RESEARCH ARTICLE

Is anaemia frequent in HIV/AIDS patients presenting to a tertiary care hospital?

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Abstract

Objective: To determine the frequency of anaemia among patients with human immune-deficiency virus / acquired immunodeficiency syndrome.

Methods: The descriptive cross-sectional single-blind study was conducted at Jinnah Hospital, Lahore, Pakistan, from June 25 to December 25, 2016, and comprised human immune-deficiency virus / acquire immunodeficiency syndrome patients diagnosed at least 3 months earlier. Demographic information was obtained along with sample of patient's blood for haemoglobin level estimation. Anaemia was defined as haemoglobin <13 g/dL in males and <12 g/dL in females. Data was analysed using SPSS 20.

Results: Of the 230 patients, 100(43.7%) were females and 130(56.5%) were males. The overall mean age was 37.99±14.48 years. The mean haemoglobin level was 11.08±2.44 g/dl; 113(49.1%) 8-12 g/dl, 26(11.3%) <8g/dl, and 91(39.6%) >12g/dl. Overall, 152(66.1%) patients were anaemic and 78(33.9%) were normal. Age and socioeconomic status were significantly associated with anaemia status (p<0.05).

Conclusion: Anaemia was a common finding among human immune-deficiency virus / acquired immunodeficiency syndrome patients.

Keywords: HIV/AIDS, Anaemia.

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Introduction

The human immunodeficiency virus (HIV) is part of the Lentivirus[1] genus member of the Retroviridae family. Lentivirus is transmitted as an enveloped positive-sense single-stranded ribonucleic acid (RNA) virus. After entry into the host cell, the RNA viral genome gets reverse-transcribed into a double-stranded deoxyribonucleic acid (DNA) using the virally encoded reverse transcriptase which gets transported alongside the viral genome into the virus particle. The resultant viral DNA is transferred into the nucleus where it gets integrated into the host DNA using a virally encoded integrase and cellular co-factors.[2] After integration, the virus can remain latent, therefore premising the virus and the infected target cell to remain undetected by the host's immunologic system. On the other hand, the virus might get transcribed to produce new RNA genomes along with viral proteins which are packaged and then secreted from the host cell as fresh virus particles which commence the viral replication cycle again.[2]

HIV and acquired immunodeficiency syndrome (AIDS) represent a new-age global pandemic. In 2014, worldwide about 37 million people were HIV-positive, and the incidence of newly diagnosed infections was almost 2 million.[3] However, the number was down from 3.1 million newly diagnosed patients in 2001. Out of the 37 million cases, females comprised more than half of the cases and 2.6 million cases were aged <15 years.[3] It caused approximately 1.2 million deaths in 2014, which was a reduction from 2.2 million deaths in 2005. Sub-Saharan Africa is the most drastically affected region. In 2010, approximately 68% (22.9 million) of the total HIV patients and 66% of all HIV deaths (1.2 million) happened in that region. The second most affected region was south and southeast Asia where in 2010 approximately 4 million cases were reported, representing 12% of worldwide HIV cases, causing an estimated 250,000 deaths. About 2.4 million of South Asian patients were in India.[4] In 2008, about 1.2 million individuals in the United States (US) were infected with HIV, causing about 17,500 deaths. It was reported by the Centre for Disease Control and Prevention (CDC) that 20% of the infected individuals in the US were unaware of their HIV status in 2008.[3] Frequency was lowest in the Middle East and northern Africa at <0.1%. It was 0.1% in eastern Asia and 0.2% in western and central Europe. The European countries most affected in 2009 and 2012 were Russia, Ukraine, Latvia, Moldova, Portugal and Belarus, in decreasing order of estimated frequency.[4]

HIV is a health concern on the rise in Pakistan, with the number of new cases still growing. Recreational drug abuse and extra-marital sex have resulted in the HIV/AIDS epidemic, mostly among the injectable drug abusers, male and female sex workers, and repatriated migrant workers.[5] The National AIDS Programme shows that more than

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17,224 HIV cases have been diagnosed since 1986, but the United Nations (UN) and government estimates report the burden of HIV/AIDS cases to be about 97,000 varying from a low value of 46,000 to the high value of around 210,000.[6]

The particular details of HIV infection that lead to AIDS have not been yet wholly understood in spite of substantial advances in the virology of HIV and the immunology of the human host.[7] It is known that HIV causes a reduction in the cluster of differentiation 4+ (CD4+) helper T cell counts, with a resultant inversion of the normal CD4/CD8 T-cell ratio along with dysregulation in the production of antibodies by the B-cells. Therefore, immune reaction in response to certain antigens start to deteriorate, and, therefore, host cells do not considerably react, causing increased susceptibility to various opportunistic infections and the normal harmless commensal organisms.

Anaemia is often a complication present with infection of the human immunodeficiency virus (HIV), and may be important clinically. The study conducted in Iran[8] showed the frequency of anaemia of 71%. A study conducted in South India[9] reported anaemia to be 69% in HIV-positive patients. In Iran[10] anaemia was found in 46% subjects.

The current study was planned to determine the frequency of anaemia among patients with HIV/AIDS at an urban healthcare facility.

Material and Methods

The descriptive cross-sectional single-blind study was conducted at Jinnah Hospital, Lahore (JHL), Pakistan, from June 25 to December 25, 2016, and comprised HIV / AIDS patients diagnosed at least 3 months earlier. Anaemia was defined as haemoglobin (Hb) level <13g/dL in males and <12g/dL in females. Hb level >8g/dl was labelled mild anaemia and <8g/dl as severe anaemia. HIV/AIDS was considered positive using the enzyme-linked immuno-absorbent assay (ELISA) technique and confirmed by the Western blot test.

After approval from the institutional ethics committee, the sample size was calculated while keeping confidence interval (CI) of 95% with confidence limits of 6%. The sample was raised using non-probability consecutive sampling technique. Data was collected after taking informed consent from the subjects. Demographic information, like age, gender, address, socioeconomic status (SES) etc., was noted. A 2ml blood sample was taken in complete blood count (CBC) vial for Hb level estimation. Single-blind was applied to reduce bias by assigning serial number in place of patient name. Hb level and final outcome anaemia were recorded. Patients with anaemia were managed as per the hospital protocol.

Data was analysed using SPSS 20. Mean and standard deviation (SD) were calculated for quantitative variables, like age, duration of HIV/AIDS, Hb level. Frequency and percentage were calculated for qualitative variables, like gender, SES, and anaemia. Effect modifiers, like age, gender, SES, duration of HIV, were controlled through stratification. Chi-square test was applied after stratification by taking $p \leq 0.05$ as significant.

Results

Of the 230 patients, 100(43.7%) were females and 130(56.5%) were males. The overall mean age was 37.99±14.48 years (Table 1). The mean Hb level was 11.08±2.44 g/dl; 113(49.1%) 8-12 g/dl, 26(11.3%) <8g/dl, and 91(39.6%) >12g/dl. Overall, 152(66.1%) patients were anaemic and 78(33.9%) were normal. Among the anaemic, 62(41%) were females and 90(59%) were males.

In SES terms, 103(44.8%) patients belonged to low SES earning <10,000 rupees per month, 91(39.6%) were earning Rs.10-50,000 and 36(15.7%) were earning >50,000 rupees (Table 2).

Mean duration of disease was 11.72±7.96 months, with

Table-1: Stratification of outcome with regards to age distribution (n=230).

Age (years)	Anaemia		Total
	Present	Absent	
18-26	32	25	57
27-35	31	24	55
36-44	32	18	50
45-53	32	7	39
54-62	9	3	12
63-71	8	1	9
72-80	8	0	8
Total	152	78	230

Chi square *p*-value: 0.014 (significant)

Table-2: Stratification of outcome with regards to socioeconomic status distribution (n=230).

Socioeconomic Status	Anaemia		Total
	Present	Absent	
High	17	19	36
Middle	64	27	91
Low	71	32	103
TOTAL	152	78	230

Chi square *p*-value: 0.033 (significant)

Table-3: Distribution of Duration of Disease (n=230).

Duration of disease (months)	n (%)
3-6	72 (31.3)
7-12	87 (37.8)
Greater than 12	71 (30.9)
Total	230 (100)

Mean duration of disease ± SD: 11.72 ±7.96

71(30.9%) patients having been diagnosed >12 months ago (Table 3).

Age and socioeconomic status were significantly associated with anaemia status (p<0.05), while gender and duration of disease were non-significant (p>0.05).

Discussion

Anaemia is often a complication present with HIV infection, and may be important clinically. Causes of anaemia can be multifactorial. By defining anaemia as Hb <12g/dL in females and <13g/dL in males, the current study showed frequency of anaemia at 66.1% which is slightly less than the 71% reported from Iran.[8] However, the findings of the current study are similar to studies conducted in the region.[9,10]

We observed that anaemia was more frequent in men than women, which is in contrast to some studies,[11-13] but similar to a study that had 9690 HIV-infected patients.[14]

Frequency of anaemia was about 70% in patients belonging to middle class and 68.9% in lower class patients. The high frequency of anaemia in these SES classes points to multifactorial aetiologies of anaemia, including nutritional deficiencies, besides the HIV infection. Better lifestyle and provision of resources may be a factor of low anaemia frequency in high SES. In the current study, mild anaemia was found in 49.1% and severe anaemia in 11.3% subjects. A study in Iran[10] found the presence of mild anaemia in 46% subjects but no case of severe anaemia was observed. Also in Iran, Jabbari et al.[13] reported the frequency of severe anaemia as 8% (100 patients).

In our study, frequency of anaemia was 70.1% in patients diagnosed 6-12 months ago, and 67% in patients who had disease duration >12 months. This is in agreement with other studies.[15]

Anaemia is also an independent predictor of disease progression and mortality, therefore close monitoring for anaemia should be done for patients on zidovudine-based antiretroviral therapy (ART) regimen. Anaemia screening, coupled with anaemia prevention techniques and treatment when required, should be a part of HIV care. A peripheral smear provides information regarding morphology of blood cells and can also provide clues about the cause of the abnormalities in haematopoiesis. However, a study[16] suggested that pre-treatment severe anaemia, as defined by Hb level ≤8 g/dL, should not be applied as criteria to avoid the prescription of zidovudine-based ART therapy in limited-resource settings. Cost-effective and prompt screening programmes for anaemia and infectious diseases, along with modification of strategies for morbidity and mortality reduction, are basic requirements in the treatment of HIV/AIDS patients in Pakistan.

Conclusion

Baseline anaemia at the time of diagnosis was found to be common in HIV/AIDS patients. Screening and timely management of anaemia are important steps to decrease the severity and overall mortality of the disease.

Disclaimer: The text is based on a dissertation.

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