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A Follow-Up Study on Survival Trend of AIDS Patients Reported at ART Center in Delhi & Variation According to Age, Sex, Stages & Mode of Transmissions

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Abstract

Incubation period of HIV to AIDS is a vital tool that plays an important role in estimating the longevity or survivability of the HIV infected patients. However, death of AIDS patients when considered as end point becomes meaningful while finding the actual survivability of an individual. The present study is focused in analyzing the data on 343 AIDS patients who were recommended to undergo treatment in the ART centre followed up for a period of 6 years. The study included a cohesive treatment of censored observations based on lost to follow-up, deaths, recovered and alive cases till the end of study as well as uncensored observations. On the basis of diagnosed AIDS cases, the estimates of survivability under various conditions have been obtained. This paper also incorporates the trend of survivability for the reported AIDS patients with respect to age, sex, stages and mode of transmission across these 6 years. Kaplan Meier estimation method and Cox proportional hazard model were applied to determine the effect of various covariates that may be responsible for the death of the AIDS patients, survival pattern.

Key Words

HIV, AIDS, ART, survival period, Kaplan-Meier, Cox proportional hazard model

Introduction

Approximately 33 million people worldwide are living with HIV infection or AIDS. (1) An estimated 5.2 million people in low and middle-income countries are receiving ART (2). WHO estimates that 1.2 million people started receiving treatment in 2009, bringing the total number of people receiving treatment to 5.2 million as compared to 4 million at the end of 2008 (2). ART has significantly reduced mortality and improved life expectancy (3,4) of such individuals. Some earlier studies have reported a poorer prognosis for male population (5,6) in comparison to females (7), IDUs (8) and persons infected early in the epidemic (1). However, some other researches (9) have shown that there were no significant differences between deceased and other subjects in relation to mode of transmission, gender, age at the time of the diagnosis of HIV infection or the number of year from the diagnosis to death. Delay in the diagnosis and the treatment of HIV infection in adult could well explain the short duration of survival after testing for HIV infection.

In survival analysis, incubation period of AIDS plays an imperative role in estimating the longevity of the infected person and hence is considered as a powerful tool for modeling of HIV/AIDS data. The longevity of an HIV infected individual is influenced by social, biological, economical and medical factors which either prolong or shorten the lifespan. Studies of the natural history of the HIV infection have generally focused on time from sero-conversion to AIDS rather than time from entering into the stage of AIDS to the stage of death of the patients, because the latter requires longer duration of follow-up (10,11). Death of AIDS patients may also be more meaningful as an end point for the individuals future planning and for economic evaluation.

The incubation period may vary from person to person and place to place and hence it's nature is random and sometimes very long (12-14). Distribution of incubation period is very difficult to estimate, as exact time of infection in any risk groups is usually unknown. The median incubation time is estimated to be 11 years or 20years (15,13) Moreover, in India, the exact time of HIV infection is not known because of unawareness and lack of medical facilities. Hence new infections of HIV/ AIDS are usually underestimated because of lack of reporting. Parametric and non parametric analysis of the incubation period of AIDS have been discussed in the literature extensively (13,16-18,11). The present study

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was undertaken to estimate the prognosis of AIDS over 6 years, to estimate survival function of AIDS patient who were diagnosed at ART centre and to find out that whether age, gender, stages and mode of transmission affect risk factor of death of AIDS patients.

Material and Methods

Study was restricted to AIDS patients who were diagnosed at ART centre of Ram Manohar Lohia Hospital, New Delhi. A cohort of 343 AIDS cases in the year 2004 were considered and followed up for a period of 6 years with the variations noted according to age, sex, stages and modes of transmission. For the reported AIDS patients, we have considered survival and censored time in a random manner. The estimation of survival functions for AIDS patients were done using both parametric and nonparametric methods subcategorizing with respect to different variables of interest, like mode of transmission, gender, age at the time of diagnosis, stage of AIDS (defined by WHO) (2) and year of AIDS diagnosis. The data comprises of all the AIDS patients who entered in the year 2004 and were followed up till the end of year 2009. These patients have been followed till the period 31st December 2009 and included the cases who were lost either because of death due to AIDS or lost to follow up against medical advice. For this six years follow-up study, we have categorized the data into six groups: *Group-1* consists of HOMO-MSM (sex with men to men) who were infected through sex from male with male. *Group-2* consists of HETERO's who had been infected through sex. *Group-3* consists of MTCTs (mother to child transmission) who were infected through mother to child,. *Goup-4* consists of Blood who were infected through blood transfusion. *Group-5* consists IDUs (injection drug users) who were infected through contaminated syringe. *Group-6* consists of unknowns who were infected through unknown modes of transmission.

Kaplain-Meier Product Limit Method: Cumulative survival function of AIDS patients have been obtained using Kaplan-Meier estimation method. (19) For the prediction of prognostic factors related to survival time, we have applied Cox proportional hazard models. All the analysis were performed on SPSS version 15.

Cox Proportional Hazard Method: Cox proportional hazard model has been used for the prediction of significant prognostic factors related to survival time. This model gives an expression for the hazard at time t for an individual with a given specification of a set of explanatory variable denoted by the X, which represents a collection (vector) of predictor variables that is being modeled to predict an individual's hazard rate.(20)

Results

Table-1 shows the number of AIDS patients segregated according to different age groups, Children (1-14), Youth (15-35) and Adults (36-80). For these three age groups, median age at the time of the diagnosis are 5, 31, 42 and median (± standard deviation) survival time is 5.66 (± 1.38), 5.1 (± 1.76), and 4.59 (± 1.73) respectively. Also, gender distribution is found to be 73.2% males as against 26.5% females and 0.3% eunuchs. The distribution of mode of transmission is as follows: infections associated with blood are 14.9 %, with HETERO sexually intercourse 63.8%, with HOMO-MSM sexually intercourse 3.5%, with IV-drug users 4.1 %, with MCTC 6.7 % and with unknown mode of transmission are 7% respectively. The mode of transmission HOMO-MSM are identified for higher age groups only and IDU were associated with male gender only. UNAIDS report - 2008) (21) shows that HOMO-MSM patients were getting infected much more across the world, albeit it is not found so in our case study. Table-2 shows the cross tabulation of patients according to the mode of transmission and status (i.e., Alive or Expired). A chi-square p-value (p = 0.011) pointed towards a significant association between the status and mode of transmission at 5% level of significance. It was found that out of 343 patients, 98 patients died in the six years follow-up study, of which 17 deaths were with mode of transmission blood, 52 with HETERO, 2 with HOMO-MSM, 9 with IDU users, 9 with MCTC and 9 were associated with unknown mode of transmission. In IDU users, majority of patients had expired as compared to other modes of transmission where majority were recorded alive.

The analysis was also performed w.r.t mode of transmission to determine the difference in ages of alive and expired patients. For all the modes of transmission

Table-1. Number of AIDS Patients at ART Centre by Age Group, Gender & Mode of Transmission (2004-09)

Mode of Transmission	Gender	Age Groups (in years)			Total
		0-14	15-35	36 & above	
Blood	Female	9	8	2	**19**
	Male	13	16	3	**32**
	Total	22	24	5	**51**
HETERO	Female	1	34	9	**44**
	Male	0	103	72	**175**
	Total	1	137	81	**219**
HOMO-MSM	Female	NA	NA	NA	**0**
	Male		5	7	**12**
	Total		5	6	**12**
IDU	Male		8	6	**14**
	Total		8	6	**14**
MTCT	Female	6	NA	NA	**6**
	Male	17	NA	NA	**17**
	Total	23			**23**
Unkown	Female		18	4	**22**
	Male		1	1	**2**
	Total		19	5	**24**
Grand Total		**46**	**193**	**104**	**343**

Table-2. Frequency of "Deaths &Alive", Mean Age & Survival time of AIDS Patients with Respect to Mode of Transmission

Mode of Transmission	Alive			Expired		
	Number (%)	Mean Age±S.E	Survival time	Number (%)	Mean Age±S.E	Survival time
HETERO	167(76.3)	34.353 ± 8.26	4.601 ±1.339	52(23.7)	34.538 ± 8.56	3.481±1.388
HOMO-MSM	10(83.3)	38.2 ± 5.432	4.028 ±1.782	2(16.7)	46.5 ± 9.192	4.63±1.004
MTCT	14(60.9)	5.286 ± 2.84	5.078 ±0.986	9(39.1)	4.0 ± 2.179	4.059±1.108
Blood	34 (66.7)	25.471 ± 12.488	4.583 ±1.2	17(33.3)	16.176 ± 11.786	3.871±1.413
IDU	5(35.7)	31 ± 1.581	5.336 ±0.285	9(64.3)	37.333 ± 7.45	4.134±1.243
Unknown	15(62.5)	29.4 ± 7.268	4.313 ±1.519	9(37.5)	35.111 ± 9.4	2.806±1.697

Table-3. Mean Age of Males & Females with Respect to Mode of Transmission at Entering in ART Centre

Mode of Transmission	Male (mean ± S,D)	Female (mean ± S.D)	p-value
HETERO	35.103±8.361	31.591±7.574	*0.012*
HOMO-MSM	39.545±6.817	NA	-
MTCT	5.118±2.848	3.833±1.722	*0.314*
Blood	23.344±13.319	20.737±12.4	*0.492*
IDU	35.071±6.696	NA	-
Unknown	38±11.314	30.955±8.197	*0.266*
p-value	*< 0.01*	*< 0.01*	

Table-4. Comparison of Kaplan Meier Estimates of Survival Function with Respect to Gender Among AIDS Patients

Years	Male	Female
0-1	1.00	0.99
1-2	0.98	0.97
2-3	0.94	0.92
3-4	0.89	0.84
4-5	0.80	0.78
5-6	0.65	0.71

Table-5 Survival Function of Over all AIDS Patients

Interval Start Time (in years)	Number of patients Entering in interval	Number of Withdrawals during Interval	Number of Deaths during interval	Cumulative Proportion Surviving at End of Interval	S E. of Cumulative Proportion Surviving at End of Interval
0-1	343	3	2	.99	.00
1-2	338	10	6	.98	.01
2-3	322	13	13	.94	.01
3-4	296	12	18	.88	.02
4-5	266	16	25	.79	.02
5-6	225	27	33	.67	.03

Table-6. Frequency Distribution & Percentage of Reported AIDS Patients with Mode of Transmission

Mode of Transmission	Sex			Total	Percentage (%)
	Eunuch	Female	Male		
HETERO	0	44	175	219	63.48
HOMO-MSM	1	0	12	12	3.5
MTCT	0	6	17	23	6.7
Blood	0	19	32	51	14.9
IDU	0	0	14	14	4.1
Unkown	0	22	2	24	7.0
Total	**1**	**91**	**252**	**343**	**100**

Table-7. Survival Function of AIDS Patients with Mode of Transmission

Year	Hetero		Homo-MSM		MTCT		Blood		Drugs		Unknown	
	S(t)	S.E	S(t)	S.E	S(t)	S.E	S(t)	S.E	S(t)	S.E	S(t)	S.E
0 - 1	1	0	1	0	1	0	1	0	1	0	1	0
1 - 2	0.98	0.01	0.98	0.01	0.99	0.01	0.96	0.03	0.98	0.01	0.96	0.04
2 - 3	0.94	0.02	0.96	0.02	0.94	0.04	0.94	0.03	0.93	0.07	0.91	0.05
3 - 4	0.89	0.02	0.92	0.04	0.86	0.07	0.9	0.04	0.79	0.11	0.82	0.08
4 - 5	0.81	0.03	0.88	0.08	0.77	0.09	0.78	0.06	0.71	0.12	0.73	0.1
5 - 6	0.72	0.03	0.76	0.11	0.57	0.11	0.63	0.07	0.36	0.13	0.67	0.11

Fig 1. Survival Function of AIDS Patients and 95% Confidence Interval with Respect to year from Diagnosis with Respect to Various Modes of Transmission

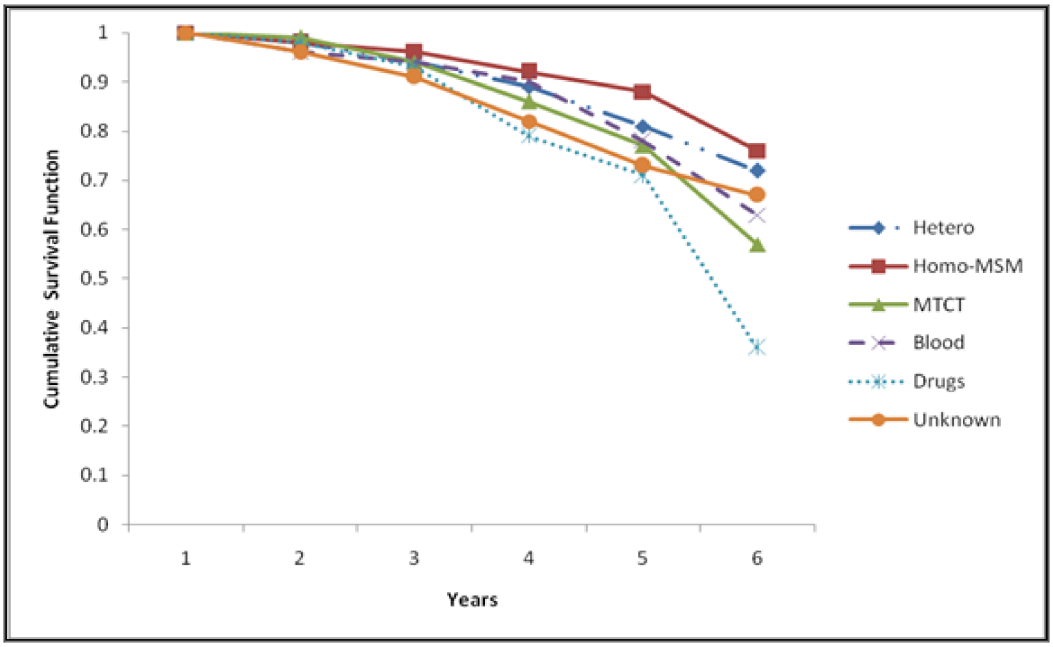

Table-8. Results of Proportional Hazard Regression Analysis for Male & Female AIDS Patients

Gender	Covariate	B	SE	*p -Value*	Hazard Ratio	95.0% CI for Hazard Ratio	
						Lower	Upper
Male	Age	0.601	0.546	0.023	1.824	0.631	5.312
Female	Age	-0.202	0.243	0.041	0.817	0.507	1.315

Table-9. Results of a Proportional Hazard Regression Analysis for AIDS with Respect to Mode of Transmissions

Mode of Transmission	Covariates	B	SE	*p- Value*	Hazard Ratio	95.0% CI for Hazard Ratio	
						Lower	Upper
HETERO	Age	0.700	.635	0.027	2.014	1.72	7.03
HOMO-MSM	Age	-0.36	.161	0.001	0.697	0.540	0.957
Blood	Age	0.47	0.14	0.014	1.595	1.22	2,09
IV-Drugs	Age	-0.645	0.377	0.017	0.524	0.252	1.096
Unknown	Age	-1.18	.764	0.806	0.307	0.069	1.373

Table-10. Results of a Proportional Hazard Regression Analysis for AIDS with Respect to Different Stages

Stages	Covariate	B	SE	*p-Value*	Hazard Ratio	95.0% CI for Hazard Ratio	
						Lower	upper
I	Age	0.047	0.019	0.216	1.048	1.009	1.087
II	Age	-0.130	0.548 0.101	0.001	0.878	0.720	1.070
III	Age	-0.556	0.329	0.031	0.573	0.915	3.323
IV	Age	0.691	0.375	0.006	1.995	0.566	2.460

except for blood and IDU , it is found that the mean age for alive and expired patients is insignificant. However, for patients with mode of transmission to be blood, the average age of death is 16.18 which is significantly less than those of alive cases where it is 25.47 (p-value =0.014). Also for patients with mode of transmission as IDU's, mean age of death is 37.33 which is significantly higher than that of alive patients i.e., 31 years (p-value = 0.04). Note that all comparisons are done at 5% level of significance.

Also we note that the average age for various modes of transmissions for alive as well as expired patients is highly significant (ANOVA p-value < 0.01). Further analysis using Tukey's test revealed that for the alive patients, the average age of the MTCT is significantly lower than that of other modes of transmission. Also for expired patients, the average ages of MTCT and blood are significantly lower than that of other categories.

Table-2 also shows, the average length of survival from getting treatment in ART centre till death or to the end of the study in different modes of transmission categorized as per the status. The t-test shows that mean length of survival of alive and deceased AIDS patients with the mode of transmission HOMO-MSM, blood and IDU cases are not significantly different (4.028vs4.630,p-value =0.661), (4.583 Vs 3.871,p-value =0.066) and (3.936 Vs 3.634,p-value =0.058) respectively. While length of survival of AIDS patients with the mode of transmission with HETERO, MTCT and unknown are insignificant (4.601 Vs 3.481, p-value =0.001), (5.078 Vs 4.051, p-value=0.031) and (4.313 Vs 2.806, p-value =0.034). Also, it is observed that there is no significant difference in the length of survival across various mode of transmission for both alive (p-value = 0.315) and expired cases (p-value = 0.204).

Table 3 shows that the average age of males is significantly higher than that of females for Hetero mode of transmission (t-test p-value = 0.012) where as for other modes of transmission, there is no significant difference. Also within males the average age across the various modes of transmission is different. The highest age is for HOMO-MSM whereas the lowest age is for MTCT. Similar conclusions may also be drawn for the females. We could not conduct t-test for HOMO-MSM and IDU group as these group were related to male segment only.

Table-4 gives the stratification of survival function among AIDS patients in terms of gender. Nonparametric Wilcoxon-Test shows no significant difference between male and female survival times for AIDS diagnosed cases at the ART centre (p-value = 0.343).

Table-5 Shows the Kaplain-Meier estimation of cumulative survival function of AIDS patients.This estimator is obtained using method shown in equation (1). At the beginning of our study, 343 patients reported, while total deaths are 98 and the total numbers of withdrawal cases are 81 during the six years study. The median time for all diagnosed AIDS patients is found to be 6 years.

Table-6 shows that transmission through HETERO groups is maximum (63.48%) and the number of infections through HOMO-MSM, MTCT, BLOOD, IDU and UNKNOWN mode of transmission are 12, 23,51,14 and 24 respectively.

Table-7 gives the Kaplan-Meier estimates of survival function of AIDS patients w.r.t. different modes of transmission for a period of 6 years. 63.8% (219 /343) HETERO, 3.5%(12/343) HOMO-MSM, 6.7%(23/343) MTCT, 14.1%(51/343) BLOOD, 4.1 % (14/343) IDU and 7% (24/343) unknown cases have been diagnosed at the time of study. The median survival time for the AIDS patients with these modes of transmission viz. HETERO,HOMO-MSM,MTCT, blood, IDU and unknown were 5.68, 5.01, 5.87, 5.11, 4.48 and 5.23 years respectively. *Figure-1* shows survival functions with 95% confidence intervals w.r.t. various mode of transmission. The survival curves are falling gradually for HETERO and HOMO-MSM mode of transmission whereas for the others the decline is very steep.

We applied Cox proportional hazard model for the prediction of significant prognostic factors related to survival time. Cox proportional Hzard model reveals that modes of transmission, age, gender and stages are significantly prognostic factors related to survivability of AIDS patients.

Results of Cox regression analysis are presented for males, females and mode of transmission for two age groups (age $\leq$ 35 and age > 35) of reported AIDS patients in table 10-12. The estimated coefficient B is interpreted as the predicted change in log hazard for a unit increase in the predictor.

Table-8 shows result of Cox proportional hazard model with time independent covariates for male and female for two age groups (age $\leq$ 35 and age> 35). For male group, p=0.023 shows a significant difference of risk between both the groups. Moreover, the positive sign (B=0.601) of the regression coefficient indicates that the older AIDS patients (age >35) have higher risk of dying. The 95% Confidence Interval for regression coefficient is 0.601 ± 1.96(0.546) or [-0.46, 1.67]. The estimated risk of dying for the patients with the age greater than 35 is 1.824 times higher than that for the patients with the age less than 35. Consequently, the 95% Confidence Interval for the relative risks is ($e^{-0.46}$, $e^{1.67}$) or [0.631, 5.312]. For the female groups, p=0.041 shows a significant difference of risk of dying for both the age groups (age $\leq$ 35 and age>35). Moreover negative sign of regression

coefficient (B= -0.202) indicates that younger patient have higher risk of dying but the estimated risk has not much difference i.e. younger patient (age ≤35) is 1.22 [=1/ 0.817] times higher than patient with the age (age>35). The 95% Confidence Interval for regression coefficient is -0.202 ± 1.96(0.243) or [-0.678, 0.274]. Consequently, the 95% Confidence Interval for the relative risks is ($e^{-0.678}$, $e^{0.274}$) or [0.507, 1.315].

Table-9 summarizes the results of analysis using Cox hazard model with the covariate mode of transmission for two age groups (age ≤35 and age >35). A p-value of 0.027 & 0.017 show that the Risk of dying for AIDS patients with mode of transmission HETERO and blood is significantly different for both the age groups and positive signs of regression coefficients (B=0.700, B=0.47) indicate that AIDS patients with older age (Age>35) has risk 2.014 and 1.595 times higher than AIDS patients of younger age (age35) for both the mode of transmissions respectively. The 95% Confidence Intervals for regression coefficients for HETEROs and blood are 0.70 ± 1.96(0.635) or [0.545, 1.95] and 0.47 ± 1.96(0.14) or [0.196, 0.744] respectively. Consequently, the 95% Confidence Interval for the relative risks is ($e^{0.545}$, $e^{1.95}$) or [1.72, 7.03] and ($e^{0.196}$, $e^{0.744}$) or [1.22, 2.09] respectively. Although significant difference of risk of dying is observed for the mode of transmission HOMO-MSM, IDU and unknown but negative sign of regression coefficient (B= -0.36, B= -0.645 and B= -1.18) indicate higher risk in younger AIDS patients (age 35) as compared to older patients (age >35).Younger patients have or 1.43[=(1/0.697)], 1.91[=(1/0.524] and 3.26[=(1/ 307)] times higher than older AIDS patients for HOMO-MSM ,IDU and Unknown mode of transmission respectively. The 95% Confidence Interval for regression coefficient for HOMO-MSM, IDU and Unknown mode of transmission are -0.36 ± 1.96(0.161) or [-0.676,-0.044], -0.645 ± 1.96(0.377) or [-1.38,0.092] and -1.18 ±1.96(.764) or [-2.68,0.317] respectively. Consequently, the 95% Confidence Interval for the relative risks for HOMO-MSM, IDU and UNKNOWN mode of transmission are ($e^{-0.676}$, $e^{-0.044}$) or [0.540, 0.957] , ($e^{-1.38}$, $e^{0.092}$) or [0.252, 1.096] and ($e^{-2.67}$, $e^{0.317}$) or [0.069, 1.373] respectively.

Stages I, II, II & IV are defined by World Health Organization on the basis of intensity of HIV infection (22). *Table-10* shows the estimates using Cox hazard model with covariate Stage for the two age groups (age ≤ 35 and age >35) of AIDS patients. Stage-I shows insignificant difference between risks of dying for both the age groups (age≤35 and age >35). The 95% Confidence Interval for regression coefficient for Stage-I is 0.047 ± 1.96(0.019) or [0.009, 0.084]. Consequently, the 95% Confidence Interval for the relative risks is ($e^{0.009}$, $e^{0.084}$) or [1.009 ,1.087]. The risk of dying for AIDS patients with Stage-I for both the age groups is almost same. In other words we conclude that Stage-I doesn't seem to relate age to the risk of dying of AIDS patients. However, Stage-II and Stage-III have significant difference of risk of dying of AIDS patients with respect to both the age groups (age ≤35 and age >35). Moreover negative signs of regression coefficients (B= -0.130 and B= -0.556) indicate that younger patient (age 35) have higher risk of dying and these are 1.13 and 1.75 times higher than AIDS patient of older age (Age>35). The 95% Confidence Interval for regression coefficient for Stage-II and III are -0.130 ± 1.96(0.101) or [-0.328, 0.068] and 0.556 ± 1.96(0.329) or (-0.089, 1.201) respectively. Consequently, the 95% Confidence Interval for the relative risks is ($e^{-1.20}$, $e^{0.944}$) or (0.720 ,1.070) and ($e^{-0.089}$, $e^{1.201}$) or [0.915 ,3.323].While p=0.006 for Stage-IV, shows a significant difference between risk of dying for both the age groups (age ≤ 35 andage>35).Moreover the positive sign of regression coefficient (B=0.691) indicates older AIDS patients have higher risk of dying and its almost two times higher than younger AIDS patients. The 95% Confidence Interval for regression coefficient for Stage-IV is 0.691±1.96(0.375) or [-0.044,1.426]. Consequently, the 95% Confidence Interval for the relative risks is ($e^{-0.044}$, $e^{1.426}$) or [0.957, 4.162].

Discussion

In this paper, we have tried to provide a comprehensive study about the survival trend of AIDS patients. Assuming that no study have been intervened before 2004 in ART centre in Delhi city, India ,these estimate can be considered as a baseline for further studies. We assumed the survival time and censored time in a random manner for all reported AIDS case and categorized the data according to age, sex, stages and mode of transmissions. The analysis has been performed to determine association between mode of transmission and the above estimated parameters.

We observed that, number of years for alive cases with respect to HETERO, MTCT and unknown mode of transmissions are significantly greater than that of deaths cases respectively. We also observed that survivability of AIDS patients is highest (5.078 yrs) in MTCT mode of transmission. This may be possible as immune system in children is stronger as compared to higher age group cases. Child patients are monitored closely/regularly and so drug adherence is much better among them. The lowest survivorship of AIDS patients is observed in IDU users. It may be possible because of the increase in the intensity of HIV virus due to using drugs. Also, lack of awareness about the treatment and irregularity in taking ART. Therefore, it declines the

effectiveness of treatment in IDUs. The mean age at time of entering ART center is highest (i.e. 35.10 yrs) in those male AIDS patients who were infected through HOMO-MSM mode of transmission, while it is highest (i.e. 31.10) in HETERO for female cases. Age for males and females at the time of entering ART center w.r.t. mode of transmission MTCT, blood and unknown were significantly different (p=0.314, p=0.492 and p=0.292), while it is found insignificant (P=0.012) for male and female cases with HETERO mode of transmission. Mean length of survival is estimated to be highest in MTCT cases, while it is estimated to be lowest in IDU users. These estimates have also been justified by the estimates obtained by Kaplan Meier Product limit estimation method. Using Kaplan Meier estimation method, the median survival time for AIDS patients with these modes of transmission viz. HETERO HOMO-MSM, MTCT, blood, IDU and unknown is estimated as 5.68, 5.01, 5.87, 5.11., 4.48 and 5.23 years respectively.

Cox regression method entered age, sex, stages and modes of transmission as predictor covariates to the model, based on that we have estimated survival function. To identify variables that might have influenced survival viz. age at the time of diagnosis of AIDS, year of the diagnosis of AIDS patients, gender, stages and modes of transmission are entered through Cox regression model. Age at the time of diagnosis is found to be significantly associated with the survival. Consistent with the findings from previous studies, age at the time of diagnosis of HIV infection is inversely related to longevity. As older age may be associated with immunologic vulnerability, exposure to infectious diseases, psychosocial comorbidies and the other factors of disease progression.(22,7) Gender did not show any significant effect on survival time. Stages-III and IV, that are related to intensity of infection showed a significant effect as compared to stage-I and II on survival time. It may be because stage-III and IV are considered as critical conditions for AIDS patients.

Conclusion

The global burden of AIDS has risen dramatically in the past two decade worldwide. ART centre is playing an important role and has significantly reduced mortality and improved life expectancy.Therefore some more covariates are needed for more extensive analysis. We may now look to explore the effect of CD4 counts, common opportunistic infections etc on the AIDS patients to carry this research further. Moreover this data is taken from one ART centre so a large sample may be taken for further epidemiologic and clinical studies to optimize the magnitude of this complicated medical condition.

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