The goal of the project was to explore the impact of HIV status on elevated blood pressure in Johannesburg, South Africa. Chi-square tests were used to create a table detailing the characteristics of participants, categorized by HIV status, while accounting for missing values. Potential confounders across various characteristics were identified, including sex, age, clinical obesity, previous diabetes, smoking status, and employment status. Regression modeling was employed to estimate the risk ratio while assessing the association between HIV status and elevated blood pressure, controlling for relevant variables.

Table 1. Characteristics of participants stratified by HIV status and in total, with n(%) for categorical variables, median(IQR) for continuous variables, and n(%) of missing values in Johannesburg, South Africa (N=1376)

	With HIV n=341(24.78)		Without HIV n=1035(75.22)		Total N=1376	
	n(%) for categorical variables; median(IQR) for continuous variables	n(%) of missing values	n(%) for categorical variables; median(IQR) for continuous variables	n(%) of missing values	n(%) for categorical variables; median(IQR) for continuous variables	n(%) of missing values
Study site						
1	61(17.89)	0(0)	219(21.16)	0(0)	280(20.35)	0(0)
2	213(62.46)		596(57.58)		809(58.79)	
3	22(6.45)		62(5.99)		84(6.10)	
4	45(13.20)		158(15.27)		203(14.75)	
Employment Status						
employed	178(52.20)	0(0)	509(49.18)	0(0)	687(49.93)	0(0)
unemployed	163(47.80)		526(50.82)		689(50.07)	
Smoking status						
ever	109(31.96)	0(0)	338(32.66)	0(0)	447(32.49)	0(0)

never	232(68.04)		697(67.34)		929(67.51)	
Previous diabetes diagnosis						
yes	6(1.78)	3(0.88)	28(2.72)	7(0.68)	34(2.49)	10(0.73)
no	332(98.22)		1000(97.28)		1332(97.51)	
Previous hypertension diagnosis						
yes	27(8.36)	18(5.28)	72(7.35)	55(5.31)	99(7.60)	73(5.31)
no	296(91.64)		908(92.65)		1204(92.40)	
Mental health condition						
yes	3(0.88)	0(0)	3(0.29)	0(0)	6(0.44)	0(0)
no	338(99.12)		1032(99.71)		1370(99.56)	
Respiratory condition						
yes	1(0.29)	0(0)	11(1.06)	0(0)	12(0.87)	0(0)
no	340(99.71)		1024(98.94)		1364(99.13)	
Cardiovascular disease						
yes	6(1.76)	0(0)	15(1.45)	0(0)	21(1.53)	0(0)
no	335(98.24)		1020(98.55)		1355(98.47)	
Biological sex						
female	179(52.49)	0(0)	559(54.01)	0(0)	738(53.63)	0(0)
male	162(47.51)		476(45.99)		638(46.37)	
Age category						
age<40	189(55.43)	0(0)	570(55.07)	0(0)	750(54.51)	0(0)

age>=40	152(44.57)		465(44.93)		626(45.49)	
Obese						
bmi>=30	99(29.03)	0(0)	289(27.92)	0(0)	388(28.20)	0(0)
Bmi<30	242(70.97)		746(72.08)		988(71.80)	
Age	39(30, 47)	0(0)	38(30, 47)	0(0)	38(30, 47)	0(0)
bmi	25.66(21.78, 30.86)		25.64 (21.83, 30.78)		25.65(21.83, 30.81)	

Table 2. n(%) on elevated blood glucose, elevated blood pressure, linked to care, stratified by HIV status and in total, with n(%) of missing values in Johannesburg, South Africa (N=1376)

	With HIV n=341(24.78)		Without HIV n=1035(75.22)		Total N=1376	
	n(%)	n(%) of missing values	n(%)	n(%) of missing values	n(%)	n(%) of missing values
Elevated blood glucose						
yes	5(1.47)	0(0)	17(1.64)	0(0)	22(1.60)	0(0)
no	336(98.53)		1018(98.36)		1354(98.40)	
Elevated blood pressure						
yes	52(15.25)	0(0)	161(15.56)	0(0)	213(15.48)	0(0)
no	289(84.75)		874(84.44)		1163(84.52)	
Elevated blood						

glucose among those with no previous diabetes diagnosis						
yes	2(0.60)	9(2.64)	10(1.00)	35(3.38)	12(0.90)	44(3.20)
no	330(99.40)		990(99.00)		1320(99.10)	
Elevated blood pressure among those with no previous hypertension diagnosis						
yes	34(11.49)	45(13.20)	106(11.67)	127(12.27)	140(11.63)	172(12.5)
no	262(88.51)		802(88.33)		1064(88.37)	
Linked to care						
yes	27(56.25)	293(85.92)	64(55.17)	919(88.79)	91(55.49)	1212(88.08)
no	21(43.75)		52(44.83)		73(44.51)	

	Sex = female	
	PLWH	**PLWOH**
Elevated BP+	10	39
Elevated BP-	136	436
Total	146	475
Risk	0.068	0.082
Risk Ratio	0.83	reference
% Exposed	23.51	-

	Sex = male	
	PLWH	**PLWOH**
Elevated BP+	24	67
Elevated BP-	126	366
Total	150	433
Risk	0.16	0.15
Risk Ratio	1.07	reference
% Exposed	25.73	-

	Obese = no	
	PLWH	**PLWOH**
Elevated BP+	26	66
Elevated BP-	190	617
Total	216	683
Risk	0.12	0.097
Risk Ratio	1.24	reference
% Exposed	24.03	-

	Obese = yes	
	PLWH	**PLWOH**
Elevated BP+	8	40
Elevated BP-	72	185
Total	80	225
Risk	0.1	0.18
Risk Ratio	0.56	reference
% Exposed	26.23	-

Characteristic		Crude Risk Ratio (95% CI)	Adjusted Risk Ratio (95% CI)
HIV status	PLWOH	Reference	Reference
	PLWH	**0.98(0.74, 1.31)**	**0.93(0.70, 1.23)**

Confounders identified in Part 2 above: bio_sex, agelt40, obese, prevdm (which are related to both exposure and outcome)

Participants with HIV infection had 0.93 times the risk of having elevated blood pressure with a 95% CI of (0.70, 1.23), controlling for biological sex, whether age is less than 40, clinical obese, and previous diagnosis of diabetes.

The association between HIV infection and elevated blood pressure was confounded by biological sex, whether age is less than 40, clinical obese, and previous diagnosis of diabetes, by 5.38%. Since 10% change in estimate was 5.38% < 10%, there was no bias.