



Original Article

Socio-Demographic and Behavioral Factors in Patients with Delayed Diagnosis of Human Immunodeficiency Virus: A Cross-Sectional Study

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Abstract

Objective: To find socio-demographic characteristics and behavioral factors of patients presenting in the late stage of HIV infection

Methods: This descriptive retrospective, cross sectional study was conducted at District Headquarter (DHQ) Teaching Hospital, Kohat Development Authority (KDA), Kohat from April 2020 to September 2020. Socio-demographic data was collected from patients record registered at HIV care center Kohat from either gender having age greater than 15 years with CD4 count at the time of diagnosis less than 350/mm³, or patient presenting with an AIDS defining illness on a pre-designed form. Descriptive statistics were applied to find characteristics of patients with late HIV diagnosis.

Results: A total of 152 patients had a CD4 count less than 350/mm³ at the time of diagnosis and registration at the HIV care center DHQ Teaching hospital. There were 87 (57.2%) males and 53 (34.9%) females. Majority of patients belonged to the age group of 31-45 years (40.8%), were unemployed (59.2%), married (63.2%) and were from area of Bannu (19.1%). A significant number of patients had a history of travelling abroad and were using smokeless tobacco while majority of patients didn't know about HIV infection and never visited health care worker in last year before registration at HIV Care Center Kohat.

Conclusion: Delayed diagnosis of HIV is common in male, unemployed patients, with a history of travelling abroad and married patients with majority of patients having no knowledge about HIV infection. Public health authorities shall implement new methods of expanding the realm of diagnostic testing as well as targeting those populations at a higher risk i.e., unemployed, substance abuse history, uneducated and having history of travel abroad, will help in early HIV diagnosis, avoiding AIDS defining conditions and mortality associated with HIV virus infection.

Keywords: Acquired Immunodeficiency Syndrome, Human immunodeficiency virus, Viral Diseases, Prevention, Infections

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Introduction

Barriers to Human immunodeficiency virus infection (HIV) testing and early diagnosis may relate to patient, health care provider or health care setup. According to public health perspective, the key to control HIV epidemic is identifying undiagnosed cases at a very early and even at the acute stage of HIV infection and then to put them on treatment

immediately.¹ The United Nations Program on HIV and Acquired Immunodeficiency Syndrome (AIDS) (UNAIDS) set the 90-90-90 targets. Their goals were to diagnose 90% of all HIV infected patients, provide antiretroviral (ARV) drugs to 90% of those diagnosed and achievement of complete viral suppression in 90% of patients on treatment by 2020.^{1,2} United Nation member states development summit held in

2015 set a target to eliminate HIV epidemic as one of their goals by 2030.² To achieve these targets, early diagnosis of HIV infection and prompt initiation of ARV therapy is essential for proper treatment of patient and controlling its spread to others by effectively suppressing the virus.³ However, still a significant proportion of patients infected with HIV are picked at a very advanced stage even in the developed countries.⁴ There are studies on South Asia, Central Asia including China and their results show that a substantial number of cases are diagnosed at a very advanced stage and there is a higher proportion of undiagnosed cases as well.^{3,6}

Late diagnosis of HIV is defined as a condition in which patients CD4 count is less than 350 cells per mm³ within 3 months of diagnosis of HIV infection.⁷ Different studies have been done to identify factors related with the late diagnosis of HIV. Various demographic factors, patient factors and specific groups of population have been identified that could be implicated for delay in diagnosis of HIV. Pakistan has a low prevalence of HIV infection but there has been an increase in new cases lately. There has been no local study to identify factors and characteristics of patients with delayed diagnosis in our part of the world especially in southern part of Khyber Pakhtunkhwa. The main objective of our study is to identify social, demographic and patient related factors associated with a delay in diagnosis of HIV in an advanced stage. The data can be of great importance and may provide important information for policy making locally to identify high risk groups and diagnose them with HIV infection at initial stages to prevent morbidity, mortality and further spread of HIV infection.

Methods

This descriptive, retrospective, cross sectional study was conducted at DHQ Teaching Hospital, Kohat, from September 2021 to April 2022. Data collection was started after taking ethical approval from KMU-Institute of medical sciences ethical review board (ERC/KIMS/2021/06). All patients registered at HIV Care Center KDA, Kohat, from June 2008 till June 2020 of either gender having age greater than 15 years with CD4 count at the time of diagnosis less than 350/mm³ or patient presenting with AIDS defining illness were included in the study. We excluded patients who were registered at other HIV care centers or had history of antiretroviral medication use before registration at Kohat or were defaulters. We also excluded patients having Hepatitis B infection and a past history of treatment with Tenofovir.⁸ Patient with positive HIV serology by WHO three

step method along with positive HIV ribonucleic acid (RNA) by polymerase chain reaction (PCR) were labelled as infected with HIV. Late presentation was defined as patient having initial CD4 count less than 350/mm³ within 4 weeks of HIV diagnosis.⁹ Patients whose initial CD4 count was less than 200/mm³ within 4 weeks of HIV diagnosis or patients who presented with HIV defining illness at the initial visit, irrespective of CD4 count were labelled as very late presentation.

Clinical records and registration books of all patients registered at HIV care center, Kohat, between June 2008 and June 2020 were reviewed. Data was collected at HIV care center from records by using structured questionnaire. The nurse and counsellor working at HIV center were trained on data collection form before starting the study for assuring proper data collection. Structured data collection form consisting of demographic factors, modes of transmission, travel history and risky behavior at the time of diagnosis were used to identify factors associated with the delay in HIV diagnosis. Information was collected from patient records at initial registration visit to HIV care center. Information was collected about demographics, monthly income, HIV exposure status, travel history and mode of transmission at the time of initial diagnosis from records of patient. Behavioral factors like smoking, substance abuse, patient membership group and perception about HIV infection were checked. Details were collected from patient records about stage of initial presentation, CD4 counts and clinical findings suggestive of AIDS defining illness. Data was collected in any visit done to see health care professional in 1 year time before initial diagnosis was made to assess for any missed opportunity for early HIV diagnosis by Health care worker.

Data entry and analysis was done on SPSS version 23.0. Descriptive statistics were used to describe characteristics of study population and distribution of data. Results were presented as tables.

Results

All patients' records registered at HIV care center since June 2008 were checked and a total of 152 patients had CD4 count less than 350/mm³ at the time of diagnosis and registration at HIV care center DHQ Teaching hospital, Kohat, and were hence were labelled as delayed presentation. There were 87 (57.2%) males and 53 (34.9%) females. Majority of patients belonged to the age group of 31-45 years (40.8%). Patients were mostly unemployed, married,

and were from the area of Bannu. Socio-demographic details of our study population is given in table 1.

All patients were further divided into late and very late presentation, on basis of their CD4 count and 82 (53.9%) patients were diagnosed at very late stage having CD4 count less than 200/mm³ (Table.1). Significant number of patients had history of travelling abroad and were using smokeless tobacco. Majority of patients didn't know about HIV infection and never visited health care worker in last year before registration at HIV Care Center. Behavioral

Table 1: Socio-Demographic factors in patients with Delayed HIV Diagnosis

Variable	Total number (N=152)	Percentages
Gender		
Male	87	57.2
Female	53	34.9
Transgender	12	7.9
Age		
18-30 years	32	21.1
31-45 years	62	40.8
46-60 years	35	23
More than 60 years	23	15.1
Educational status		
Primary (5 th class)	37	24.3
Middle (8 th Class)	41	27
Secondary (Matric)	20	13.2
Intermediate (FA, FSc)	13	8.6
Higher Education (graduation or above)	9	5.9
Uneducated	32	21.1
Marital status		
Married	96	63.2
Unmarried	43	28.3
Divorced	7	4.6
Widow	6	3.9
Monthly income		
Less than 20,000 PKR	34	22.4
20000-49999 PKR	52	34.2
50000-99999 PKR	41	27
100000 PKR or More	25	16.4

Table 1: Socio-Demographic factors in patients with Delayed HIV Diagnosis

Variable	Total number (N=152)	Percentages
Residence		
Kohat	11	7.2
Hangu	16	10.5
Waziristan	17	11.2
Bannu	29	19.1
Lakki Marwat	17	11.2
DI Khan	13	8.6
Karak	13	8.6
Orakzai Agency	11	7.2
Darra Adamkhel	14	9.2
Others	11	7.2
Employment		
Employed	62	40.8
Un-Employed	90	59.2
Stage of Presentation		
Late Presentation	70	46.1
Very Late presentation	82	53.9

factors in patients with late diagnosis of HIV infection are given in Table 2.

Discussion

Our study found that presentation and diagnosis at a delayed stage was common in patients having male gender, age group of 31-45 years, married, unemployed and belonging to lower middle class. Moreover, majority of patients were using naswar, had history of travelling abroad and did not know about HIV infection.

Diagnosing HIV at an early stage and prompt initiation of ART is of utmost importance in treating patients infected with HIV. Many studies have been done worldwide to assess characteristics of patients and factors associated with delayed diagnosis of HIV infection. A study conducted in India to assess factors associated with delayed presentation showed that the majority of the study participants were men in the 25–44-year-old age group emphasizing the cohort that is most adversely affected. The enormous disparity in health care uptake between males and females is shown by the notably low proportion of females who visit the health care facility specially for HIV testing and, being in the reproductive age could

be the reason for a higher prevalence in the 30-45 years age group. Their results were almost similar to our findings and the reason could be common social and cultural norms in South Asia.⁴ Another study done in Sweden also showed that majority of patients were males with an average age of 39.7 years.¹⁰ 59.2% patients with delayed HIV diagnosis were unemployed. A study conducted in Texas also showed that unemployment and poverty were risk factors for

delayed HIV diagnosis.¹¹ Another study done at HIV clinic in New Haven also reported unemployment and old age were the main characteristics of patients who were diagnosed at the Delayed stage of HIV infection.¹² As it is true for the majority of HIV cases reported in India, the heterosexual mode of sexual transmission was the commonest transmission pathway mentioned by patients as a potential method of acquiring the infection. Most of the patients in our

Table 2: Behavioral factors in patients with Delayed HIV Diagnosis

Variable	Total number(N=152)	Percentages
Travel Abroad		
Yes	45	29.6
No	107	70.4
Tobacco Use		
Smoker	26	17.1
Non-smoker	42	27.6
Ex-Smoker	37	24.3
Smokeless Tobacco (Naswar)	47	30.9
Substance abuse		
Alcohol	6	3.9
Opioids	15	9.9
Cocaine	12	8
Cannabis	4	2.6
Others	4	2.6
No substance abuse	111	73
Patient Membership		
Male Sex Worker	24	15.78
Female sex Worker	19	12.5
Injectable drug user	13	8.55
Transgender sex worker	7	4.6
General Population	89	58.55
Patient Perception about HIV infection		
Didn't Know about HIV infection	48	31.57
Think risk for infection was low	17	11.18
Afraid of finding out they have HIV	16	10.52
Social Stigmatization	36	23.68
Denial	20	13.15
Others	5	3.28
Visit to Health care worker last year & HIV test offer		
Didn't Visit health care Physician last year	89	58.6
Visit Health care Physician last year but HIV test not offered	46	30.3
Visit Health care Physician Last year, HIV test offered but not done	17	11.2

study population were married, uneducated or had only primary education.¹³ These risk factors have also been reported by other investigators. For instance, a study done in Nigeria, regarding epidemiology of patients with delayed HIV diagnosis showed that majority of patients were married, uneducated or had primary education. Similar results were also reported in another study done in Mozambique where majority of patients were married, uneducated or had only primary education.¹⁴

We also checked patients for the stage of late presentation and majority of our patients CD4 count at the time of diagnosis were < than 200/mm³ and presented with an AIDS defining illness. These patients are already at risk of death and, often there is a delay in the initiation of effective ART due to various social, cultural and health care setup factors. The prevalence of Late Presentation was 57% in children and 66.7% in adults with an overall prevalence of 65.5% in a study conducted in Southern Ethiopia.¹⁵ Another study conducted in Iran showed that approximately two-thirds of HIV patients are Late Presenters and one-third have Advanced HIV Disease.¹⁶ A study conducted in USA showed that 7% of patients have delayed entry into HIV care and in initiation of ARV medications.¹⁷ Another study conducted in Lahore showed that late commencement of Highly active antiretroviral therapy (HAART) is common in patients with a diagnosis of HIV infection.¹⁸ HIV stigmatization, lack of understanding, unemployment and poor access to HIV care facility could be the reasons for delayed initiation of HIV medication and has been endorsed by different studies conducted world-wide.¹⁹⁻²²

We also assessed behavioral factors of our study population and 29.6% patients had history of travelling abroad which was quite significant. Travelling can predispose to sexual transmission and at times substance abuse which could be the reason for higher prevalence in travelers specially in our population. A study done in Europe showed travelling as a risk factor for HIV transmission.²³ Another study conducted to check delayed HIV diagnosis in Urban/rural Florida showed travelling was an important risk factor for delayed HIV diagnosis.²⁴ Patient membership was also analyzed to check for possible route of HIV transmission and most of our patients were from general population. Male sex Workers (MSW) were the second most common group in patients having a late HIV diagnosis. MSW behavior has been proved by other studies as well, to be a risk factor for delayed HIV diagnosis. A study done in Amsterdam showed that late diagnosis of HIV was common in MSW group and the reason could be

the rising trend of same sex partner behavior in these regions.²⁵ Similarly many other studies done in other parts of Europe, Asia and America have shown MSW behavior as a risk factor for HIV diagnosis at a very advanced stage.²³⁻²⁵ MSW practice has been reported in Southern area of KPK which could be the reason for our findings. Substance abuse was reported in 41(26.97%) patients in our study population with opioid use being the most common. There were only 13 (8.55%) patients who were intravenous (IV) drug abusers. Substance abuse and IV drug abuse has been reported to have an association with the diagnosis of HIV at a very advanced stage. These patients are often homeless, unemployed and share needles and generally have a higher HIV prevalence.⁴

Most of our patients didn't know about HIV infection and had a very poor understanding. 89 (58.6%) patients from our study population didn't visit any health care professional 1 year before diagnosis at our HIV care center, while 46 (30.3%) patients of our study population who visited HCP in the last year were not tested for HIV. Poor perception, stigmatization and missed opportunities by HCP to offer HIV testing for early diagnosis has been reported in literature. In a study conducted in India, although majority of patients had features suggestive of immune compromised state, they were not tested for HIV in previous clinical visits. Another study conducted in Beijing, China, also reported under diagnosis of HIV infection by physicians at the primary level setup. A study done in Asia with data collected from South Asian countries including Bangladesh, Pakistan, Indonesia, Nepal and Vietnam identified factors like younger age, sex worker, imprisonment, transgender identity, illiteracy, rural residence, IV drug use, lack of health insurance, fear of confidentiality breach and public sector hospital as the place of HIV testing as barriers for diagnosis of HIV infection in early phase—.

There were several limitations in our study. Firstly, due to time constraints, our study sample was limited to patients registered at a single HIV care center and did not include patients from other HIV care centers. The cross-sectional nature of study limited actual estimation of the number of HIV infected patients retained in HIV center over time after starting of ARV and contributing factors. Lastly, a comparative study having patients with early diagnosis as control would have given better insight to factors associated with delayed diagnosis.

In spite of limitations in this study it still gives an idea about various socio-demographic factors in patients with late diagnosis of HIV and in future, further studies can be done to explore these factors by doing

multicenter case-control studies, to establish association of different factors leading to delayed HIV diagnosis in a developing country like Pakistan. Increasing HIV awareness and testing, training for health care workers in order to improve their approach to those with HIV infection and building their confidence in conducting a test will help in avoiding delay in HIV diagnosis.

Conclusion

Developing successful programs for community HIV testing, making collaborative effort to reduce the stigma associated with HIV testing and diagnosis, normalization of HIV diagnostic testing as a universal screening strategy and training Public health authorities to look for acceptable methods of expanding HIV testing as well as targeting key populations i.e. MSW, unemployed, those with substance abuse history, uneducated and having history of travel abroad, will help in early HIV diagnosis, avoiding AIDS defining conditions and mortality associated with HIV virus infection.

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Authors' Contribution

FN,AN: Conception

SA,MH: Design of the work

FS,UI: Data acquisition, analysis, or interpretation

FS,UI,SA,MH: Draft the work

FN,AN: Review critically for important intellectual content

All authors approve the version to be published

All authors agree to be accountable for all aspects of the work

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