International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 15; Issue: 11; November 2025
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Diagnostic Utility of Monocyte Distribution Width (MDW) in Early Diagnosis of Sepsis - Beyond SOFA and SIRS

Rekha SR[1], Bonnie Anna George[2], Elizabeth Joseph[3]

[1]Post graduate, Department of Pathology, Believers Church Medical College, Kuttapuzha, Thiruvalla, India
[2]Assistant Professor, Department of Pathology, Believers Church Medical College, Kuttapuzha, Thiruvalla, India
[3]Professor, Department of Pathology, Believers Church Medical College, Kuttapuzha, Thiruvalla, India

Corresponding Author: Dr. Bonnie Anna George

DOI: https://doi.org/10.52403/ijhsr.20251130

ABSTRACT

Background: Sepsis remains a critical challenge due to high mortality and the limitations of traditional diagnostics, which are often slow (microbial culture) or lack specificity (CRP and Pro-calcitonin). Monocyte Distribution Width (MDW), an automated haematology cell analyzer generated parameter quantifying monocyte size variation, reflects early immune cell activation and cellular swelling (pyroptosis) during systemic infection. This study evaluated the diagnostic accuracy of MDW for early sepsis detection.
Methods: This hospital-based cross-sectional study included 153 adult intensive care unit (ICU) patients with clinical suspicion of sepsis and 100 healthy controls. Blood samples were collected at the time of clinical suspicion of sepsis for complete blood count, microbial culture, CRP and Pro-calcitonin. MDW was measured using Beckman Coulter Unicel DxH 900 analyzer. Diagnostic performance was evaluated using Area under the Curve (AUC), optimal cutoff determination, and correlation analysis against other biomarkers and the microbial culture gold standard.
Results: 104 patients were microbial culture-positive. Mean MDW was found to be significantly higher in culture-positive cases (26.35 ± 6.18) compared to culture-negative cases (17.79 ±1.69) and controls (16.27 ± 1.26) ($p< 0.001$). MDW showed excellent diagnostic performance (AUC = 0.969) with an optimal cut off of 20.655, achieving 90.4% sensitivity and 98.0%specificity. MDW demonstrated a strong positive correlation with CRP (r=0.597).
Conclusion: Monocyte Distribution Width is a reliable, rapid, and highly accurate early biomarker for sepsis, demonstrating almost perfect agreement with microbial culture (Kappa=0.843). As it is available from a standard complete blood count, integrating MDW into the initial laboratory workup can significantly enhance the speed and accuracy of sepsis diagnosis in the ICU.

Keywords: Sepsis, Monocyte Distribution Width, Hematology Analyser, Pro-calcitonin, C-reactive protein

INTRODUCTION

Sepsis, derived from the Greek word for putrefaction, has long been recognized as a common complication of wounds. Despite advancements in intensive care medicine and antimicrobial therapy, defining sepsis and early diagnoses remains challenging, and it continues to be a prevalent condition with high mortality rates.[1]

To diagnose sepsis, healthcare providers use various tests to identify the infection and assess the body's response. A complete blood count (CBC) reveals infection indicators like elevated white blood cells with increase in neutrophil counts and immature granulocyte precursors. Features favouring sepsis can be identified by morphological changes in neutrophils and monocytes under light microscopy, such as cell size, nucleus density, toxic granules and vacuolation. However, identifying these characteristics on a peripheral smear is subjective and requires microscopy expertise.[2-7]

Conventional biomarkers have been developed such as Lactate, C-reactive protein (CRP) and Pro-calcitonin (PCT) for early diagnosis of sepsis. Elevated Lactate, CRP and PCT levels signal poor oxygenation, inflammation, and bacterial infection. The gold standard of microbial culture for diagnosing sepsis has a drawback of delayed results of up to 72 hours, and the potential for false positives and false negatives due to contamination or prior antimicrobial treatment respectively. Combining these diagnostic tools enables timely sepsis detection and treatment, improving patient outcomes. However, the diagnostic accuracy of these tests has been disappointing. [8-12]

Monocytes are key components of the innate immune system which act early in infection defense along with neutrophils, eosinophils, basophils, γδ T cells, and natural killer cells. Monocytes recognize pathogen-associated molecular patterns (PAMPs) and damage-associated molecular patterns (DAMPs) through pattern recognition receptors (PRRs), triggering cytokine release (IL-1β, IL-18, TNF-α, IL-6) and morphological changes such as cell swelling and filopodia formation.

Recent advances in hematology analyzers have introduced Monocyte Distribution Width (MDW) as a rapid sepsis screening tool in ICU settings. Using Beckman Coulter's VCS technology, MDW reflects the standard deviation of monocyte volumes measured via electrical impedance. Elevated MDW indicates monocyte activation, cellular inflammation, and early pyroptotic changes, often preceding clinical signs of sepsis. Readily available within an hour from routine blood counts and visualized on the WBC scattergram (Fig. 1), MDW enables early sepsis detection and timely clinical intervention.[13-17]

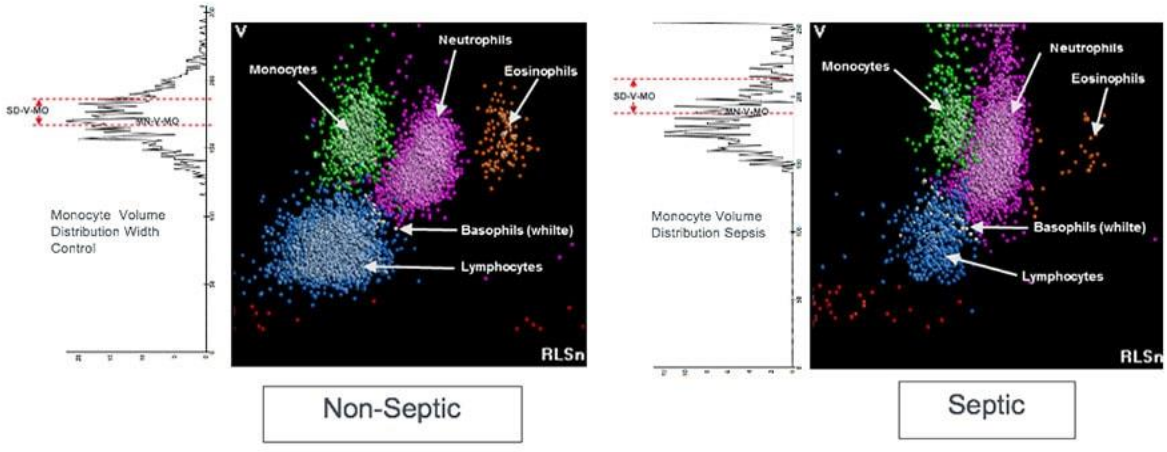

Figure 1. Analysis of cell population distribution. Representative histograms of white blood cell (WBC) populations are shown. (Left) Example from a non-septic donor. (Right) Two-dimensional histogram illustrating a patient with septic shock (adapted from Crouser et al., 2017). [17]

MATERIALS & METHODS

This cross-sectional study was conducted in the Medical Intensive care unit of Believers Church Medical College hospital, Kuttapuzha, Thiruvalla between June 2023 and December 2024.

Inclusion criteria: Cases included 153 adult patients with clinical suspicion of sepsis (meeting SOFA/SIRS criteria) and 100 apparently healthy volunteers as the control group.

Exclusion criteria: Samples from patients below 18 years, those with haematological malignancies, post-transplant patients, and inadequate blood sample volume.

STUDY PROCEDURE

Patients admitted to the Intensive Care Unit (ICU) fulfilling the inclusion and exclusion criteria for suspected sepsis were included in the study. Venous blood samples (2 mL) were collected in Ethylene diamine tetra acetic Acid (EDTA) anticoagulant tubes at the time of clinical suspicion of sepsis, along with samples for microbial cultures and other relevant investigations such as C-reactive protein (CRP) and Procalcitonin (PCT), as per ICU protocol. Monocyte distribution width (MDW) was measured for each case using the UniCel DxH 900 hematology analyzer, and peripheral smear examination was performed for morphological assessment. The obtained MDW values were compared with microbial culture results and serum biomarkers (CRP and PCT) to evaluate their diagnostic correlation in sepsis. All data were systematically entered and statistically analyzed to determine the relationship between MDW values, culture results, and conventional biomarkers.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) for Windows (Version 26.0, IBM Corp, Armonk, NY, USA). A One-way ANOVA was performed to compare MDW values across multiple groups, and post-hoc Tukey analysis was used to identify significant pairwise differences. The diagnostic performance of MDW for sepsis was evaluated by calculating sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). Receiver Operating Characteristic (ROC) curve analysis was carried out to assess the discriminative ability of MDW and to determine the optimal cut-off value. The association between microbial culture status (gold standard) and MDW-based classification was assessed using the Chi-square test, and Cohen's Kappa statistic was calculated to measure agreement between the two methods. Independent samples *t*-test was used to compare mean C-reactive protein (CRP) and Procalcitonin (PCT) levels between microbial culture-positive and culture-negative groups. Pearson's correlation coefficient was used to examine relationships between MDW, CRP, and PCT. All statistical tests were interpreted at a 95% confidence interval, and $p < 0.05$ was considered statistically significant.

RESULT

A total of 253 samples were included in the present study (Patients n=153, normal controls n=100). The patient group comprised of 103 males and 50 females whereas control group comprised of 65 males and 35 females. Of the 153 patients, 104 cases were microbial culture-positive and 49 cases were culture-negative. The mean age was significantly higher in the culture-positive group (68.5 ± 12.6 years) compared to controls (42.5 ± 8.3 years). Among the 104 culture-positive cases, respiratory infections were the most common cause of sepsis (33.8%), followed by urinary tract infections (13.1%), gastrointestinal-related (11.0%), and community-acquired pneumonia (10.3%) (Fig.1). In the culture positive cases, Gram-negative bacteria—specifically Escherichia coli (37.5%), Klebsiella pneumoniae (19.2%), and Pseudomonas aeruginosa

(5%)—were the most frequently identified organisms (Fig 2)

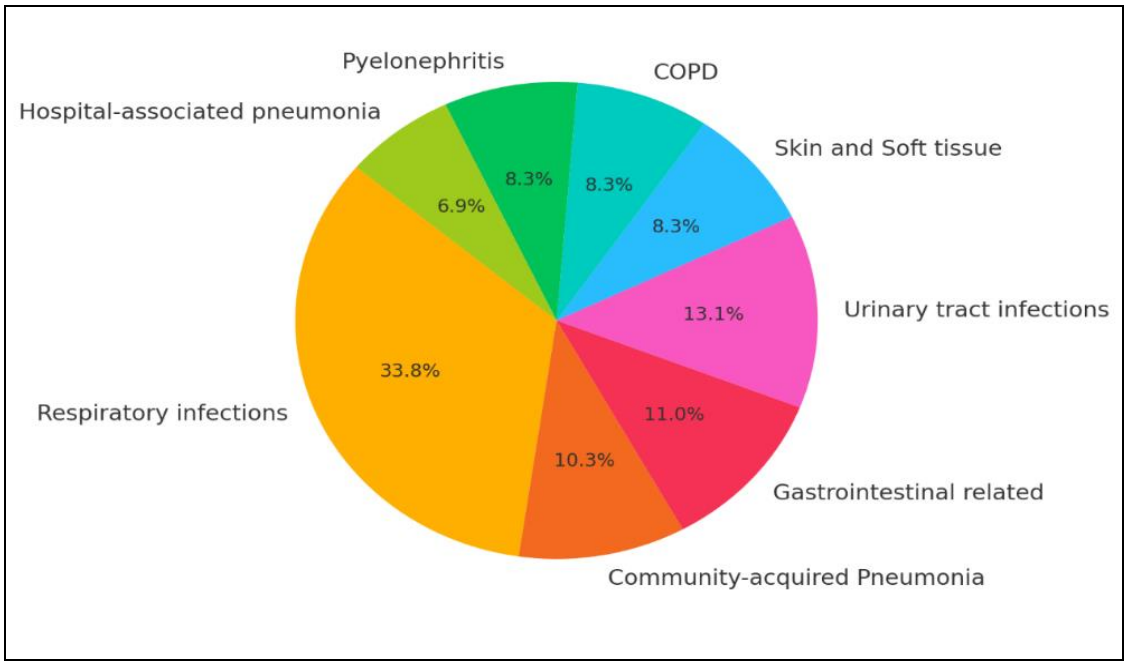

Figure: 1 Focus of sepsis in culture positive cases n=104.

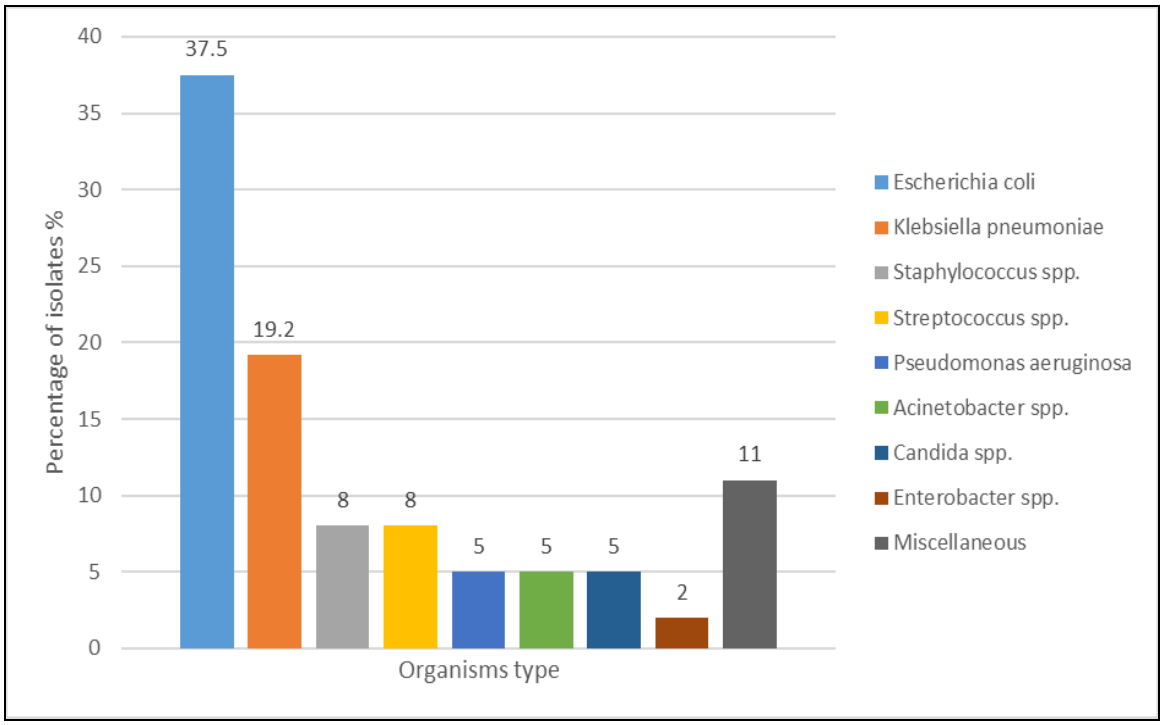

Figure 2 Distribution of organisms isolated from ICU cultures

Table 1. Overview of MDW Values, C-reactive protein and Pro-calcitonin Levels in Different Groups

Groups	**MDW (Mean ± SD)**	**CRP (mg/L) *(Ref < 10)***	**PCT (ng/mL) *(Ref < 0.05)***
Microbial Culture–positive (n = 104)	26.35 ± 6.18	128.96 ± 86.50	27.43 ± 30.45
Microbial Culture–negative (n = 49)	17.79 ± 1.69	23.01 ± 37.46	3.50 ± 4.40
Control group (n = 100)	16.27 ± 1.26	NA	NA

Mean MDW, CRP, and Pro-calcitonin levels were all significantly higher in the microbial culture-positive group compared to the culture-negative and control groups (Table .1)

Table 2. Post-hoc Tukey HSD Comparison of Monocyte Distribution Width (MDW) following One Way ANOVA Between Groups

Comparison	Mean Difference (I–J)	Std. Error	*p*-value	95% Confidence Interval (Lower–Upper)
Culture Positive vs Culture Negative	8.55	0.71	<0.001	6.87 – 10.23
Culture Positive vs Control	10.08	0.58	<0.001	8.72 – 11.44
Culture Negative vs Control	1.53	0.72	0.086	–0.16 – 3.22

A one-way ANOVA revealed a highly significant difference in MDW among the microbial culture positive, culture negative and control groups ($F = 168.145$, $p < 0.001$), indicating considerable variation in MDW. The post-hoc Tukey HSD analysis showed that MDW values were significantly higher in the culture-positive group compared to both the culture- negative group ($p < 0.001$) and the control group ($p < 0.001$). There was no significant difference between the culture-negative and control groups ($p = 0.086$) (Table 2).

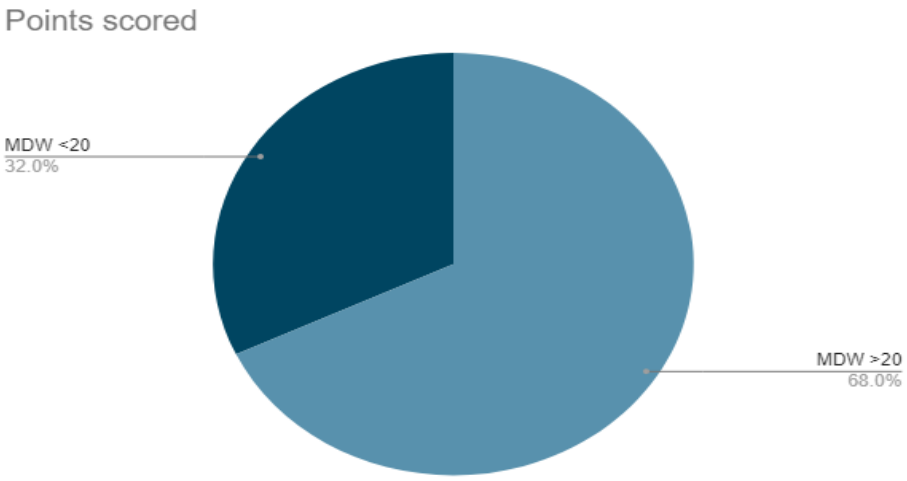

Figure: 3 MDW - diagnostic performance

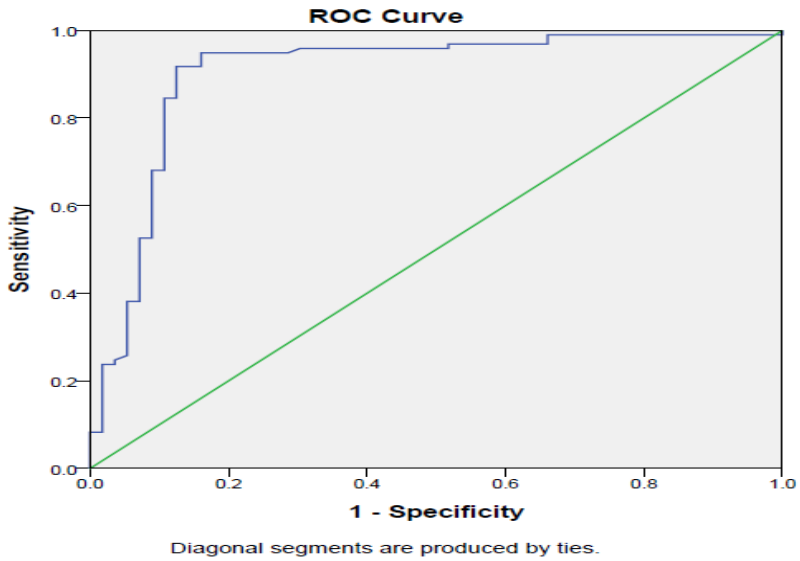

Figure: 4 MDW- Area under curve

ROC curve analysis determined an optimal MDW cutoff of >20.65 provided optimal diagnostic accuracy (AUC 0.969) (Fig 3,4), This cutoff of more than 20 yielded a high sensitivity (90.4%) and specificity (98.0%) (Fig 3,4 Table 3).

Table 3. Cross-Tabulation of MDW-Based Diagnosis vs Microbial Culture Results and diagnostic performance metrics

MDW-Based Diagnosis (MDW>20.65)	Microbial Culture Positive (n=104)	Microbial Culture Negative (n=49)	Total (n=153)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
Positive	94	1	95	90.4	98.0	98.9	82.8	92.8
Negative	10	48	58	—	—	—	—	—
Total (n)	104	49	153	—	—	—	—	—

Table 4. Association and Agreement between True Positive Microbial Culture Status and MDW-Based Diagnosis

Statistical Test / Measure	Value	df / N	Effect Size	p-value
Chi-Square (χ^2)	110.44	1 / 153	$\varphi = 0.85$	< .001
Pearson's Correlation (r)	0.85	—	—	< .001
Spearman's Correlation (ρ)	0.85	—	—	< .001
Cohen's Kappa (κ)	0.84	—	—	< .001

MDW-based diagnosis with cutoff >20.65 demonstrated high diagnostic performance compared with true microbial culture results. Sensitivity was 90.4%, specificity 98.0%, positive predictive value 98.9%, and negative predictive value 82.8%, yielding an overall diagnostic accuracy of 92.8% (Table 3). A chi-square test of independence revealed a significant association between true positive microbial culture status and MDW-based diagnosis, χ^2 (1, N = 153) = 110.44, $p < .001$, $\varphi = 0.85$, indicating a strong relationship between the two diagnostic methods. Consistent with this finding, both Pearson's ($r = 0.85$, $p < .001$) and Spearman's ($\rho = 0.85$, $p < .001$) correlations demonstrated a strong positive association between culture status and MDW-based diagnosis. Furthermore, a high level of diagnostic agreement was observed (Cohen's $\kappa = 0.84$, $p < .001$), indicating excellent concordance between the two methods (Table 4)

Procalcitonin levels were significantly higher in microbial culture-positive patients (M= 27.43 ± 30.45 ng/mL) compared with microbial culture-negative patients (M = 3.50 ± 4.40 ng/mL), t (151) = 5.47, p < .001, with a mean difference of 23.93 ng/mL (95% CI: 15.28 – 32.58) (Table 5). Additionally, a significant moderate positive correlation was observed between MDW and procalcitonin levels, r (153) = 0.396, p < .001, suggesting that higher MDW values are associated with higher PCT concentrations (Figure 5).

C-Reactive protein (CRP) levels were significantly higher in culture positive cases(128.96±86.51mg/L) than in culture negative cases (23.01±37.46 mg/L). A t-test (t=8.207, p<0.001) confirmed a highly significant difference, with a mean difference of 105.94mg/L. (Table 6). Pearson's correlation demonstrated a strong correlation observed between MDW and CRP (r=0.597, p<0.001), (Fig 6, Table 6)

	Group / Variables	***n***	**Mean (ng/mL)**	**SD**	***t***	***df***	***p***	**Mean Difference (ng/mL)**	**95% CI for Difference**	***r***	**Sig. (2-tailed)**
PCT	Culture (+)	104	27.43	30.45	5.47	151	< 0.001	23.93	15.28 – 32.58	—	—
	Culture (–)	49	3.50	4.40						—	—
Pearson's Correlation Analysis	MDW vs. PCT	153	—	—	—	—	< 0.001	—	—	0.396	< 0.01

Table 5. Comparison of Procalcitonin Levels by microbial Culture Status and Correlation with MDW

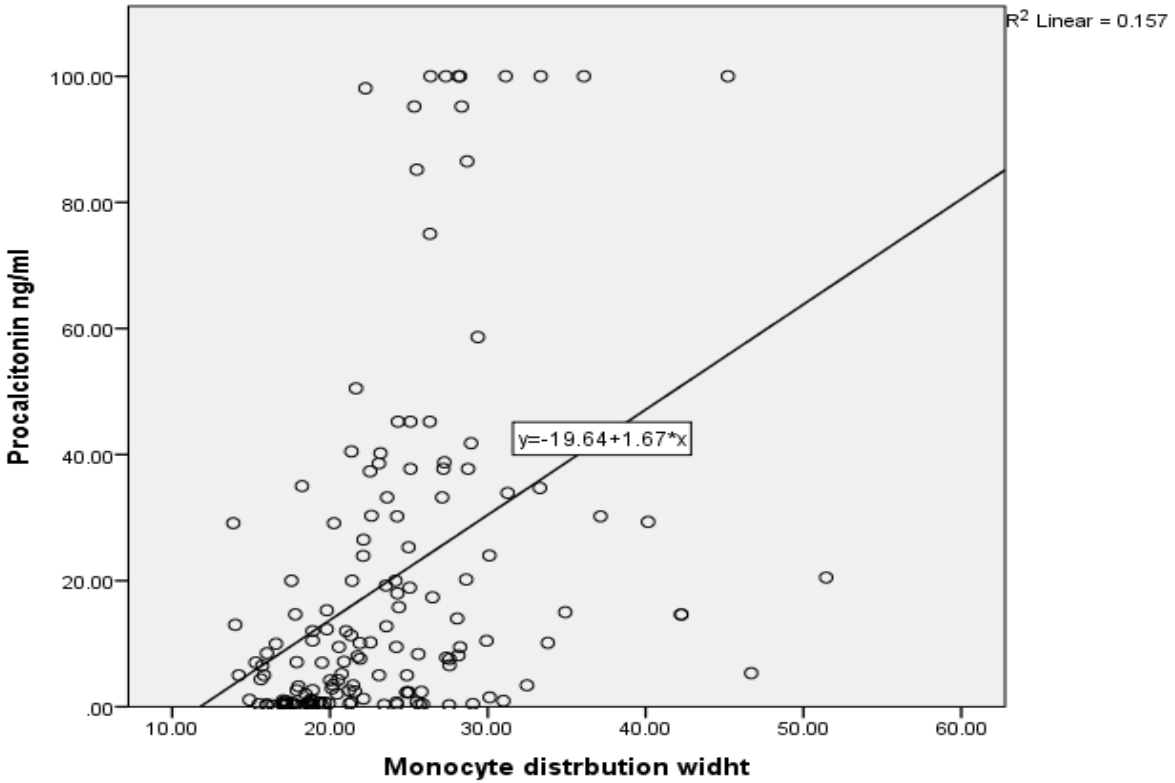

Figure 5. Correlation between Monocyte Distribution Width (MDW) and Procalcitonin (PCT) Levels in Sepsis Detection.

Parameter	**Group / Variables**	***n***	**Mean (mg/L)**	**SD**	***t***	***df***	***p***	**Mean Difference (mg/L)**	**95% CI for Difference**	***r***	**Sig. (2-tailed)**
CRP	Culture (+)	104	128.96	86.5	8.2	151	< 0.001	105.94	80.44 – 131.45	—	—
	Culture (–)	49	23.01	37.5						—	—
Pearson's Correlation Analysis	MDW vs. CRP	153	—	—	—	—	< 0.001	—	—	0.597	< 0.01

Table 6. Comparison of C reactive protein levels by microbial culture status and Correlation with MDW

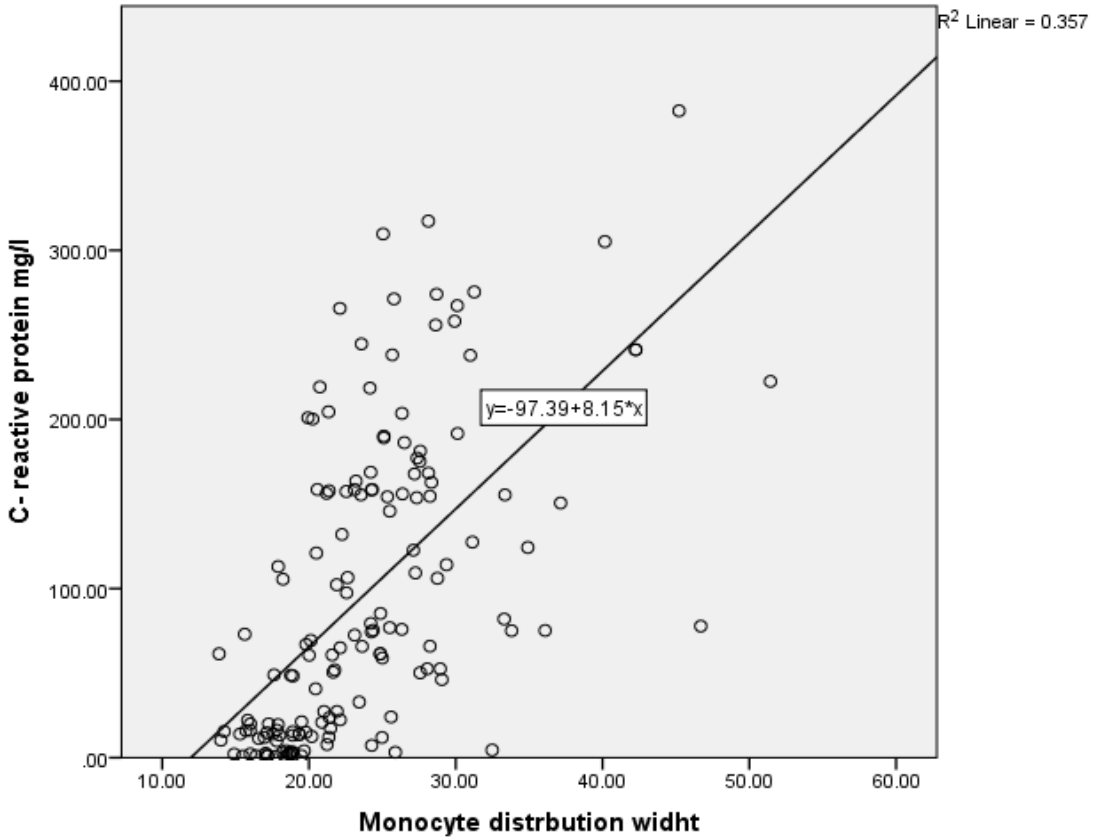

Figure 6. Correlation between Monocyte Distribution Width (MDW) and C - reactive protein Levels in Sepsis Detection

DISCUSSION

This cross-sectional study evaluated Monocyte distribution width in ICU patients with confirmed sepsis (n=104), culture-negative patients (n=49), and healthy controls (n=100). The mean age was significantly higher in the culture-positive group (68.5 ± 12.6 years) compared to controls (42.5 ± 8.3 years), while gender distribution showed no significant differences across groups. Respiratory infections, particularly pneumonia, were the most frequent source of sepsis (33.8%), followed by urinary (13.1%) and gastrointestinal infections (11.0%). Gram-negative bacteria, predominantly Escherichia coli (37.5%), Klebsiella Pneumoniae(19.2%), and Pseudomonas aeruginosa (5%) were the most commonly isolated pathogens.

This study demonstrated significant differences in Monocyte Distribution Width (MDW) values across culture-positive, culture-negative, and control groups, with the culture-positive group showing markedly higher MDW levels (26.35 ± 6.18) compared to the culture-negative (17.79 ± 1.69) and control groups (16.27 ± 1.26). A one-way ANOVA revealed a highly significant difference among the three groups ($F = 168.145$, $p < 0.001$), and post-hoc Tukey HSD analysis confirmed that MDW was significantly elevated in culture-positive individuals compared to both culture-negative and controls ($p< 0.001$), and no significant difference was observed between the culture-negative and control groups ($p = 0.086$). The diagnostic performance analysis demonstrated that MDW possessed excellent discriminatory ability, with an AUC of 0.969. The optimal cutoff value of 20.655 yielded high sensitivity (90.4%) and specificity (98.0%), along with strong positive predictive value (~90%) and negative predictive value (~98%). These findings indicate that MDW is a highly reliable parameter for accurately identifying both positive and negative cases. A kappa coefficient of 0.843 demonstrated an almost perfect concordance between MDW-based diagnosis and culture-confirmed cases, further supporting the reliability of MDW as a diagnostic marker ($p < 0.001$). These findings suggest MDW as a reliable biomarker for detecting infection, particularly in microbial culture-positive cases.

Pro-calcitonin levels were significantly higher in microbial culture-positive cases (27.43± 30.45 ng/ml) compared to culture-negative cases (3.50 ± 4.40 ng/ml). A t-test confirmed a highly significant difference, ($t = 5.465$, $p < 0.001$) with a mean difference of 23.93 ng/ml (95% CI: 15.28–32.58). MDW showed a moderate positive correlation with Pro-calcitonin ($r = 0.396$, $p < 0.001$), suggesting both biomarkers rise together in infection or inflammation but are not direct substitutes.

C-reactive reactive protein (CRP) levels were significantly higher in microbial culture positive cases (128.96 ± 86.51 mg/L) than in culture-negative cases (23.01 ±37.46 mg/L). A t-test ($t = 8.207$, $p < 0.001$) confirmed a highly significant difference, with a mean difference of 105.94 mg/L (95% CI: 80.44–131.45). A strong correlation was observed between MDW and CRP ($r = 0.597$, $p <0.001$), indicating CRP aligns more closely with MDW changes.

Comparable results have been reported by several researchers. Agnello et al. found that MDW levels were significantly elevated in sepsis patients compared to other groups ($p < 0.001$), with an AUC of 0.964 and an optimal cutoff of 23.5, yielding a sensitivity of 92.0% and specificity of 92.9%, demonstrating excellent diagnostic accuracy for sepsis prediction.[14]

Meraj et al. similarly reported an optimal cutoff value of 20.24 for detecting sepsis, closely aligning with the findings of this study. [15]

Pollili et al. identified an MDW threshold of ≥22 as a useful laboratory biomarker, indicating an almost four-fold increased risk of sepsis with an NPV of 97%, supporting MDW's role in ruling out sepsis at

presentation—findings consistent with our results. [16]

Crouser et al. observed that an initial MDW >20.0%, compared to <20.0%, was significantly associated with increased sepsis incidence, independent of SIRS or qSOFA criteria, which concurs with the present study's results showing a strong relationship between elevated MDW and sepsis presence.[17]

Furthermore, Sun et al. reported that MDW had a diagnostic AUC of 0.82, comparable to CRP (0.78) and PCT (0.82); at a cutoff of 25.25, it achieved a sensitivity of 83%, specificity of 76%, PPV of 44%, and NPV of 95%.[18]

Collectively, these findings from previous studies strongly corroborate our results, underscoring MDW as a highly effective and reliable biomarker for infection and sepsis diagnosis.

CONCLUSION

Early detection of sepsis is critical to prevent organ failure and death, yet traditional methods like microbial cultures are often slow and inconclusive. This study shows that Monocyte Distribution Width (MDW) >20, measured via automated hematology analyzers, is a reliable biomarker with high sensitivity (90.4%) and specificity (98.0%) for sepsis diagnosis. MDW complements established markers such as CRP and PCT, and incorporating these parameters into routine protocols could improve early detection and timely intervention, enhancing patient outcomes.

However, the cross-sectional design limits causal inference and long-term evaluation. Confounding factors, including comorbidities and medications, may influence biomarker levels. Additionally, MDW is available only on select analyzers and is not part of standard complete blood counts, restricting its utility to specialized tertiary care centers.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Evans T, Diagnosis and management of sepsis, Clin Medicine, 2018; 18 (2): 146-149, doi: 10.7861/clinmedicine.18-2-146.
2. Guarino M, Perna B, Cesaro AE, Maritati M, Spampinato MD, Contini C, De Giorgio R. 2023 Update on Sepsis and Septic Shock in Adult Patients: Management in the Emergency Department. J Clin Med. 2023 Apr 28;1(9):3188. doi:10.3390/jcm12093188. PMID: 37176628; PMCID: PMC10179263.
3. Lever A, Mackenzie I. Sepsis: definition, epidemiology, and diagnosis. BMJ. 2007 Oct 27;335(7625):879-83. doi: 10.1136/bmj.39346.495880.AE.PMID: 17962288; PMCID: PMC2043413.
4. Huang M; Cai S, Su, J. The Pathogenesis of Sepsis and Potential Therapeutic Targets. Int. J. Mol. Sci. 2019;20: 5376. https://doi.org/10.3390/ijms20215376.
5. Tang BM, Huang SJ, McLean AS. Genome-wide transcription profiling of Human sepsis: a systematic review. Crit Care.2010;14(6): R237.doi: 10.1186/cc9392. Epub 2010 Dec 29. PMID: 21190579; PMCID: PMC3219990.
6. Tamayo E, Fernández A, Almansa R, Carrasco E, Heredia M, Lajo C, Goncalves L, Gómez-Herreras JI, de Lejarazu RO, Bermejo-Martin JF. Pro- and anti-inflammatory responses are regulated simultaneously from the first moments of Septic shock. Eur Cytokine Netw. 2011 Jun;22(2):82-7. doi: 10. 1684/ ecn. 2011.0281. PMID: 21628135.
7. Hotchkiss RS, Moldawer LL, Opal SM, Reinhart K, Turnbull IR, Vincent JL. Sepsis and septic shock. Nat Rev Dis Primers. 2016 Jun 30; 2:16045. doi: 10.1038/nrdp.2016.45. PMID: 28117397; PMCID: PMC5538252.
8. Andaluz-Ojeda D, Bobillo F, Iglesias V, Almansa R, Rico L, Gandía F, Resino S, Tamayo E, de Lejarazu RO, Bermejo-Martin JF. A combined score of pro- and Anti-inflammatory interleukins improves mortality prediction in severe sepsis. Cytokine. 2012 Mar;57(3):332-6. doi:

10.1016/j.cyto.2011.12.002. Epub 2011 Dec 23. PMID: 22197776.
9. Chaudhry H, Zhou J, Zhong Y, Ali MM, McGuire F, Nagarkatti PS, Nagarkatti M. Role of cytokines as a double-edged sword in sepsis. In Vivo. 2013 Nov-Dec;27(6):669-84. PMID: 24292568; PMCID: PMC4378830.
10. Daix T, Guerin E, Tavernier E, Mercier E, Gissot V, Hérault O, etal Multicentric Standardized Flow Cytometry Routine Assessment of Patients with Sepsis to Predict Clinical Worsening. Chest. 2018 Sep;154(3):617-627. doi: 10.1016/j.chest.2018.03.058. Epub 2018 Apr 26. PMID: 29705219.
11. Nierhaus A, Klatte S, Linssen J, Eismann NM, Wichmann D, Hedke J, Braune SA, Kluge S. Revisiting the white blood cell count: immature granulocytes Count as a diagnostic marker to discriminate between SIRS and sepsis—a Prospective, observational study. BMC Immunol. 2013 Feb 12; 14:8. doi: 10. 1186/1471-2172-14-8. PMID: 23398965; PMCID: PMC3575223.
12. Rubio I, Osuchowski MF, Shankar-Hari M, Skirecki T, Winkler MS, Lachmann G, et al. Current gaps in sepsis immunology: new opportunities for translational Research. Lancet Infect Dis. (2019) 19: e422–e36. 10.1016/S1473-3099(19) 30567-5
13. Esposito JE, D'Amato M, Parruti G, Polilli E. Monocyte distribution width for sepsis diagnosis in the emergency department and intensive care unit: a systematic review and meta-analysis. Int J Mol Sci. 2025;26(15):7444. doi:10.3390/ijms26157444.
14. Agnello L, Giglio RV, Bivona G, Scazzone C, Gambino CM, Iacona A, Ciaccio AM, Lo Sasso B, Ciaccio M. The Value of a Complete Blood Count (CBC) for Sepsis Diagnosis and Prognosis. Diagnostics (Basel). 2021 Oct 12;11(10):1881. doi: 10.3390/diagnostics11101881. PMID: 34679578; PMCID: PMC8534992.
15. Meraj F, Shaikh S, Maqsood S, Kanani F, Khan H, Jamal S. Monocyte Distribution Width, a Novel Biomarker for Early Sepsis Screening and Comparison with Procalcitonin and C-Reactive Protein. J Lab Physicians. 2023 Jan 18;15(2):294-299. doi: 10.1055/s-0042-1758666. PMID: 37323592; PMCID: PMC10264128.
16. Polilli E, Sozio F, Frattari A, Persichitti L, Sensi M, Posata R, Di Gregorio M, Sciacca A, Flacco ME, Manzoli L, Di Iorio G, Parruti G. Comparison of Monocyte Distribution Width (MDW) and Procalcitonin for early recognition of Sepsis. PLoS One. 2020 Jan 10;15(1): e0227300. doi: 10.1371/ journal. pone.0227300. PMID: 31923207; PMCID: PMC6953886. 146
17. Crouser ED, Parrillo JE, Seymour C, Angus DC, Bicking K, Tejidor L, Magari R, Careaga D, Williams J, Closser DR, Samoszuk M, Herren L, Robart E, Chaves F. Improved Early Detection of Sepsis in the ED with a Novel Monocyte Distribution Width Biomarker. Chest. 2017 Sep;152(3):518-526. doi: 10.1016/j.chest.2017.05.039. Epub 2017 Jun 15. PMID: 28625579; PMCID: PMC6026271.
18. Sun J, Shao Y, Jiang R, Qi T, Xun J, Shen Y, et al Monocyte distribution width (MDW) as a reliable diagnostic biomarker for sepsis in patients with HIV. Emerg Microbes Infect. 2025 Mar 17:2479634. doi: 10.1080/ 22221751. 2025.2479634. Epub ahead of print

How to cite this article: Rekha SR, Bonnie Anna George, Elizabeth Joseph. Diagnostic utility of monocyte distribution width (MDW) in early diagnosis of sepsis - beyond SOFA and SIRS. *Int J Health Sci Res.* 2025; 15(11):244-254. DOI: *https://doi.org/10.52403/ijhsr.20251130*

******