

Anemia Prevalence and Characteristics in Individuals Living with HIV: A Comprehensive Study on Haemoglobin Level

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Conflict of interest: Nil

Abstract

Introduction: Cytopenia, a frequent complication of the human immunodeficiency virus (HIV), may arise due to abnormalities in bone marrow production, elevated peripheral blood loss, or destruction of blood cells. [4] The aim of the study is to find the anemia among the HIV individuals.

Methods: A prospective cross-sectional study was conducted at the Physiology Department of GSL Medical College, Rajamahendravaram, from January to May 2016. The study protocol received approval from the Institutional Ethics Committee, and informed written consent was obtained from all participants. The study included individuals of both genders aged over 18 years who were identified as HIV-infected according to the National AIDS Control (NACO) guidelines. Following the initial procedures, a physical examination was conducted, and all observations were meticulously documented in the study form. Sociodemographic details including age, gender, economic status, educational background, and occupation were also recorded. Subsequently, blood samples were collected adhering to universal safety precautions. HIV status was determined in accordance with NACO guidelines, with strict adherence to manufacturer guidelines. Additionally, hemoglobin (Hb) levels were measured using an automated method, following institutional protocols.

Results: Total 164 members were included in the research. Among the participants, 68 individuals (41.5%) exhibited Hb levels above 10.5 g/dl and another 6 (3.7%) had levels below 6.5 g/dl.

Conclusion: The prevalence of anemia in this study exceeds that of comparable research. Given this elevated prevalence, it underscores the necessity for vigilant monitoring of patients receiving a zidovudine-based regimen. Enhanced screening for both anemia and infectious diseases is warranted.

Keywords: haemoglobin, anemia, HIV, research

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Introduction

Anemia is a condition characterized by a deficiency in the number of red blood cells (RBCs) or a low concentration of hemoglobin (Hb) within these cells, leading to a reduced capacity of the blood to carry oxygen. [1] In 2019, anemia accounted for around 50.3 million years of healthy life lost due to disability (YLDs) worldwide. The regions with the highest YLDs attributed to anemia were South Asia, Western Sub-Saharan Africa, and Eastern Sub-Saharan Africa. [2]

Hb levels below 12.0 g/dL in women and below 13.0 g/dL in men indicate low concentration, considered as anemia. [3] Hb is a protein containing iron found in RBCs. Its primary function is to transport oxygen from the lungs to the tissues and to carry carbon dioxide from the tissues back to the lungs. Anemia can lead to substantial impacts on both physical and mental health, as well as economic and social well-being. Health conditions such as chronic diseases

and infections can contribute to the development of anemia. [4]

Cytopenia, a frequent complication of the human immunodeficiency virus (HIV), may arise due to abnormalities in bone marrow production, elevated peripheral blood loss, or destruction of blood cells. [4] The aim of the study is to find the anemia among the HIV individuals.

Methods

A prospective cross-sectional study was conducted at the Physiology Department of GSL Medical College, Rajamahendravaram, from January to May 2016. The study protocol received approval from the Institutional Ethics Committee, and informed written consent was obtained from all participants. The study included individuals of both genders aged over 18 years who were identified as HIV-infected according to the National AIDS Control (NACO) guidelines. Excluded from the research were non-

cooperative individuals, pregnant women, and those already receiving medication.

Upon enrolment in the study, individuals were provided with a clear explanation of the research objectives, and any queries they had were addressed. Participants were assured that their health status would not be affected by the study protocol. Confidentiality was strictly maintained, with assurances that participant names would not be disclosed by the study team.

Following the initial procedures, a physical examination was conducted, and all observations were meticulously documented in the study form. Sociodemographic details including age, gender, economic status, educational background, and occupation were also recorded. Subsequently, blood samples were collected adhering to universal safety precautions. [5] HIV status was determined in accordance with NACO guidelines, with strict adherence to manufacturer guidelines. [6] Additionally, Hb levels were measured using an

automated method, following institutional protocols.

Statistical analysis: The data was analysed using SPSS software version 17. Statistics such as mean, Standard deviation, ANOVA and t test were used. P value < 0.05 was considered statistically significant.

Results

Total 164 members were included in the research. Among the participants, 68 individuals (41.5%) exhibited Hb levels above 10.5 g/dl, while 69 (42.1%) fell within the range of 9.5 to 10.5 g/dl. Additionally, 15 individuals (9.1%) had Hb levels ranging from 8.0 to 9.4 g/dl, 6 (3.7%) ranged between 6.5 to 7.9 g/dl, and another 6 (3.7%) had levels below 6.5 g/dl (Table 1). These findings highlight the distribution of Hb levels among the studied population, demonstrating varying degrees of anemia severity.

Table 1: Frequency of Hb levels among the study members

Hb	Number	%
>10.5	68	41.5
9.5 – 10.5	69	42.1
8.0 – 9.4	15	9.1
6.5 – 7.9	6	3.7
<6.5	6	3.7
Total	164	100

Discussion

In HIV infection, anemia prevalence fluctuates based on demographic traits and disease progression, typically escalating in advanced stages, particularly among women, infants, and children, as well as in developing nations. [7] In HIV-infected patients, anemia can lead to severe complications, spanning from reduced functional abilities and quality of life to disease advancement and diminished survival rates. The factors contributing to anemia in HIV-infected individuals can be classified into three primary categories: diminished RBC production within the bone marrow, heightened RBC breakdown, and ineffective RBC generation caused by nutritional deficiencies. [8]

The study comprised 164 heterosexual HIV individuals from the Antiretroviral Therapy (ART) Center of Rajamahendravaram. Among them, the majority were females, accounting for 95 cases (57.9%), while males constituted 69 cases (42.1%). Analysis revealed a statistically significant ($P < 0.05$) reduction in both the mean and frequency of Hb levels among the cases, averaging 10.1 ± 1.9 . Similar findings were reported by Kaudha R et al. [9]

The anemic in HIV members was classified according to WHO/ACTG anemia toxicity grades. [10] Among the 164 study population, an overall anemia prevalence was noted in 96 individuals (58.5%), with Hb levels ranging between 6.5 – 10.5 g/dl. Specifically, 69 cases (42.1%) were categorized as grade 1, 15 (9.1%) as grade 2, 6 (3.7%) as grade 3, and another 6 (3.7%) as grade 4 anemia.

Parinitha et al. [11] reported similar findings with a mean Hb level of 10.2, but only 48% of cases had Hb levels below 10 g/dl. Daniel Nii Aryee Tagoe and Evelyn Asantewaa [12] also observed a mean Hb level of 10.20 ± 2.05 . These results align with the research by Malapati B et al. [13], indicating a significant decline in Hb levels ($P < 0.05$). Additionally, S. Mittal et al. [14] reported Hb level of 7.58 ± 2.00 gm/dl in their study, which included 75 HIV/AIDS patients with anemia characterized by Hb levels ≤ 10 gm/dl. These collective findings underscore the prevalence and severity of anemia in HIV/AIDS patients across various studies, emphasizing the importance of monitoring and managing Hb levels in this population.

Anemia and severe anemia frequently reported in individuals living with HIV (PLWH). [15] Studies

indicate that antiretroviral therapy (ART) affects the risk of anemia among people PLWH. During the early stages of treatment, the use of zidovudine (AZT) was associated with bone marrow suppression, resulting in anemia. [16] This study found no correlation between the presence of anemia before and after the initiation of treatment, highlighting a limitation in its scope.

Conclusion

Normocytic anemia with a reduced reticulocyte count emerged as the predominant type of anemia observed overall. The prevalence of anemia in this study exceeds that of comparable research. Given this elevated prevalence, it underscores the necessity for vigilant monitoring of patients receiving a zidovudine-based regimen. Enhanced screening for both anemia and infectious diseases is warranted.

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