonstrated a notable correlation between RDW and DAS28. A recent study by Hassan W et al. [16] revealed a significant association between RDW and disease activity markers, suggesting RDW's potential as a reflective marker of disease activity.

In the current study comparing MPV levels, no significant differences in DAS28 were observed between groups. ESR and CRP levels, showed numerical disparity with no statistical significance. Similarly, Etwa T et al. study found no significant correlation between MPV and disease activity markers.

Similar results were reported by Tecer D et al. [12] and Moghimi et al. Furthermore, the recent investigation by Hassan W et al. [16] also concluded the limited utility of MPV as a disease activity marker.

In the analysis of variations in RDW and MPV concerning different comorbidities, it was observed that RDW levels did not exhibit significant differences between patients with or without diabetes mellitus (DM), hypertension, and coronary artery disease. Similarly, MPV levels also did not show statistically significant variations across these comorbidities. Contrary to these findings, the study by Atwa ET et al. [3] found that anemia of chronic disease and iron deficiency anemia significantly influenced RDW, while they did not significantly affect MPV.

Medication usage was found to have no significant impact on RDW. The utilization of various medications did not affect RDW or MPV in the studied population [3]. However, it is noteworthy that anti-TNFa therapy led to a substantial increase in MPV throughout the study duration [17].

Conclusion.

The RDW potentially serves as a valuable indicator for assessing disease activity. RDW showed a strong correlation with disease activity, making it a practical and readily available tool since it is routinely assessed in complete blood counts without incurring extra costs. However, MPV did not show significant results as a reliable marker of disease activity in RA patients.

REFERENCES

1. Khaliq T, Shah SA, Iftikhar K. Novel Hematological Markers Neutrophil to Hemoglobin Lymphocytes Ratio and Platelets to Lymphocytes Ratio and its Association with the Disease Activity in Rheumatoid Arthritis: Heamtological Markers in Rheumatoid Arthritis. Foundation University Medical Journal. 2023;5:14-9.

2. Guo Q, Wang Y, Xu D, et al. Rheumatoid arthritis: pathological mechanisms and modern pharmacologic therapies. Bone Res. 2018;6:1-14.

3. Atwa ET, Omar HM, Amin A, et al. Red cell distribution width and mean platelet volume in rheumatoid arthritis patients: Its association with disease activity. Reumatologia clinica. 2022;18:399-405.

4. Scott DL, Symmons DP, Coulton BL, et al. Long-term outcome of treating rheumatoid arthritis: results after 20 years. Lancet. 1987;1:1108-1111.

5. Cakır L, Aktas G, Mercimek OB, et al. Are red cell distribution width and mean platelet volume associated with rheumatoid arthritis. Biomed Res. 2016;27:292-4.
6. Al-Osami MH, Awadh NI, Khalid KB, et al. Neutrophil/ lymphocyte and platelet/ lymphocyte ratios as potential markers of disease activity in patients with Ankylosing spondylitis: a case-control study. Adv Rheumatol. 2020;60:13.
7. Möller B, Scherer A, Förger F, et al. Anaemia may add information to standardised disease activity assessment to predict radiographic damage in rheumatoid arthritis: a prospective cohort study. Ann Rheum Dis. 2014;73:691-96.
8. Farouk AM, Abdel Rahman SM, Abou Elwafa MA, et al. Hematological parameters in rheumatoid arthritis and their relationship with disease activity. Ain Shams Medical Journal. 2023;74:493-503.
9. Sunar I, Garip Y, Yilmaz O, et al. Disease activity (rheumatoid arthritis disease activity index-5) in patients with rheumatoid arthritis and its association with quality of life, pain, fatigue, and functional and psychological status. Archives of Rheumatology. 2015;30.
10. Knijff-Dutmer EA, Koerts J, Nieuwland R, et al. Elevated levels of platelet microparticles are associated with disease activity in rheumatoid arthritis. Arthritis and rheumatism. 2002;46:1498-1503.
11. Gurler M, Aktas G. A review of the association of mean platelet volume and red cell distribution width in inflammation. Int J Res Med Sci. 2016;4:1-4.
12. Tecer D, Sezgin M, Kanık A, et al. Can mean platelet volume and red blood cell distribution width show disease activity in rheumatoid arthritis? Biomark Med. 2016;10:967-74.
13. Aletaha D, Ward MM, Machold KP, et al. Remission and active disease in rheumatoid arthritis: defining criteria for disease activity states. Arthritis & Rheumatism. 2005;52:2625-27.
14. Gasparyan AY, Ayvazyan L, Mukanova U, et al. The Platelet-to-Lymphocyte Ratio as an Inflammatory Marker in Rheumatic Diseases. Ann Lab Med. 2019;39:345-357.
15. Moghimi J, Ghahremanfard F, Salari M, et al. Association between mean platelet volume and severity of rheumatoid arthritis. The Pan African Medical Journal. 2017;27.
16. Hassan W, Elhanafi M, Eltanawy R, et al. AB0258 potential role of mean platelet volume and red blood cell distribution width as a biomarker for clinical and sonographic activity in rheumatoid arthritis patients. Ann Rheum Dis. 2019;78:1586.
17. Gasparyan AY, Sandoo A, Stavropoulos-Kalinoglou A, et al. Mean platelet volume in patients with rheumatoid arthritis: the effect of anti-TNF-therapy. Rheumatol Int. 2010;30:1125-9.