Indian Journal of Biological Sciences, 22 : 30-40, 2016 : ISSN No. 0972-8503

RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND HIV INFECTION IN RURAL PEOPLE OF THREE DISTRICTS OF WEST BENGAL, INDIA

Soumitra Barick[1], Sandip Chattopadhyay[1*], Bulbul Purkait[2], Nirmalya Kumar Sinha[3] and Debidas Ghosh[1]

[1]Department of Bio-Medical Laboratory Science and Management,Vidyasagar University,Midnapore-721102, West Bengal, India.

[2]Department of Biochemistry, Midnapore Medical College & Hospital, Midnapore-721101,West Bengal, India.

[3]Department of Nutrition, Raja N.L. Khan Women's College, Midnapore-721102, West Bengal, India.

ABSTRACT ■ The socioeconomic condition, nutritional status makes a complex relationship on the risk of HIV infections and also the progression of the infection in the body. The differentiationin disease progressionamong males and femaleswas little understood in the rural settings of West Bengal. A hospital based cross sectional study was conducted to investigate the impact of nutritional status in terms of body mass index and socioeconomic status (SES) on HIV infection status among the people of three districts of Jangalmahal areas of West Bengal.

The study was conducted in the Midnapore Medical College and Hospital, Midnapore. The socioeconomic status of the participants was collected through a questionnaire method and height and weight were measured to determine the nutritional status of the HIV-positive and HIV-negative individuals.

The highest numbers of HIV-positive individuals were found in the age group of =35 years in both sexes. Unemployed males and females had 3.91 and 1.28 times greater chance of being HIV infected. It was observed that the risk of HIV infection was associated with low education ($P<0.01$), low family income ($P<0.001$) and low socio-economic condition ($P<0.001$) among the female and occupational condition ($P<0.01$) of the male.

The study shows some indicators of SES were related to HIV infection.

Key words: Socioeconomic status, body mass index, awareness, migrant.

INTRODUCTION

In 1981, the first incidence of AIDS was reported. The epidemic of HIV/AIDS has become not only the deadliest epidemic, but also a major demographic, humanitarian and development crisis. The societies are increasingly threatened by the epidemic of HIV/AIDS.World Bank in 2016 designated India as lower middle-income country from the perspectives of its low socioeconomic status (SES), lower education, poverty and poor health (World Bank, 2016). The socioeconomic inequity of a community has a greater influence on spreading of HIV and its subsequent development of disease state (Perry et al., 1998; Michelo et al., 2006; Shelton et al., 2005). The quality of life for individuals suffering from AIDS is, however influenced by SES (American Psychological Association, 2006). Inadequate socio-

* **Corresponding author** : e-mail: sandipdoc@yahoo.com,sandipdoc@mail.vidyasagar.ac.in

economic resources are allied to the higher risk behaviors in the spreading of infection (Adler et al., 2006; Ickovics et al., 2002; Aidala et al., 2005).

Body mass index (BMI) is considered as an important predictor of HIV/AIDS; low body mass index (BMI<18.5) reflects the progression of HIV/AIDS. Critically, low BMI strongly predicts mortality independent of CD4 lymphocyte counts at the time of diagnosis and enrollment (van der Sande et al., 2004; Argemi et al., 2012).Subsequently BMI is a good indicator of nutritional status of an individual, it focuses an important part of the comprehensive care package for positive individual living with HIV(clinical, psychological, social, legal and nursing care).Depression has to be associated with reduced dietary intake in adults living with HIV (Isaac et al 2008).The relationship between the socioeconomic status, and health factors which predicting BMI at enrollment in HIV care programs. The association between BMI, HIV/AIDS disease progression, and health-related outcomes, at the time of enrollment into HIV care can usefully guide treatment and supportive care as well as provide information about targeting and recruiting potential patients. The present study was carried out to find out the association between HIV infection status, socioeconomic status and nutritional status in a rural hospital setting of the people mainly from Jagalmahal area.

METHODS

This hospital based cross-sectional study was conducted at the Midnapore Medical College and Hospital, Midnapore, West Bengal, India. However, the suspected individuals came from three districts of Jangalmahal area of West Bengal state for medical treatment in this hospital as a first point of contact. The HIV diagnosis was performed by ELISA rapid test. The subjects who had an indeterminate HIV test result, or subjects with incomplete evaluation or data were excluded from this study. The ethics committee of the Midnapore Medical College and Hospital approved the study and the study was conducted with prior consent of the participants. Confidentiality was assured to all participants.

All collected data were undertaken by the trained research personnel and completed in the same laboratories using identical instruments for the assays. The randomly selected sample size for this study was 200; of which100 individuals were under the category of HIV positive group and the rest of the 100 participants were in the HIV negative group. During enrollment the participants were interviewed personally using some questionnaire to collect data on the demographic characteristics of interest. These included age, sex, marital status, educational attainment, occupational status, and monthly income. The socioeconomic status of the participants was assessed by modified Kuppuswamy's Socio-Economic Status Scale (Gururaj & Maheshwaran, 2014).The height of each subjects was taken one time using anthropometer. The measurement was taken to the nearest 0.1 cm. Body weight measurement was considered for rapid weight loss is highly predictive of mortality and morbidity. The weight of the subjects was taken with minimal clothing before their meal by a digital weighing machine nearest 100g. BMI was computed by following the standard equation.

STATISTICAL ANALYSIS

The proportions of categorical variables were calculated, and tests of statistical significance were performed using the Fisher's exact test. In these tests, a P value of <0.05 was considered statistically significant. The data

were analyzed using the Statistical Package for the Social Sciences version 17 (SPSS 17).

RESULTS

Collected data included socio-demographic variables, such as age, educational attainment, occupation status and monthly income of the study population of HIV-negative and HIV-positive subjects (Table-1 and Table-2 and figs. 1 & 2). The mean age of female and male HIV-negative subjects was 27.26±4.81 and 28.56±5.60 years respectively, whereas, the mean age of HIV-positive female was 31.92±9.73 years and for male HIV-positive groups it was 36.52±7.68 years. The highest number of HIV-positive individuals was found in the group of 35 years (Table-1).

We found that 36% of HIV positive male had completed high school level, which was higher than the HIV negative male group. On the other hand, illiteracy was higher among HIV positive female (48%) than that of the negative female group (18%). But, there was no significant association between educational level among HIV status of the male subjects ($P>0.05$) though in case of female the significant association was observed ($P<0.01$) Table-2. Further, we found that monthly income of the female ($P<0.001$) and occupational status of the male ($P<0.01$) had significantly associated with the HIV states (Table-2).It is also noted that the overall unemployment was high in both positive group that is 14% in male and 92% in female (Table-2) than that of negative group.

The analysis of socioeconomic class revealed that 69% people of positive group were from the upper lower category. In this present study, we found some indicators of SES might be related to HIV infection. Illiteracy or primary school education predominated in most of the age groups of HIV-positive subjects, in contrast to HIV-negative subjects predominated by high school education. Similarly, low income group was predominated by HIV-positive subjects, in contrast to HIV-negative subjects of middle income group.

While considering the nutritional status of the subjects, it was found that 52% of HIV positive male and 40% of HIV positive female were underweight and a significant association between nutritional status and HIV state was observed in both male and female participants (Table-3).

DISCUSSION

This present investigation showed a relationship between SES, body mass index and HIV infection in the people from the rural areas of Purulia, Bankura and Paschim Medinipur. The study was consistent with the current knowledge indicating that the prevalence of HIV-positive individuals was under the peak age group of ≥ 35years. The age group found in this study might be related to the late hospital presentation that is common practice in these areas. Similar reports were found in Nigeria (Ogun et al.,

Table 1: Relationship between age wise distributions of HIV positive and negative participants

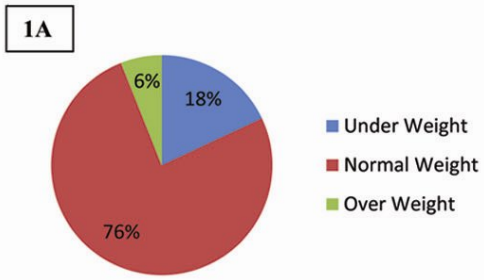
Age (years)	Male			Female		
	HIV (-) n=50	HIV (+) n=50	P-value	HIV (-) n=50	HIV (+) n=50	P-value
<25	20(40%)	4(8%)	P<0.001	22(44%)	14(28%)	P<0.001
25-35	26(52%)	17(34%)		26(52%)	18(36%)	
>35	4(8%)	29(58%)		2(4%)	18(36%)	

Table 2: Relationship between Socioeconomic statues and HIV states among male and females

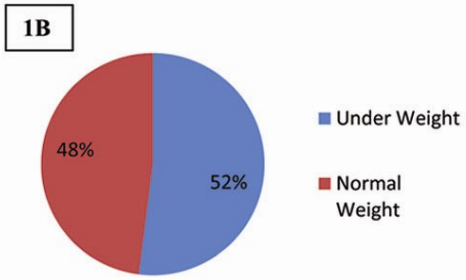
Socioeconomic Variables	Male			Female		
	HIV (-) n=50	HIV (+) n=50	P-value	HIV (-) n=50	HIV (+) n=50	P-value
Education						
Illiterate	7 (14%)	9 (18%)	P>0.05	9 (18%)	24(48%)	P<0.01
Primary School	19 (38%)	17 (34%)		26 (52%)	22(44%)	
Middle School	3 (6%)	4 (8%)		0 (0%)	0 (0%)	
High School	17 (34%)	18 (36%)		13 (26%)	4(8%)	
Intermediate	1 (2%)	2 (4%)		0 (0%)	0 (0%)	
Graduate	3 (6%)	0 (0%)		2 (4%)	0 (0%)	
Occupation						
Unemployed	2 (4%)	7(14%)	P<0.01	45 (90%)	46 (92%)	P>0.05
Unskilled	21(42%)	14(28%)		2 (4%)	3 (6%)	
Semi skilled	3 (6%)	6(12%)		0 (0%)	0 (0%)	
Skilled	9 (18%)	20(40%)		2 (4%)	0 (0%)	
Shop owner	7 (14%)	2(4%)		0 (0%)	0 (0%)	
Semi profession	2 (4%)	0 (0%)		0 (0%)	0 (0%)	
Profession	6 (12%)	1(2%)		1 (2%)	1 (2%)	
Family Monthly Income						
? 1802	0 (0%)	0 (0%)	P>0.05	0 (0%)	1(2%)	P<0.001
1803-5386	20(40%)	25(50%)		29 (58%)	33(66%)	
5387-8988	27 (54%)	19(38%)		19 (38%)	14(28%)	
8989-13494	1(2%)	6(12%)		1 (2%)	2(4%)	
13495-17999	2 (4%)	0 (0%)		1 (2%)	0 (0%)	
Socio Economic Status						
Upper middle	6 (12%)	1(2%)	P=0.052	1(2%)	1(2%)	P<0.001
Lower middle	8 (16%)	9(18%)		1(2%)	0 (0%)	
Upper lower	36(72%)	36(72%)		43(86%)	33 (66%)	
Lower	0	4 (8%)		5 (10%)	16 (32%)	

Table 3: Relationship between nutritional statues and HIV states among male and females

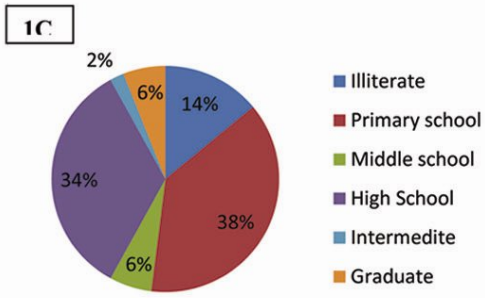
Nutritional status	Male			Female		
	HIV (-) n=50	HIV (+) n=50	P-value	HIV (-) n=50	HIV (+) n=50	P-value
Underweight	9 (18%)	26 (52%)	14.117 P<0.001	6 (12%)	20(40%)	11.588 P<0.01
Normal Weight	38 (76%)	24 (48%)		39 (78%)	29(58%)	
Overweight	3 (6%)	0 (0%)		5 (10%)	1(2%)	



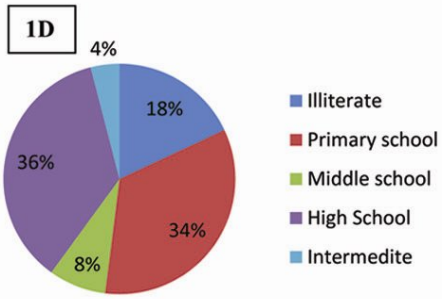
BMI status of HIV negative group(Male)



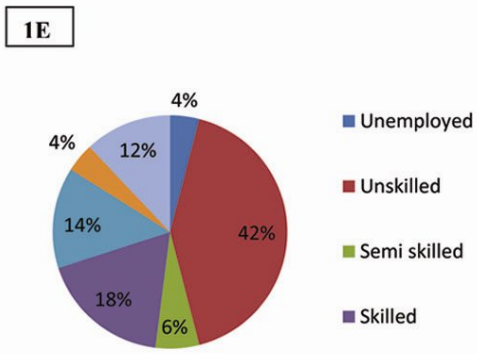
BMI status of HIV positive group (Male)



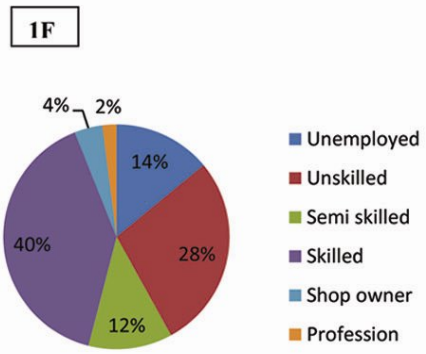
Education status of HIV negative Group (Male)



Education status of HIV positive Group (Male)



Occupation status of HIV negative Group (Male)



Occupation status of HIV positive Group (Male)

1G

1H

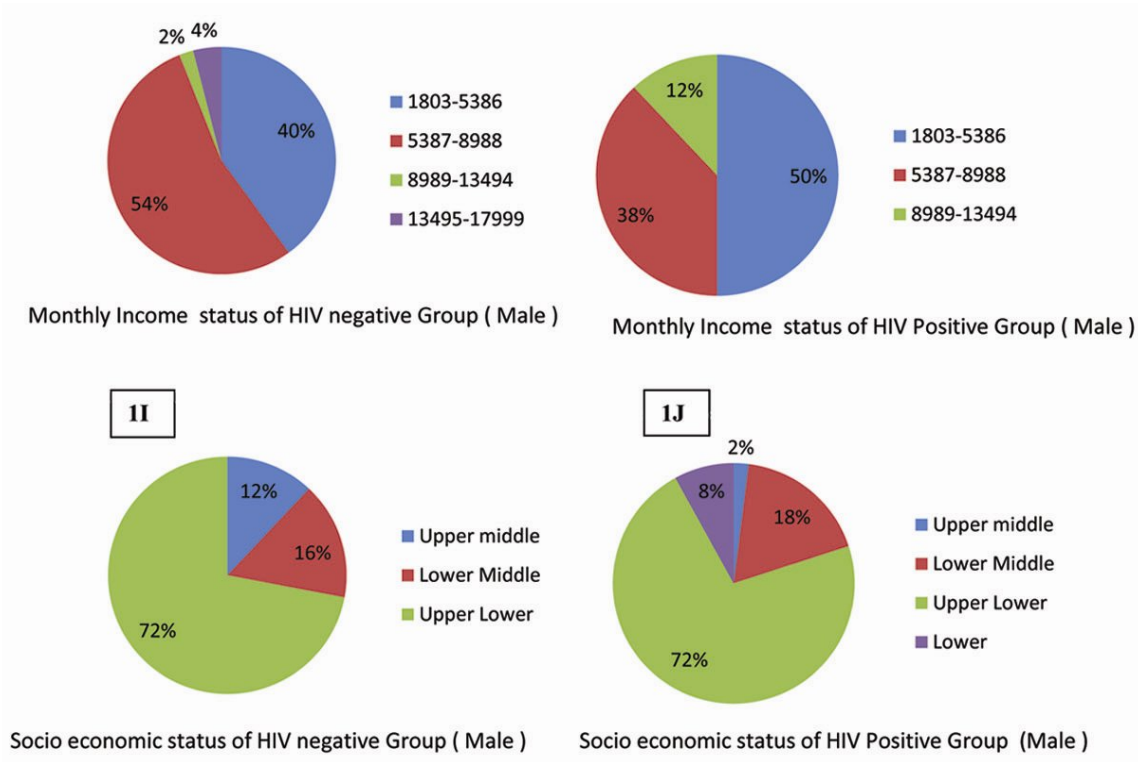
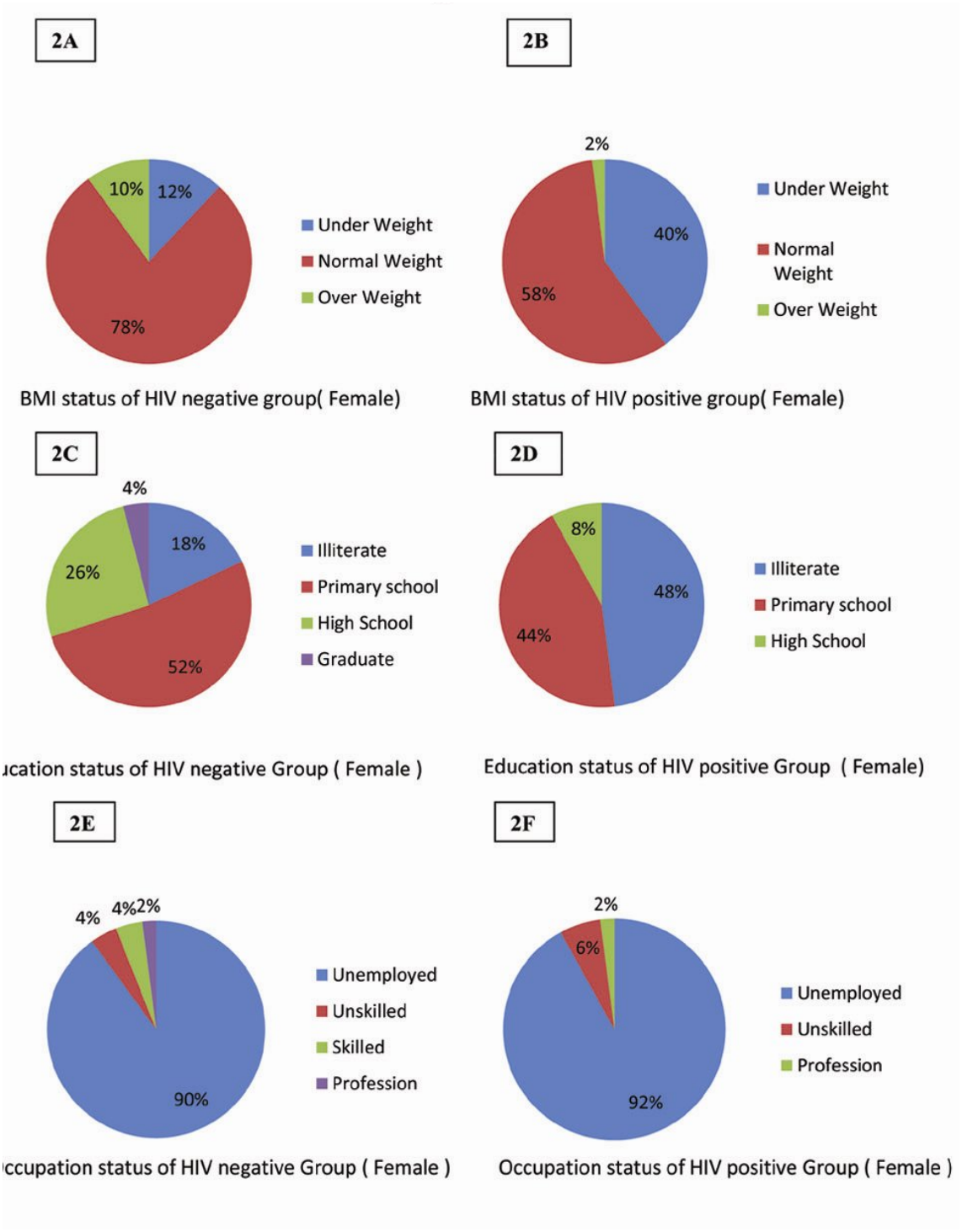


Fig. 1: Distribution of male subjects by different parameters

2000; Ogunmola et al., 2014).

SES is a complex composite measure depending on three main domains such as social status, employment status and economic condition and this can be measured by the level of education, occupation and monthly income, respectively (Bunyasi and Coetzee, 2017).In West Bengal, particularly in the southwest region, attainment of education is a key marker of socioeconomic position and is also naturally affecting the health issues. It was observed that most of the HIV infected female (92%) were illiterate or had only primary school attainment. The relationship between various levels of educational attainment of the female and HIV infection was statistically significant ($P<0.01$) but in case of males no such association were observed. This may be suggested that education is one of the most important risk factor for HIV infection for the female not the males. In a previous study in India the women showed a close proximity with the reduced risk of being HIV-positive when their education level is comparatively higher whereas women are having without education or with primary education are associated with greater risk of being HIV-positive (Perkins et al., 2009). The possible explanation is that the people with greater education may be accustomed with risk-reduction behaviors more rapidly than those with less education because the people with advance education exposed to better health promotion or they are empowered to take protective measures during sex with their partners (Hargreaves and Glynn, 2002; Barnighausen et al., 2007). A lack of proper


2A
10%
12%
78%
Under Weight
Normal Weight
Over Weight
BMI status of HIV negative group(Female)
2B
2%
40%
58%
Under Weight
Normal Weight
Over Weight
BMI status of HIV positive group(Female)
2C
4%
18%
26%
52%
Illiterate
Primary school
High School
Graduate
ucation status of HIV negative Group (Female)
2D
8%
48%
44%
Illiterate
Primary school
High School
Education status of HIV positive Group (Female)
2E
4%
4%
2%
90%
Unemployed
Unskilled
Skilled
Profession
ccupation status of HIV negative Group (Female)
2F
2%
6%
92%
Unemployed
Unskilled
Profession
Occupation status of HIV positive Group (Female)

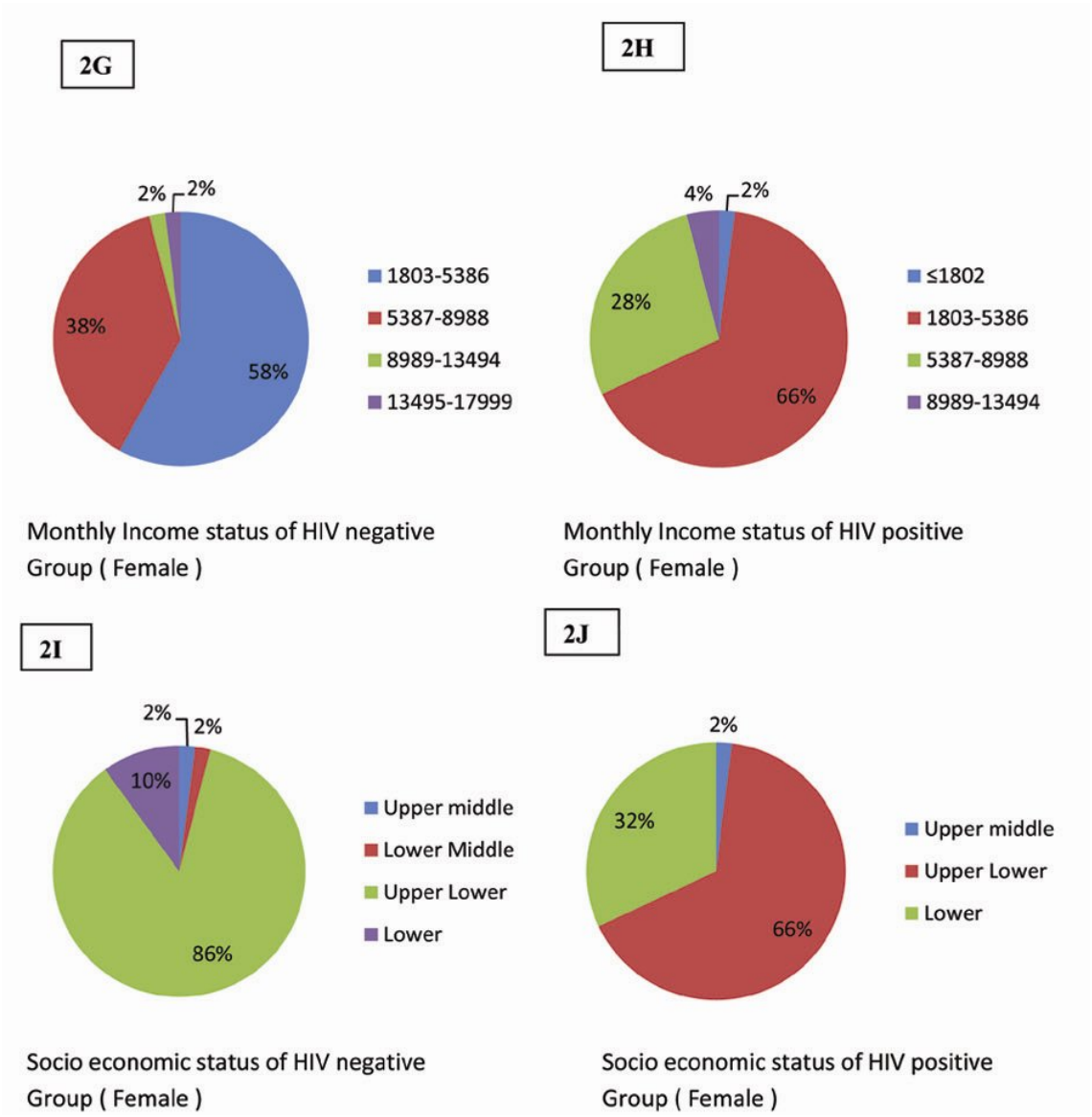


Fig. 2: Distribution of female subjects by different parameters

education is also linked with lower awareness to HIV that may trigger the probability of being HIV infected.

Most of the women (nearly 90 %) in this study were unemployed in both HIV positive and negative group. Women are psychologically attached to the employment status of their husband. This was not evaluated in this study, but may serve as a future area of research. Among the male, we noted an inverse relationship between occupational status and HIV infection ($P<0.01$), the higher the occupational status the lower the risk of HIV infection. It was further found that the unemployed males and females had 3.91 and 1.28 times greater chance of being HIV

infected. Risky sexual behavior in response to unemployment may lead to an increase in HIV prevalence (Sinkamba and Moseki-Lowani, 2016). Occupational migration is also one of the major factors of being HIV infected for low economic group mainly of unskilled workers with low educational level. In this investigation we found that 78% of the total study population was migrating (data not shown).

Our study has been shown no significant difference in monthly income among the male participants, but evidential fact from the study (Nagata et al., 2011) revealed that there is an inverse relationship of monthly income and HIV infection. Low income makes an individual vulnerable to accepting a risky situation for his or her daily needs, multiple sexual exposures for financial gain. People with low incomes are also prone to unstable housing. This may be one of the causes of getting a significant association between monthly family income and HIV states in our study particularly among the female participants. The lower the family income the tendency of being infected was observed among the females only but not among males. This has been linked to the risk for HIV infection. Poverty has been associated with the distribution of HIV infection and high-risk sexual behaviors (Ghosh, 2002).

In our study, it was apparent that lower middle class also affected by HIV (18%) but affected persons from upper middle class were quite low (2%) in case of male participants. It is interestingly noted that 2% of the female participants belongs to upper middle-class group but no female from lower middle class have HIV infection. It has been reported in a previous study that people with higher SES have a greater risk for HIV during the early stages of the infection while people of lower SES become disproportionately affected (Rutstein et al., 2004)

The prevalence of underweight in this HIV positive population was higher than the normal weight or overweight group (Table III). The low BMI may be reflective of higher food insecurity and poverty levels among persons living with HIV/AIDS. It may also suggest that HIV- associated wasting may have progressed significantly by the time of enrollment in HIV care (Nagata et al., 2011). Younger age was significantly associated with lower BMI among both sexes. The young adults have the greater risk of underweight and this may be associated with decreased food allocation due to their low household status and increased energy expenditure from work and household obligations.

Determination of socioeconomic status and associated HIV risk could have important implications for designing and implementing prevention programs. As a result, one of the strategies used by some HIV prevention programs in West Bengal projected towards the empowering of HIV patients economically independent through financial assistance and loans.

CONCLUSSION

In conclusion, our findings suggest that BMI, education, income, and occupation status are closely related to HIV infection. Illiteracy and primary school level of education showed a significant relationship. However, the low-income category has the comparatively highest prevalence of HIV infections. Urgent measures are indispensable to improve the condition. Our findings suggest increased spending on social services in public health are necessary to reduce the occurrence of HIV and AIDS related deaths. Future studies should use multiple measures in relation to partners' SES (measured by education, occupation, and

income) to further define this relationship.

ACKNOWLEDGEMENT

The part of the work is funded by UGC Innovative Research Project (SC) [VU/ Innovative/SC/01/2015 dated 17.06.2018]

REFERENCES

Adler, N.E. Appendix, D.(2006): Overview of health disparities, In: Thompson, G.E., Mitchell, F., Williams, M.B. editors. Examining the Health Disparity Research Plan of the National Institutes of Health: Unfinished Business. Washington, DC, USA: National Academies Press. pp. 121–174.

Aidala, A., Cross, J.E., Stall, R., Harre, D., Sumartojo, E. (2005): Housing status and HIV risk behaviors: implications for prevention and policy. AIDS Behav. 9(3):251–265.

American Psychological Association (2006): Report of the APA Task Force on Socioeconomic Status. Washington, DC, USA: American Psychological Association.

Argemi, X., Dara, S., You, S., Mattei, J.F., Courpotin, C., Simon, B., Lefebvre, N., et al. (2012): Impact of malnutrition and social determinants on survival of HIV-infected adults starting antiretroviral therapy in resource-limited settings. AIDS. 26(9):1161–1166.

Barnighausen, T., Hosegood, V., Timaeus, I.M., Newell, M.L. (2007) The socioeconomic determinants of HIV incidence: evidence from a longitudinal, population-based study in rural South Africa. Aids. 21(Suppl 7):S29–38.

Bunyasi, E.W., Coetzee, D.J. (2017): Relationship between socioeconomic status and HIV infection: findings from a survey in the Free State and Western Cape Provinces of South Africa. BMJ Open. 7:e016232.

Ghosh, J. (2002): A Geographical Prespective on HIV/ AIDS In India. Geographical Review. 92(1):114-126.

Gururaj, Maheshwaran. (2014): Kuppuswamy's Socio-Economic Status Scale –A Revision of Income Parameter For 2014. International Journal of Recent Trends in Science And Technology, 11(1): 01-02.

Hargreaves, J.R., Glynn, J.R. (2002) Educational attainment and HIV-1 infection in developing countries: a systematic review. Trop Med Int Health. 7:489–498.

Ickovics, J.R., Beren, S.E., Grigorenko ,E.L., Morill, A.C., Druley, J.A., Rodin, J. (2002): Pathways of risk: race, social class, stress, and coping as factors predicting heterosexual risk behaviors for HIV among women. AIDS Behav. 6(4):339–350.

Isaac, R., Jacobson, D., Wanke, C., Hendricks, K., Kno,x TA., Wilson, I.B. (2008): Declines in dietary macronutrient intake in persons with HIV infection who develop depression. Public Health Nutr. 11(02):124.10.1017.

Michelo, C. Sandy, I.F., and Fylkesnes, K. (2006): Marked HIV prevalence declines in higher educated young people, evidence from population-based surveys (1995–2003) in Zambia. AIDS. 20(7):1031–1038.

Nagata, J.M., Magerenge, R.O., Young, S.L., Oguta, J.O., Weiser, S.D., Cohen, C.R. (2011): Social determinants, lived experiences, and consequences of household food insecurity among persons living with HIV/AIDS on the shore of Lake Victoria, Kenya. AIDS Care. 24(6):728–736.10.1080.

Ogun, S.A., Adelowo, O.O., Familoni, O.B., Jaiyesimi, A.E., Fakoya, E.A. (2000): Pattern and outcome of medical admissions at the Ogun State University Teaching Hospital, Sagamu – a three year review. West Afr J Med. 19(4):304–308.

Ogunmola, O.J., Oladosu, Y.O., Olamoyegun, M.A. (2014): Relationship between socioeconomic status and HIV infection in a rural tertiary health center. HIV/AIDS – Research and Palliative Care. 6: 61–67.

Perkins, J.M., Khan, K.T., (2009): Subramanian SV.Patterns and distribution of HIV among adult men and women in India.PLoS One. 4(5):e5648.

Perry, M.J., (1998): Gender, Race and economic perspectives on the social epidemiology of HIV infection, implications for prevention. J Prim Prev. 19(2):97–104.

Rutstein, S.O., Johnson, K. (2004) : DHS Comparative Reports No 6: The DHS Wealth Index. Calverton, MD: ORC Macro

Shelton, J.D., Cassell, M.M., and Adetunji, J. (2005): Is poverty or wealth at the root of HIV? Lancet. 366(9491):1057–1058.

Sinkamba, R.,Moseki-Lowani, T. (2016): Youth unemployment and HIV and AIDS: Insights from the 2013 Botswana AIDS Impact Survey. Pula: Botswana Journal of African studies. 30(2): 240-252.

van der Sande, MA., Vander Loeff, MFS., Aveika, AA., Sabally, S., Togun, T., Sarge-Njie, R., Whittle, H.C., et al. (2004): Body mass index at time of HIV diagnosis: A strong and independent predictor of survival. JAIDS. 37(2):1288–1294.

World Bank. (2016): Low and middle income countries as defined by the World Bank in September 2016(https://datahelpdesk.worldbank.org/knowledgebase/articles/906519).