

A STUDY ON RISK FACTORS ASSOCIATED WITH HIV PATIENTS AND IN GENERAL POPULATION – A CASE CONTROL STUDY IN AHMEDABAD CITY

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ABSTRACT

Background: The global estimates of HIV/AIDS cases and especially the growing number of women and children being infected and affected by it, raises serious concern. In the absence of a vaccine or cure for HIV infection, our only option is to promote awareness and sexual behaviour change for primary prevention of HIV.

Aims & Objective: (1) To study the Socio-demographic and the Clinico-epidemiological profile of HIV positive people (cases) and general population (controls); (2) To study the various risk factors associated with HIV/AIDS transmission in HIV positive people and general population.

Material and Methods: It was a case-control study in Infectious Disease clinic. A structured, open ended and pretested proforma was used to interview HIV positive and negative patients attending Infectious Disease clinic, Ahmedabad. Prior verbal and written consent was taken. This study included 600 HIV positive cases and 600 HIV negative controls of all ages attending clinic during January-December 2011.

Results: The study included 600 patients in cases and 600 patients in control groups. Total 466 (77.66%) patients were in sexually and economically reproductive age group of 25-49 years in case group and in control they were 454 (75.66%). Maximum 83.3% were positive through hetero-sexual route and 72% were having one or more clinical symptoms in case group. Unsafe sexual practices were more in cases 133 (22.2%) than control 66 (11%). High risk behaviour was more in cases 49 (8.2%) than control 13 (2.2%).

Conclusion: The study emphasizes the need for strict adherence to their Highly Active Ante-retro viral Therapy (HAART) & awareness about disease in order to have better prevention of spreading disease in community.

Key-Words: Socio-Demographic Profile; HIV/AIDS; Case-Control Study

Introduction

Human Immunodeficiency virus (HIV) and Acquired Immuno-Deficiency Syndrome (AIDS) is threatening the survival of many nations. It can't be cured but can be effectively prevented by changing the sexual behaviour of community^[1] and halted by ART regimen^[2]. India is having third largest number of people living with HIV/AIDS.^[3] In India, since the first case was detected in 1986,^[4] HIV infection and AIDS rapidly spread to the other parts of the country. HIV/AIDS prevalence in India is around 0.36% and is prevalent in all states.^[5] As per data, around 2.5-3 million people are living with HIV/AIDS in India.^[4] Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that more than 40 million people worldwide were living with HIV/AIDS by the end of 2010 and of these vast majority (90%) are surviving in developing countries.^[2] In this, women account for 47% of all adult living with HIV/AIDS.^[2] In Gujarat, 0.4% adult population is

living with HIV and around 1.4 lakhs with AIDS^[2] Heterosexual route of transmission is the main driver of the epidemic in most of India, accounting for nearly 90% nationwide prevalence.^[6]

Opportunistic infections (OIs) are an important cause of morbidity and mortality in patients with HIV/AIDS. When CD4 counts fall below 350 cells/mm³, the infection is associated with wide variety of OIs and other co-morbidities^[7] In order to implement the desired interventions, the epidemiology of modes of transmission (HIV/AIDS) in a particular region has to be understood with regards to socio-demographic factors, level of awareness, as well as risk behaviour of the population. It is so because effective approach for prevention and control of infection/disease is through awareness generation and life style modifications^[8] In a view of above facts and figures, this case-control study was carried out to contemplate the risk factors and clinico-epidemiological profile of HIV positive

patients and general population attending tertiary care clinic in private sector in Ahmedabad.

Objectives: (1) To study the Socio-demographic and the Clinico-epidemiological profile of HIV positive people (cases) and general population (controls); and (2) To study the various risk factors associated with HIV/AIDS transmission in HIV positive people and general population

Materials and Methods

Study Design: Hospital based case control study (Retrospective Study Design)

Study Duration: January-December 2011 (1 year)

Sample Size: 600 HIV positive patients and 600 control patients

Inclusion Criteria: All HIV positive patients irrespective of their age groups during above said period

Exclusion Criteria: Patients whose data was not found or who were dead

Site of the study: At private tertiary care hospital

Ethical Consideration: Written consent was obtained of all PLHA participants. Confidentiality and privacy has been assured for all the participants. For control patients, permission was taken from respective institution head.

Data Collection for Cases: A retrospective study where data collected from the clinical records of 600 patients over a period 1 year was carried out. The data were from January 2007 to December 2010. The data was collected from individuals attending tertiary care clinic. All individual who were HIV positive were eligible for this study. Subjects were clinically evaluated by treating physicians for any associated clinical co morbidities and complications. The diagnosis was made by a specialist based on clinical history, examination and laboratory investigations. Serological tests included HIV antibody testing by Enzyme linked immunosorbent assay (ELISA) and for confirmation western blot test was carried out. CD4 count was done at each visit. In severely ill

patients, viral load was done to know the virus activity. Data was collected at the frequent visits throughout the year. The following characteristics were used to analysis: (1) Demographic information—age, marital status and locality; (2) Sexual behavior; and (3) Clinical complaints at the time of presentation, duration of complaints, and any treatment taken for the complaints. A syndromic and clinical diagnosis was made on the basis of clinical features and laboratory investigations. Treatment was provided to the patient as per NACO operational treatment guidelines.

Data Collection for Control: Controls of the study were selected from same duration as cases and also from the same hospital. Controls were matched for age and sex. Proper history was taken and control patients were clinically evaluated same as the HIV positive cases. It was not possible to test for HIV to control participants because of some limitation of the study but who had a sign and symptoms suggesting HIV were tested and other STD patients without HIV/AIDS were taken as control in the study.

Definitions: (1) *Case:* HIV positive was defined on the bases of standard case definition given by WHO^[1] Cases are those who had the signs and symptoms or complications suggesting of HIV/AIDS and who were confirmed by laboratory diagnosis. (2) *Control:* HIV negative or controls were defined on the bases of not having typical signs and symptoms or complications of HIV/AIDS. Laboratory tests were negative for control and diagnosis was done other than HIV/AIDS.

Analysis: The pretested and structured proforma (questionnaires) was administered to all study subjects. The completed questionnaires were verified. Prior to analysis, missing data was checked against the survey forms both for cases and control group. Quantitative and categorical data was entered into MS Office- Excel 2007 and analyzed through Epi-info 7 software.

Results

The study was conducted with 600 HIV/AIDS patients and 600 HIV negative patients (control) out of them 410 (68.3%) were male and 190

(31.7%) were female in both the groups. Male: Female ratio was 2.1:1. Total 466 (77.66%) patients were in sexually and economically reproductive age group of 25-49 years in case group and in control they were 454 (75.66). Among them 298 (64%) were male and 168 (36%) were female in cases and 295 (65%) were male and 159 (35%) were female in control. In the study, 520 (86.7%) patients were married, in which 347 (66.7%) were male and 173 (33.3%) were female in case group and in control group 527 (87.8%) patients were married, in which 356 (67.5%) were male and 171 (32.5%) were female. In cases, majority of patients were urban dwellers around 430 (71.7%) and 170 (28.3%) patients were rural dwellers. In which, 417 (69.5%) patients were migrant (Other than Ahmedabad or from other state or from other country) and 183 (30.5 %) patients were local dwellers. In control, 475 (79.1%) were urban dwellers and 125 (20.9) were rural dwellers [Table 1].

Table-1: Demographic Profile of Patients in the Study

Characteristics	Cases		Control	
	Male (%)	Female (%)	Male (%)	Female (%)
Age (n = 600)*				
0-5	1 (50)	1 (50)	1 (50)	1 (50)
6-14	13 (81)	3 (19)	16 (80)	4 (20)
15-24	20 (69)	9 (31)	26 (79)	7 (21)
25-49	298 (64)	168 (36)	295 (65)	159 (35)
>50	68 (78)	19 (22)	72 (79)	19 (21)
Marital Status (n = 600)**				
Divorced	5 (71.4)	2 (28.6)	2 (66.6)	1 (33.3)
Married	347 (66.7)	173 (33.3)	356 (67.5)	171 (32.5)
Remarried	4 (44.4)	5 (55.6)	3 (50)	3 (50)
Not Applicable	54 (84.4)	10 (15.6)	49 (76.6)	15 (23.4)
Locality (n = 600)***				
Rural	116 (68.2)	54 (31.8)	92 (73.6)	33 (26.4)
Urban	294 (68.4)	136 (31.6)	318 (66.9)	157 (33.1)

Case Group: * $\chi^2 = 8.57$, df=4, p>0.05; ** $\chi^2 = 10.63$, df=3, p<0.05;

*** $\chi^2 = 0.00$, df=1, p=0.97;

Control Group: * $\chi^2 = 10.49$, df=4, p<0.05; ** $\chi^2 = 3.09$, df=3, p>0.05; *** $\chi^2 = 2.02$, df=1, p=0.15

Table-2: Socio-Economic Profile of Patients in the Study

Class*	Cases (%)**	Control (%)**	Total
Class I	246 (41)	267 (44.5)	513 (42.75)
Class II	207 (34.5)	193 (32.2)	400 (33.33)
Class III	117 (19.5)	111 (18.5)	228 (19)
Class IV	23 (3.8)	25 (4.2)	48 (4)
Class V	7 (1.2)	4 (0.6)	11 (0.9)
Total	600 (100)	600 (100)	1200 (100)

* Socio-economic Class according to Modified Prasad Classification; ** $\chi^2 = 2.41$, df=4, p>0.05

Socio economic classification shows majority of patients fall in class I, II and III in both case and

control group. In cases, 246 (41%) patients were in class I, 207 (34.5%) are in class II and 117 (19.5%) were in class III. In control group, 267 (44.5%) patients were in class I, 193 (32.2%) were in class II and 111 (18.5%) are in class III. This was due to study was done in private tertiary care hospital [Table 2].

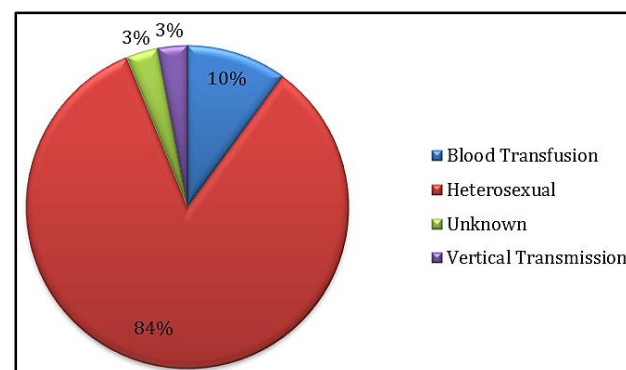


Figure-1: Mode of Transmission in PLHA Patients

Table-3: Presenting Symptoms in cases and control in the study@

Symptoms	Cases (%)	Control (%)	OR	95% CI	P-value
Fever (n=600)					
Present	296 (49.3)	237 (39.5)	1.49	1.18-1.89	< 0.01**
Absent	304 (50.7)	363 (60.5)			
Weight loss (n=600)					
Present	284 (47.3)	163 (27.2)	2.45	1.91-3.14	< 0.01**
Absent	316 (52.7)	437 (72.8)			
Cough (n=600)					
Present	126 (21)	97 (16.2)	1.38	1.02-1.87	< 0.05**
Absent	474 (79)	503 (83.8)			
Diarrhoea (n=600)					
Present	79 (13.2)	63 (10.5)	1.29	0.90-1.87	> 0.05**
Absent	521 (86.8)	537 (89.5)			
Anorexia (n=600)					
Present	223 (37.2)	208 (34.7)	1.11	0.87-1.42	> 0.05**
Absent	377 (62.8)	392 (65.3)			
Gastro-Intestinal Upset (n=600)					
Present	57 (9.5)	91 (15.2)	0.59	0.41-0.85	< 0.01**
Absent	543 (90.5)	509 (84.8)			
Oral ulcers (n=600)					
Present	48 (8)	13 (2.2)	3.93	2.04-7.70	< 0.01**
Absent	552 (92)	587 (97.8)			
Herpes (n=600)					
Present	17 (2.8)	1* (0.2)	17.47	2.46-35.34	< 0.01**
Absent	583 (97.2)	599 (99.8)			
Itching (n=600)					
Present	30 (5)	17 (2.8)	1.8	0.95-3.46	> 0.05**
Absent	570 (95)	583 (97.2)			

* Not confirmed but signs and symptoms suggesting herpes, ** P-values < 0.05 are significant; @ Multiple symptoms present, Figure in the parenthesis shows percentage

Figure 1 showing mode of transmission wise distribution of HIV positive patients in the study. It shows that 503 (84%) of patients had HIV infection through heterosexual route followed by 60 (10%) through blood borne transfusion, 18

(3%) vertical and in 19 (3%) patient didn't know or I couldn't elicit it.

Table 3 depicts the presenting symptoms and complications in both the groups' means cases and control groups. Odds ratio was calculated for the strength of association between cases and control groups. P value of < 0.05 was stated as statistically significant at the level of 95% confidence interval between both the groups. Symptoms like fever, weight loss, cough, diarrhea, anorexia, gastro-intestinal upset, oral ulcers, herpes and itching which are commonly found in HIV/AIDS were compared. HIV related symptoms were more in cases than control groups. Fever was present in 296 (49.3%) of cases. Weight loss and cough were present in 284 (47.3%) and 126 (21%) respectively. Diarrhoea was present in only 79 (13.2%) of cases. Gastro-intestinal upset was more in control group 91 (15.2%) than cases 57 (9.5%). This difference was due to selection of control from the infectious disease tertiary care hospital. In fever, weight loss and cough, the difference was statistically significant [$p < 0.05$].

Table-4: Main risk factors associated with both the groups[@]

Risk Factor	Cases (%)	Control (%)	Odds Ratio	95% CI	P-value
Unsafe Sexual Practices (n=600)					
Present	133 (22.2)	66 (11)	2.3	1.65-3.22	< 0.01
Absent	467 (77.8)	534 (89)			
Men Sex with Men* (n=600)					
Present	3 (0.5)	0 (0)	--	--	> 0.05
Absent	597 (99.5)	600 (100)			
Intra Venous Drug Users* (n=600)					
Present	1 (0.2)	0 (0)	--	--	> 0.05
Absent	599 (99.8)	600 (100)			
Migrants (n=600)					
Present	417 (69.5)	298 (49.7)	2.31	1.81-2.95	< 0.01
Absent	183 (30.5)	302 (50.3)			
High Risk Behaviour (n=600)					
Present	49 (8.2)	13 (2.2)	4.02	2.08-7.87	< 0.01
Absent	551 (91.8)	587 (97.8)			
Unknown (n=600)					
Present	53 (8.8)	27 (4.5)	2.06	1.24-2.41	< 0.01
Absent	547 (91.2)	573 (95.5)			

[@] Multiple symptoms present; P- values < 0.05 are significant; * Odds ratio can't be calculated

Main risk factors which were associated with case and control groups are shown in table 4. Unsafe sexual practices mean history of sex without any protection like condoms or history of anal sexual practices. Men having sex with men means practices of homosexuality. Intravenous drug users mean patients who have ever practiced

intravenous drug for addiction purpose. Migrants were those who were non-residents of Gujarat state or Ahmedabad city. High risk behaviour means those who have multiple sexual partners or males who are going to brothel. Migrants 417 (69.5%) were more followed by Unsafe sexual practices 133 (22.2%), High risk behaviour 49 (8.2%), Men having sex with men 3 (0.5%) and Intra venous drug users 1 (0.2%) in case group. In control group also Migrants 298 (49.7%) followed by Unsafe sexual practices 66 (11%) and High risk behaviour 13 (2.2%). There were no any participants in Men having sex with men and Intra venous drug users. Unknown group also contents smokers, alcoholics and frequent travellers. Difference between case and control group was found highly significant ($p < 0.01$) in unsafe sexual practices, migrants, high risk behaviour and unknown group. Odds ratio was very high for High risk behaviour (4.02) followed by Migrants (2.31), Unsafe sexual practices (2.3) and (2.06) for unknown group.

Table-5: Significant past history of patients in both the groups[@]

Past History	Cases (%)	Control (%)	Chi-square (χ^2)
Blood Transfusion (n=600)			
Present	98 (16.3)	43 (7.2)	$\chi^2 = 24.3$, df=1, p<0.01
Absent	502 (83.7)	557 (92.8)	
Operation (n=600)			
Present	115 (19.2)	87 (14.5)	$\chi^2 = 4.67$, df=1, p<0.05
Absent	485 (80.8)	513 (85.5)	
Major Illness (n=600)			
Present	69 (11.5)	78 (13)	$\chi^2 = 0.62$, df=1, p>0.05
Absent	531 (88.5)	522 (87)	
Drug Exposure (n=600)			
Present	110 (18.3)	137 (22.8)	$\chi^2 = 3.72$, df=1, p>0.05
Absent	490 (81.7)	463 (77.2)	

[@] Multiple symptoms present; P- values < 0.05 are significant

Table 5 shows the significant past history associated with both case and control groups. History of blood transfusion means transfusion at any time due to any reason like during trauma or pregnancy. Past history of blood transfusion was present in 98 (16.3%) of cases and 43 (7.2%) of control patients. Past history of operation was present in 115 (19.2%) of cases and 87 (14.5) of control patients. Past history of Major Illness was present in 69 (11.5%) of cases and 78 (13%) of control patients. Major illness means Diabetes, Hypertension or any long duration illness. Drug exposure was present in 110 (18.3%) of cases and 137 (22.8%) of control patients. Drug exposure means patients those who have taken drugs for

long duration for any major or minor illness. The Difference between cases and control was found highly significant for blood transfusion and any operation [$\chi^2 = 24.3, p < 0.01$].

Discussion

Mean age in the study was 37 years which was 38.7 years in a study of Sharma^[11] and 37.22 years in a study at Hamirpur by Vishal Chander et al^[12] According to this study, 82.5% patients were from the age group of 15-49 years (the most sexually active age group) which was slightly lower than the national figure (88.55%) by Park et al^[13] and other studies^[6,14] in which they were 92.4% in a study done by Joardar GK et al and 88.7% in the study done by Kumar A et al at south Kannada respectively and also in a study of Lal S.^[15]

Epidemiological analysis of reported AIDS cases reveals that disease is common in males than females, ratio being 3:1.^[15] In the study, it was 2.1:1 which was similar to study of Kumar A et al^[14], B Unnikrishnan et al^[16] and other studies by Yengkokpam Chitra et al^[5], MACSI^[17], Ebrahim RA et al^[18]. This may be due to more women coming out for treatment, decreased social stigma and more matured epidemic in Gujarat and surrounding states.

In this study, married male and female were respectively 84.6% and 90% which were similar to study of Kumar A et al.^[14] In this study, rural males/ females were 28.3%/ 28.4% respectively and urban males/ females are 71.7%/ 66.8% respectively. Data was different from the study of Rawat Vinita et al^[19] and BMJ^[20] recent studies, because in present study, the clinic was designed as tertiary care private clinic with catchment of population having higher affordability as well as during study period larger number of rural patients directed towards free ART centers in government sector.

In this study, Housewives were 26.7% in case group which was similar with previous studies by B Unnikrishnan et al^[16], Nitya Vyas et al^[21], Rawat Vinita et al^[19] and Shaikh Mohsin et al.^[22] Housewife percentage was more because they become HIV positive through Heterosexual route by their infected husbands. So in Indian culture

awareness of female for HIV/AIDS should be increased to accept the use of condom as a main preventive measure.

In this study, around 84% patients acquired infection through Heterosexual route which is similar with other studies done by Rashmi Sharma^[11] and Vinita Rawat et al^[19] 24.1% male spouse and 55.3% female spouse were HIV positive in the study. Similar observations were found in a study of Shaikh Mohsin et al.^[22]

This study was done in Gujarat state which is very low prevalent state in HIV/AIDS and female seropositivity is very low. We found a very few studies related to risk factor in HIV related cases and control. In one of such studies done by Fatu M. Forna et al^[23] on black women in Africa, they found high rates of HIV risk behaviors in both HIV-positive and HIV-negative sexually active black women which was very different from this study scenario and Here female are mainly affected by their positive husband while in Africa women have very high risk behavior and also Africa is a very high prevalent country in HIV/AIDS. HIV is a disease often linked to poverty, and previous studies suggest that economic disparities contribute to the HIV epidemic among black women.^[24,25] Most study participants in this study were from low-income households where as in this study almost all the participants were from well to do families due to conduction of this study in private tertiary care hospital in Ahmedabad city.

Sexually transmitted infection is one of the most important risk factors associated with HIV/AIDS. It may be present asymptotically in HIV positive males and females.^[26] Herpes was present in 17 (2.8%) of cases while females were 8 (4.8%) out of total females in cases group. This finding is different from Archana Sharma et al^[27] study in which it was high up to 11% because this study was done at the STI clinic where case load was very high for the same disease. In this study, only 1 (1%) confirmed case of syphilis while in this study, 31 (5.2%) cases were VDRL positive.

In this study, data related to Injecting Drug User was only 1 (0.2%) because in Gujarat, Injecting Drug Use is not a common route of transmission of

HIV. While Injecting Drug Use is the predominant route of transmission in north eastern states, it accounts for 1.6 percent of HIV infections.

Social class is also one of the important risk factors for HIV/AIDS. In this study, the participants were belonged to social classes I, II and III. This was remarkably same as the study by Yasmeen A Khan^[28] where majority (73%) cases belonged to either I or II class of socio economic status. In a study by Baig Vaseem et al^[29] (84%) study individuals belonged to social classes III, IV and V, which was different from this study. This can be explained on the account of the variation of source from where the study individuals have been taken.

In this study, 49 (8.2%) cases and 13 (2.2%) of control having high risk behavior and MSM were 3 (0.5%) in cases. Majority (95%) of the married men had got their infection due to sexual promiscuous behavior (multiple sexual partners) in which 84% having contact with commercial sex workers, 66% having extra marital contacts while 5% having MSM practice. These were the findings of the study done by Baig Vaseem et al.^[29]

Certain occupations may also be act as the risk factor for transmitting HIV/AIDS in the community. In this study, laborers were 91 (15.2%) and drivers were 29 (4.8%). History of migration for work was given by 38.5% of study individuals in a study by Baig Vaseem et al^[29] and this was supported by Magis Rodriguez et al.^[30] Transport related job was seen in 24% of study individuals and touring job was seen in 10.5%. Collectively these three major risk factors were found in 73% of their study individuals.

In this study, findings were quite different from below said studies for female sex workers (FSW), 2 (0.3%) because of non-response from this study participants or we couldn't elicit the data from them. Mathematical modelling by Nagelkerke NJ et al^[31] and several epidemiological studies^[32,33] find that vulnerable groups such as FSW and their clients, who have high rates of acquiring and transmitting HIV, play key roles in the spread of HIV and for maintaining HIV infection levels in the general population in a study by Jha P et al^[34].

Limitations of the Study

- Cases and control selection task was very difficult and participants with window period at the time of testing were couldn't elicited both in cases and control group.
- In the study, 5% deaths were recorded whose data was not analyzed due to insufficient and poor follow up which precludes the possibility of obtaining a random sample of all people living with HIV/AIDS.

Conclusion

In the study, age group mainly affected is 25-49 years (about 75%) which is sexually and economically productive age group. In cases, married males and females were 57.8% and 42.2% accordingly. In controls, they were 59.3% and 40.7% respectively. Pregnancy is one of the indirect risk factor for spreading the HIV/AIDS from infected mother to their new born child. Mode of transmission was 84% for heterosexual route and 10% blood borne. We also found 18 (3%) patients with vertical transmission which states strict care of the HIV positive mother and provision of Nevirapine prophylaxis both to the mother and baby at the private hospital also.

Some indirect risk factors were also found in the study. Certain major operations needed blood transfusion which also spread the disease in the study. Proportion of operations and there by history of blood transfusion is also more in the patient of case (16.3%) group as compared to the patients of control (7.2%) group which was found statistically significant.

All the risk factors in the study are more in the patients of case group as compared to the patients of control group. In cases unsafe sexual practices like low condom use, anal sex etc, migrants and high risk behavior were 22.2%, 69.5% and 8.2% respectively while in control group, they were 11%, 49.7% and 2.2% respectively. The difference was found statistically significant between them. Men having sex with men (MSM) (0.5%) activities and Intravenous drug users (IDUs) (0.2%) are not so much prevalent route in Gujarat and thereby in Ahmedabad city which was already mentioned in the results.

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