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VARIATION IN HEMATOLOGICAL PARAMETERS AMONG DRUG ADDICTS

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ABSTRACT

The study aims to determine the effect of drug addiction on hematological health using 120 clinical data based on laboratory findings on drug-dependent individuals. The findings indicate that the major blood parameters have changed and a significant fraction of the participants depict low levels of hemoglobin and red blood cells which indicates that anemia is very common. Moreover, the mismatch of the levels of white blood cells, i.e. leukopenia and leukocytosis, are signs of the dysregulation of the immune system and predisposing to infection. Also pointing to the possibility of coagulation and bleeding dispossessions, platelet abnormalities especially, thrombocytopenia. All these findings prove that drug addiction has a significant negative impact on the hematopoietic system and the necessity to include regular hematological screening in the clinical care of drug-dependent patients to help identify the disease at an early stage, treat it in time, and achieve better health outcomes.

Keywords: *Drug addiction; Hematological parameters; Anemia; White blood cell count; Platelet count; Substance abuse*

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1. INTRODUCTION

Drug addiction and substance abuse have become one of the primary social health concerns of the global community, with multiple implications on physical and mental health. The continued use of addictive drugs like opioids, cannabinoids, stimulants, sedatives, and alcohol provokes the involvement of multisystems, which will frequently cause considerable physiological and biochemical changes. The hematopoietic system is one of the most susceptible to the effects, and the level of blood parameters speaks about the whole health condition of the person and his or her internal homeostasis.

Hematological parameters, such as hemoglobin level, red blood cells count, white blood cells count, platelets count, and erythrocyte indices, are vital in oxygen delivery, immune defense, and coagulation. Medical abuse may interfere with these parameters in various ways by means of nutritional deficiency, suppression of bone marrow, immune moderation, unease inflammation, liver dysfunction, and heightened vulnerability to infection. The route of drug administration, addiction period, substance type used also impact the degree of hematological changes.

It has been reported in several studies that drug-dependent people have anemia, leukocytosis or leukopenia, thrombocytopenia, and distorted erythrocyte indices. These changes can predispose addicts to complications like infections, bleeding disorders, delaying wound healing among other physical performance. In spite of such dire side effects, hematological alterations amongst drug addicts are not commonly diagnosed despite the fact that in third world countries where screening and education are not a routine procedure.

It is thus important to gain a better insight into the difference in hematological parameters in drug addicts to ensure early identification of systemic complications, clinical intervention planning, and better health outcomes. The paper will assess and interpret the hematological profile of patients who are dependent on drugs and, thus, help to improve the models of diagnosis and prevention in the field of addiction medicine.

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1.1.Objectives of the Study

1. To assess the hematological parameters such as hemoglobin, total red blood cell count, total white blood cell count, platelet count, and erythrocyte indices among drug addicts.
2. To compare the hematological profiles of drug-dependent individuals with those of non-addicted (healthy) controls.
3. To evaluate the association between drug addiction and hematological variations, with respect to duration and type of substance abuse.
4. To identify potential hematological abnormalities that may serve as early indicators of systemic complications in drug addicts.

1.2.Hematological Alterations Associated with Drug Addiction

The clinical and physiological consequences of the addictive drug use on the bone marrow, the immune system, and the full metabolic processes are multifactorial and lead to a wide range of hematological changes. Chronic substance abuse is often linked to unhealthy eating, gastrointestinal malabsorption, and disturbed metabolic processes, which result in the lack of such vital micronutrients as iron, folates, and B12. These are essential nutrients in the normal production of erythrocytes and their lack disrupts the production of red blood cells leading to different forms of anemia that are often experienced by persons who are drug addicts. These hematological abnormalities are further worsened by chronic inflammation and direct toxicity of bone marrow by drugs.

The modification of the levels of white blood cells in the individuals who abstain drugs is usually the indication of the immune dysfunction due to constant exposure to the substances of abuse. These immune impairments can be in the form of leukopenia, which is a measure of lower immune competence or leukocytosis, which is a measure of chronic infection or inflammatory responses. As a result, individuals who are dependent on drugs become prone to frequent infections and slow healing of the disease. Also, platelet abnormalities are often cited, which occur due to liver dysfunction, bone marrow, suppressive or the direct toxic effect of drugs on the functions of megakaryocytes. Such alterations can predispose a person to bleeding diseases, or, in certain instances, thrombotic complications. All these hematological disturbances show the systemic and progressive nature of drug addiction, and thus, the

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importance of regular hematological studies in the clinical examination, follow-up, and proper treatment of an individual with the condition.

2. REVIEW OF LITERATURE

Jain, George, and Narnoli (2020) carried out an uptake of hematologic alterations linked to alcohol and substance use conditions. Their research posted that chronic substance abuse produced considerable unfavorable outcomes on the hematopoietic system, which usually leads to anemia, leukocyte defects, and platelet dysfunctions. The authors have indicated that significant contributors to the change in the hematology profile in substance users were nutritional deficiencies, liver impairment, bone marrow suppression, and chronic inflammation. The review has highlighted clinical significance of continuous hematological observation in people with substance use disorders to identify systemic complications at an early stage.

Rahmayanti et al. (2017) pre- and post-intervention hematological and blood chemistry indicators in recovering drug abusers in Indonesia. They found that despite the partial recovery of parameters of blood observed in the process of rehabilitation, some of them still had abnormal hemoglobin levels, distorted red blood cell indices, and immune-related disturbances. The research implied that there were permanent hematological consequences of prolonged drug exposure despite the drug abuser stopping the substance use and hence the importance of medical follow up during the recovery stage.

Guzel et al. (2018) examined immunomodulatory and hematologic cellular responses in opioid and heroin addicts. The research revealed a considerable change in the number of white blood cells and the distribution of immune cells which showed immune maladjustment among opioid dependent people. Also, there were some changes in red blood cell and platelet parameters, which implied that opioid addiction influenced the immune and hematopoietic functions. The authors concluded that the use of heroin and opioids had an immense effect on the systemic immunity and blood cell homeostasis.

Tavasolian et al. (2015) compared the hematological and biochemical parameters of the addicts of methamphetamine with those of healthy people. Their findings revealed that the level of hemoglobin, changes in the count of red blood cells, and the abnormal features of white

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blood cells in methamphetamine users become significantly lower. The researchers credited these alterations to oxidative damage, malnutrition and direct toxicity of methamphetamine on bone marrow functions. The authors also stressed the fact that hematological changes can be used as early warning signs of systemic toxicity in the abuse of stimulants.

3. RESEARCH METHODOLOGY

The systematic design of the research methodology of the given study was aimed at investigating the differences in the chosen hematological parameters in drug-dependent individuals based on the clinical laboratory evidence. Due to the aim of determining and characterizing the hematological changes related to drug addiction, a cross-sectional descriptive study was deemed the best way to conduct an analysis. This methodology allowed measuring the hematological status at a certain moment with the help of the available laboratory investigation records, which allowed presenting a clear and valid overview of the abnormalities related to blood in drug-dependent people. It was carried out in a identified clinical environment during a stipulated period of time and in a strictly selected population of identified drug addicts, and a sufficient sample size of the population was selected using purposive sampling to guarantee the availability and completeness of pertinent hematological information.

3.1.Research Design

The current study used descriptive cross-sectional research design to determine changes in the chosen hematological parameters in drug-addicted patients. The design was selected due to the laboratory investigation records to give a picture of the hematological changes due to drug addiction at a given time.

3.2.Study Area and Duration

The research was carried out in one accredited clinical diagnostic laboratory and de-addiction center. The information was gathered within a stipulated study duration of six months, where hematological investigation reports of the drug-dependent persons were gathered and examined.

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3.3.Study Population

The study cohort was a group of people that had a history of drug addiction with a record of hematological tests as a clinical assessment. The study involved only the confirmed cases of substance dependence which were identified by the healthcare professionals.

3.4.Sample Size and Sampling Technique

The sample size used in the study was 120 drug-depending individuals. A purposive sampling was used to select the samples, which were restricted to the accessibility of the entire records of the hematological investigation and the meeting the inclusion criteria.

4. RESULT AND DISCUSSION

The current research was done on a sample of 120 people whereby the sample included drug-dependent subjects who had a regular hematological investigation. The data obtained in the laboratory were organized and analyzed systematically through the methods of descriptive statistics. Hematological parameters were divided into clinically relevant ranges, and the results were communicated in the number of frequencies and percentages to emphasize changes in the study population.

Table 1: Distribution of Study Participants According to Hemoglobin Levels (n = 120)

Hemoglobin Level (g/dL)	**Frequency**	**Percentage (%)**
Below Normal (<12 g/dL)	48	40.0
Normal (12–16 g/dL)	62	51.7
Above Normal (>16 g/dL)	10	8.3
Total	**120**	**100.0**

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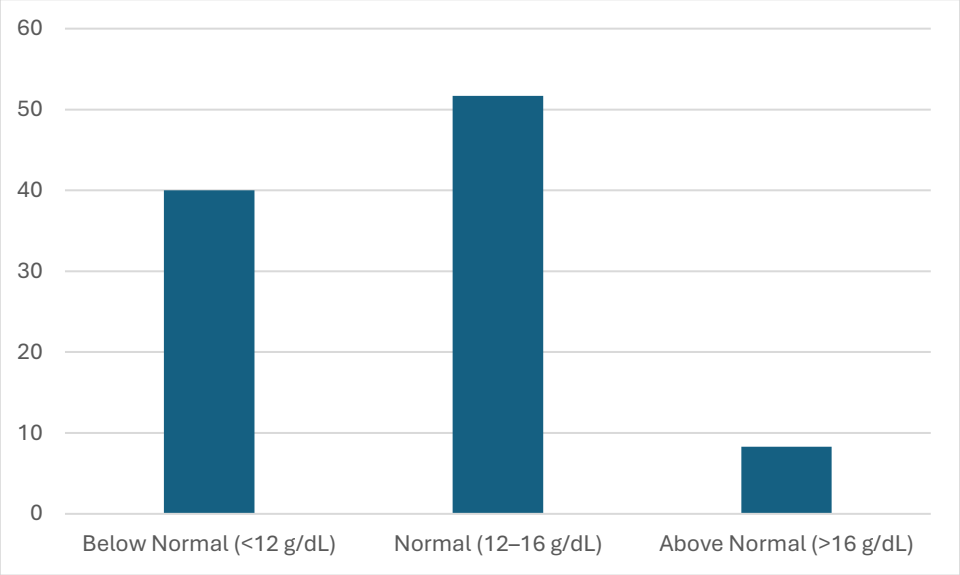

Figure 1: Graphical presentation of Distribution of Study Participants According to Hemoglobin Levels

Table 1 shows the allocation of the study participants based on the levels of hemoglobin. Among 120 drug dependent patients, 48 (40.0%) of them had the level of hemoglobin below the normal value and this means that anemia is highly prevalent. Most of the participants, 62 (51.7%) had normal levels of hemoglobin in the body with only 10 (8.3%) having levels above the normal range. The large percentage of low hemoglobin levels indicates that the drug addiction could be related to the impaired erythropoiesis, nutritional deficiencies, or persistent systemic stress.

Table 2: Distribution According to Total Red Blood Cell (RBC) Count

RBC Count (million cells/mm³)	Frequency	Percentage (%)
Below Normal	44	36.7
Normal	68	56.6
Above Normal	8	6.7

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Total	**120**	**100.0**

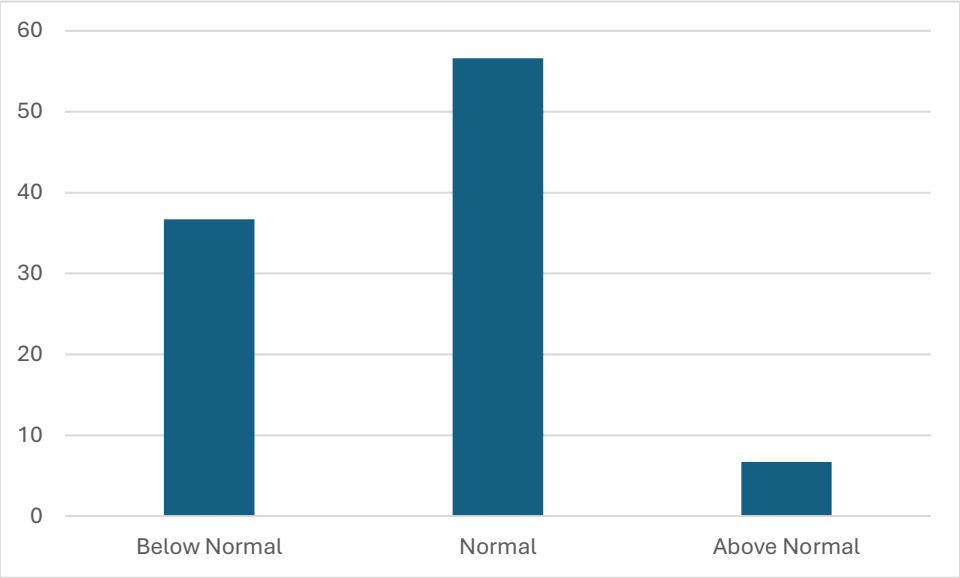

Figure 2: Graphical presentation of Distribution According to Total Red Blood Cell (RBC) Count

Table 2 shows how the sample is distributed in terms of the total amount of the RBCs. The sample size of 44 participants (36.7%), which showed the lowering of RBC count, supported the results of anemia observed by low hemoglobin levels. The participants whose RBC counts were normal (56.6% = 68) were observed to have normal counts and the ones whose RBC counts were high had only 8 participants (6.7%). The lower number of the RBCs in a significant number of subjects is indicative of potential bone marrow supression and nutritional deficiencies that are synonymous with chronic drug abuse.

Table 3: Distribution According to Total White Blood Cell (WBC) Count

WBC Count (cells/mm³)	Frequency	Percentage (%)
Leukopenia (<4,000)	22	18.3
Normal (4,000–11,000)	74	61.7

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Leukocytosis (>11,000)	24	20.0
Total	**120**	**100.0**

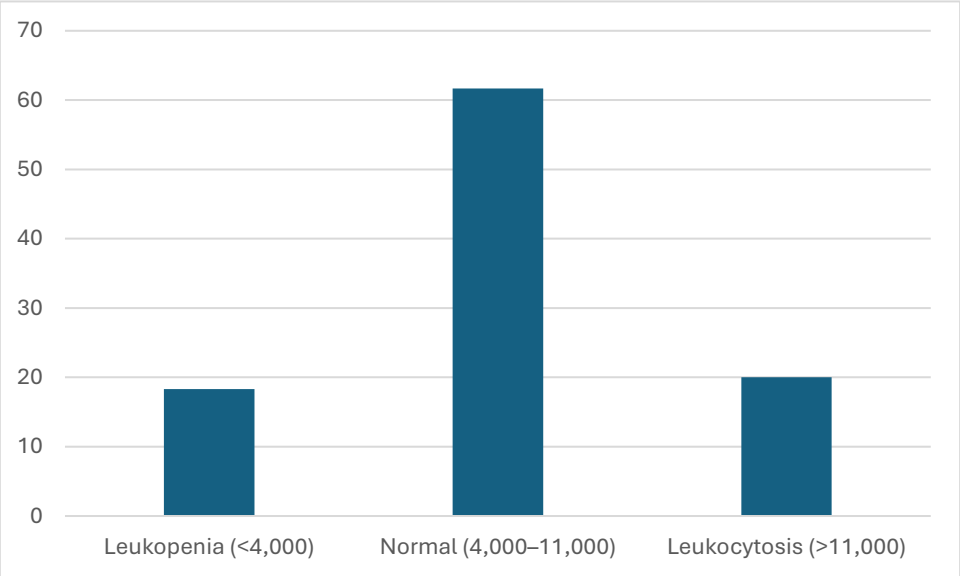

Figure 3: Graphical presentation of Distribution According to Total White Blood Cell (WBC) Count

Table 3 represents the totals of the WBC counts in the study participants. A normal level of WBC was detected in 74 people (61.7%), which implies that the immune system remains intact in most of the patients. Nonetheless, 22 subjects (18.3%) exhibited leukopenia that could indicate cases of immune suppression, whereas 24 subjects (20.0%) exhibited leukocytosis that could be related to underlying infections or inflammation. These differences indicate the immune dysregulation in drug-dependent people.

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Table 4: Distribution According to Platelet Count

Platelet Count (cells/mm³)	Frequency	Percentage (%)
Thrombocytopenia (<1.5 lakh)	30	25.0
Normal (1.5–4.5 lakh)	78	65.0
Thrombocytosis (>4.5 lakh)	12	10.0
Total	**120**	**100.0**

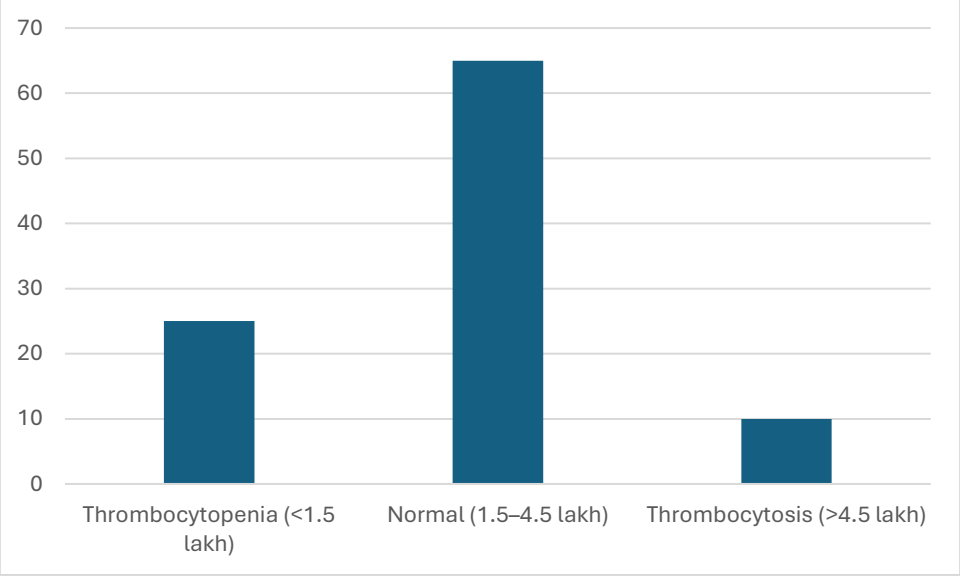

Figure 4: Graphical presentation of Distribution According to Platelet Count

Table 4 presents a representation of the platelet count among the study population. Seventy-eight participants (65.0%) had normal platelet levels. Nevertheless, 30 subjects (25.0%) had thrombocytopenia which can predispose to bleeding complications whereas 12 subjects (10.0%) had thrombocytosis which may be related to inflammatory or a response to a condition. The occurrence of platelet abnormality indicates the effect of drug addiction on coagulation and hematologic stability.

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5. CONCLUSION

The current experiment identifies huge differences in hematological variables between drug-dependent persons and proves the negative effects of substance abuse on the functioning of the hematopoietic and immune systems. The study of laboratory-based results in 120 drug abusers found that the reduction in hemoglobin concentration and red blood cell counts were too high, and this showed that the abusers were anaemic due to deficiency in nutrients, suppression in bone marrow and chronic systemic stress. Changes in the count of white blood cells, both leukopenia and leukocytosis, indicated immune deregulation, and elevated risk of infections, whereas platelet abnormalities, especially thrombocytopenia, were indicative of the possibility of coagulation and bleeding. The results of the study underline that drug addiction is not only a behavioral problem but a disorder that has severe physiological implications, which is why regular hematological screening and early clinical intervention in those people, who are addicted to drugs, are necessary to avoid adverse effects and enhance an overall state of health.

REFERENCES

1. *Jain, R., George, A. B., & Narnoli, S. (2020). Haematological changes in alcohol and substance use disorders-an overview. Int Arch Subst Abuse Rehabil, 2(006), 10-23937.*
2. *Rahmayanti, F., Riany, R., Subita, G. P., Irmagita, A., Wardhany, I. I., Wimardhani, Y. S., ... & Savitri, A. (2017). Hematology and blood chemistry results of recovering drug abusers in indonesia. Journal of International Dental and Medical Research, 10, 546-550.*
3. *Guzel, D., Yazici, A. B., Yazici, E., & Erol, A. (2018). Evaluation of immunomodulatory and hematologic cell outcome in heroin/opioid addicts. Journal of addiction, 2018(1), 2036145.*
4. *Tavasolian, F., Abdollahi, E., Samadi, M., & Vakili, M. (2015). Analysis of Hematological and Biochemical Parameters in Methamphetamine Addicts Compared with Healthy Individuals. Medical Laboratory Journal, 9(4).*
5. *Lalit, V. K. G., & Kumar, S. An Overview-Haematological Variations in Alcohol and Drug Addiction Problems.*
6. *Emeribe, A. U. (2016). Hematological changes associated with illicit drug abuse in a city of Northern Nigeria. International Journal of Hematology Research.*

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7. *Yager, L. M., Garcia, A. F., Wunsch, A. M., & Ferguson, S. M. (2015). The ins and outs of the striatum: role in drug addiction. Neuroscience, 301, 529-541.*
8. *Nennig, S. E., & Schank, J. (2017). The role of NFkB in drug addiction: beyond inflammation. Alcohol and Alcoholism, 52(2), 172-179.*
9. *Karim, R. (2018). Case Study of Drug Addict. J Psychol Clin Psychiatry, 9(1), 00504.*
10. *Hossain, M. K., Davidson, M., Kypreos, E., Feehan, J., Muir, J. A., Nurgali, K., & Apostolopoulos, V. (2022). Immunotherapies for the treatment of drug addiction. Vaccines, 10(11), 1778.*
11. *Venniro, M., Zhang, M., Caprioli, D., Hoots, J. K., Golden, S. A., Heins, C., ... & Shaham, Y. (2018). Volitional social interaction prevents drug addiction in rat models. Nature neuroscience, 21(11), 1520-1529.*
12. *Sansone, A., Di Dato, C., de Angelis, C., Menafra, D., Pozza, C., Pivonello, R., ... & Gianfrilli, D. (2018). Smoke, alcohol and drug addiction and male fertility. Reproductive biology and endocrinology, 16(1), 3.*
13. *Feltenstein, M. W., See, R. E., & Fuchs, R. A. (2021). Neural substrates and circuits of drug addiction. Cold Spring Harbor perspectives in medicine, 11(4), a039628.*
14. *Bozarth, M. A. (2023). Drug addiction as a psychobiological process. In Addiction controversies (pp. 112-134). CRC Press.*
15. *Volkow, N. D., Michaelides, M., & Baler, R. (2019). The neuroscience of drug reward and addiction. Physiological reviews, 99(4), 2115-2140.*

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