DOI: https://doi.org/10.53350/pjmhs221610236

ORIGINAL ARTICLE

Frequency of Prediabetes in patients of HIV Infection Presenting at Tertiary Care Hospital

MUHAMMAD HAROON BILAL[1], MUHAMMAD ABDUL RAZIQ[2], MUHAMMAD AJWAD HUMAYON[3], TARIQ HUSSAIN[4], MUHAMMAD TAHIR[5]

[1]*Associate Prof of Medicine, D.G Khan Medical College, D.G Khan*
[2]*Assistant Professor, Department of Physiology, Quaid-e-Azam Medical College, Bahawalpur*
[3]*Medical Officer, Brain Surgery Hospital, Multan*
[4]*Senior Demonstrator, Biochemistry Department, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan*
[5]*Semester 7th, Department of Statistics, The Islamia University Bahawalpur*
Correspondence to: Dr. Muhammad Haroon Bilal, Email: drmuhab@gmail.com, Cell: 03216786787

ABSTRACT

Objective: To find out the frequency of prediabetes in patients of HIV presenting at tertiary care hospital.
Study design: Cross sectional study.
Place and duration: Department of Medicine, D.G Khan Hospital, D.G Khan. (January 2020 to December 2020)
Methodology: Total 187 patients of HIV infection, age 20 years to 60 years both male or female with duration of HIV 10 years were selected and pre-diabetes was studies.
Results: Total 187 patients of HIV infection was recruited for this study and prediabetes was assessed. Mean age and mean HIV infection duration was 37.81 ± 12.81 years and 5.31 ± 2.86 years. Prediabetes was noted in 63 (34%) patients. Male patients and female patients were 122 (65.24%) and 65 (34.76%) respectively. Prediabetes was found in 58 (47.54%) males and in 5 (7.69%) females. Prediabetes was significantly (P=0.000) associated with gender.
Conclusion: This study showed a higher percentage of prediabetes among HIV infected patients. Most of the cases were belonged to 3rd and 4th decade of life. Males were more victim of HIV infection as compared to females and most of the males were prediabetics. No association of development of prediabetes with duration of HIV infected was noted.
Keywords: Prediabetes, HIV infection, diabetes mellitus, IGT

INTRODUCTION

As of 2017, 38 million people globally have HIV infection.[1] In USA, prevalence of HIV infection fell from 2010 to 2013, but it increased or remained unchanged in several demographic categories.[2] HIV infection, which is indicated by a CD4+ cell count below 200 cells/mL, can result in opportunistic infections such as cytomegalovirus disease and pneumocystis associated with AIDS if left untreated.[3] Nevertheless, because of advancements in anti-retroviral therapy (ART), HIV infection has changed from being a condition closely linked to AIDS and opportunistic infections to a chronic condition with a number of cardiometabolic consequences, including diabetes[4], heart disease[5] and other conditions unrelated to AIDS like osteoporosis.[6]

Pre-diabetes is a condition of poor glucose homeostasis characterized by a lack of or resistance to insulin. Impaired fasting glucose (IFG), impaired glucose tolerance (IGT) and IFG/IGT combination are the three most prevalent pre-diabetic states in the United States. IFG affects close to 20% of the population, IGT affects 5%, and 10% have both.[7] IGT and IFG are indicators of early changes in homoeostasis of glucose that take place before diabetes. Higher levels of peripheral insulin resistance (PIR) and hepatic insulin resistance are thought to reflect pathophysiologically distinct entities in IFG and IGT, respectively.[8] Pre-diabetes occurs before the emergence of overt T2DM. Due to its association with elevated mortality and morbidity, it satisfies the criteria for a disease condition.[9]

Traditionally seen as consequences of diabetes, cases of prediabetes may also have concurrent macrovascular illnesses, CKD, diabetic retinopathy and neuropathies.[10] It is well known that by life style modifications and medications, diabetes can be postponed or averted in patients with prediabetes.[11] The primary objectives of management for those with the disease were to prevent the onset of diabetes and prediabetes consequences. Therefore, the diagnosis of prediabetes in cases of HIV is crucial for determining who needs medications to reduce their risk of acquiring diabetes in the future. However, there is a lack of data regarding the prevalence, methods of diagnosis, and indicators of prediabetes in HIV-infected people receiving ART.[12] According to earlier studies, Hemoglobin A1c (HbA1c) is incorrect in HIV-positive cases.[13]

Estimating the prevalence of prediabetes in HIV-positive individuals is the goal of this investigation. The findings of this study could be helpful in the early detection and management of prediabetes. By doing this, we might be able to reduce the associated morbidity.

MATERIAL AND METHODS

This cross sectional study was conducted at Department of Medicine, D.G Khan Hospital, D.G Khan from January 2020 to December 2020. Non-probability consecutive sampling technique was used and sample size was calculated form www.openepi.com. Inclusion criteria was: total 187 patients of HIV infection, age 20 years to 60 years both male or female with duration of HIV 10 years were selected. Exclusion criteria was: patients on lipid lowering medicines, diabetic patients and pregnant women were excluded.

Study was approved by the ethical committee and written informed consent was taken from every patient.

History was taken of all the patients along with demographic profile. Five ml blood sample was drawn and send to laboratory for blood glucose analysis and findings were noted in pre-designed proforma in term of pre-diabetes (Yes/No)

All the collected was analyzed by using SPSS version 20. Mean and SD was calculated for age and duration of HIV. Frequencies were calculated for pre-diabetes (Yes/No), gender (Male/Female). Stratification was done for age, gender and duration of HIV. Post stratification chi-square was applied to see the effect of these on outcome variable i.e pre-diabetes. P. value ≤0.05 was considered as significant.

RESULTS

Total 187 patients of HIV infection was recruited for this study and prediabetes was assessed. Mean age and mean HIV infection duration was 37.81 ± 12.81 years and 5.31 ± 2.86 years respectively. Out of 187 patients, prediabetes was seen in 63 (34%) patients. (Fig. 1)

Two age groups (20-40 and 41-60 years) were made. There were 111 (59.36%) patients and 76 (40.64%) patients respectively in both age groups. In age group 20-40 years, prediabetes was reported in 48 (43.24%) patients while it was reported in 15 (19.74%) patients of age group 41-60 years. Prediabetes was significantly (P=0.001) associated with age group. (Table 1)

Males and females were 122 (65.24%) and 65 (34.76%) respectively. Prediabetes was found in 58 (47.54%) males and in 5 (7.69%) females. Prediabetes was significantly (P=0.000) associated with gender. (Table 2)

Among 105 (56.15%) patients, duration of HIV infection was 1-5 years while in 82 (43.85%) patients, duration of HIV infection was 6-10 years. Prediabetes was noted in 34 (32.38%) patients of 1-5 years group and in 29 (35.37%) patients of 6-10 years group. Association of prediabetes with duration of HIV infection was statistically insignificant with p value 0.668. (Table 3)

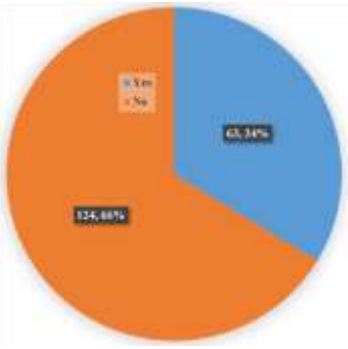

Fig. 1: Frequency of prediabetes

Table 1: Stratification for age

Age groups (Years)	Prediabetes		Total (%)	P value
	Yes (%)	No (%)		
20-40	48 (43.24)	63 (56.76)	111 (59.36)	0.001
41-60	15 (19.74)	61 (80.26)	76 (40.64)	
Total	63 (34)	124 (66)	187	

Table 2: Stratification for gender

Gender	Prediabetes		Total (%)	P value
	Yes (%)	No (%)		
Male	58 (47.54)	64 (52.45)	122 (65.24)	0.000
Female	5 (7.69)	60 (92.31)	65 (34.76)	
Total	63 (34)	124 (66)	187	

Table 3: Stratification for duration of HIV infection

Duration of HIV Infection (Years)	Prediabetes		Total (%)	P value
	Yes (%)	No (%)		
1-5 Years	34 (32.38)	71 (67.62)	105 (56.15)	0.668
6-10 Year	29 (35.37)	53 (64.63)	82 (43.85)	
Total	63 (34)	124 (66)	187	

DISCUSSION

Globally, HIV infection is a serious health issue. HIV infection's natural course has been altered by the use of ART, which has significantly decreased morbidity and mortality. T2DM, Insulin resistance and dyslipidemia are only a few of the non-communicable diseases that are now recognized as consequences of HIV infection as the disease's natural history changes.[4-5]

The development of diabetes is at high risk in those with prediabetes. About 70% of prediabetes cases will eventually acquire DM.[6-7] It is generally known that patients with prediabetes can delay or avoid developing diabetes by using drugs like metformin and/or extensive lifestyle changes.[7] The treatment of people with prediabetes centered on halting the progression to diabetes and reducing the risks associated with prediabetes. Therefore, it is essential to identify HIV-infected patients with prediabetes in order to determine who needs therapies to lower their risk of developing diabetes in the future.

The objective of the present study was to assess the prediabetes in cases of HIV infection. Mean age and mean HIV infection duration was 37.81 ± 12.81 years and 5.31 ± 2.86 years respectively. Out of 187 patients, prediabetes was seen in 63 (34%) patients. In study of Coelho et al,[14] out of 220 HIV infected patients, frequency of prediabetes was 14.1%. In another study by Arafath et al,[15] total 249 cases of HIV infection were selected, mean age of cases was 46.3 years and most of the cases (54%) were males, prediabetes was reported in 30% cases. In present study, males and females were 65.24% and 34.76%. Prediabetes was found in 47.54% males and in 7.69% females. Association between prediabetes and gender was significant (P=0.000). Results of this study was in agreement with our study. In study of Phuphuakrat et al,[16] total 397 cases of HIV were studied, mean age was 47.0 ± 9.8 years and most (55.7%) of them were males. Prediabetes was found in 33.5% patients which is comparable with our study. Rhee et al[17] found prediabetes in 34% patients of HIV infection. In study by Srivanich et al,[18] the prevalence of prediabetes was 27.5%.

CONCLUSION

This study showed a higher percentage of prediabetes among HIV infected patients. Most of the cases were belonged to 3rd and 4th decade of life. Males were more victim of HIV infection as compared to females and most of the males were prediabetics. No association of development of prediabetes with duration of HIV infected was noted.

Recommendation: It is recommended that all HIV infected patients should be screened for pre-diabetes. We may be able to protect them from diabetes mellitus by changing in life style and diet modification.

Ethics approval and consent to participate: Study was approved by ethical committee and written informed consent was taken from every patient.

Conflict of Interest: None

Funding: None

REFERENCES

1. WHO | HIV/AIDS [Internet]. WHO. World Health Organization; [cited 2020 Aug 16]. Available from: http://www.who.int/gho/hiv/en/
2. Centers for Disease Control and Prevention. https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/HIV-Incidence-Fact-Sheet_508.pdf. Accessed August 16, 2020.
3. Chu C, Selwyn PA. An epidemic in evolution: the need for new models of HIV care in the chronic disease era. Journal of Urban Health. 2011 Jun 1;88(3):556-66.
4. Duncan AD, Goff LM, Peters BS. Type 2 diabetes prevalence and its risk factors in HIV: a cross-sectional study. PloS one. 2018 Mar 12;13(3):e0194199.
5. Freiberg MS, Chang CC, Kuller LH, Skanderson M, Lowy E, Kraemer KL, Butt AA, Goetz MB, Leaf D, Oursler KA, Rimland D. HIV infection and the risk of acute myocardial infarction. JAMA internal medicine. 2013 Apr 22;173(8):614-22.
6. Mallon PW. Aging with HIV: osteoporosis and fractures. Current Opinion in HIV and AIDS. 2014 Jul 1;9(4):428-35.
7. Karve A, Hayward RA. Prevalence, diagnosis, and treatment of impaired fasting glucose and impaired glucose tolerance in nondiabetic U.S. adults. *Diabetes Care*. 2010;33(11):2355–59.
8. Souza AF, Pace FH, Chebli JM, Ferreira LE. Insulin resistance in non-diabetic patients with chronic hepatitis C what does it mean? Arq Bras Endocrinol Metabol. 2011;55:412-18.
9. Lam KD, Bacchetti P, Abbasi F. Comparison of surrogate and direct measurement of insulin resistance in chronic hepatitis C virus infection: impact of obesity and ethnicity. *Hepatology*. 2010;52(1):38–46.
10. Phuphuakrat A, Nimitphong H, Reutrakul S, Sungkanuparph S. Prediabetes among HIV-infected individuals receiving antiretroviral therapy: prevalence, diagnostic tests, and associated factors. AIDS Research and Therapy. 2020 Dec;17:1-8.
11. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002;346:393–403.
12. Chantrathamachart P, Sungkanuparph S, Kiertiburanakul S, Malathum K. Diabetes mellitus and hypertension in HIV-infected patients receiving antiretroviral therapy: a pilot study. J Infect Dis Antimicrob Agent. 2006;23:131–8.
13. Kim PS, Woods C, Georgof P, Crum D, Rosenberg A, Smith M, et al. A1C underestimates glycemia in HIV infection. Diabetes Care. 2009;32:1591–3.
14. Coelho AR, Moreira FA, Santos AC, Silva-Pinto A, Sarmento A, Carvalho D, Freitas P. Diabetes mellitus in HIV-infected patients: fasting glucose, A1c, or oral glucose tolerance test–which method to choose for the diagnosis?. BMC infectious diseases. 2018 Dec;18(1):309.
15. Arafath S, Campbell T, Yusuff J, Sharma R. Prevalence of and risk factors for prediabetes in patients infected with HIV. Diabetes Spectrum. 2018 May 1;31(2):139-43.
16. Phuphuakrat A, Nimitphong H, Reutrakul S, Sungkanuparph S. Prediabetes among HIV-infected individuals receiving antiretroviral therapy: prevalence, diagnostic tests, and associated factors. AIDS Research and Therapy. 2020 Dec;17:1-8.
17. Rhee JY, Bahtila TD, Palmer D, Tih PM, Aberg JA, LeRoith D, Jao J. Prediabetes and diabetes among HIV-infected adults in Cameroon. Diabetes/metabolism research and reviews. 2016 Sep;32(6):544-9.
18. Srivanich N, Ngarmukos C, Sungkanuparph S. Prevalence of and risk factors for pre-diabetes in HIV-1-infected patients in Bangkok, Thailand. Journal of the International Association of Physicians in AIDS Care. 2010 Nov;9(6):358-61.