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TRENDS OF BASELINE CD4 COUNTS AT THE TIME OF REGISTRATION OF ADULT PATIENT, WHO ARE PUT ON ANTE RETROVIRAL THERAPY IN INDIA

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ABSTRACT

Background: India has shown considerable progress in prevention and treatment of HIV/AIDS, but timely detection and linkage to HIV treatment still remain a challenge. Understanding the baseline CD4 count level of patients at the time registration, who are put on ART with its trends and associated risk factors, could potentially guide program strategy.

Methods: Data on the levels and trends of baseline CD4 count level of adult (>15 years of age) patients at the time registration are drawn from the patient level data entered in PLHA software from 2007 to 2011.

Results: Out of 727,280 adult patient registered during 2007- 2011; 76.3% were initiated on ART. The baseline median CD4 count levels of adult patients, who were initiated on ART shows increasing trend during 2007-2011. Gender wise, baseline cd4 count over the year has found significantly higher CD$ in female ($p<0.05$). In this study also report patient having over 250 cells/mm^3 CD4 count have increased during the period 2007 to 2011.

Conclusion: The results indicate increase in median cd4 count level of adult patient registered and put on ART over the year. However, consolidation of universal access to treatment to all is highly felt need.

Keywords: Cd4 count, adult, ART, trend, HIV, India

INTRODUCTION

Over the last 25 years tremendous amount of work has been done to contain the spread of HIV and minimise the progression of those infected with HIV to an end stage clinical stage of Acquired Immune Deficiency Syndrome (AIDS). Today because of the availability of Antiretroviral Therapy (ART), HIV is now considered as a chronic manageable disease. The key factors that are considered instrumental for this success are increased levels of awareness about HIV, wide-spread availability of HIV testing facilities and treatment facilities and marked reduction in the cost of ARV drugs.[1]

In a country like India with a population of more than 2.1 billion and with 2.5 million people infected with HIV, spread across the country, it was essential to take up the fight against the disease in the form of a National Program. As per the latest HIV estimation report published by the programme, the Adult HIV prevalence has been brought down to 0.27% from an estimated 0.41% in 2001. In fact the last decade has seen a estimated 57% reduction in new HIV infections and with expansion in the availability of antiretroviral therapy there has been a estimated 29% reduction in annual number of death over the last 5 years occurring because of HIV/AIDS.[2]

From increasing awareness through various forms of IEC activities to collaborations with other departments, the programme has adopted a multifaceted approach to reduce HIV related stigma and discrimination and spread awareness about

HIV/AIDS and its treatment. Besides this, providing free of cost testing for HIV accompanied with pre- test and post- test counselling and treatment for all the clinically eligible HIV infected patients has also played a pivotal role in containing the spread of HIV in the country.

India has shown considerable progress in treatment and control of HIV/AIDS, but there is a dearth of study at National level which explains the timely access to HIV treatment to the patients. This paper has been written with the objective to demonstrate the trends of baseline CD4 count trends at the time of registration for HIV care at government run HIV treatment facilities in India over the period 2007-2011. The baseline CD4 count at the time of registration at the ART centre/ HIV treatment centre is a reflection of the successful expansion of ART treatment services, awareness campaigns and most importantly the linkages between Integrated Counselling and Testing centre (ICTC) and the ART centres.

The ART centres, where HIV treatment services are provided, provide free of cost ART (first line and second line) to all the clinically eligible patients. The free roll out of Antiretroviral Therapy (ART) in India under the National AIDS Control Programme was initiated in April 2004 across 8 ART centres in the country. With only 8 ART centres in 2004, today there is network of over 1000 facilities spread across the country that are providing ART to around 0.6 million people which has also resulted in improved access to treatment and increased level of awareness to HIV and its treatment among the health care workers.[2]

The programme, has for obvious reason adopted a public health approach and hence its various policies and guidelines have a reflection of the same. Over the last few years, the National AIDS Control Programme ART initiation guidelines have been updated on several occasions in order to improve the treatment standards while keeping pace with the changing guidelines across the world and at the same time ensuring that with limited funding treatment and other HIV preventive services are provided to maximum number of patients in the most distant of areas. Over the years the cut off CD4 point for initiation of ART has been increased from 200cells/mm^3 to 250cells/mm^3 and to 350cells/mm^3. For special cases also, guidelines have been developed which are in line with the WHO guidelines.

METHODS

A retrospective analysis was done for all patients who registered at any of the ART centres between April 2007 and April 2011 and entered in the Computerised Management and Information System Software (CMIS) software with their CD4 count values at the time of registration.

After data cleaning, patients with age more than 15 years at the time of registration were selected for analysis. A separate analysis was done for those whose baseline CD4 count values at the time of initiation of ART were available in the database. Data were further analyzed according to selected sociodemographic characteristics factors. MS Excel and SPSS 16.00 has been used for analysing the data.

RESULTS

The results are based on the entries done in the Computerised Management and Information System Software (CMIS) from January 2007 to December 2011. During this period, 7,76,404 (including children) registrations/ entries were made in the reporting system with a baseline CD4 count. For this research we have selected Adult patients 727280 to understand the baseline CD4 count profile. Out of 727,280 adult patient registered during 2007- 2011, 555,107(76.3%) were put on ART. The overall profile of the patients is shown in table number 1.

Cross tabulations were done to see the trends of baseline CD4 counts at the time of registration over the years. As shown in table number 2, the proportion of patients who registered with baseline CD4 count less than 200cell/mm^3 have decreased substantially over the years. In 2011, patients accessing treatment at CD4 count more than 250 cells/mm^3 had gone up to 36.5% in case of men (out of the total male registrations in 2011) and 51.5% for women (out of the total female registrations in 2011). Increasing trend is shown of median CD4 count by male, female and transgender (Fig1) during 2007-11.

Table 1: Profile of Clients

Age in years	Total (%)	Male (%)	Female (%)	Started on ART (%)
< 15	49124 (6.3)	28186 (6.6)	20938 (6)	30863 (5.3)
Adults(>=15yrs)	727280 (93.7)	401968 (93.4)	325312 (94)	555107 (94.7)
16-25	104272 (14.3)	31524 (7.8)	72748 (22.4)	62949 (11.3)
26-35	323767 (44.5)	169764 (42.2)	154003 (47.3)	246882 (44.5)
36-50	255613 (35.1)	169545 (42.2)	86068 (26.5)	209690 (37.8)
50+	43628 (6)	31135 (7.7)	12493 (38)	35586 (6.4)

Table 2: Percentage of Registrations with CD4 counts at registration (Adults, gender wise)

CD4 count	2007		2008		2009		2010		2011	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
n	59994	43710	80389	62697	91973	75110	91293	76928	78310	65249
<50	15.50	10.40	13.00	8.40	10.90	6.90	10.40	6.60	9.60	6.20
50-99	19.40	13.70	18.10	12.20	16.30	10.80	15.70	10.40	15.20	10.30
100-199	33.90	30.70	32.40	27.60	29.90	24.40	28.40	22.50	27.30	21.00
200-249	10.60	12.70	11.10	12.60	12.30	12.80	11.90	11.90	11.40	11.10
250-349	9.60	11.60	11.00	13.40	13.00	15.20	13.70	15.60	14.80	16.90
350-499	6.20	9.50	7.80	11.80	9.50	13.80	10.60	15.10	11.60	15.70
>=500	4.90	11.30	6.50	14.00	8.10	16.20	9.30	18.00	10.10	18.90

All value are in percentage except n

Table 3a: Trend of Baseline Median CD4 count (cells/mm³) at registration at the ART Centre

Indicator	Year wise Median CD4 count(Inter-Quartile Range)				
	2007	2008	2009	2010	2011
Overall Adult	159(84-254)	176(94-294)	198(107-333)	209(111-358)	220(115-372)
Gender:					
Male	141(73-225)	155(82-252)	174(93-284)	183(96-305)	191(100-323)
Female	184(103-306)	205(116-357)	230(131-396)	244(135-421)	257(140-433)
Age group (yrs)					
16-25	210(120-380)	242(140-441)	281(163-480)	310(177-504)	329(189-519)
26-35	157(83-248)	177(96-290)	202(110-334)	215(116-364)	228(121-381)
36-50	142(74-224)	155(82-250)	173(92-280)	182(96-304)	190(100-321)
50+	147(78-231)	156(83-247)	168(91-271)	174(93-293)	181(96-306)

Table 3b: Trend of Baseline Median CD4 count (cells/mm³) at ART initiation

Indicator	Year wise Median CD4 count(Inter-Quartile Range)				
	2007	2008	2009	2010	2011
Overall Adult	144(77-218)	154(85-231)	167(93-145)	171(94-253)	176(97-267)
Gender					
Male	132(70-205)	141(77-216)	153(84-233)	157(86-240)	161(89-249)
Female	163(91-237)	174(101-251)	185(108-263)	189(108-274)	196(110-288)
Age group (yrs)					
16-25	176(100-253)	187(112-269)	198(120-280)	205(122-295)	216(127-305)
26-35	143(77-216)	156(87-231)	170(95-247)	175(97-255)	180(100-269)
36-50	134(71-207)	143(78-218)	157(85-237)	160(88-243)	164(91-255)
50+	139(74-212)	145(80-219)	153(86-237)	156(87-242)	161(90-253)

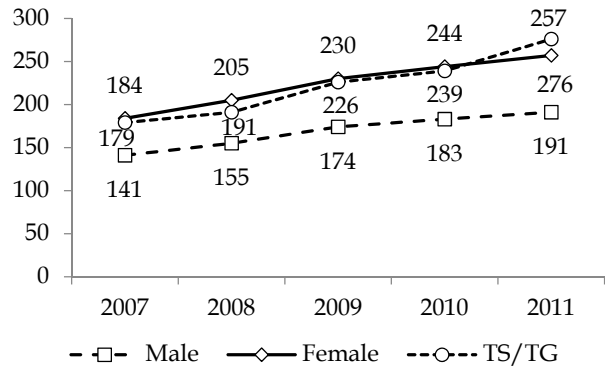

Fig 1: Gender-wise trend of baseline median CD4 count of HIV/AIDS patient in India during 2007-11

The median baseline CD4 count at the time of registration has increased from 141- 191 cells/mm3 (IQR) and 184- 257 cells/mm3 (IQR) in men and women respectively over the study period (refer to table 3). Trends of baseline CD4 count at the time of initiation of ART were also analysed. Of the total patients included in the sample, we analysed baseline CD4 count at the time of initiation of ART for 5,55,107 adult patients and the trends for these CD4 count values are shown in the table no. 3.

While analysis it was also seen that the Odds of patients registering with baseline cd4 counts less than 250 is 2.21 times more in 2007(OR =2.21, 95%CI (2.17-2.25), p<0.05) than patients with CD4 count more than and equal to 250. Among less than 250 cd4 count registered patient, the Odds of patients coming for registration at ART centre is male is almost equal times likely to register in 2007(OR =1.02, 95%CI (1.00-1.05), p<0.05) than female and Transgender patients. It has been found to be statistically significant (p<.05). (Table 4)

Table 4: Multivariate analysis for baseline CD4 count at registration

Characteristics	2007 (103884) (%)	2011 (n=143935) (%)	Odd ratio	95%(CI)	P value
Baseline CD4 counts (250 cd4 basis)					
<250	77195(74.3%)	81549(56.7%)	2.21	2.17-2.25	0.000
>=250	26689(25.7%)	62386(43.3%)	Ref		
Baseline CD4 counts(350 cd4 basis)					
>=350	15738(15.1%)	39505(27.4%)	0.47	0.46-0.48	0.000
<350	88146(84.9%)	104430(72.6%)	Ref		
Gender					
Baseline <250 cd4	(N=77195)	(N=81549)			
Male	47575(61.6%)	49704(60.9%)	1.02	1.00-1.05	.005
Female &TG	29620(38.4%)	31845(39.1%)	Ref		
Baseline >350 cd4 counts	(N=15738)	(N=39505)			
Male	6626(42.1%)	16911(42.9%)	1.02	0.99-1.06	0.130
Female &TG	9112(57.9%)	22594(57.2%)	Ref		
Age					
Baseline <250 cd4 counts	(N=77195)	(N=81549)			
16-25 years	9556(12.4%)	6809(8.3%)	2.86	2.72-3.01	0.000
26-35 years	37867(49.1%)	32440(39.8%)	2.38	2.28-2.48	0.000
36-50 years	26243(34%)	35097(43%)	1.52	1.46-1.59	0.000
50+ years	3529(4.6%)	7203(8.8%)	Reference		
Baseline >350 cd4 counts	(N=15738)	(N=39505)			
16-25 years	4479(28.5%)	8778(22.2%)	2.12	1.91-2.35	0.000
26-35 years	7141(45.4%)	16888(42.7%)	1.75	1.59-1.94	0.000
36-50 years	3614(23%)	11742(29.7%)	1.28	1.15-1.42	0.000
50+ years	504(3.2%)	2097(5.3%)	Reference		

While analyzing for age it was seen that the odds of patients registering with CD4 count less than 250 is almost three times in the age group 16-25 years as compared to those more than 50 years in 2007 (OR =2.86, 95%CI (2.72-3.01), p<0.05) while the odds of patients registering with baseline CD4 count more than or equal to 350 is half in the age group of 16- 25 than that those above 50 years in the same year (OR =2.12, 95%CI (1.91-2.35), p<0.05). (Table 4)

DISCUSSION

Very few studies in India have looked at baseline CD4 counts trends at the time of registration in to HIV care and initiation of treatment under the HIV program in India. The main strength of this study is that since data used for analysis is from the central server, there is representation from all the states. During the study period there had been a major scale up of prevention and treatment activities across India. In fact over the years the National HIV/AIDS Program has implemented various HIV awareness programs with the intention to reduce stigma surrounding HIV, educate people2 and ensure that HIV positive people get registered at the ART centres at the earliest. The analysis in this paper is based on data from around 300 ART centres spread across the country and is a reflection about the success of the various HIV prevention and treatment related policies developed and implemented by the Government of India.

From the results it is evident that the number of patients who are seeking HIV care early has improved. This increase in median baseline CD4 count at the time of registration over the years could be attributed to various policy decisions during this period like increase in ICTC- ART linkages, expansion in the network of testing and treatment centres and most importantly awareness campaigns like Red Ribbon Express and other awareness camps.3 The trends of baseline CD4 counts show a more promising situation for women as the median baseline CD4 counts for registration and initiation of ART are higher in women as compared to their male counterparts and this has been seen in many other studies across the world. The reason for females presenting for care early over time may be explained by getting tested for HIV earlier now through expanded, PPTCT activities4 or through partner testing programmes after a partner tests positive. With regards to initiation of ART, it is clear from our results that more patients are now being initiated on ART at a higher CD4 count than before. Our findings on baseline CD4 trends for patients initiating ART are comparable with the studies done earlier that have shown that between 2004- 2008, more

than 75% of the patients initiating ART had CD4 count less then 200 cells/mm3.5,6. In a paper that discusses the Scale up of ART treatment in the state of Karnataka7, similar trends were seen, where the median CD4 count at the time of registration has increased from 125 to 233 cells/mm3 from 2004- 2012, which is consistent with our results. Like trends across the world8, our study also shows that median baseline CD4 counts are lower in the older age groups as a result of which the treatment initiation is delayed, CD4 counts further fall and hence the prognosis is compromised9,10. In fact Persons presenting for care with a CD4 count below 350 cells/mL are defied as late presenters since they are unable to they are unable to fully benefit from ART11.

In the recent past many initiatives have been undertaken and the program has managed a drastic reduction in the number of patients starting ART at very low CD4 counts, which also is an important step towards reduction in the transmission of HIV. Still a large number of patients area starting ART at lower CD4 count values. The important aspect of older people presenting late for care at HIV treatment centre has come up significantly in our study.

The results show that a large number of patients are coming into the program at a late stage thereby compromising the clinical prognosis of the patient.12 Besides this ART that is now considered as an important component of the prevention package which if started early can also help in fight against spread of HIV.13 People from the older age groups and men are coming late for seeking care which could be either they think they have low risk for acquiring HIV infection or unaware about the risk of transmitting infection to others14,15

CONCLUSION

In conclusion we have found that the base line CD4 count trends are improving both for men and women but a lot needs to be done. So the programme needs to ensure that maximum number of patients are tested for HIV and linked to the ART centres. Besides this we have also seen that majority of the patients are starting ART at a low CD4 count. It appears that people start ART only when they show clinical signs of the infection which could be due to poor counselling services, poor tracking by the centres or poor linkages b/w ICTC and ART centres. Whatever be the issue, it is important to address these issues if HIV infection is to be contained.

The patients included in the sample size are only those whose baseline CD4 value was available in the database. This is a limitation, but keeping in view the sample size and its geographic representation, the results give a fair idea about the CD4 trends.

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