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Research Article

A Comparative Study Of Complete Blood Count (Cbc) Parameters In Young Males And Young Females At Tertiary Health Care Hospital

Anit D. Rokade[1*], Sunita M. Handergulle[2], Sunita S. Dhule[3]

[1]Junior Resident, Department of Physiology, Swami Ramanand Teerth Rural Government Medical College. Ambajogai, Maharashtra, India.

[2]Professor & HOD, Department of Physiology, Swami Ramanand Teerth Rural Government Medical College. Ambajogai, Maharashtra, India.

[3]Associate Professor, Department of Physiology, Swami Ramanand Teerth Rural Government Medical College. Ambajogai, Maharashtra, India.

Correspondence:
Dr. Anit Rokade.

Email: dra.rokade@gmail.com

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Abstract: Background: Complete blood count parameters vary with biological and population characteristics, including sex. Understanding these differences may improve the interpretation of haematological measurements in young adults. Aim: To compare complete blood count parameters between young males and young females at a tertiary health care hospital. ***Materials and Methods***: A hospital-based analytical cross-sectional comparative study was described at the Department of Physiology, S.R.T.R. Government Medical College and Hospital, Ambajogai, over approximately 12 months. The proposed sample comprised 142 apparently healthy adults aged 18-30 years, including 71 males and 71 females. Clinical information and anthropometric measurements were recorded using a structured proforma. Venous blood collected in EDTA tubes was analysed using an automated haematology analyser. Continuous variables were expressed as mean and standard deviation. Between-group comparisons used Welch's independent-samples t-test, with mean differences and 95% confidence intervals. Statistical significance was assessed at α=0.05, with Holm adjustment for secondary CBC comparisons. ***Results***: In the illustrative analysis, males had higher haemoglobin than females (14.60 ± 1.10 versus 12.70 ± 1.20 g/dL; mean difference: 1.90 g/dL; 95% CI: 1.52-2.28; p<0.001). RBC count (5.03 ± 0.42 versus 4.46 ± 0.39 $\times 10^6$/µL) and haematocrit (43.80 ± 3.40% versus 38.20 ± 3.60%) were also higher in males (both p<0.001). Females had higher platelet counts (276.00 ± 57.00 versus 248.00 ± 51.00 $\times 10^3$/µL; p=0.002) and RDW-CV (13.70 ± 1.10% versus 13.10 ± 0.90%; p=0.001). These secondary differences remained significant after Holm adjustment. Total leukocyte count, MCV, MCH, MCHC, MPV and PDW did not differ significantly. ***Conclusion***: The illustrative comparisons showed higher erythrocyte-related measurements in males and higher platelet count and RDW in females. These patterns support sex-aware CBC interpretation but require confirmation using actual participant data and appropriate consideration of confounding factors.

Keywords: Complete blood count; Sex differences; Young adults.

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INTRODUCTION

The complete blood count (CBC) is a commonly performed laboratory investigation that provides information about erythrocytes, leukocytes and platelets. Its parameters assist in evaluating anaemia, infections and haematological disorders and in assessing general health. However, interpreting CBC results requires consideration of biological variation, particularly differences associated with age and sex. Adeli et al. (2015) [1] demonstrated substantial age- and sex-related variation in haematological parameters, with lower haemoglobin and haematocrit values in females emerging from puberty. Their findings supported the use of appropriately partitioned reference intervals for interpreting laboratory results.

Differences between males and females are particularly evident in haemoglobin concentration, red blood cell count and haematocrit. In a multicentre study, Wu et al. (2015) [2] reported higher values of these parameters in males across the age groups examined. They also identified geographical variation in platelet counts, demonstrating that population characteristics can influence CBC interpretation. Consequently, findings from one population cannot automatically be applied to another without considering local demographic and environmental conditions.

Biological variability also needs consideration when comparing haematological measurements. Gupta et al. (2020) [3], studying healthy individuals from a South Asian population, identified differences in between-subject variation for several CBC parameters and sex-related differences in haemoglobin, erythrocyte count and haematocrit. These observations highlight the importance of consistent participant selection and standardised measurement procedures when investigating differences between groups.

Indian studies provide further evidence supporting population-specific assessment. Ganie et al. (2024) [4] evaluated haematological indices among apparently healthy reproductive-age women recruited from six geographical zones of India. They reported differences between the derived reference intervals and commonly used values, emphasising the relevance of locally representative data. More recently, Goel et al. (2025) [5] examined haematological reference ranges among healthy Indian blood donors, further the importance of population characteristics in laboratory interpretation.

AIM

To compare complete blood count parameters between young males and young females at a tertiary health care hospital.

OBJECTIVES

1. To compare haemoglobin, red blood cell count, haematocrit, MCV, MCH, MCHC and RDW between young males and young females.
2. To compare total leukocyte count between young males and young females.
3. To compare platelet count, mean platelet volume and platelet distribution width between young males and young females.

MATERIALS AND METHODS

Source of Data

Data were obtained from apparently healthy young male and female volunteers recruited from the population attending or associated with S.R.T.R. Government Medical College and Hospital, Ambajogai. Participants were screened through clinical history and physical examination before enrolment. Information was collected directly from participants using the structured case record form, and CBC measurements were obtained from their venous blood samples. Both groups were recruited from the same source population to reduce selection differences.

Study Design

The study was conducted as a hospital-based, analytical cross-sectional comparative study. Participants were categorised into male and female groups, and their CBC parameters were assessed at a single study visit. No therapeutic intervention or follow-up assessment was included.

Study Location

The study was conducted in the Department of Physiology, S.R.T.R. Government Medical College and Hospital, Ambajogai, District Beed, Maharashtra, with laboratory support from the institutional haematology laboratory.

Study Duration

Participant recruitment and data collection were conducted over approximately 12 months.

Sample Size

The sample size was estimated for comparing two independent means with equal allocation between males and females. Haemoglobin concentration was selected as the primary outcome for sample-size planning.

A recruitment target of 71 participants per group was selected, giving a total target of 142 participants: 71 males and 71 females.

Sampling Method

Consecutive eligible volunteers were recruited until the required number in each sex group was reached. Screening was performed using the same eligibility criteria and procedures for both groups. Reasons for exclusion and non-participation were recorded.

Inclusion Criteria

Participants were included if they:

1. Were males or females aged 18-30 years.
2. Were apparently healthy on clinical history and physical examination.
3. Provided written informed consent.
4. Were willing to undergo venous blood sampling and provide the required clinical information.

Exclusion Criteria

Participants were excluded if they had:

1. A known haematological disorder, including previously diagnosed anaemia, haemoglobinopathy, bleeding disorder or haematological malignancy.
2. An acute febrile illness, clinically evident infection or inflammatory illness within the preceding two weeks.
3. A known chronic systemic condition likely to affect blood counts, including chronic kidney disease, chronic liver disease, autoimmune disease or malignancy.
4. Pregnancy or ongoing lactation.
5. Blood donation, blood transfusion, major surgery or significant non-menstrual blood loss within the preceding three months.
6. Current treatment likely to alter blood counts, including haematinics, systemic corticosteroids, cytotoxic drugs, erythropoietin or hormonal therapy.
7. Current smoking or smokeless tobacco use.
8. An inability or unwillingness to provide informed consent.

An invalid specimen was treated as a specimen-quality problem, and repeat collection was attempted with consent. Participants were not excluded solely because an otherwise valid study CBC result was outside the laboratory reference interval.

Procedure and Methodology

Potential participants were informed about the purpose of the study, the examination and blood collection procedures, confidentiality and their right to withdraw. Written informed consent was obtained before study procedures. Each participant was assigned a unique identification number.

A detailed history was recorded, including age, sex, occupation, dietary pattern, recent illness, medication and supplement use, smoking, other addictions, previous blood donation or transfusion, and relevant personal and family history. Among female participants, menstrual regularity, the date of the last menstrual period, duration of bleeding and a history suggestive of heavy menstrual bleeding were recorded. Menstrual status at blood collection was documented.

Resting pulse rate, blood pressure and respiratory rate were recorded. Cardiovascular, respiratory, abdominal and neurological examinations were performed to identify clinically evident disease.

Participants rested in a seated position for approximately 15 minutes before blood collection. Collection conditions and timing were kept as consistent as practicable across both groups. Recent vigorous exercise and other factors likely to influence results were documented. Approximately 2-3 mL of venous blood was collected under aseptic precautions into an appropriately sized K_2-EDTA tube filled to its specified volume.

Haemoglobin was treated as the primary comparison outcome. The remaining CBC parameters were treated as secondary outcomes.

Sample Processing

Immediately after collection, tubes were gently inverted according to the manufacturer's instructions to mix blood with the anticoagulant. Each sample was labelled with the participant's identification number and collection time. Samples were transported promptly to the laboratory and analysed within a standardised interval, preferably within two hours, to minimise storage-related variation, particularly in platelet indices. Storage time and temperature can affect haematological measurements.

The following parameters were recorded:

Parameter	Reporting unit
Haemoglobin	g/dL
Red blood cell count	$\times 10^6/\mu L$
Haematocrit/packed cell volume	%
Mean corpuscular volume	fL
Mean corpuscular haemoglobin	pg
Mean corpuscular haemoglobin concentration	g/dL
Red cell distribution width, RDW-CV	%
Total leukocyte count	cells/µL
Platelet count	$\times 10^3/\mu L$
Mean platelet volume	fL
Platelet distribution width	Analyser-specific unit: fL or %

Platelet counts recorded in lakhs/µL on the case record form were converted consistently when required; 1 lakh/µL equalled 100 $\times 10^3/\mu L$. The PDW unit was taken directly from the analyser report rather than assumed from the printed form.

Internal quality-control materials were analysed according to laboratory procedures, and participant results were accepted only after satisfactory quality-control performance. Samples were checked for identification errors, inadequate filling, clotting and visible haemolysis. Flagged results were reviewed, and peripheral blood smear examination or repeat analysis was

performed when indicated. Persistently invalid samples were documented as unavailable rather than assigned estimated results.

Data Collection

Data were recorded in the supplied structured case record form and subsequently entered into a password-protected electronic database. The dataset included demographic details, clinical history, menstrual history where applicable, anthropometric measurements, vital signs, examination findings and CBC results.

Collection and analysis times, specimen-quality issues and repeat testing were also documented. Electronic entries were checked against the original forms and laboratory reports. Identifiable information was stored separately from the analytical dataset, and access was restricted to the research team.

Statistical Methods

Data were analysed using [insert statistical software and version actually used]. Continuous variables were summarised as mean and standard deviation when approximately normally distributed, or as median and interquartile range when substantially skewed. Categorical variables were expressed as frequencies and percentages.

Distributional assumptions were assessed using histograms, Q-Q plots and the Shapiro-Wilk test. Male-female differences in approximately normally distributed continuous outcomes were assessed using Welch's independent-samples t-test. Results were reported as the mean difference, calculated as male minus female, with its 95% confidence interval, t statistic, degrees of freedom and p value.

Markedly skewed outcomes were compared using the Mann-Whitney U test. The U statistic and p value were reported with group medians and interquartile ranges; this test was interpreted as a comparison of distributions rather than automatically as a test of medians.

Categorical variables were compared using the chi-square test or Fisher's exact test, depending on expected cell frequencies. Age and BMI were considered as potential confounders in a prespecified linear regression analysis of haemoglobin, with sex as the main explanatory variable. Regression assumptions were checked, and adjusted coefficients were reported with 95% confidence intervals.

The primary haemoglobin comparison was evaluated using a two-sided significance level of $\alpha = 0.05$. The remaining ten CBC comparisons were treated as secondary, with Holm adjustment applied to account for multiple testing. Unadjusted and adjusted p values were distinguished clearly.

Missing observations were quantified, and the number analysed for each parameter was reported. No simple mean substitution was used. Statistical significance was interpreted alongside the magnitude and precision of the observed differences. Findings were not presented as definitive reference intervals or proof that sex alone caused the observed differences.

Ethical Considerations

The study was conducted after obtaining Institutional Ethics Committee approval. Written informed consent was obtained from all participants in a language they understood. Participation was voluntary, and withdrawal did not affect access to medical care. Confidentiality was maintained throughout the study.

RESULTS

Table 1: Overall comparison of selected complete blood count parameters between young males and young females

Parameter	Males (n=71), Mean (SD)	Females (n=71), Mean (SD)	Welch's t statistic	Mean difference (95% CI)	p value
Haemoglobin (g/dL)	14.60 (1.10)	12.70 (1.20)	9.835	1.90 (1.52 to 2.28)	<0.001
Red blood cell count ($\times10^6$/µL)	5.03 (0.42)	4.46 (0.39)	8.380	0.57 (0.44 to 0.70)	<0.001
Haematocrit (%)	43.80 (3.40)	38.20 (3.60)	9.529	5.60 (4.44 to 6.76)	<0.001
Total leukocyte count (cells/µL)	6,840 (1,420)	7,210 (1,530)	-1.494	-370.00 (-859.80 to 119.80)	0.138
Platelet count ($\times10^3$/µL)	248.00 (51.00)	276.00 (57.00)	-3.085	-28.00 (-45.95 to -10.05)	0.002

Among the 71 males and 71 females, mean haemoglobin, red blood cell count and haematocrit were significantly higher in males. Mean haemoglobin was 14.60 (SD 1.10) g/dL in males compared with 12.70 (SD 1.20) g/dL in females, with a mean difference of 1.90 g/dL (95% CI: 1.52-2.28; p<0.001). Red blood cell count and haematocrit showed mean differences of 0.57 $\times10^6$/µL (95% CI: 0.44-0.70) and 5.60 percentage points (95% CI: 4.44-6.76), respectively, both with p<0.001. Females had a significantly higher platelet count than males (276.00 versus 248.00 $\times10^3$/µL; p=0.002). Although total leukocyte count was higher in females, the difference was not statistically significant (p=0.138).

Table 2: Comparison of haemoglobin and erythrocyte parameters between young males and young females

Parameter	Males (n=71), Mean (SD)	Females (n=71), Mean (SD)	Welch's t statistic	Mean difference (95% CI)	p value
Haemoglobin (g/dL)	14.60 (1.10)	12.70 (1.20)	9.835	1.90 (1.52 to 2.28)	<0.001
Red blood cell count (×10^6/µL)	5.03 (0.42)	4.46 (0.39)	8.380	0.57 (0.44 to 0.70)	<0.001
Haematocrit (%)	43.80 (3.40)	38.20 (3.60)	9.529	5.60 (4.44 to 6.76)	<0.001
Mean corpuscular volume (fL)	87.10 (5.20)	85.70 (5.80)	1.514	1.40 (-0.43 to 3.23)	0.132
Mean corpuscular haemoglobin (pg)	29.00 (1.90)	28.50 (2.10)	1.488	0.50 (-0.16 to 1.16)	0.139
Mean corpuscular haemoglobin concentration (g/dL)	33.30 (0.90)	33.20 (1.00)	0.626	0.10 (-0.22 to 0.42)	0.532
Red cell distribution width, RDW-CV (%)	13.10 (0.90)	13.70 (1.10)	-3.557	-0.60 (-0.93 to -0.27)	0.001

Comparison of erythrocyte parameters showed significantly higher haemoglobin, red blood cell count and haematocrit in males, with Welch's t statistics of 9.835, 8.380 and 9.529, respectively (all p<0.001). Mean corpuscular volume was 87.10 (SD 5.20) fL in males and 85.70 (SD 5.80) fL in females, while mean corpuscular haemoglobin was 29.00 (SD 1.90) pg and 28.50 (SD 2.10) pg, respectively; neither difference was statistically significant (p=0.132 and p=0.139). Mean corpuscular haemoglobin concentration also showed no significant difference (33.30 versus 33.20 g/dL; p=0.532). However, RDW-CV was significantly higher in females, at 13.70 (SD 1.10)% compared with 13.10 (SD 0.90)% in males, with a mean difference of -0.60 percentage points (95% CI: -0.93 to -0.27; t=-3.557; p=0.001).

Table 3: Comparison of total leukocyte count between young males and young females

Parameter	Males (n=71), Mean (SD)	Females (n=71), Mean (SD)	Welch's t statistic	Mean difference (95% CI)	p value
Total leukocyte count (cells/µL)	6,840 (1,420)	7,210 (1,530)	-1.494	-370.00 (-859.80 to 119.80)	0.138

Mean total leukocyte count was 6,840 (SD 1,420) cells/µL in males and 7,210 (SD 1,530) cells/µL in females. The mean difference was -370.00 cells/µL (95% CI: -859.80 to 119.80). Welch's t-test showed no statistically significant difference between the groups (t=-1.494; p=0.138), and the confidence interval included zero.

Table 4: Comparison of platelet count and platelet indices between young males and young females

Parameter	Males (n=71), Mean (SD)	Females (n=71), Mean (SD)	Welch's t statistic	Mean difference (95% CI)	p value
Platelet count (×10^3/µL)	248.00 (51.00)	276.00 (57.00)	-3.085	-28.00 (-45.95 to -10.05)	0.002
Mean platelet volume (fL)	9.60 (0.90)	9.90 (1.00)	-1.879	-0.30 (-0.62 to 0.02)	0.062
Platelet distribution width (fL)*	12.80 (1.60)	13.10 (1.70)	-1.083	-0.30 (-0.85 to 0.25)	0.281

Mean platelet count was significantly higher in females, at 276.00 (SD 57.00) ×10^3/µL, compared with 248.00 (SD 51.00) ×10^3/µL in males. The mean difference was -28.00 ×10^3/µL (95% CI: -45.95 to -10.05; t=-3.085; p=0.002). Mean platelet volume was slightly higher in females than males (9.90 versus 9.60 fL), but the difference was not statistically significant (mean difference: -0.30 fL; 95% CI: -0.62 to 0.02; p=0.062). Similarly, platelet distribution width was 13.10 (SD 1.70) fL in females and 12.80 (SD 1.60) fL in males, without a statistically significant difference (mean difference: -0.30 fL; 95% CI: -0.85 to 0.25; p=0.281).

DISCUSSION

Table 1: Overall comparison of complete blood count parameters

The supplied tables showed higher haemoglobin, red blood cell count and haematocrit in males, whereas platelet count was higher in females. Total leukocyte count did not differ significantly between the groups. This pattern broadly agrees with Adeli et al. (2015) [1], who demonstrated age- and sex-related variation in haematological parameters, including lower haemoglobin

and haematocrit in females beginning at puberty. Similarly, Wu et al. (2015) [2], in a multicentre study of healthy Chinese adults, reported higher RBC count, haemoglobin and haematocrit in males across age groups. These studies support considering sex when interpreting erythrocyte measurements, although their wider age ranges and different populations limit direct numerical comparisons with young Indian adults.

Gupta et al. (2020) [3] documented biological variation in common haematological parameters in a South Asian population, including sex-related differences in haemoglobin, RBC count and haematocrit. Their findings emphasise that differences between individuals and variation within individuals must be considered alongside analytical precision. In India, Ganie et al. (2024) [4] derived haematological reference intervals from 472 clinically and biochemically healthy women after screening a much larger population. Goel et al. (2025) [5] also reported population-specific haematological reference ranges among Indian blood donors. These Indian studies provide relevant context, but neither a female-only population nor a selected blood-donor population is directly equivalent to an unrestricted comparison of young males and females.

Table 2: Haemoglobin and erythrocyte parameters

Mean haemoglobin was 14.60 g/dL in males and 12.70 g/dL in females, representing a difference of 1.90 g/dL (95% CI: 1.52-2.28; p<0.001). RBC count and haematocrit were also higher in males, with differences of 0.57 $\times 10^6$/µL and 5.60 percentage points, respectively. A closely comparable direction was reported by Abdullah et al. (2020) [6] in Sulaymaniyah, Iraq: male and female mean haemoglobin values were approximately 15.5 and 13.6 g/dL, while RBC counts were approximately 5.2 and 4.5 $\times 10^{12}$/L. Although the haemoglobin difference was similar, the Iraqi participants were older on average, and numerical agreement does not establish equivalence between populations.

Al-Mawali et al. (2018) [7], studying 2,202 healthy Omani adults, likewise reported higher RBC count, haemoglobin and haematocrit in males. Siraj et al. (2018) [8] in Asmara and Yalew et al. (2016) [9] in Gondar also identified sex-related differences in these erythrocyte parameters. The authors discussed hormonal influences and menstrual blood loss as possible explanations. These mechanisms are plausible explanations for male-female differences, but they were not directly evaluated in the supplied tables. Consequently, differences cannot be attributed solely to hormones or menstruation without information on iron status, menstrual loss, nutrition and other relevant factors.

Supporting evidence also comes from Rasouli et al. (2017) [10], who found higher haemoglobin, RBC count and haematocrit in healthy Iranian male blood donors. However, donor selection may exclude individuals with lower haemoglobin concentrations and therefore influence the observed distributions. Nah et al. (2018) [11] established age- and sex-specific CBC intervals using a large Korean health-examination dataset, while Zierk et al. (2020) [12] demonstrated changes in blood-count distributions across adulthood and older age. Together, these studies indicate that sex comparisons should account for age composition, even when both groups are described broadly as adults.

The absence of significant differences in MCV, MCH and MCHC in the supplied tables was consistent with the findings of Wu et al. (2015) [2], who did not identify significant sex differences in these indices in their combined analysis. However, Siraj et al. (2018) [8] and Yalew et al. (2016) [9] reported differences in MCH and MCHC, illustrating that erythrocyte-index findings are not uniform across populations. A non-significant result in the supplied tables should therefore be interpreted as insufficient evidence of a difference, rather than proof that male and female values are identical.

RDW-CV was higher in females than males, with a difference of 0.60 percentage points (p=0.001). Abdullah et al. (2020) [6] also reported a numerically higher female RDW, whereas Yalew et al. (2016) [9] found no significant sex difference. Moradinazar et al. (2021) [13] reported associations between BMI and RDW, as well as effects of smoking and physical activity on several CBC parameters. Thus, RDW differences may reflect factors beyond sex. Higher RDW alone cannot establish iron deficiency without appropriate biochemical assessment. Takami et al. (2021) [14] additionally identified age-related changes in RBC count and MCV among Japanese men, reinforcing the importance of age-adjusted interpretation.

Table 3: Total leukocyte count

Mean total leukocyte count was 6,840 cells/µL in males and 7,210 cells/µL in females. The difference was not statistically significant (mean difference: -370 cells/µL; 95% CI: -859.80 to 119.80; p=0.138). This agrees with the absence of significant sex-related WBC differences reported by Siraj et al. (2018) [8], Yalew et al. (2016) [9] and Rasouli et al. (2017) [10]. The confidence interval nevertheless permits differences in either direction, so the result does not demonstrate equivalence.

In contrast, Mengistu Sissay et al. (2021) [15] reported a significantly higher median WBC count in non-pregnant females than males in Dire Dawa, Ethiopia: 6.8 versus 5.9 $\times 10^9$/L (p=0.006). Abbam et al. (2021) [16] identified significant sex-related differences in WBC counts across Ghanaian ecological zones, and Fondoh et al. (2020) [17] reported higher median WBC counts in women in Bamenda, Cameroon. These findings suggest that the direction of the supplied difference is compatible with some published populations, although its statistical significance differs. Comparisons must also distinguish published medians from the means reported in the supplied tables.

Bimerew et al. (2018) [18] demonstrated age-related variation in haematological measurements in southwest Ethiopia, with an adult WBC reference interval of approximately 3.28-11.22 $\times 10^9$/L. Bakrim et al. (2018) [19], in a large Moroccan study, found significant sex differences in total leukocytes and several differential counts. Differences in recruitment, age distribution, sample size and laboratory methods may contribute to variation between studies. Moreover, the supplied table includes only

total leukocyte count; it cannot establish whether neutrophil, lymphocyte or other leukocyte subpopulations differed between males and females.

Table 4: Platelet count and platelet indices

Platelet count was higher in females than males, with means of 276.00 and 248.00 $\times 10^3/\mu L$, respectively (mean difference: -28.00 $\times 10^3/\mu L$; 95% CI: -45.95 to -10.05; p=0.002). This agrees with Abdullah et al. (2020) [6], Rasouli et al. (2017) [10] and Fondoh et al. (2020) [17], who reported higher platelet counts in females. Mulu et al. (2017) [20] similarly found significantly higher platelet counts among women in the Gojjam zones of Ethiopia. However, Siraj et al. (2018) [8] and Yalew et al. (2016) [9] found no significant sex difference, indicating that female predominance in platelet count is common but not universal.

MPV and PDW were numerically higher in females, but neither difference was statistically significant (p=0.062 and p=0.281, respectively). Al-Mawali et al. (2018) [7] reported no significant sex differences in CBC parameters other than the principal erythrocyte measurements and platelet-related counts identified in their analysis. Conversely, Bakrim et al. (2018) [19] found a significant sex difference in MPV. These contrasting observations caution against assuming that a higher platelet count must be accompanied by a significant difference in platelet size. Neither MPV nor PDW alone establishes increased platelet activation or thrombotic risk.

Laboratory comparability is particularly relevant when interpreting small differences in platelet indices. Florin et al. (2020) [21] established common adult haematology reference intervals in a multicentre study using the Sysmex XN platform, providing an example of reference-interval work tied to a defined analytical system. Ozmen and Ozarda (2021) [22] demonstrated that the stability of CBC measurements varied with storage time, temperature and the parameter assessed. These methodological findings support documenting the analyser, specimen handling and analysis interval before interpreting small between-group differences. PDW units must also be confirmed from the analyser report before comparisons with other studies.

CONCLUSION

The supplied analysis showed significantly higher haemoglobin, red blood cell count and haematocrit in young males, whereas young females had significantly higher platelet counts and red cell distribution width. No statistically significant differences were identified in total leukocyte count, MCV, MCH, MCHC, mean platelet volume or platelet distribution width. These patterns support considering sex when interpreting CBC parameters in young adults. However, the comparisons do not establish population-specific reference intervals or demonstrate that sex alone accounts for the observed differences.

LIMITATIONS OF THE STUDY

The proposed single-centre, hospital-based study involved a relatively small sample of 142 participants, limiting generalisability to the wider population. Consecutive volunteer recruitment could introduce selection bias, while the cross-sectional design and single blood measurement could not assess temporal changes or within-person biological variability. The restricted age range of 18-30 years limited applicability to other age groups. Without biochemical assessment of iron, ferritin, vitamin B12 and folate, subclinical nutritional deficiencies could not be excluded. Menstrual blood loss, dietary intake, physical activity and hormonal influences could also contribute to differences between groups. The supplied comparisons were unadjusted for potential confounders such as age and BMI. Furthermore, the sample size was planned around haemoglobin, so non-significant findings for other parameters might reflect limited statistical power. The study was not designed to establish definitive sex-specific reference intervals.

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