Metabolic syndrome among people living with HIV (PLWH) in a specialist HIV clinic in London

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Introduction

Metabolic abnormalities including diabetes (DM), dyslipidaemia, hypertension (HTN), and obesity are increasingly described among people living with HIV (PLWH) [1]. Some antiretroviral therapies (ART) including protease inhibitors (PI), integrase strand-transfer inhibitors (INSTI) and tenofovir alafenamide (TAF) have been implicated in worsening of some of these conditions. We aimed to describe the prevalence of metabolic abnormalities and metabolic syndrome (MS) in people attending our HIV clinic and to explore the factors associated with MS.

Methods

Cross-sectional analysis was performed on 5372 PLWH from 2017-2019 .

Metabolic abnormalities were defined as:

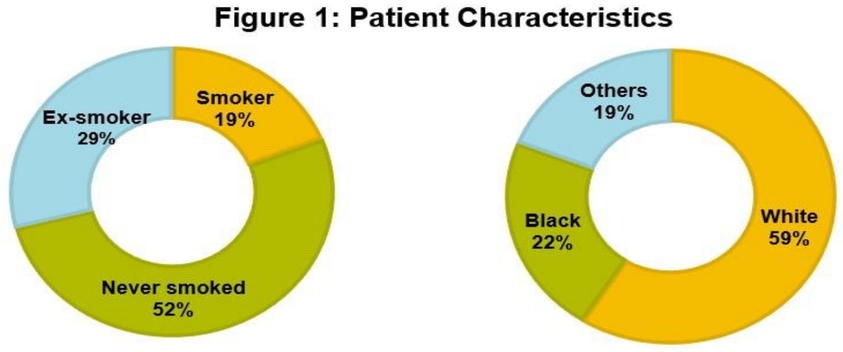
- DM (HbA1c >48 mmol/mol), confirmed diagnosis, and/or on treatment
- HTN (systolic BP ≥ 130 mmHg, diastolic BP ≥ 85mmHg), confirmed diagnosis, and/or on treatment
- Dyslipidaemia (TG 1.7 mmol/L or greater and/or HDL <1.0 mmol/L in men and <1.3 mmol/L in women), confirmed diagnosis, and/or on treatment
- Obesity: Based on body mass index (Healthy weight BMI 18.5-24.9, Overweight BMI 25-29.9, Obesity BMI ≥30kg/m²) plus confirmed diagnosis, and/or on treatment.

MS was defined as having ≥3 of the following: HTN, DM, hypertriglyceridemia, low HDL, obesity. Chi-square test and logistic regression explored the association between MS and demographics and ART regimen.

Results

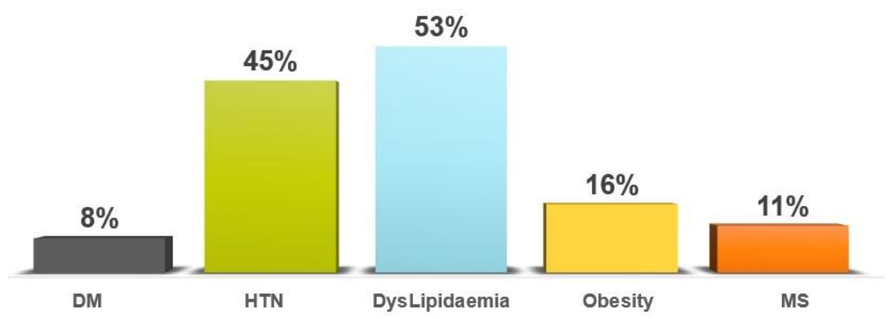
- 59% of the sample were white, 82% were male with a median age of 50 years (IQR 42-58) (Figure 1).
- Almost half of the sample (52%) had never smoked while 76% had alcohol intake (Figure 1)

Figure 1: Patient Characteristics



- Dyslipidaemia was highly prevalent (53%), while 11% met criteria for MS (Figure 2)

Figure 2: Prevalence of metabolic abnormalities



- Older age was significantly associated with HTN, DM, Dyslipidaemia and Obesity (p< 0.05)
- Women had higher levels of obesity and diabetes compared to men (44.5% vs 25.5% and 13.3% vs 7.2% respectively; p<0.01) but lower dyslipidaemia (41.6% vs 54.9%; p<0.01)
- 24% and 19% of the studied population were on PI+TDF and PI+TAF drug combination respectively while 35% were in INSTI+TDF (Figure 3)
- TAF was associated with HTN, DM, dyslipidaemia (p <0.01) but not with obesity (p=0.09).
- PI correlated with dyslipidaemia and obesity (p<0.01) while INSTI showed no association.

Figure 3: Frequency of ART combinations used at the time of recruitment

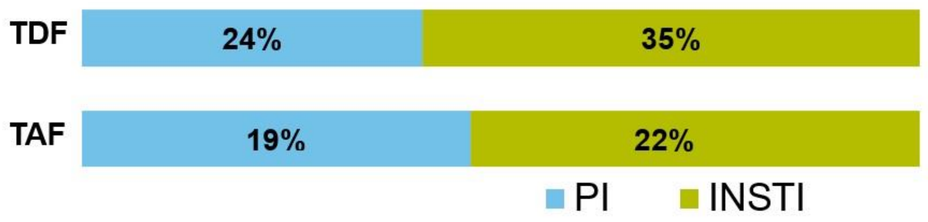


Table1: Factors associated with Metabolic Syndrome

	Prevalence of MS	Univariate analysis			Multivariate analysis		
	%(N)	OR	95% CI	P	OR	95% CI	P
Age							
<50	5.85 (147)	1	-				
≥50	15.01 (429)	2.8	2.3 3.4	<0.001	2.7	2.2 3.3	<0.001
Sex							
Female	12 (113)	1	-				
Male	10.5 (463)	0.8	0.7 1.1	0.169	--	--	--
Ethnicity							
White	10.8 (345)	1	-				
Black	12.6 (149)	1.1	0.9 1.4	0.095	--	--	--
Others	8.1 (82)	0.7	0.5 .9	0.015	--	--	--
Alcohol							
No alcohol Intake	12.1 (141)	1	-				
Alcohol intake	10 (337)	0.8	0.6 0.9	0.047	--	--	--
Smoking							
Never smoked	11.3 (299)	1	-				
Ex-smoker	11.7 (114)	1.03	0.8 1.3	0.76	--	--	--
Smoker	8.5 (126)	0.7	0.5 0.9	0.004	--	--	--
PI	31.2 (180)	1.6	1.3 1.9	<0.001	1.7	1.3 2.1	<0.001
TAF	26.9 (155)	1.9	1.5 2.3	<0.001	1.5	1.2 1.9	<0.001
TDF	39.6 (228)	0.7	0.6 0.8	<0.001	--	--	--
INSTI	45.3 (261)	1.1	0.9 1.3	0.276	1.3	1.1 1.6	0.003
PI+TAF	10.4 (60)	1.8	1.3 2.4	<0.001	--	--	--
PI+TDF	9.5 (55)	1.1	0.8 1.5	0.267	--	--	--
INSTI+TAF	13 (75)	1.8	1.3 2.3	<0.001	--	--	--
INSTI+TDF	11.4 (66)	0.8	0.6 1.1	0.339	--	--	--

- Age older than 50 years have approximately 3-times higher odds of having MS (OR 2.7; P<0.001) while alcohol intake was associated with 20% decreased odds of MS (OR 0.8; p=0.047)
- People who smoked had 30% less odds of having MS compared to non-smokers (OR 0.7; p=0.004).
- Protease inhibitor (PI) and TAF alone and PI+TAF were associated with higher odds of MS (OR 1.6, OR 1.9 and OR 1.8, respectively; p < 0.01) while TDF had a protective effect (OR 0.7, 95% CI: 0.6 - 0.8; p<0.001). INSTI was not associated with MS (OR 1.1; p=0.276).
- After adjusting for confounders, age over 50 years, use of PI, TAF and INSTI remained associated with MS (AOR 2.7 p<0.001; AOR 1.7 p<0.001; AOR 1.5 p<0.001; AOR 1.3 p=0.003 respectively) while sex, ethnicity, alcohol intake, smoking and being on TDF and TDF-containing drug combination were not associated with MS (p > 0.05).

Conclusion

Our study shows the complex metabolic profile of PLWH on ART. Age appears to be a significant factor associated with HTN, DM, Dyslipidaemia, obesity and MS in our cohort. PI and TAF use increased the risk of MS. Future research is needed to investigate the pathogenesis of MS, and ways to optimize the prevention and treatment of MS in PLWH.

References:

1. Pao V, Lee GA, Grunfeld C. HIV therapy, metabolic syndrome, and cardiovascular risk. *Curr Atheroscler Rep*. 2008;10(1):61-70. doi:10.1007/s11883-008-0010-6

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