Original Article

Cardiovascular Risk Factors amongst the Patient Living with HIV Attending at Anti-Retroviral Therapy Center of Bangladesh

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Abstract

Human immunodeficiency Virus (HIV) seropositive individual is at risk of developing disease of cardiovascular system (CVD). There are scarce of research work regarding this field in Bangladesh. Considering scarcity, this study was conducted at anti-retroviral therapy (ART) center of Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh to find out the frequency of the CVD and their common risk factors in HIV seropositive patients from March 2017 to September 2019. Different CVD risk factors were assessed in this study. The demographic data were assessed and World Health Organization STEPS questionnaire were used to collect demographic data. The 10-year CVD risk was calculated by using the Framingham coronary risk score (FRS). Mean age of study population was 38, SD= 9.8. Among them sixty-five (65%) were men and thirty-five (35%) were women. About one third were overweight followed by 5% were obese. High cholesterolemia, high triglyceridemia, high low-density lipoprotein (LDL) and low high-density lipoprotein (HDL) were found in 23%, 58%, 14%. and 63% of the HIV patent, respectively. Hypertension was present in 19% and diabetes in 15% of the patients. In Framingham risk score, 19% of the participants had intermediate to high risk of cardiovascular disease within 10 years. The cardiovascular risk factors were common in HIV patients attending ART center of BSMMU, where base line 10-years CVD risk was low. People living with HIV appear to be an imminent risk to develop CVD.

Keywords: *HIV, anti-retroviral therapy, 10-year cardiovascular disease risk.*

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INTRODUCTION

The common cardiovascular events are associated with HIV infection. In HIV seropositive patient, atherosclerosis and cardiovascular disease are developed by several mechanism like vascular endothelial dysfunction, abnormal coagulation process and systemic inflammatory response.[1] It is found in different studies that cardiovascular risk factors like smoking, dyslipidemia, hypertension and central obesity were prevalent in the HIV sero-positive patients.[2,3] So, cardiovascular disease risk and cardiovascular risk factors in people living with HIV needs to be studied. The data are scarce regarding cardiovascular diseases and risk factors in HIV populations in Bangladesh. So, this study would be helpful for both the clinician and the patients in making a rational approach in management of overlapping HIV infection with cardiovascular diseases and this report may contribute to the monitoring of the cardiovascular disease prevention and control policy among HIV infected patient in our country. This study may be helpful in reduction of the sufferings and burden of cardiovascular diseases in HIV patients.

MATERIALS AND METHODS

This was a cross-sectional observational study done from March 2017 to September 2019 in the ART Center of Bangabandhu Sheikh Mujib Medical University. The socio-demographic characteristics were evaluated by

interviewing face to face using WHO STEPS questionnaire. Anthropometric measurements were performed following standard procedures. The venous blood samples were drawn and fasting blood glucose, HbA1c and fasting lipid profile were measured in department of Biochemistry, BSMMU.

The participant was considered as diabetic who were already diabetic or fulfilled the criteria having HbA1c ≥ 6.5% or fasting plasma glucose level ≥7 mmol/L. The US National Cholesterol Education Program (NCEP) III guidelines was used to define dyslipidemia. All the participant had provided written informed consent before enrollment. Ethical approval was obtained from the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University. After collection of the data analysis was performed by SPSS Version 22.

RESULTS

Table I shows a total of 100 participants were enrolled between March 2017 to September 2019 in the ART Center of Bangabandhu Sheikh Mujib Medical University. The age range of the participants were 18-64 years. Mean age was 38.05 ±9.85 years. Female participants were 35 (35%) and male participants were 65 (65%) in number and male: female ratio was 1.8:1. Among the male participant 48 resided in rural area where as 29 of female participant were living in the rural area. Male were educated above higher secondary level more in number than the female (27 vs 6) but there was a little difference in illiteracy level/primary level(38 v29). All the female participant were married and divorced rate was higher in them (10 vs 0). Regarding the transmission route heterosexuality is the predominant both in the male and female (59 vs 35) followed by MSM in case of male in our study. The commonest opportunistic infection was Tuberculosis and only one patient was found to be have CMV retinitis. Except one patient among the male and 100% of the female patient were receiving HAART. PPI use was more common in the male participant (14 vs 1) (Table-1). Fifteen participants (15%) were underweight, thirty three participants (33%) were overweight, five participants (5%) were obese but forty seven participants (47%) were normal in weight at presentation (Figure-1). Very small amount (5%) of the participants were physically active as per World Health Organization (WHO).

Table 1 Study population socio demographic characteristics(N=100)

| Characteristic	Male	Female
Sex of the participants	65/100	35/100
Age (Range of years)	18-65 (years)	25-64 (years)
Type of community		
Rural	48 /65	30/35
Urban	17/65	5/35
Level of education		
Illiterate/Primary	38/65	29/35
Secondary or Above	27/65	06/35
Occupation		
Employed	48/65	3/35
Unemployed	17/65	32/35
Marital status		
Never married	8/65	0/35
Married	57/65	25/35
Divorced/Widow	0/65	10/35
Route of transmission		
Heterosexual	59/65	35/35
MSM	06/65	0/35
Blood borne	0/65	1/35
Injectable syringe/Unknown	0	0
Opportunistic infection		
Pulmonary TB	05/65	02/35
Extrapulmonary TB	03/65	0/35
CMV retinitis	0/65	1/35
HAART		
On HAART	64/65	35/35
Current PI use	14/65	1/35
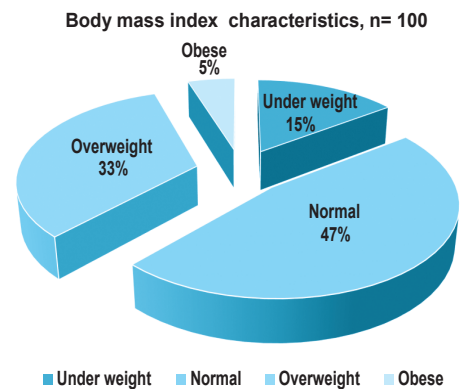
Figure 1: *Body mass index characteristics of study participants.*

Figure 1 shows that 47% participants had normal body weight. 33% participant were overweight, 15% were underweight and 5% were obese

Table II shows the framingham risk scores, 81% patient was in low-risk group, 16% were in intermediate risk group followed by 3% were in high-risk group population

Table II: Shows the Framingham risk scores of HIV infected peoples (N=100)

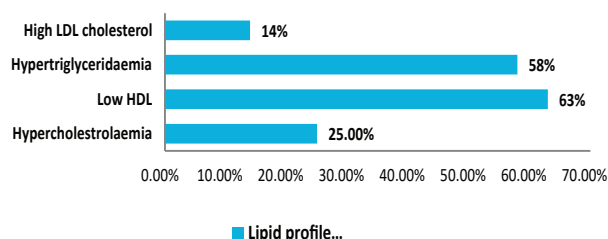| FRS	All	Male	Female
Low risk (<10% cardiovascular disease risk)	81 (81%)	49 (75.4%)	32 (91.4%)
Intermediate risk (10%-20% cardiovascular disease risk)	16 (16%)	13 (20%)	3 (8.5%)
High risk (>20% cardiovascular disease risk)	3 (3%)	3 (4.6%)	0 (0%)

Figure 2: Lipid profile characteristics of study participants.

Figure 2: shows the lipid profile characteristics of study participants frequency of hypercholesterolemia, hypertriglyceridemia, high LDL and low HDL were present among 25%, 58%, 14% and 63% of the participants respectively
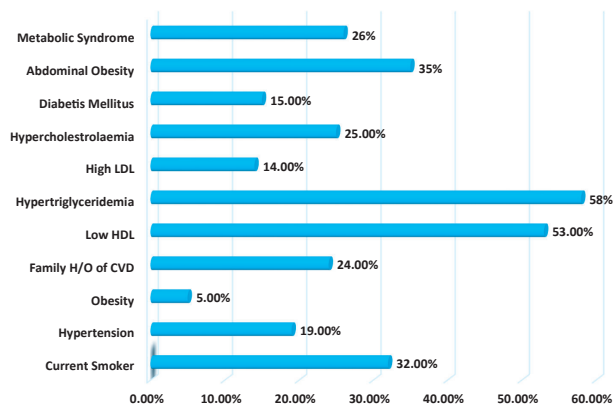

Figure 3: Cardiovascular risk factors characteristics of study participants.

Figue-3 shows overall frequency of Hypertension was 19%, Diabetes was 15 %, Hypercholesterolaemia 25%, High LDL was 14%, Hypertiglyceraldemia was 58%, Low HDL was 53%, family history of CVD was present in 24%, Obesity was 5%. Among the male participant 32% participant were current smoker

Almost all the patients (99%) received ART among them 15% were treated protease inhibitors (PI) like lopinavir. The median duration of ART was 3 years.

DISCUSSION

This is probably the pioneer study in Bangladesh about the CVD and its risk factors in HIV patients. The WHO STEPS questionnaire was utilized to assess dietary habit, physical activity, tobacco use and alcohol consumptions.

In the study population, male to female ratio was 1.8:1 with males comprising 65% of cases. Male predominance was also observed in several studies.[4,5] Age range of our study population was 18 years to 65 years and median age was 35. Higher prevalence seen as this is sexually active and reproductive age. Similarly, higher prevalence in this age group was observed in previous studies conducted in Bangladesh.[4] About 67% of HIV patient completed up to primary level education. These findings were similar the study conducted in India.[5] It is possible that educated people are more motivated and exposed to prevention programs.

Majority of participants were married (82%), eight (8%) participants were unmarried and ten (10%) were widows. High number of married persons having HIV/AIDS was also reported in other Indian studies.[5] Almost all widows gave history of death of their spouses due to HIV/AIDS. In this study, most common possible route of transmission was heterosexual (92%). This is due to probably homosexuality is not common in Bangladesh.[6]

Majority of participants cited fever, weight loss and diarrhea as symptoms within 6 months of HIV diagnosis. Tuberculosis was the commonest opportunistic infection found in 10% patients in this study. This is near similar to studies done in ICDDRB, Bangladesh[4] but lower from the other South Asian[7] study done in 2006 which reported tuberculosis in 62% patients of their study populations.

That study was conducted a decade before, when wide spread use of ART was not possible. Now the good availability and wide spread use of ART could be the reason of this decrease in opportunistic TB infection in HIV seropositive patients, despite the high prevalence of tuberculosis in the Bangladesh.

Ninety-nine participants (99%) were receiving ART of which fifteen (15%) were receiving protease inhibitors (PI) in the form of boosted lopinavir-based therapy. The median duration of ART exposure was 3 years. Only five (5%) of the participants were involved in physical activity consistent with WHO recommendations and only 2 study participant's dietary habits were in compliance with WHO recommendation. According to the participant response low intake was due to their low financial condition. Other study had shown less consumption of fruits and vegetable is associated with increase in CVD rsik.[8,9] A high rate of unemployment (49%) was observed in this study, as 91% of female were housewife and 26.15% male had no jobs. This high unemployment rate and stigma related to HIV infection, may cause high levels of stress to HIV seropositive patients.

Thirty-nine participants (39%) reported to have ever smoked, of which thirty-two (32%) were current smokers, all of them being men. 25% of participants used tobacco with betel leaf. Only 5 participants occasionally use alcohol, all of them being men. These behavioral risks are similar to Indian studies.[10]

About 5% were obese and metabolic syndrome was present in 26% in our study. These findings are similar to other study findings conducted in Asia.[11] The female was more obese than male in our study and the reason behind this may be physical inactivity.

Among metabolic risk factors, hypertension was observed in nineteen (19 %) participants. Diabetes mellitus in males and females were 15% similar to studies in Malaysia (12). In this study, Hypercholesterolemia was present in 25% of the participants which is similar to the results from other studies. Hypertriglycedaemia and low HDL was the predominant lipid abnormalities found in this study which was consistent with other studies.[13] High level of TG and low HDL may be associated with low intake of fruits and vegetables.[14]

To detect the cardiovascular disease risk, Framingham risk score was used because was a proven tool to assess CVD risk in non-HIV patients [15] and it can also provide an early prediction of presence of carotid atherosclerosis.[16] Framingham risk score showed 81% of participants had low cardiovascular disease risk. Only 19% had intermediate to high risk based upon Framingham risk score, which is par compared with rates observed among individuals with HIV in South Korea (29%) (17), Western countries (19.6%-21.1%) (18) where sedentary life style were also high.

Limitations of this study include that this study was conducted at only one ART center. Therefore, the study findings may not be generalizable to people receiving HIV care from other centers. The cross-sectional design limits our understanding of causal links between risk factors and the development of cardiovascular diseases.

CONCLUSIONS

Cardiovascular diseases among people living with HIV appear to be an imminent risk group. The 10-year cardiovascular disease risk was low. Risk factors for CVD were common and significantly related to individual living with HIV. Stepping up of preventive services including screening services should be considered.

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