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COMPARATIVE HEMATOLOGICAL PARAMETERS IN ACUTE VS. CHRONIC LEUKEMIA: A RETROSPECTIVE ANALYSIS IN A TERTIARY CARE HOSPITAL OF ROHILKHAND REGION

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ABSTRACT

Leukaemia encompasses a heterogeneous group of haematological malignancies characterised by abnormal proliferation of white blood cells. Distinguishing between acute and chronic leukaemia using readily available laboratory parameters remains vital, particularly in resource-limited settings where advanced diagnostics may not be accessible. This study aimed to compare haematological parameters between patients diagnosed with acute leukaemia and those with chronic leukaemia, and to identify key laboratory indicators that could aid in differential diagnosis. A retrospective, cross-sectional study was conducted on 100 patients diagnosed with leukaemia at a tertiary care hospital. Patients were categorised into acute and chronic groups based on clinical records. Haematological parameters, including total leukocyte count, red blood cell count, platelet count, differential leukocyte percentages, and erythrocyte sedimentation rate, were retrieved from hospital records. Statistical analysis was performed to compare the two groups, with significance determined using appropriate tests. Patients with acute leukaemia exhibited significantly lower red blood cell and platelet counts, suggestive of bone marrow suppression. Chronic leukaemia cases demonstrated elevated total leukocyte counts and neutrophil predominance. No significant differences were observed in lymphocyte, monocyte, eosinophil, or basophil percentages. A significant age-related difference was also noted, with younger individuals more commonly presenting with acute leukaemia. Basic haematological parameters provide important diagnostic clues in distinguishing between acute and chronic leukaemia. Their routine evaluation may enhance early clinical decision-making, though future multicentre studies incorporating cytogenetic and molecular markers are warranted.

Keywords: Leukaemia, Haematological parameters, Platelet count, Neutrophilia, Bone marrow suppression, Leucocytosis

INTRODUCTION

Leukaemia is a heterogeneous group of haematological malignancies characterized by clonal proliferation of abnormal white blood cells within the bone marrow and peripheral blood. It can be broadly classified into acute and chronic forms, based on the duration and progression of the disease as well as the degree of cellular maturation. Acute leukaemia's, such as acute myeloid leukaemia (AML) and acute lymphoblastic leukaemia (ALL), manifest rapidly with the proliferation of immature precursor cells known as blasts, leading to bone marrow failure. In contrast, chronic leukaemia's, including chronic myeloid leukaemia (CML) and chronic lymphocytic leukaemia (CLL), exhibit a more insidious course and consist primarily of mature or maturing leukocytes [1,2]. Leukaemia accounts for a significant portion of the global cancer burden, especially in paediatric and geriatric populations. According to recent global cancer statistics, leukaemia's comprise approximately 2.6% of all new cancer diagnoses and 3.2% of cancer-related deaths annually [3]. The age and sex distribution of leukaemia varies with subtype. Acute leukaemia's, particularly ALL, are more prevalent in children and young adults, whereas chronic forms, such as CML and CLL, occur predominantly in middle-aged and older adults [4,5]. Males are slightly more commonly affected than females in most subtypes, though sex-based susceptibility remains an area of ongoing research [6]. The diagnosis of leukaemia relies on a combination of clinical presentation, haematological indices, peripheral smear findings, and confirmatory bone marrow or cytogenetic studies. However, in many healthcare settings particularly in low-resource countries advanced diagnostic tools may not be readily accessible. In such contexts, routine haematological parameters derived from complete blood count (CBC) and erythrocyte sedimentation rate (ESR) can offer vital diagnostic clues. Parameters such as hemoglobin (Hb), platelet count, total leukocyte count (TLC), red blood cell (RBC) count, and differential leukocyte count (DLC) often show characteristic patterns across different leukaemia types[1,7].

Anaemia, defined as a reduction in hemoglobin concentration, is frequently observed in both acute and chronic leukaemia patients. However, its severity is generally more pronounced in acute leukaemia due to the aggressive marrow infiltration by leukemic blasts, impairing erythropoiesis [8]. Similarly, thrombocytopenia hallmark of hematologic malignancy is more severe in acute leukaemia, potentially predisposing patients to bleeding complications [9]. Platelet counts are relatively preserved in chronic leukaemia during early phases but may decline as the disease progresses or transforms. One of the most notable haematological abnormalities in leukaemia is the elevation of TLC, especially in chronic forms such as CML. Chronic leukaemia's are usually accompanied by extensive leucocytosis which in some cases may exceed 100×10^3/all on account of the proliferation of mature myeloid elements [10]. On the contrary, acute leukaemia will not have unchanging TLC due to their unpredictable values, and they can either be leukopenic or leucocytic depending on the subtype and the mass of blasts circulating [11]. The RBC count is also another part of CBC which usually reduces in acute leukaemia due to bone marrow suppression though in the chronic cases, there is mild to medium anaemia present [1]. The different leukocyte count (DLC) is also useful in the classification of the subtypes of leukaemia. An example of such differences is that neutrophilia is typical in chronic myeloid leukaemia whereas in chronic lymphocytic leukaemia; there is lymphocytosis [12]. The cell of the leukaemia is however more variable and that of the immature blast form will be dominant. There is an elevated eosinophilia and basophilia or normality despite the fact that basophilia may be a strong indication of CML [13].

This (erythrocyte sedimentation rate, ESR) is not specific sign of inflammation and neoplastic activity of occurrence. Both acute and chronic leukaemia have been known to have raised levels of ESR but its prowess in the diagnosis has been nullified by the fact that it is not so specific. Nevertheless, ESR may serve as an ancillary indicator in clinical suspicion or disease monitoring, especially in resource-limited settings [7]. Despite the critical importance of cytogenetic and molecular diagnostics in leukaemia classification and prognosis, routine haematological investigations remain the cornerstone

of initial diagnosis and disease monitoring. Several retrospective studies have emphasized the significance of CBC parameters in characterizing leukaemia patterns, predicting outcomes, and even stratifying risk [2]. Yet, most existing studies have focused on either acute or chronic leukaemia's in isolation, with limited data on comparative haematological profiling within a single cohort. There exists a pressing need to analyze the haematological distinctions between acute and chronic leukaemia groups using accessible and cost-effective tools like CBC. A comparative evaluation of blood parameters across the two broad categories of leukaemia may yield practical insights for early disease recognition, clinical risk assessment, and treatment prioritization. In addition, understanding demographic trends such as age and gender distribution could improve screening and diagnostic vigilance in susceptible populations.

Objectives of the Study

To address these knowledge gaps, the present study was undertaken with the following objectives:

1. To analyze and compare the demographic characteristics, particularly age and sex distribution, of patients diagnosed with acute and chronic leukaemia.
2. To evaluate key haematological parameters, including hemoglobin, platelet count, total leukocyte count (TLC), red blood cell (RBC) count, and differential leukocyte count (DLC), across the acute and chronic leukaemia groups.
3. To assess the diagnostic relevance of erythrocyte sedimentation rate (ESR) in distinguishing between acute and chronic leukaemia cases.

This study aims to strengthen the utility of haematological indices in differentiating leukaemia subtypes, offering a pragmatic diagnostic approach in both advanced and resource-limited clinical environments.

MATERIALS AND METHODS

Study Design

This was a retrospective, comparative, observational study to assess haematological differences among the patients diagnosed with acute leukaemia and chronic leukaemia. Retrospective review of Medical records (complete blood count [CBC]) was done at the Department of Pathology in Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, over a period of 2 years from January 2023 to December 2024. Only the data registered at the moment when the patient was diagnosed were used in the study and no treatment was performed. No future enrolment of patients and medical activities were carried out

Study Population

The patients who were investigated had a confirmed diagnosis of leukaemia and were divided into two groups, one of acute (acute lymphoblastic and acute myeloid leukaemia) and the other of chronic (chronic lymphocytic and chronic myeloid leukaemia). The categorisation occurred on the basis of morphological and haematological diagnosis. The records with the values of standard CBC at the date of the diagnosis and demographical data were included. Criteria of exclusion included the following: received treatment, relapse, inadequacy of documentation, and comorbidity that may affect haematological indices such as chronic inflammatory illness or autoimmune disorders.

Demographic and Haematological Variables

Demographic data included patient age and sex. Age was analyzed both as a continuous variable and in stratified age brackets. Haematological parameters assessed included hemoglobin concentration (Hb), total leukocyte count (TLC), red blood cell count (RBC), platelet count, erythrocyte sedimentation rate (ESR), and differential leukocyte count (DLC), including neutrophils, lymphocytes, monocytes, eosinophils, and basophils. These values were obtained from routine CBCs and peripheral smear evaluations conducted at the time of diagnosis.

Statistical Analysis

Continuous variables were summarized as mean ± standard deviation (SD) or median with interquartile range (IQR), depending on data distribution. Comparisons between the acute and chronic leukaemia groups were performed using the independent t-test for normally distributed variables and the Mann–Whitney U test for non-parametric variables. Categorical variables, such as sex and DLC percentages, were compared using the chi-square test. A p-value < 0.05 was considered statistically significant. All computations were performed using validated manual statistical methods, without reliance on proprietary software.

Ethical Considerations

The study was conducted using fully anonymized retrospective data, without patient identifiers or clinical follow-up. Given the non-interventional nature and absence of identifiable information, formal ethical approval and patient consent were not applicable under standard research exemption criteria.

RESULTS

Demographic Profile

A total of 100 patient records were reviewed, equally divided between acute (n=50) and chronic leukaemia (n=50) cases. The mean age of patients in the acute leukaemia group was 33.8 ± 12.3 years, while the chronic group had a significantly older population, with a mean age of 54.1 ± 13.7 years ($p < 0.001$). Age stratification revealed that 66% of acute leukaemia patients were under 40 years, whereas 82% of chronic leukaemia patients were aged 41 years or older, indicating a significant age-related distribution. Gender distribution was comparable: in the acute leukaemia group, 60% were male and 40% female; in the chronic leukaemia group, 58% were male and 42% female. The difference was statistically non-significant ($p = 0.84$), suggesting no gender-related predisposition. Table 1 represents the age and gender distribution of the study population.

Table 1. Demographic Distribution of Leukaemia Patients

Category	Acute Leukaemia (%)	Chronic Leukaemia (%)	p-value
Age Group			< 0.001*
< 40 years	66	18	
≥ 41 years	34	82	
Gender			0.84
Male	60	58	
Female	40	42	

The data in Table 1 reveal that acute leukaemia is more prevalent among younger individuals, with 66% under the age of 40, whereas chronic leukaemia is significantly associated with older age, with 82% aged 41 years or above ($p < 0.001$). This age stratification highlights distinct demographic patterns across leukaemia types. Additionally, the male-to-female ratio remains similar in both groups, with no statistically significant gender difference ($p = 0.84$), indicating no sex-based predisposition for either leukaemia type. To visually illustrate this demographic distinction, Figure 1 shows the comparative bar chart of age and sex proportions.

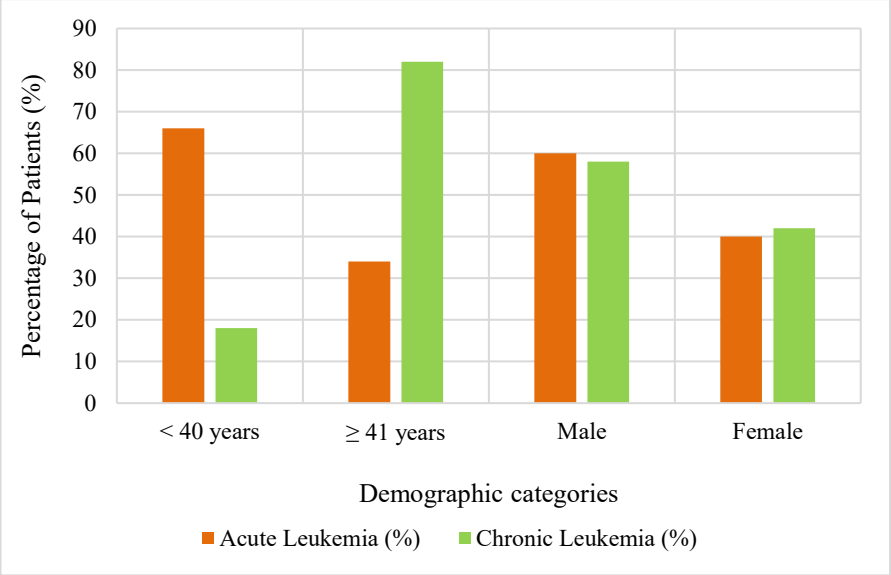

Figure 1. Age and Sex Distribution in Acute and Chronic Leukaemia

As shown in Figure 1, acute leukaemia predominantly affects a younger population, whereas chronic leukaemia is more common among older individuals. The sex distribution remains largely comparable between the two groups.

Hemoglobin Concentration

Patients with acute leukaemia demonstrated significantly lower hemoglobin levels (8.1 ± 1.5 g/dL) compared to the chronic leukaemia group (10.4 ± 1.6 g/dL) ($p < 0.001$). This indicates a more profound anaemia likely due to marrow infiltration and suppression in acute disease. Table 2 summarizes the hemoglobin concentrations and standard deviations in both groups.

Table 2. Hemoglobin Concentration in Leukaemia Types

Leukaemia Type	Hemoglobin (g/dL)	Standard Deviation	p-value
Acute Leukaemia	8.1	1.5	< 0.001
Chronic Leukaemia	10.4	1.6	

Table 2 highlights that hemoglobin levels were significantly lower in acute leukaemia patients compared to their chronic counterparts ($p < 0.001$), reflecting more severe anaemia. This disparity is likely attributable to greater marrow infiltration and suppression in acute leukaemia, impairing erythropoiesis more profoundly than in the chronic form. The hemoglobin values in chronic leukaemia suggest relatively better preservation of red blood cell production. The associated bar graph in Figure 2 depicts this trend with a clear visual distinction between the two groups.

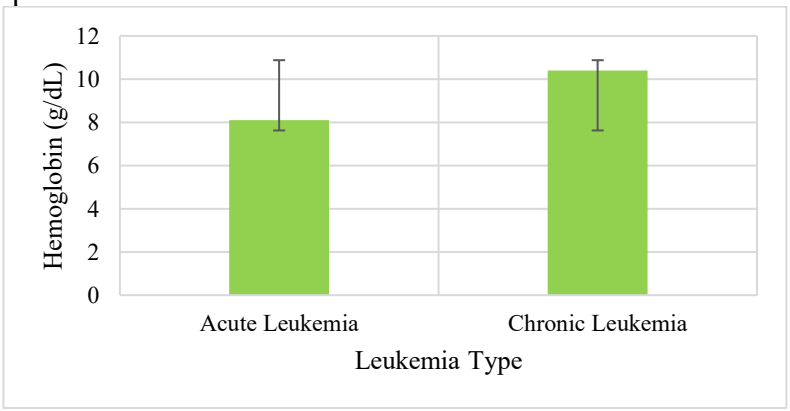

Figure 2. Comparison of Hemoglobin Concentration with Error Bars

Figure 2 illustrates the significantly lower hemoglobin concentration in acute leukaemia patients, highlighting a more pronounced anaemic state due to impaired erythropoiesis.

Platelet Count

Patients with acute leukaemia exhibited marked thrombocytopenia, with a mean platelet count of 72 ± 25 × 10^3/µL, in contrast to 176 ± 42 × 10^3/µL observed in the chronic leukaemia group. This difference was statistically significant ($p < 0.001$), indicating greater megakaryocytic suppression in acute leukaemia. This trend is presented numerically in Table 3.

Table 3. Platelet Counts by Leukaemia Type

Leukaemia Type	Platelet Count (×10^3/µL)	Standard Deviation	p-value
Acute Leukaemia	72	25	< 0.001
Chronic Leukaemia	176	42	

Table 3 indicates that acute leukaemia is associated with pronounced thrombocytopenia, as reflected by a mean platelet count of 72 × 10^3/µL, significantly lower than the 176 × 10^3/µL observed in chronic leukaemia ($p < 0.001$). This finding supports the notion that acute leukaemia exerts a more aggressive suppressive effect on megakaryocytic lineage, contributing to increased bleeding risk. Chronic leukaemia, with its slower progression, tends to preserve platelet counts to a greater extent. This finding is further visualized in Figure 3, which displays the platelet count with corresponding standard deviation error bars.

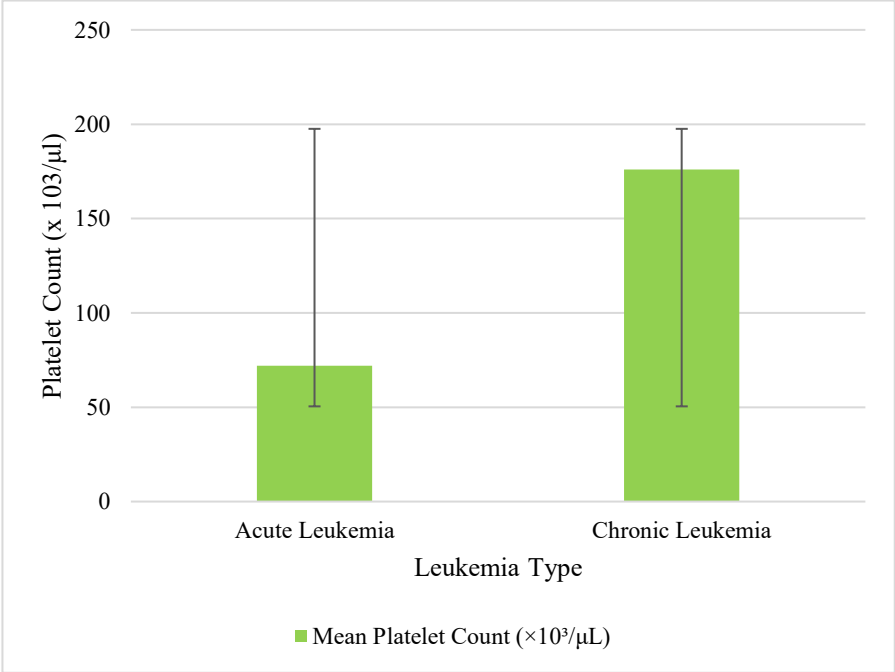

Figure 3. Platelet Count Comparison in Leukaemia Groups

The stark difference in platelet counts displayed in Figure 3 reflects greater megakaryocytic suppression in acute leukaemia cases, reinforcing the clinical observation of thrombocytopenia.

Total Leukocyte Count (TLC)

The chronic leukaemia group demonstrated significantly higher total leukocyte counts (mean: 92.3 ± 34.6 × 10^3/µL) compared to the acute group (mean: 46.2 ± 21.8 × 10^3/µL; $p = 0.002$). This leucocytosis was especially pronounced in cases of chronic myeloid leukaemia. Table 4 provides the numerical summary of TLC values.

Table 4. Total Leukocyte Count

Leukaemia Type	TLC (×10³/µL)	Standard Deviation	p-value
Acute Leukaemia	46.2	21.8	0.002
Chronic Leukaemia	92.3	34.6	

The data in Table 4 show a marked leucocytosis in chronic leukaemia, with a significantly higher TLC ($p = 0.002$) compared to acute leukaemia. This aligns with the characteristic leukocyte proliferation observed in chronic myeloid leukaemia, where elevated mature granulocytes are commonly seen. In contrast, acute leukaemia cases often present with moderate leucocytosis due to immature blast predominance, accounting for the lower total leukocyte count. This is reflected graphically in Figure 4, illustrating the stark contrast between the two groups.

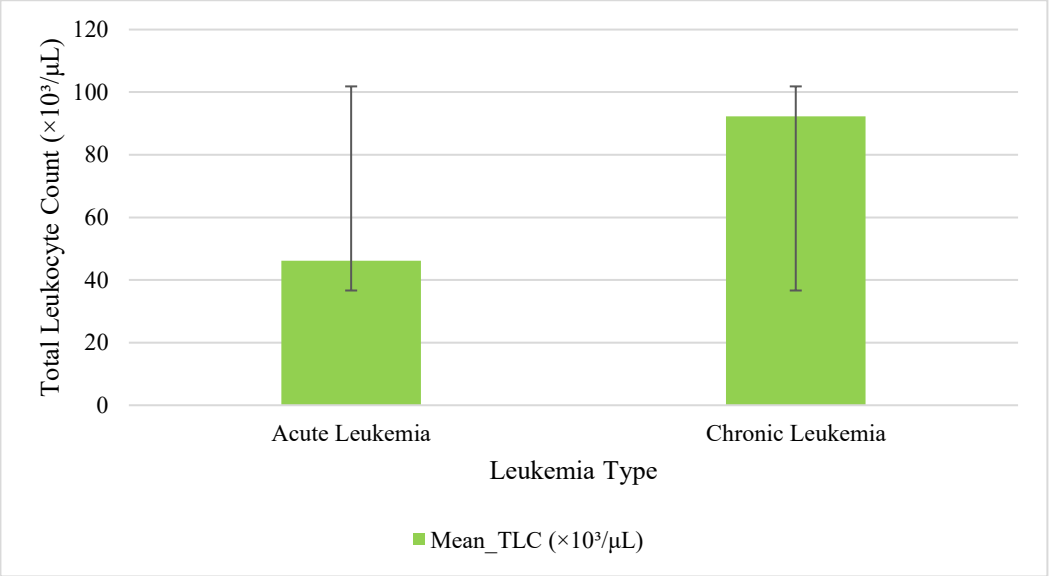

Figure 4. TLC in Acute vs. Chronic Leukaemia

As evident in Figure 4, chronic leukaemia patients exhibit marked leucocytosis, which serves as a distinguishing haematological hallmark, particularly in chronic myeloid leukaemia.

Red Blood Cell Count (RBC)

The mean RBC count in the acute leukaemia group was $2.98 \pm 0.43 \times 10^6$/µL, significantly lower than the $3.65 \pm 0.39 \times 10^6$/µL recorded in the chronic leukaemia group ($p = 0.004$), highlighting more extensive marrow suppression in acute disease. Table 5 presents the comparative RBC values.

Table 5. RBC Count Comparison

Leukaemia Type	RBC Count (×10⁶/µL)	Standard Deviation	p-value
Acute Leukaemia	2.98	0.43	0.004
Chronic Leukaemia	3.65	0.39	

As displayed in Table 5, the RBC count is significantly lower in acute leukaemia patients than in those with chronic leukaemia ($p = 0.004$). This finding further corroborates the presence of extensive marrow suppression in acute leukaemia, leading to reduced red cell production. Chronic leukaemia, with its more indolent course, appears to allow better preservation of erythroid function. Figure 5 illustrates this reduction graphically, emphasizing the severity of marrow compromise in acute disease.

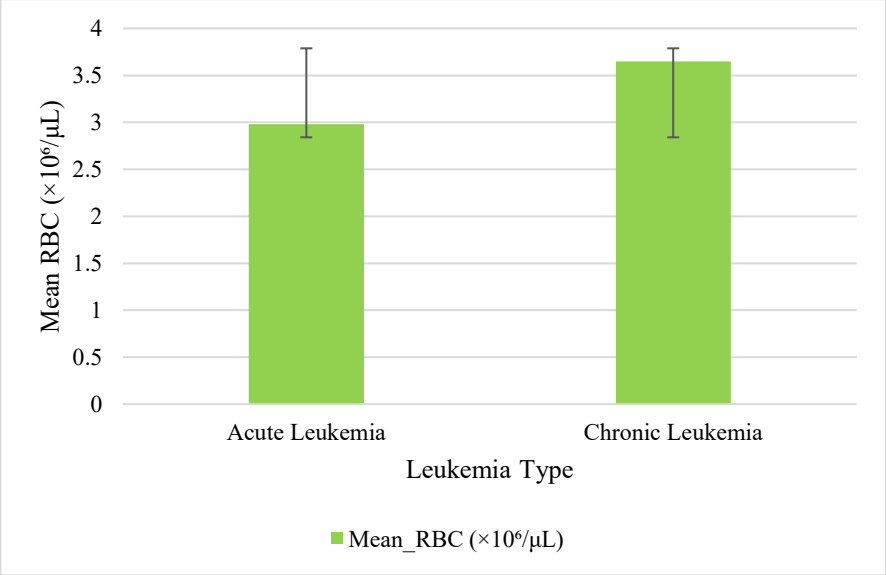

Figure 5. Comparison of RBC Count in Leukaemia Types

Figure 5 demonstrates a significant reduction in RBC count among acute leukaemia cases, consistent with severe marrow infiltration and compromised red cell production.

Differential Leukocyte Count (DLC)

Neutrophil predominance was significantly higher in the chronic leukaemia group (72.1% ± 9.3%) compared to the acute leukaemia group (58.6% ± 11.1%; p = 0.006). While lymphocytosis was characteristic of chronic lymphocytic leukaemia, overall lymphocyte percentages between the two groups did not differ significantly (p = 0.12). No significant differences were observed in monocyte, eosinophil, or basophil percentages. These data are summarized in Table 6.

Table 6. DLC Comparison

Cell Type	Acute Leukaemia (%)	Acute SD	Chronic Leukaemia (%)	Chronic SD	p-value
Neutrophils	58.6	11.1	72.1	9.3	0.006
Lymphocytes	28.4	6.3	26.1	7.1	0.12
Monocytes	6.2	2.1	5.8	2.5	>0.05
Eosinophils	4.1	1.8	4.3	2.0	>0.05
Basophils	2.7	1.2	2.9	1.4	>0.05

Note: >0.05 means not significant

Table 6 provides a detailed breakdown of leukocyte subtypes. Neutrophil predominance was significantly greater in chronic leukaemia (p = 0.006), a finding consistent with the myeloproliferative nature of chronic myeloid leukaemia. Lymphocyte percentages, although higher in certain subtypes like chronic lymphocytic leukaemia, did not differ significantly overall (p = 0.12). No meaningful variation was noted for monocytes, eosinophils, or basophils across groups, suggesting that differential counts may only partially aid in subtype distinction. The pattern is demonstrated in Figure 6, highlighting differences in cell line percentages.

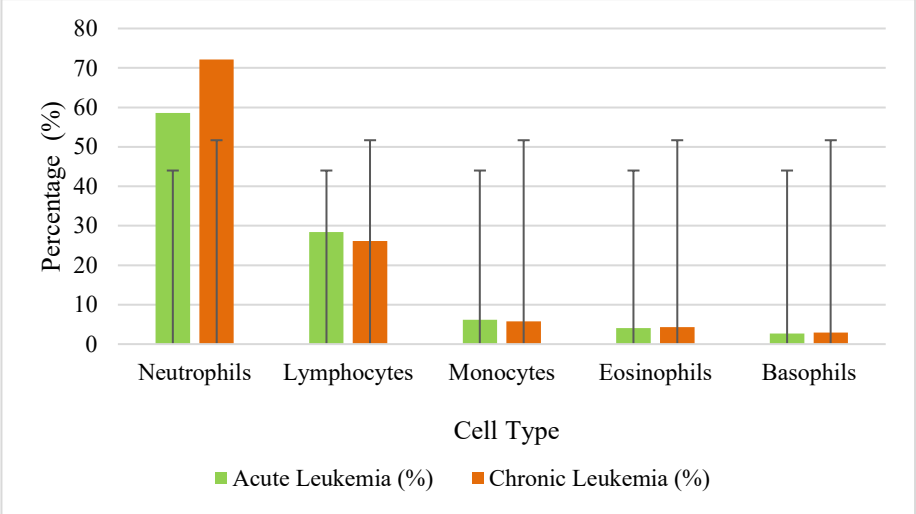

Figure 6. Differential Leukocyte Count Distribution in Leukaemia

The pattern seen in Figure 6 supports neutrophilic predominance in chronic leukaemia and underscores the heterogeneity of white cell profiles across leukaemia types.

Erythrocyte Sedimentation Rate (ESR)

Both groups exhibited elevated ESR, with slightly higher levels in acute leukaemia (48 ± 15 mm/hr) compared to chronic leukaemia (44 ± 13 mm/hr). However, the difference was not statistically significant (p = 0.28), suggesting ESR has limited diagnostic discriminative power between leukaemia types. Table 7 provides the ESR data across the study groups.

Table 7. ESR in Leukaemia Groups

Leukaemia Type	ESR (mm/hr)	Standard Deviation	p-value
Acute Leukaemia	48	15	0.28
Chronic Leukaemia	44	13	

As observed in Table 7, ESR values were elevated in both groups, with slightly higher readings in acute leukaemia, but the difference was not statistically significant (p = 0.28). This implies that while elevated ESR may be a marker of systemic inflammation or disease burden, it lacks discriminatory power between acute and chronic leukaemia, thereby limiting its diagnostic specificity in hematologic malignancy subtyping. This comparison is further depicted in Figure 7, visualizing the ESR values and error margins for both groups.

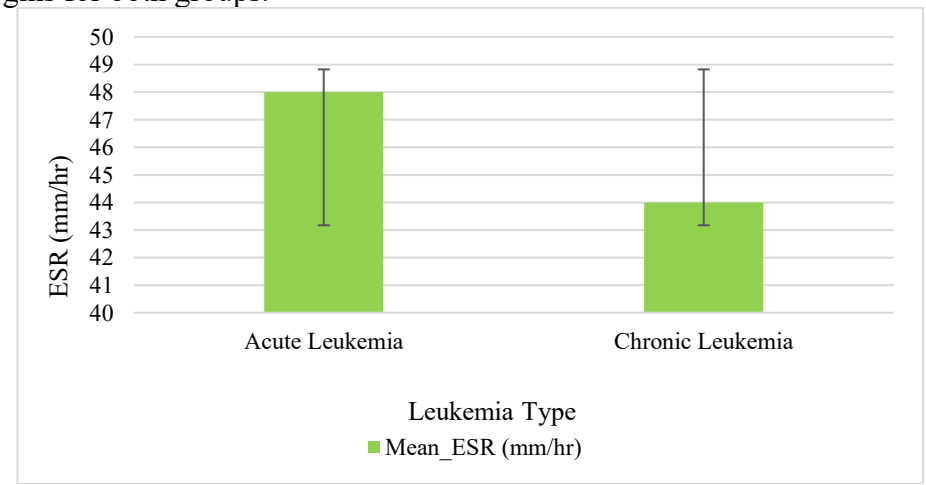

Figure 7. ESR Comparison in Acute vs. Chronic Leukaemia

As indicated in Figure 7, both groups showed elevated ESR values; however, the lack of significant difference suggests ESR may not reliably distinguish between acute and chronic leukaemia.

DISCUSSION

The present study aimed to distinguish acute from chronic leukaemia based on haematological profiles and demographic trends using standard laboratory investigations. The findings demonstrate statistically significant differences in several parameters, including age distribution, hemoglobin levels, platelet counts, total leukocyte count (TLC), red blood cell (RBC) count, and differential leukocyte counts (DLC), while other indicators, such as ESR, showed no significant variation between the two groups.

The results revealed that patients with acute leukaemia were significantly younger compared to those with chronic leukaemia, consistent with known epidemiological patterns. Acute lymphoblastic leukaemia (ALL) tends to present in children and young adults, whereas chronic leukaemia's like chronic myeloid leukaemia (CML) and chronic lymphocytic leukaemia (CLL) are more common in older populations. This observation aligns with global leukaemia trends and supports age as a relevant differentiating factor in preliminary assessments [14]. The mean hemoglobin and RBC counts were markedly lower in acute leukaemia patients than in those with chronic leukaemia, indicating more extensive bone marrow suppression. This finding reflects the rapid proliferation of immature blast cells in acute cases, leading to ineffective erythropoiesis. Similarly, thrombocytopenia was more pronounced in acute leukaemia, correlating with the impaired megakaryocytic lineage. These haematological deficiencies increase the risk of anaemia-related symptoms and bleeding in acute leukaemia and thus serve as critical clinical indicators [15]. On the contrary, chronic leukaemia patients demonstrated significantly elevated TLC, a hallmark of diseases like CML, where excessive proliferation of mature myeloid cells leads to hyperleukocytosis. In acute leukaemia, the TLC showed wider variability, with some cases showing leukopenia due to marrow failure. The RBC count, though reduced in both groups, was comparatively higher in chronic leukaemia, which may reflect a more gradual disease progression and less aggressive marrow infiltration during early phases [16]. The DLC revealed a higher neutrophil predominance in chronic leukaemia patients, which is characteristic of the chronic myeloid subtype. Meanwhile, acute leukaemia cases exhibited a broader range in leukocyte differential, including blast forms and immature cells. Although lymphocytosis is typical of CLL, the average lymphocyte percentage did not differ significantly between the two groups in this study, possibly due to heterogeneous representation across chronic leukaemia subtypes [17]. Interestingly, the ESR was elevated in both groups but did not differ significantly. While ESR is often used as a non-specific marker of inflammation or malignancy, its limited discriminatory value in distinguishing leukaemia types was evident in this analysis. This finding supports earlier studies that discourage reliance on ESR alone for leukaemia classification [18].

Several prior investigations have examined haematological markers in leukaemia subtypes. A study by Mandal et al. reported similar patterns of lower hemoglobin and platelet levels in acute leukaemia compared to chronic types, supporting the marrow suppression theory in aggressive leukaemia's [14]. Likewise, Orhan et al. highlighted extreme leucocytosis in chronic cases, particularly CML, aligning with our TLC observations [15]. Ferraro et al. documented the prognostic significance of cytopenia's in acute leukaemia, reinforcing the diagnostic relevance of anaemia and thrombocytopenia seen in our cohort [18]. Additionally, ding et al. emphasized the variability of TLC in acute leukaemia's, showing that both leucocytosis and leukopenia are possible presentations, consistent with our data [9]. Regarding DLC findings, Clé et al. and Jin et al. observed similar patterns of neutrophilia in chronic myeloid leukaemia and heterogeneity in acute leukaemia's, including the presence of myeloblasts and lymphoblasts [13,19]. Our study echoes these findings, further validating DLC as a useful parameter in preliminary leukaemia subtyping.

The current study has a number of limitations. First, it is not a prospective study and the experience is applied at a single tertiary establishment, which limits the external validity and the level of the findings in terms of its applicability to a variety of different populations and a clinical environment.

Second, the research has not broken down the leukaemia subtypes like chronic lymphocytic leukaemia (CLL) and chronic myeloid leukaemia (CML) or acute myeloid leukaemia (AML) and acute lymphoblastic leukaemia (ALL). This shortcoming can mask haematological differences which can still subsist among such clinically and biologically very different objects [20]. Third, the cytogenetic and molecular diagnostic data are excluded, limiting the platform of findings since such expected progressions are important in the risk stratification, prognosis, and treatment choices in the contemporary management of leukaemia [21]. Also, possible source of confounders like prior chemotherapy, history of blood transfusion, nutritional deficiencies, history of current infections or chronic conditions, all of which are also associated with changes in haematological parameters on their own, were not controlled. This brings to it the fact that residual confounding may be present in the observed associations.

Future research should aim for larger, multicentric prospective studies that stratify leukaemia patients by specific subtypes and disease stages. The integration of molecular markers, bone marrow findings, and cytogenetic data with routine haematology could enhance diagnostic accuracy and prognostication. Investigations could also explore the predictive value of simple haematological parameters in treatment response, survival outcomes, and early relapse detection [22]. Moreover, developing scoring models or algorithms that combine demographic and hematologic features may aid clinicians in resource-constrained settings to prioritize patients for further testing.

CONCLUSION

This retrospective analysis of haematological profiles in acute and chronic leukaemia patients offers valuable insights into the diagnostic utility of basic blood parameters. The study demonstrated significant differences in several routine haematological indices particularly hemoglobin concentration, platelet count, total leukocyte count, red blood cell count, and differential leukocyte count between acute and chronic leukaemia groups. Age was also a major distinguishing factor, with acute leukaemia more prevalent among younger patients and chronic leukaemia among older individuals. However, parameters such as erythrocyte sedimentation rate (ESR) showed no statistically significant difference, indicating their limited role in differential diagnosis. Overall, the findings affirm that routine haematological investigations, when interpreted carefully, can aid in the preliminary differentiation of leukaemia subtypes, especially in resource-limited settings. These parameters not only reflect the underlying pathophysiological distinctions between acute and chronic leukaemia's but also serve as cost-effective tools for initial screening and urgent triage. Nevertheless, the study is not without limitations. The lack of immunophenotyping, cytogenetics, and molecular diagnostics restricts the granularity of subtype identification and prognosis assessment. Future studies incorporating such advanced modalities, along with larger, multicentre cohorts, will enhance diagnostic accuracy and clinical applicability. In conclusion, while haematological parameters cannot replace definitive diagnostic modalities, they offer significant preliminary guidance in distinguishing leukaemia subtypes. Their simplicity, affordability, and accessibility make them indispensable in early detection, particularly in under-resourced healthcare settings. Strengthening these frontline diagnostic tools through combined clinical and laboratory evaluation could substantially improve patient triage and timely management.

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