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RESEARCH ARTICLE

SOCIO-DEMOGRAPHIC, CLINICAL PROFILE AND QUALITY OF LIFE OF PEOPLE LIVING WITH HIV/AIDS IN UTTARAKHAND

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ABSTRACT

The study was conducted at Anti Retroviral Therapy (ART) centre of Susheela Tiwari Hospital, Haldwani, Distt. Nainital, Uttarakhand. The data for the study was collected by personal interview and case study. The study revealed that majority of the subject, 41.84 and 55.45 per cent were in the age group 18-30 and 30-60 years, respectively. A 77.28 per cent subjects were literate but only 10.92 per cent subjects were graduates. Heterosexual transmission was observed in 82.73 per cent subjects. Majority of subjects were on ART and only 1.81 per cent subjects were not on ART. Majority of the subjects (56.37 per cent) were diagnosed HIV infection within a period of one year while 60.18 per cent subject ART was initiated in that period. Majority (73.64 per cent) of the subjects were in I stage of infection with a mean CD4 count and Hb of 303.05±133.5 cells mm^{-3} and 10.88±2.15 g/dl, respectively. The mean scores of all the six domains of QOL fell in the moderate category (12.24-14.23). The subject achieved maximum score in physical domain (14.34±3.86) and minimum (12.56±2.29) in social relationship. No significant difference was found between means scores of male and female subjects. CD4 cell count was highly correlated (P<0.01) with physical and social domain.

INTRODUCTION

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS), a major public health problem in many developing countries has contributed to lowering the life expectancy among those infected (UNAIDS, 2007). HIV is a blood borne and sexually transmittable retrovirus (**Batterham, *et al.*, 2001**). HIV is distinguished by the presence of reverse transcriptase, an enzyme that allows the RNA of the virus to make its own DNA by using genetic material from the host cell. Only cells that have the CD4+ glycoprotein receptor on the cell membrane can become infected (**Kotler, 2004**). The first case of HIV was reported in 1981 in USA and 35.5 million people globally living with HIVAIDS. In India, after the first case of HIV was detected in Chennai in 1986, thereafter the virus spread rapidly across the nation in both urban and rural areas in all the sectors of the society. India has the third largest number of people living with HIV/AIDS (**NACO, 2011**) and is one of the largest and most populated countries in the world, with over one billion inhabitants have a prevalence rate of 0.3 percent which equates to around 2.1 million people living with HIV (**UNAIDS, 2013**). People Living with HIV (PLHA) have lower socioeconomic status and are likely to die earlier than those who have higher levels of wealth and education. In fact, the susceptibility to opportunistic infections amongst the lower socioeconomic group is much greater than those in the higher socioeconomic group (**Thomas, 2008**). Most of HIV affected population is from lower socioeconomic class and reproductive group (15-44 years) which increases the economical burden and affects the overall development of the family, community and country (**Joge *et al.*, 2012**). Low level of literacy and poor economic status were the main reasons for relocation for employment (**Pandey *et al.*, 2006**). TB-HIV co-infected cases were significantly found in SC/ST population and among illiterate group (**Jaiswal *et al.*, 2012**).

Quality of life (QOL) is a term that is popularly used to convey an overall sense of well-being and includes aspects such as happiness and satisfaction with life as a whole. World Health Organization has defined QOL as “individuals’ perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, standards, expectations and concerns” (WHO 1998). With the recent advances in clinical tests and treatments for those suffering from human immunodeficiency virus (HIV) acquired immunodeficiency syndrome (AIDS), the survival of these patients has increased and their QOL has become an important focus for researchers and healthcare providers (**Wild *et al.*,**

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2006). QOL assessment is useful tool to assess or determine the efficacy of treatment or interventions like dietary interventions (Echeverria *et al.*, 1999). Socio –economic variables have a significant association with quality of life of PLWHA. Higher level of education and earning higher income were identified as factors for improved quality of life (Peltzer and Phaswana – Mafuya 2008). The aim of this study was to explore the socio-economic characteristics, clinical profile and quality of life of HIV patients attending ART centre of Susheela Tiwari Hospital, Haldwani. Uttarakahnd.

MATERIALS AND METHODS

The study was conducted from August 2013 to October 2013 at ART centre of Susheela Tiwari Hospital, Haldwani. The sample size of 110 subjects was calculated according to Kish-Leslie (1965) formula. All adults, non- pregnant, non-lactating women and asymptomatic subjects attending ART centre were included for the study. Whereas pregnant and lactating women, symptomatic, unable to give consent for the study and who could not communicate in the study languages were excluded for the study. The subjects who were fulfilled the inclusion criteria during study period registered for the study. The study was approved by the advisory committee of Department of Foods and Nutrition, College of Home Science, GBPUA & T, Pantnagar, Uttarakhand. Permission was taken from the hospital administration of Susheela Tiwari Hospital, Haldwani to carry out the study. For ethical consideration the subjects were well explained the purpose of the study and their confidentiality in participant information sheet. A written consent was obtained from the subjects in participant information sheet for their willingness in participating in the study.

The data was collected by

Case Record: Individual case record was used to get the information about mode of transmission of infection, stage of illness and routine blood examination for CD4 count and Hb.

Personal Interview: Personal interview was carried out by the researcher with the help of pre designed semi structured questionnaire which contained questions regarding socio demographic, clinical information and quality of life.

Quality of life: Quality of life of subjects was assessed by WHOQOL-HIV BREF, 2002 version. The scale has six domains viz. physical, psychological, level of independence, social relationships, environmental, and spirituality, religion, personal beliefs (SRPB). Individual items are rated on a 5-point Likert scale where 1 indicates low, negative perceptions and 5 indicates high, positive perceptions. Negatively framed questions have reverse scores where 1 indicates high, positive perceptions and 5 indicate low, negative perceptions. Negatively framed questions have correction factor to calculate scores (WHOQOL-HIV BREF, 2002). The mean score of items within each domain was used to calculate the domain scores by multiplying by 4, so that scores ranged from 4 (minimum) to 20 (maximum), with higher scores indicating a better QoL. The raw scores converted into 20 point scale by the formula. Transformed scores ranges between 4-9.9, 10-14.9 and 15-20 were considered as low, medium and high scores respectively.

Statistical Analysis

Data were cleaned, coded, entered and analyzed for Sample size, per cent, central tendency, and dispersion and student *t*-test using the Microsoft Excel 2007. Correlation was assessed on STPR3. Socio demographic profile, clinical profile and domains of QoL were subjected to per cent, central tendency, dispersion and *t*-test. Inter domain correlation coefficient between six domains was calculated.

RESULTS AND DISCUSSION

The investigation was done to study the socio-demographic, clinical profile and quality of life of HIV/AIDS patients attending of ART centre of Susheela Tiwari Hospital, Haldwani. Data related to socio demographic profile of the subjects has been given in Table 1.

Table 1. Socio- demographic profile of the subjects

	N 110	
	Number	Per cent
Sex		
Male	52	47.27
Female	58	52.73
Age (years)		
18-30	46	41.82
30-60	61	55.45
>60	3	2.73
Educational status		
illiterate	25	22.72
Primery	16	14.55
Middle	18	16.36
High School	23	20.90
Intermediate	16	14.55
Graduate	8	7.27
Post graduate	4	3.65
Religion		
Hindu	53	48.18
Muslims	50	45.45
Sikh	7	6.37
Marital status		
Married	62	56.36
Unmarried	10	9.09
Widow/widower	35	31.82
Separated	3	2.73
Type of family		
Nuclear	89	80.90
Joint	21	19.1
Family size		
0-4	78	70.90
5-8	21	19.09
Above 8	1	10.01
Occupation		
House wife	35	31.81
Private job	33	30
Government job	2	1.81
Labour	13	11.81
Self employed	10	9.90
Farmer	17	15.45
Retired	2	1.81
Activity		
Sedentary	69	62.7
Moderate	41	37.3
Per capita income (Rs/month) Mean ± SD	2125±1512 (300-7500)	

The per cent of male and female subjects were 47.27 and 52.73, respectively. The per cent of the subjects in the age groups 18-30, 30-60 and above 60 years were 41.82, 55.45 and 2.73, respectively.

The literacy level of the subjects revealed that 77.28 per cent of subjects were literate and 22.72 per cent of subjects were illiterate. Among literate only 10.92 per cent were graduates and the majority of the subjects (66.36 per cent) had education up to intermediate. The religion wise distribution shows that 48.18 per cent of subjects were Hindus and 45.45 and 6.37 per cent were Muslim and Sikh respectively. Majority (56.36 per cent) of subjects were married and 9.09, 31.82 and 2.73 per cent were unmarried, widow/widower and separated, respectively. A large per cent of subjects (80.90) were from nuclear family and only 19.1 per cent of subjects were living in joint family. Majority (70.90 per cent) of subjects had small family size (0-4) while 19.09 and 10.01 per cent subjects had family size of 5-8 and above 8 members, respectively. A 62.7 per cent of subjects were engaged in sedentary activity and rest 37.3 per cent were moderate worker. Per cent of working subjects was 68.19 while non working subjects were. Among nonworking all were females and housewives. Among working subjects majority of subjects (30 per cent) had private job and 15.45, 11.81, 9.90, 1.81 and 1.81 per cent subjects were farmers, labourer, self employed, government job and retired respectively. The per capita income per month of the subjects was Rs. 2125±1512, ranged (300-7500).

The study shows that the majority (52.73 per cent) were located in plain where as 39.09 and 8.18 per cent of subjects were located in hill and bhabhar region, respectively.

Table 2. Clinical Profile of subjects

	N 110	
	Number	Per cent
Mode of transmission		
Heterosexual transmission	91	82.73
Unsafe needles	6	5.45
Blood transfusion	5	4.55
Unknown	7	6.36
ID user	1	0.91
Period of illness/ diagnosis		
<1 year	62	56.37
1-2 Years	17	15.4
>2 years	31	28.23
Period of ART		
< 1 year	65	60.18
1-2 years	15	13.89
> 2 years	24	25.93
Stage of disease (WHO)		
I	81	73.64
II	11	10
III	10	9.09
IV	8	7.27
CD4 cell count (cells mm^{-3})		
Mean±SD	303.05±133.5	
Ranged	(39-983)	-
Hb (g/dl)		
Mean±SD	10.88±2.15	
Ranged	4.4-16.2	

Clinical profile of the subjects has been presented in Table 2. The most common mode of transmission of virus was heterosexual transmission in 82.73 per cent subjects followed by unsafe needles, blood transfusion, unknown and ID user in 5.45, 4.55, 6.36 and 0.91 per cent of subjects, respectively.

In 56.37 per cent subjects the HIV positive status was diagnosed within 1 year period where as in 15.4 and 28.23 per cent subjects the HIV status was diagnosed in 1-2 and more than 2 years, respectively. Only 1.81 per cent subjects were not on ART and of those already on ART 60.18 per cent of the subjects ART started within 1 year and remaining 13.89 and 25.93 per cent of the subjects ART started from a period of 1-2 and more than 2 years, respectively. Majority of subjects (73.64 per cent) were in I stage of infection and rest 10, 9.09 and 7.27 per cent of subjects were in II, III and IV stage of infection, respectively. The mean CD4 count and Hb of the subjects was 303.05±133.5 cells mm^{-3} with a range of 39-983 and 10.88±2.15 g/dl with a range of 4.4-16.2, respectively.

Per cent distribution of subjects on the basis of biochemical parameters of subjects has been presented in Table 3. A 68 per cent of subjects had Hb less than 12 g/dl. Majority of subjects (50 per cent) had CD4 cell count in the range of 200-350.

Table 3. Per cent distribution of subjects on the basis of biochemical parameters of subjects

Biochemical parameter	Male	Female	Total
Haemoglobin (g/dl)			
>12	15.5	16.5	32
< 12	32	36	68
CD4 cell count			
< 200	5	8	13
200-350	25.5	24.5	50
>350	16	21	37

Mean scores of all six domain of quality of life has been presented in Table 4. The subjects achieved high scores in physical domain and environment and lower scores in psychological, level of independence, social relationship and spirituality, religion, personal beliefs (SRPB) domains.

Table 4. Mean scores of quality of life

	Mean	SD	Range
Physical	14.23	3.69	6-20
Psychological	12.96	2.78	7.2-19.2
Level of independence	12.84	2.82	5-18
Social relationship	12.24	2.19	6-18
Environment	13.72	2.14	7.5-19
SRPB	12.59	3.35	5-20

SRPB -spirituality, religion, personal beliefs

Gender wise mean scores of the all the six domains of the quality of life have been presented in Table 5.

Table 5. Gender and quality of life

	Male (n=52)	Female (n=58)	*t*-value
Physical	14.34±3.86 (6-20)	14.15±3.69 (8-20)	0.21
Psychological	13.19±2.6 (7.2-19.2)	12.75±2.91 (7.2-17.6)	0.86
Level of independence	13±2.63 (6-18)	12.71±2.79 (5-19)	0.41
Social relationship	12.56±2.29 (6-18)	11.94±2.05 (6-18)	1.4
Environment	14.06±1.84 (10-18.5)	13.4±2.29 (7.5-17.5)	1.8
SRPB	13.26±3.51(5-20)	12.36±3.22 (5-20)	1.85

Values in box show mean ± SD (range)

Correlation between the means scores of all domains of the quality of life has been presented in Table 6. Physical domain was found to be highly significant (P<0.01) psychological, level of independence, environmental and SRPB domains. Highly significant correlation (P<0.01) between level of independence and environmental domain was found. Social relation was found to highly significant (P<0.01) with environmental domain. Highly significant (P<0.01) correlation was found between environmental and SRPB.

Table 6. Correlation between domains of QOL

	Physical	Psychological	level of independence	Social relation	Environmental	SRPB
Physical	-	0.363**	0.691**	0.101	0.378**	0.121
Psychological	-	-	0.42**	0.366**	0.398**	0.441**
level of independence	-	-	-	0.177	0.408**	0.042
Social relation	-	-	-	-	0.287**	0.126
Environmental	-	-	-	-	-	0.215*
SRPB	-	-	-	-	-	-

* (P<0.05) ** (P<0.01)

Table 7. Correlation of biochemical parameter with SES and QOL

	Age	Education	PCI	Physical	Psychological	level of independence	Social relation	Environmental	SRPB
Hb	0.037	0.23*	0.115	0.174	0.048	0.098	-0.022	0.092	0.099
CD4	-0.069	0.089	0.145	0.305**	0.064	0.127	0.232*	0.293**	0.123

* (P<0.05) ** (P<0.01)

Correlation between biochemical parameter with SES and QOL has been given in Table 7. Significant positive correlation was observed between Hb and educational status. Highly significant correlation between CD4 cell count and physical and environmental domains of quality of life was observed. Social domain was found to be positively correlated with CD4 cell count.

DISCUSSION

In the present study majority of the subjects were in the age group 30-60 years and had low level of education. Many studies have reported that most of the HIV/AIDS patients were in the age group 20-50 years of age which is the economically productive and socially active group and thus having a tremendous impact on the livelihood of the affected family ans growth and development of the country (**Sonani *et al*., 2011; Deshpande *et al*., 2012; Mandal *et al*., 2000**). **Deshpande *et.al* (2012) and Jayaram *et al.* (2008)** reported that high prevalence of HIV infection among this group is associated with low educational status of seropositive patients and less awareness regarding safe sex. In the present study majority of subjects were working as unskilled worker and from lower middle and lower socio economic class. **Deshpandey *et al.* (2012)** also reported that patients were from the lower middle and lower socio-economic classes. Most of them were working as laborers/farmer (55%), housewife (14.2%) and drivers (4.8%). **Mandal *et al*. (2000)** found that the main risk groups were truck drivers and labourers. Sexual, especially the heterosexual, transmission is the main driver of the epidemic in most of India is also revealed in the present study. Many studies reported heterosexual transmission in 80.4, 90 and 92.3 per cent of subjects **(Chakravarty *et al*., 2006; Deshpande *et al*., 2012; Kothari *et al*., 2001)**. Haemoglobin and the CD4 count indicate how strong the immune system is. High level of CD4 results in better physical health and less susceptibility to opportunistic infection and therefore indicate level of infection in the body (**Saha *et al*., 2011**). As a response to pathogens, haemoglobin releases free radical, which kills the pathogen by break down of its cell wall and membrane (**Iang, 2007**) and CD 4 cells are T cells of WBC that play a central role in cell-mediated immunity and indicate how far the disease has advanced and helps predict the risk of complications and debilitating infections (**Bonilla *et al*., 2010**).

The mean Hb of the subject was 10.88±2.15 and majority of subjects (68 per cent) had Hb less than 12 g/dl and were anaemic. **Vajpayee *et al.* (2008)** also reported 10.8 g/dl and 10.2 g/dl Hb men and women respectively. **Daminelli *et al*. (2010)** found 63 and 95 per cent prevalence of anaemia in AIDS patients Anaemia is the most commonly encountered hematologic abnormality in human immunodeficiency virus (HIV)-positive patients, occurring with increasing frequency as the disease progresses. Low level of Hb is caused by nutritional deficiencies and improved by micronutrient supplementation (**Argemi *et al*., 2011**). CD4 cell count was found to positive and highly correlated (P<0.01) with physical and environmental domain and positively correlated with social relationship (P<0.05). **Anand *et al*. (2012)** also found a positive correlation between CD4 count with physical and social domain. Increase CD 4 cell count is associated with increase scores of QOL. The mean scores of all the six domains of QOL fell in the moderate category. Similar finding was reported by **Bhowmik *et al.* (2012)** and **Anand *et al.* (2012).** The subject achieved maximum score in physical domain followed by environmental, psychological, level of independence, SRPB and lowest in social relationship. Gender wise comparison showed insignificant difference between male and female subjects. Lowest social score is reflection of stigma and discrimination faced by seropositive subjects. Poor personal relationship, sexual activity and social support also have negative effect on social relationship domain. Many studies in different part of world also reported low scores in social relationship domain compare to other domains. (**Ebisabete *et al*., 2007; Fleck *et al*., 2000; Fatiregun *et al*., 2009**) **Adebola *et al.* (2010)** found that ART therapy is associated with improvements in physical health but not sufficient for improvements in the quality of life. Improvement in physical domain indicates survival of patients (**Cunningham *et al*., 2005**), adherence to ART, stabilization HIV/AIDS

infection as well as its adverse consequences (**Delmas *et al.*, 2007**). CD4 cell count was found to positive and highly correlated (P<0.01) with physical and environmental domain and positively correlated with social relationship (P<0.05). **Anand *et al.* (2012)** also found a positive correlation between CD4 count with physical and social domain. Increase CD 4 cell count is associated with increase scores of QOL.

Conclusion

The present study concluded that majority of subjects were in reproductive age group and have low level of education. Heterosexual transmission was main mode of transmission of infection. Majority of the subjects were in I stage of infection. CD4 cell count and Hb level was low. The mean score of QOL fell in the moderate category. CD4 cell count is highly correlated with physical and social domain indicates better immune status is associated with high score of quality of life

REFERENCES

Anand, D., Puri, S. and Mathew, M. 2012. Assessment of quality of life of HIV-positive people receiving ART: An Indian perspective. *Ind. J. Community Med*., 37(3): 165–169.

Argemi, X., Dara, S., Yo, S., Mattei, J.F., Courpotin, C., Simon, B. *et al.* 2012. Impact of malnutrition and social determinants on survival of HIV-infected adults starting antiretroviral therapy in resource-limited settings. *AIDS* 26:1161-1166.

Batterham, M., Brown, D. and Garsia, R. 2001. Nutritional management of HIV/AIDS in the era of highly active antiretroviral therapy: A review. *Aust. J of Nutr and Diet*., 58(4), 211-223.

Bhowmik, A., Ghugre, P., Udipi, S. and Guha, S.K. 2012. Nutritional status and quality of life of women with HIV/AIDS. *Am. J. of Infect. Dis*., 8: 1-13

Bonilla, F.A. and Oettgen, H.C. 2010. Adaptive immunity. *J Allergy Clin Immunol.*, 125:S33–S40

Chakravarty, H., Mehta, A., Parekh, SVS., Attili, NR., Agrawal, S.P. and Singh, S.S. 2006. Study on clinico-epidemiological profile of HIV patients in eastern India. *J Assoc Physicians Ind*., 54: 554-557.

Chlebowski, R. T., Grosvenor, M. B., Barnhard, N. H., Morales, L. S. and Bulcavage, L. M. 1989. Nutritional status, gastrointestinal dysfunction, and survival in patients with AIDS. *Am. J. Gastroenterol.*, 84:1288–1293.

Cunningham, W. E., Crystal, S., Bozette, S. and Hays, R. D. 2005. The association of health-related quality of life with survival among persons with HIV infection in the United States. *J. Gen. Inter. Med.*, 20: 21-27.

Delmas, P., Cote, J., Delpierre, C., Sylvain, H., Lauwers-Cancres, V. and Delon, S. 2007. Evolution of phychosocial factors in a cohort of HIV- infected patients adherent to therapy. *Rech. Soins. Infirm.*, 88: 38-50.

Deshpande, J. D., Giri, P. A. and Phalke. D. B. 2012. Clinico-epidemiological profile of HIV patients attending ART centre in rural western Maharashtra, India. *South East Asia J. Public Health*, 2(2):16-21.

Deshpande, J. D., Giri, P. A. and Phalke. D. B. 2012. Clinico-epidemiological profile of HIV patients attending ART centre in rural Western Maharashtra, India. *South East Asia J. Public Health*, 2(2):16-21

Echeverria, P. S., Jonnalagadda, S. S., Hopkins, B. and Rosenbloom, C. A. 1999. Perception of quality of life of persons with HIV/AIDS and maintenance of nutritional parameters while on protease inhibitors. *AIDS Patient Care STDS.* 13:427–433.

Elisabete, C.; Morandi Dos, Santos, Ivan, F.J. and Fernanda, L.2007 Quality of life of people living with HIV/AIDS in São Paulo, Brazil. *Rev Saúde Pública*., 741(2): 647

Fatiregun, A. A., Mofolorunsho, K. C. and Osagbemi, K. G. 2009. Quality of life of people living with HIV/AIDS in Kogi state, Nigeria. *Benin Journal of Postgraduate Medicine*, 11 (1):22-17

Fleck, M. P. A., Louzada, S., Xavier, M., Chachamovich, E., Vieira, G., Santos, L. *et al*. 2000. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida "WHOQOL-bref". *Rev Saude Publica*. 34(2):178-83.

Iang, N., Tan, N. S., Ho, B. and Ding, J. L. 2007. Respiratory protein-generated reactive oxygen species as an antimicrobial strategy. *Nature Immunology*, 8 (10): 1114–22.

Jaiswal, R. K., Srivastav, S. and Mahajan, H. 2012. Socio demographic profile of TB-HIV coinfected patients in Bundelkhand region, Uttar-Pradash. *National J. of Med., Res*., 2 (2): 149-151.

Jayaram, S., Shenoy, S., Unnikrishnan, B., Ramapu-ram, J. and Rao M. 2008. Profile of attendees in Voluntary Counseling and Testing Centers of a Medical College Hospital in Coastal Karnataka. *Ind. J. Comm Med.*, 33:43-46.

Jayaram, S., Shenoy, S., Unnikrishnan, B., Ramapu-ram, J. and Rao M. 2008. Profile of attendees in voluntary counseling and testing centers of a medical college hospital in coastal Karnataka. *Ind. J. Comm. Med.*, 33:43-6.

Joge, U. S., Deo, D, S., Lakde, R. N., Choudhari, S. G., Malkar, V. R. and Ughade, H. H. 2012. Sociodemographic and clinical profile of HIV/AIDS patients visiting to ART Centre at a rural tertiary care hospital in Maharashtra state of India. *Intern. J. of Biol. and Med. Res.*, 3 (3):1568.

Kaplan, G., Pamuk, E., Lynch, J. W. and Cohen, R. D. 1996. Inequality in income and mortality in the United States: Analysis of mortality and potential pathways. *Brit.Med.J.*, 312:996-1103.

Kish-Leslie, 1965. Survey Sampling. John Wiley and Sons, Inc. New York, NY. pp. 41.

Kothari, K. and Goyal, S. 2001. Study of clinical presentation, spectrum of systemic involvement and opportunistic infections in AIDS patients. *J Assoc Physicians Ind*., 49:435-438.

Kotler, D. P. 2004. The biology of human immunodeficiency virus infection. *Nutr. Clin. Prac.*, 19(4):324-329

Mandal, A. K., Singh, V. P. and Gulati, A. K. 2000. Prevalence of Human Immuno deficiency virus infection in and around Varanasi, Uttar Pradesh. *Ind. J. Assoc. Physicians.* 48:288-9.

NACO 2011. Department of AIDS control. National AIDS control organisation. Ministry of health and family welfare, Government of India. Annual Report

Palella, F.J Jr., Delaney, K.M., Moorman, A.C., Loveless, M. O., Fuhrer, J. and Satten, G.A. 1998. Declining morbidity

and mortality among patients with advanced human immunodeficiency virus infection. HIV Outpatient Study Investigators. *N Engl J Med*., 338: 853-60.

Pandey, S., Hasan, H. and Singh, S.P. 2006. Socio-demographic profile and transmission dynamics among HIV/AIDS patients in eastern UP. *Ind. J. Prev. Soc. Med*., 37 (3, 4): 82-88.

Peltzer K. and Phaswana-Mafuya N. 2008. Health-related quality of life in a sample of HIV-infected South Africans. *African J. of AIDS Res*., 7(2): 209-218

Saha K., Firdaus R., Santra P., Pal J., Roy A., Bhattacharya MK. *et al*. 2011. Recent pattern of co-infection amongst HIV seropositive individuals in tertiary care hospital, Kolkata. Virol J.8:116.

Sonani, H. P., Undhad, A. M. and Savani, G. T. 2011. Clinical and social-demograpic profile of patients registered at ART centre, SMIMER, Surat. National *J. of. Comm. Med*., 2(1):130-132.

Thomas, M. 2008. Socio Economic Background of Affected People. In: National Conference on Nutrition and HIV/AIDS: From Knowledge to Action Thursday, February 14- Friday, 2008 Pride Hotel, Nagpur Conference Report. 10p.

UNAIDS 2013. Report on the global AIDS epidemic 2013. Geneva, World Health Organization. 2014

UNAIDS Report on the global AIDS epidemic 2006. Geneva, World Health Organization. 2007

Vajpayee, M., S. Mendiratta, N.K. Chauhan, K. Mojumdar AIDS 2008 - XVII International AIDS Conference.

Wild, D.J., Quarterman, P., Duprat-Lomon, I., Kubin, M. and Coons, S.J. 2006. A comparative review of health related quality of life measures for use in HIV/AIDS. Cl. trials. *Pharmacoeconomics*, 24:751–765.

World Health Organisation, Geneva, 1998. Guidance modules on antiretroviral treatments; module 4: safe and effective use of antiretrovirals. 155-120p

****