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BALKAN JOURNALS

# Determination of Hematological and Biochemical Parameters in Blood Samples from Oncological Patients in Kosovo

**Kushtrim Dina, Valentina Velkovski, Aksu Samet**

*Abstract*

Cancer is a complex disease characterized by the uncontrolled proliferation of abnormal cells, which possess the potential to invade surrounding tissues and metastasize to distant organs. Its development is influenced by a variety of factors, including genetic predisposition, environmental exposures, and individual biological characteristics. The aim of this research is to analyze the blood of 100 patients diagnosed with cancer seeking care at the University Clinical Center of Kosovo for Cancer Care, Oncology Clinic. The patients range in age from 29 to 85 years, with half being men and half being women. The blood parameters survey was conducted between January and June 2024 and was voluntary. Blood samples were tested for a total of ten hematological and biochemical parameters: hemoglobin, erythrocytes, platelets, leukocytes, iron, sedimentation, AST, ALT, urea, and creatinine. Statistical analysis of the data was conducted using the Statistical Package for Social Sciences (SPSS). Non-parametric tests were employed, including the median equality test based on the Chi-square distribution and Spearman's rank correlation coefficient. There is a deviation from the reference values of the measured parameters in sedimentation, where the average measured value for all patients is above the upper reference limit. Namely, the sedimentation in cancer patients covered by the analysis ranges between 5 mm/h and 40 mm/h, while the average is 14.3 mm/h. Differences in median values for almost all blood parameters are also observed between patients who have metastasized disease and those in whom the disease has not metastasized. Nutritional status is a dynamic rather than a static condition. Consequently, it should be regularly evaluated throughout the various stages of the treatment process to ensure consistent and timely access to appropriate nutritional interventions.

*Keywords:* Cancer, Analysis, Blood, Hematology, Biochemistry

# INTRODUCTION

## Impact of Chemotherapy on Hematological and Biochemical Profiles in Cancer Patients

Cancer is a leading cause of death globally, with complex causes including genetic, environmental, and structural factors (Sobin & Wittekind, 2009; Lodish et al., 2000). Treatment options such as surgery, chemotherapy, and radiotherapy vary by cancer type, stage, and location (Shahid, 2016). However, chemotherapy often causes significant side effects that may affect treatment success (Sheikh, 2014). Chemotherapy disrupts cell growth by damaging DNA, leading to declines in hemoglobin, platelets, and white blood cells, thus weakening the immune system and increasing infection risk (Devi et al., 2006; Ramasamy et al., 2016). It also affects liver and kidney function. Many chemotherapeutic drugs are metabolized in the liver, contributing to hepatocellular damage and elevated liver enzymes such as ALT, AST, ALP, and LDH (Steele & Narendran, 2012; Uo, 2006). Kidney toxicity may present as increased urea and creatinine due to tubular cell damage (Moore, 2016). Close monitoring of hematological and biochemical profiles is essential to managing side effects and improving outcomes in cancer patients receiving chemotherapy.

## The Role of Nutrition in Cancer Care

Cancer is a complex disease requiring integrated, multimodal treatment approaches. Among supportive therapies, nutrition plays a critical role in improving treatment outcomes and quality of life. Evidence shows that professional nutritional intervention enhances nutrient intake, physical function, and the overall prognosis by preventing and managing cancer-related malnutrition (Caccialanza et al., 2016). Malnutrition is a common yet often overlooked complication in cancer care, affecting up to 87% of patients, with 15–40% experiencing weight loss at diagnosis (Wigmore et al., 1997). Despite its impact, there is no universally accepted gold standard for diagnosing malnutrition in cancer. Inadequate nutritional support is linked to reduced treatment options, longer hospital stays, increased toxicity, and lower treatment response (van Cutsem et al., 2005). Alarmingly, up to 20% of cancer-related deaths may result from malnutrition rather than the cancer itself (Muscaritoli et al., 2021). Improving access to nutritional care should be prioritized across healthcare systems to enhance cancer treatment effectiveness and patient outcomes.

# LITERATURE REVIEW

## Hematological and Biochemical Markers in Breast Cancer Progression

Numerous hematological and biochemical parameters—such as hemoglobin, total leukocyte count, differential leukocyte count, random blood sugar (RBS), liver enzymes (SGPT, SGOT), bilirubin, ALP, total protein, creatinine, and urea—have been studied in breast cancer patients (Shreya et al., 2023). Among these, blood sugar, urea, hemoglobin, and alkaline phosphatase (ALP) showed significant variations between early- and late-stage breast cancer. For instance, elevated RBS levels (normal: 80–140 mg/dL) were observed in 20 out of 56 patients, with 85% in late-stage and 15% in early-stage cancer. High RBS is linked to increased tumor grade, potentially due to enhanced cell proliferation driven by hyperglycemia and hyperinsulinemia (Shander et al., 2004). ALP, a marker of liver and bone activity (normal: 40–125 mg/dL), was elevated in 31 patients, with 59% in advanced-stage disease. This supports ALP as a potential indicator of metastasis, particularly in bone and liver. Anemia was present in 30 patients, with 84% of cases in late-stage breast cancer, suggesting disease progression correlates with declining hemoglobin levels. Likewise, elevated urea levels (normal: 20–40 mg/dL) were found in 70% of late-stage and 29.6% of early-stage patients, pointing to renal dysfunction or systemic catabolism. Finally, 75% of advanced-stage patients showed elevated total protein, correlating with disease severity and systemic involvement. These findings highlight the prognostic value of routine biochemical markers in staging and monitoring breast cancer progression.

## Impact of Chemotherapy on Hematological and Biochemical Profiles in Cancer Patients

In a retrospective cohort study by Wondimneh et al. (2019), involving 376 cancer patients at Ayder Comprehensive Specialist Hospital, Ethiopia, significant changes in hematological and biochemical parameters were observed pre- and post-chemotherapy. The study included 228 women and 147 men. Hematological findings showed statistically significant decreases in white blood cells (WBC), red blood cells (RBC), hemoglobin (Hb), hematocrit (HCT), platelets (PLT), and neutrophils (NUT) after chemotherapy ($p < 0.05$), except for lymphocytes, which did not show a significant change. The WBC decrease was attributed to the suppression of hematopoietic stem cells by chemotherapy, increasing susceptibility to infections. Similarly, reduced RBC, Hb, and HCT levels suggested impaired erythropoiesis and possible chemotherapy-induced nephrotoxicity, affecting erythropoietin production. Biochemical parameters—including urea, creatinine (CRT), alanine transaminase (ALT), and aspartate transaminase (AST)—showed no statistically significant changes post-treatment ($p > 0.05$), although minor trends were noted. ALT and AST levels showed a slight, non-significant increase, while urea and CRT decreased marginally. The study concludes that chemotherapy significantly affects hematological profiles, contributing to anemia and immunosuppression, while changes in biochemical parameters were minimal. These findings underscore the need for regular monitoring to manage treatment-related toxicities effectively.

### The Role of Nutritional Intervention in Cancer Treatment

Nutritional intervention plays a vital role in comprehensive cancer care. Clinical evidence supports its effectiveness in reducing hospitalization duration, minimizing treatment-related toxicity, and enhancing nutrient intake, physical function, and overall quality of life. Importantly, nutritional support can significantly improve treatment outcomes by preventing or mitigating malnutrition—a common and often life-threatening condition among cancer patients. In fact, nearly 25% of cancer-related deaths may be attributed to malnutrition rather than the malignancy itself (Vitaloni et al., 2022). Patients with gastrointestinal cancers are particularly vulnerable due to disease-related digestive tract impairment, yet many lack adequate access to nutritional care. To address this, interdisciplinary and multiprofessional care models are essential. Such models, successfully implemented in a few European countries like the Netherlands and Sweden, ensure timely, effective, and safe nutritional interventions. However, across Europe, these remain exceptions rather than standard practice (Caccialanza et al., 2020).

## METHODS AND MATERIALS

The subject research was conducted on a sample of 100 patients diagnosed with cancer seeking care at the University Clinical Center of Kosovo for Cancer Care, Oncology Clinic. All samples were taken after approval from the institutional ethics committee and the personal consent of the patients. Blood samples were collected from patients in heparinized tubes. The patients range in age from 29 to 85 years, with half being men and half being women. The blood parameters survey was conducted between January and June 2024 and was voluntary. The patients included in the research have various demographic and socioeconomic characteristics.

In order to test the set goals, the patients covered by the research were given a survey regarding the use of nutritional supplements. For the purposes of the survey, a survey questionnaire was prepared, which contained open and closed-type questions, as well as multiple-choice questions that allow for the selection of multiple answers. In addition to demographic and socioeconomic questions about the patients, the survey questionnaire also included questions about the use of dietary supplements, changes in dietary habits, including preferences or avoidance of certain foods since the cancer diagnosis, and questions about the disease itself., that is, diagnosis, tumor stage, treatment history, and comorbidities (Dina et al, 2024). The patients diagnosed with cancer also had a blood count, that is, the measurement of ten hematological and biochemical parameters in the blood, shown in Table 1, together with their reference values. Through the analysis of blood samples, the values of: hemoglobin, erythrocytes, platelets, leukocytes, iron, sedimentation, AST, ALT, urea, and creatinine. The erythrocyte sedimentation rate (ESR) was determined using the Westergren method, a simple, cost-effective, and widely utilized laboratory technique. Statistical analysis of the collected data was conducted using the Statistical Package for Social Sciences (SPSS). Non-parametric statistical tests were applied, including the test for equality of medians based on the Chi-square distribution, as well as Spearman's rank correlation coefficient to assess the relationships between variables.

**Table 1**

*Blood parameters measured through blood count of patients.*

| Parameter | Reference values |
|---|---|
| Hemoglobin | 11.0-16.3 g/dl |
| Erythrocytes | 3.8-5.8 $x10^6mm^3$ |
| Platelets | 150-390 $x10^6mm^3$ |
| Leukocytes | 3.5-10 $x10^6mm^3$ |
| Iron | 60-180 mcg/dl |
| Sedimentation | 3-10 mm/h |
| ACT | 2-37 U/L |
| ALT | 3-41 U/L |
| Urea | 1.7-8.3 mm/l |
| Creatinine | 53-115 mm/l |

## Understanding the Importance of ESR Levels in Cancer Patients

The erythrocyte sedimentation rate (ESR) is a nonspecific laboratory marker that measures the rate at which erythrocytes (red blood cells) settle at the bottom of a test tube over a specified period. This process is influenced by the density differences among the components of blood, where heavier, iron-rich red blood cells settle beneath white blood cells and plasma, forming a gradient. The rate of sedimentation reflects the presence and intensity of inflammation within the body (MediSearch, 2023). Elevated ESR values can serve as important clinical indicators in oncology. High ESR levels have been associated with undiagnosed malignancies and are often correlated with poorer prognosis. This parameter may help clinicians assess absolute cancer risk, identify common sites of tumor involvement, and evaluate overall disease progression. Notably, ESR has shown utility in distinguishing between aggressive and non-aggressive tumor types, such as in prostate cancer. Additionally, elevated ESR may indicate metastatic spread and has been linked to reduced survival rates in patients with cutaneous melanoma (MediSearch, 2023).

# RESULTS AND DISCUSSION

## Blood Analysis in Oncology Patients

According to the results obtained from the analysis of certain blood parameters in the cancer patients covered by this research (Table 2), it can be concluded that with the exception of sedimentation, the average measured values for all other parameters are within the reference values.

Namely, from the blood analysis, it can be seen that hemoglobin in cancer patients ranges from 8 to 15.5 g/dl, with the average measured value being 12.4 g/dl, with a standard deviation of about 2 g/dl. The results show that 24% of the cancer patients covered by the research have hemoglobin below the reference level of 11 g/dl, while the rest have hemoglobin within the reference values.

The situation is similar to erythrocytes, where 26% of patients have slightly lower values than normal. Namely, the values of this parameter range from a minimum of 2.86 to a maximum of 5.12 $x10^6 mm^3$, while the average measured value for all patients is 4.1 $x10^6 mm^3$, and the standard deviation is equal to 0.6 $x10^6 mm^3$.

**Table 2**

*Descriptive statistics of blood count results*

| Indicator | Hgb. | Erith. | Sluggi | Leuk. | Iron | Sedim. | AST | ALT | Urea | Creat |
|---|---|---|---|---|---|---|---|---|---|---|
| Reference values | 11-16,3 | 3,8-5,8 | 150-390 | 3,5-10 | 60-180 | 3-10 | 2-37 | 3-41 | 1,7-8,3 | 53-115 |
| Average | 12.4 | 4.1 | 222.1 | 8.6 | 80.2 | 14.3 | 30.7 | 35.2 | 8.0 | 91.8 |
| Median | 12.2 | 4.1 | 201.2 | 8.5 | 70.9 | 10.5 | 30.1 | 32.2 | 7.4 | 80.8 |
| Minimum | 8 | 2.86 | 92.2 | 4.6 | 30.3 | 5 | 15.5 | 15.32 | 5 | 50.35 |
| Maximum | 15.5 | 5.12 | 401 | 15.5 | 150.2 | 40 | 60.6 | 90.5 | 22.2 | 200.2 |
| Stand. Dev. | 2.0 | 0.6 | 69.4 | 2.1 | 23.8 | 9.8 | 11.1 | 15.1 | 2.4 | 29.0 |
| Asymmet-ric. | -0.15 | -0.29 | 0.79 | 0.78 | 1.27 | 1.33 | 0.72 | 1.05 | 3.68 | 1.34 |
| Flatness | 1.98 | 2.19 | 3.15 | 3.73 | 4.71 | 3.91 | 2.80 | 4.02 | 18.88 | 4.66 |
| Zhark-Be-ra | 4.63 | 4.10 | 10.5 | 12.35 | 39.3 | 32.9 | 8.7 | 22.7 | 1276.5 | 41.6 |
| P-value | 0.099 | 0.129 | 0.005 | 0.002 | 0.000 | 0.000 | 0.013 | 0.000 | 0.000 | 0.000 |

According to the reference values, platelets in the blood should be between 150 and 390 $x10^6mm^3$. In the patients analyzed, platelets ranged between 92.2 $x10^6mm^3$ and 401 $x10^6mm^3$, with a mean of 222.1 $x10^6mm^3$ and a standard deviation of 69.4 $x10^6mm^3$. Only 11% of the total number of patients have platelets outside the reference values.

Regarding leukocytes, 18% of patients have leukocytes above the upper limit of 10 $x10^6mm^3$, while in the rest of the cancer patients, the value of this parameter is within the normal range. The minimum value of this parameter is 4.6 $x10^6mm^3$, and the maximum is 15.5 $x10^6mm^3$, while the average for all patients is 8.6 $x10^6mm^3$, with a standard deviation of 2.1 $x10^6mm^3$.

For iron, cancer patients have values of this blood parameter between 30.3 and 150.2 mcg/dl. The average value of the parameter for all patients is 80.2 mcg/dl, with a standard deviation of 23.8 mcg/dl. A total of 8% of patients have blood iron values below the lower reference limit of 60 mcg/dl, while the rest have iron within the reference values.

The only deviation from the reference values of the measured parameters is the sedimentation, where the average measured value for all patients is above the upper reference limit. Namely, the sedimentation in cancer patients covered by the analysis ranges between 5 mm/h and 40 mm/h, while the average is 14.3 mm/h. The reference values for this parameter are between 3 and 10 mm/h, while exactly half of the patients have elevated sedimentation.

Regarding AST and ALT parameters, 28% and 30% of patients have elevated values. For AST, measured values in cancer patients range between 15.5 and 60.6 U/L, while for ALT, the range of measured values ranges from 15.32 to 90.5 U/L. The mean AST for all cancer patients was 30.7 U/L, with a standard deviation of 11.1 U/L, while the mean ALT for all patients was 35.2 U/L, with a standard deviation of 15.1 U /L.

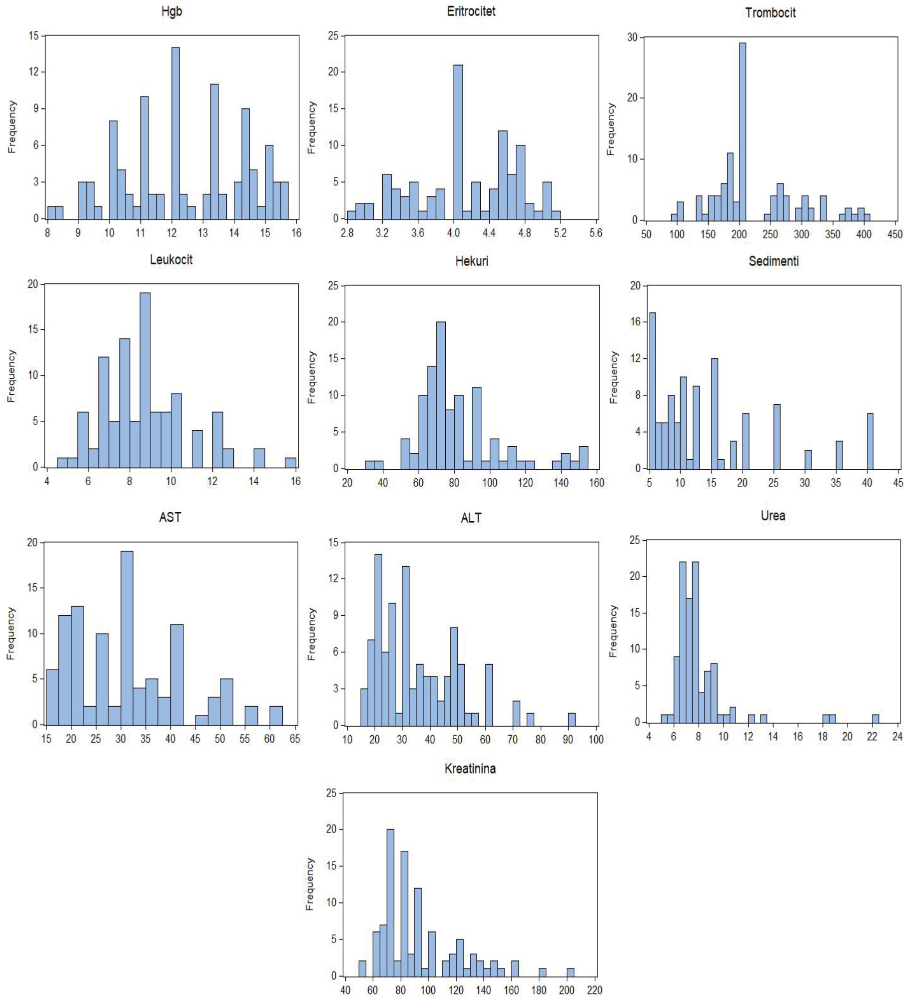
Regarding urea, reference values are between 1.7 and 8.3 mm/l, while the range of measured values in cancer patients is between 5 and 22.2 mm/l. The average value of urea for all cancer patients is 8 mm/l, with a standard deviation of 2.4 mm/l, while 24% of the patients covered by the research have elevated values of this parameter.

Finally, regarding creatinine, 2% of cancer patients have creatinine below the lower reference limit of 53 mm/l, while 21% of patients have elevated creatinine, that is, creatinine above the upper limit of 115 mm/l. The range of values of this parameter ranges from 50.35 mm/l to 200.2 mm/l, with the average value for all patients being 91.8 mm/l, with a standard deviation of 29 mm/l.

Figure 1 below shows the distribution of values for blood parameters. As can be seen from what is shown, it can be concluded that the data do not follow a normal distribution, which indicates that in further analysis it is necessary to use non-parametric tests, such as the test for the equality of the median, which follows a Chi-square distribution, or Spearman's rank correlation coefficient.

## Figure 1

*Distribution chart of blood count parameters*




From the perspective of the relationship between the age of patients and the values of blood parameters, it can be concluded that there is a moderate positive relationship (correlation) between age and: leukocytes (0.22), sedimentation (0.37), AST (0.28 ), ALT (0.26), urea (0.37), and creatinine (0.43). Additionally, we have a somewhat weaker, but negative relationship between age and iron, with a correlation coefficient of -0.18. In other words, an increase in age is often followed by an increase in the values of the above parameters, that is, a decrease in the value of iron.

In contrast to this, we have the absence of any linear relationship between the age of patients and hemoglobin, erythrocytes, and platelets, where the correlation coefficients assessed are statistically insignificant at the 0.05 significance level. It is important to point out that the rest of the coefficients are statistically significant at the 0.05 significance level, with the exception of the one between patients' age and iron, which is statistically significant at the 0.1 significance level.

**Table 3**

*Correlation coefficients between age The blood count.*

| Parameter | Age |
|---|---|
| Hemoglobin | -0.10 |
| Eritrocite | -0.13 |
| Platelets | 0.15 |
| Leukocytes | 0.22 |
| Iron | -0.18 |
| Sedimenti | 0.37 |
| AST | 0.28 |
| ALT | 0.26 |
| Urea | 0.37 |
| Creatinin | 0.43 |

From the perspective of different characteristics of the patients, an analysis was made to see if there are certain systematic differences in the median values of the measured blood parameters between separate groups of patients. In this context, the results of the analysis showed that older patients generally have higher median values of urea and creatinine, with these values tending to increase with increasing age. So, for example, people up to the age of 40 have a median urea value of 7 mm/l, while those over 70 years of age have a median urea of 7.91 mm/l.

The situation is similar to creatinine. Namely, people under the age of 50 have a median value of creatinine of 70.5 mm/l, while the median value of creatinine for those over 70 years old is 95.45 mm/l.

In terms of gender, the analysis showed that men generally have higher values than women for leukocytes (8.8 $x10^6mm^3$ in men vs. 7.7 $x10^6mm^3$ in women), sedimentation (15 mm/h in men vs. 8 mm/h in women), urea (7.7 mm/l in men vs. 7.01 in women) and creatinine (90.25 mm/l in men vs. 70.7 mm/l in women).

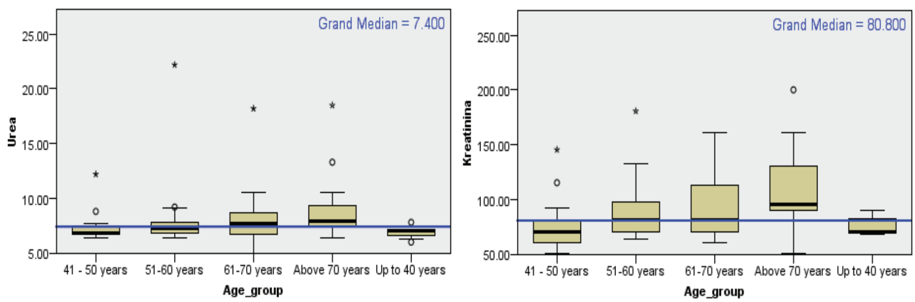
Finally, differences in median values for almost all blood parameters were also observed between patients with metastatic disease and those without metastatic disease. Namely, patients who have metastasis of the disease have generally higher values of leukocytes (9.05 vs. 7.7), sedimentation (15 vs. 8.5), AST and ALT (34.3, respectively 40.3 vs. 22.75, that is, 25.25), urea (7.79 vs. 7), and creatinine (90.3 vs. 72.2). On the other hand, patients with metastasis of the disease have generally lower values of hemoglobin (11.26 vs. 13.3), erythrocytes (4 vs. 4.43), and iron (70.2 vs. 80.3).

Regarding the other independent variables that were the subject of analysis, the results showed the absence of statistically significant differences in the median value of blood parameters between patients with different places of residence, different body mass index, cigarette consumption, presence of a history of disease in the family, as well as between patients receiving different treatments of the disease.

In addition, the graphs below (Fig. 2, Fig. 3, Fig. 4) graphically show the identified differences.

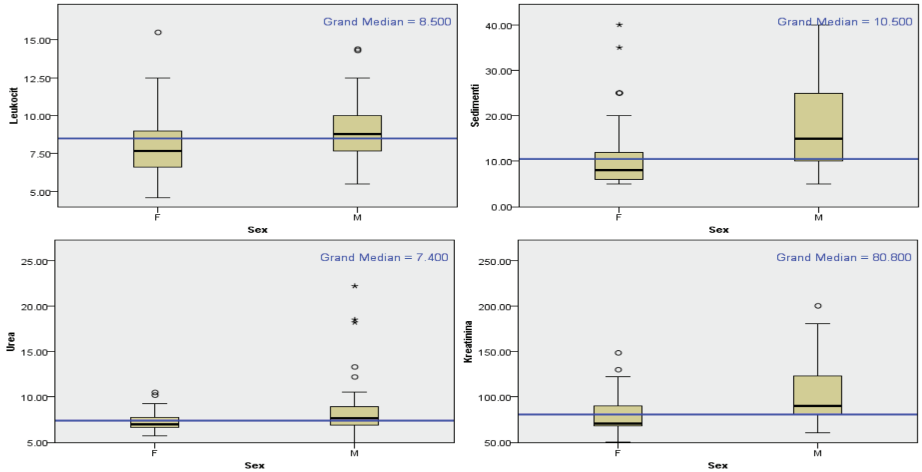
**Figure 2**

*Graphs showing the differences in the median values for specific parameters from the blood count, according to the age of the patients*



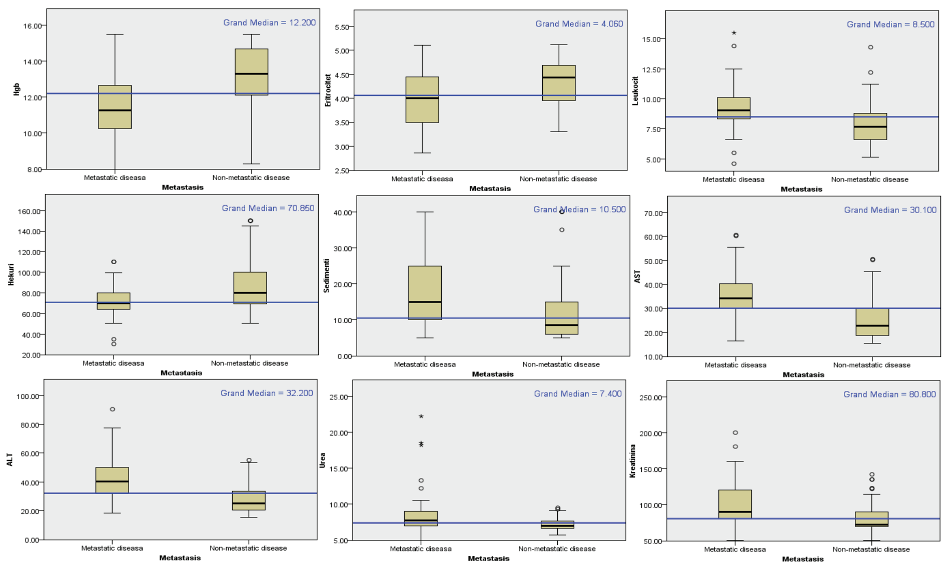
## Figure 3

*Graphs showing the differences in the median values for certain parameters from the blood count, according to the gender of the patients.*




## Figure 4

*Graphs showing the differences in median values for certain blood count parameters, according to whether the disease has metastasized or not*



Finally, the results of the conducted equality tests are shown in Table 4 below.

**Table 4**

*Tests for equality of median values of blood count parameters for different groups of patients according to age group, sex, and whether the disease is metastatic or not.*

| Parameter | Age-Group | | Gender | | Metastasis | |
|---|---|---|---|---|---|---|
| | Stat. on a test. | P-value. | Stat. on a test. | P-value. | Stat. on a test. | P-value. |
| Hemoglobin | 6.639 | 0.156 | 0.361 | 0.548 | 17.832 | 0.000 |
| Eritrociti | 2.081 | 0.721 | 0.040 | 0.841 | 4.848 | 0.028 |
| Platelets | 8.066 | 0.089 | 1.000 | 0.317 | 0.040 | 0.841 |
| Leokocit | 3.174 | 0.529 | 5.762 | 0.016 | 12.928 | 0.000 |
| Iron | 0.611 | 0.962 | 0.400 | 0.841 | 9.014 | 0.003 |
| Sedimenti | 7.287 | 0.121 | 14.440 | 0.000 | 17.668 | 0.000 |
| АСТ | 5.627 | 0.229 | 0.640 | 0.424 | 15.968 | 0.000 |
| АЛТ | 6.139 | 0.189 | 1.973 | 0.160 | 17.512 | 0.000 |
| Urea | 14.760 | 0.005 | 4.840 | 0.028 | 9.014 | 0.003 |
| Creatinin | 12.784 | 0.012 | 11.579 | 0.001 | 11.488 | 0.001 |

## Integrating Nutrition into Oncology: Clinical Benefits and Future Directions

Nutrition plays a vital role in cancer care, influencing disease progression, treatment tolerance, and quality of life. Nutritional interventions—including counseling, supplements, and enteral or parenteral support—have been shown to improve body weight, energy, protein intake, and reduce treatment-related side effects (Prado et al., 2022). These benefits lead to better treatment adherence, survival, shorter hospital stays, lower costs, and improved physical function (Caccialanza et al., 2020; Senesse et al., 2008). Beyond physical health, nutrition supports psychosocial well-being by reducing anxiety, preserving social bonds around meals, and promoting healthy habits. Combined with exercise, it helps maintain muscle mass and independence. Patients receiving nutritional counseling often report improved quality of life (Sonneborn-Papakostopoulos et al., 2021; Marin Caro et al., 2007). Early, routine nutrition screening and a personalized, multimodal assessment are essential to optimize patient care.

## Future Directions

Despite evidence, nutrition remains under-integrated in oncology due to limited awareness and dialogue. Future efforts should focus on:

- Embedding nutrition specialists in oncology teams
- Standardizing malnutrition screening tools
- Developing cancer- and treatment-specific nutritional protocols
- Investing in research on nutritional genomics, microbiome interactions, and immunonutrition
- Ensuring universal access to nutrition services regardless of socioeconomic status

Integrating nutrition fully into cancer care will improve clinical outcomes and enhance survivorship and quality of life.

## Conclusion

The results of the blood analysis show that 24% of the 100 cancer patients covered by the research have hemoglobin below the reference level of 11 g/dl, while the rest have hemoglobin within the reference values. In 26% of patients, the values of erythrocytes are somewhat lower than normal values. Only 11% of the total number of patients have platelets outside the reference values. 18% of patients have leukocyte values above the upper limit of 10 $x10^6mm^3$. A total of 8% of patients have blood iron values below the lower reference limit of 60 mcg/dl. Sedimentation in cancer patients covered by the analysis ranges between 5 mm/h and 40 mm/h, while the average is 14.3 mm/h. The reference values for this parameter are between 3 and 10 mm/h, while exactly half of the patients have elevated sedimentation. Regarding AST and ALT parameters, 28% and 30% of patients have elevated values. The average value of urea for all cancer patients is 8 mm/l, with a standard deviation of 2.4 mm/l, while 24% of the patients covered by the research have elevated values of this parameter. Regarding creatinine, 2% of cancer patients have creatinine below the lower reference limit of 53 mm/l, while 21% of patients have elevated creatinine, that is, creatinine above the upper limit of 115 mm/l.

The increase in age is followed by an increase in the values of the parameters leukocytes, sedimentation, AST, ALT, urea, and creatinine, that is, a decrease in the value of iron. The results of the analysis showed that older patients generally had higher median urea and creatinine values, with these values tending to increase with increasing age. Differences in the median values for almost all blood parameters are also observed between patients who have metastasized disease and those in whom the disease has not metastasized. Namely, patients who have metastasis of the disease have generally higher values of leukocytes (9.05 vs. 7.7), sedimentation (15 vs. 8.5), AST and ALT (34.3, respectively 40.3 vs. 22.75, that is, 25.25), urea (7.79 vs. 7), and creatinine (90.3 vs. 72.2). On the other hand, patients with metastasis of the disease have generally lower values of hemoglobin (11.26 vs. 13.3), erythrocytes (4 vs. 4.43) and iron (70.2 vs. 80.3). Evaluating the nutritional status of every cancer patient is essential, as nutrition influences disease progression, symptoms, treatment response, recovery, and overall prognosis. Health systems must invest in qualified nutrition experts to support cancer care teams. Currently, insufficient staffing and limited recognition of nutrition's importance among oncologists and policymakers hinder patients from accessing vital nutritional support. There is a critical need for enhanced education for both healthcare professionals and patients, especially regarding nutrition in digestive system cancers. Developing targeted educational and scientific resources will help raise awareness and enable effective nutritional interventions tailored to patient needs.

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