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HYPERTENSION AND OBESITY AMONG HIV PATIENTS IN A CARE PROGRAMME IN NAIROBI
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ABSTRACT

Objective: **To determine the prevalence of hypertension and obesity among HIV patients enrolled in the Sex Worker Outreach Programme (SWOP), Nairobi, Kenya. Design: A retrospective a study.**
Setting: **SWOP managed by the University of Manitoba, Nairobi team.**
Subjects: We selected clinic visit records from HIV patients seen between 2011 and 2014, which had valid blood pressure and age entries.
Interventions: **We analysed data to determine prevalence and correlates of hypertension and obesity in the study population. Associations were tested using chi-square for categorical variables and t-test for continuous variables.**
Main outcome measures: **Hypertension and obesity.**
Results: **Three thousand one hundred ninety seven subjects were included in the study. All were HIV-positive and most (97.8%) were on ART. The mean age was 39.7 years (standard deviation = 8.8) and 72.4% of the subjects were female. The prevalence of hypertension was 7.7% (246/3197) and 31% of the study cases (798/2590) were either overweight or obese. Males were more likely to have hypertension ($p < 0.001$) while females were more predisposed to obesity ($p < 0.001$).**
Conclusion: **Hypertension and obesity are important co-morbidities among HIV patients. Preventive and management strategies should be adopted as part of the comprehensive packages on offer at all existing HIV care and ART centres targeting those enrolled for services as well as their relatives and the community at large.**

INTRODUCTION

Cardiovascular disease is the leading cause of mortality worldwide responsible for 17.5 million deaths annually. Eighty percent of these deaths occur in developing countries (1). In addition, communicable diseases remain a major burden in developing countries straining their largely insufficient health systems. Over the last decade, significant progress has been made in low and middle income countries (LMICs) in combating communicable diseases such as HIV/ AIDS and malaria. In contrast, cardiovascular disease (CVD) burden has continued to increase in these countries without a commensurate growth in investment in CVD control and management (2).

Current evidence is equivocal as to whether or not CVD risk is increased in people living with HIV (PLWHIV). Some report a decreased CVD risk attributable to Anti-retroviral therapy while others show an increase in CVD risk due to metabolic disturbances induced by protease inhibitors(3,4) as well as from HIV-associated inflammation and prothrombotic changes(5). It is now clear that PLWHIV are surviving longer on HAART and this has led to an increase in the proportion of deaths in PLWHIV caused by non-communicable diseases, including CVDs.

Sub-Saharan Africa has numerous clinics or centres for HIV care. Rather than setting up a parallel system to combat CVDs, the existing HIV care centres can be leveraged to mount CVD prevention and management strategies targeting existing clients, clients' contacts, relatives and the community at large. Several studies in sub-Saharan Africa indicate that integrated screening of HIV/AIDS and CVDs is feasible (6,7). The aim of this study was to estimate the prevalence of hypertension and obesity among patients attending an HIV care programme in Nairobi and to highlight the need to mount CVD prevention and management strategies at existing HIV clinics.

MATERIALS AND METHODS

Study design: This was a retrospective analysis of electronic health records.

Setting: This study was conducted at the Sex Workers Outreach Programme (SWOP) clinics in Nairobi, Kenya. The programme provides care for key populations and their families through ten clinics and drop-in centers across Nairobi. By end of December 2014, SWOP had enrolled 27,000 clients, including 20,000 female sex workers, 2,000 male sex workers and 1,000 injecting drug users. Approximately 11,400 patients were on palliative care for HIV and 6,300 on Anti-retroviral therapy.

Sampling: All available records, which met the inclusion criteria, were analysed.

Inclusion criteria: All records that had systolic blood pressure (SBP), diastolic blood pressure (DBP) and patient's age.

Exclusion criteria: We excluded records from clients who were pregnant or below 18 years of age.

Statistical analysis: We retrieved data on the following: age, sex, income, occupation, religion, marital status, education, blood pressure, weight, height, waist circumference, hip circumference, hypertension treatment, HIV status, baseline CD4 count, Anti-retroviral treatment and pregnancy.

Retrieved data were cleaned and analysed using statistical software (IBM SPSS Statistics 20). Descriptive analysis was done using frequencies and proportions for categorical variables and measures of central tendency for numerical data. Bivariate analysis was done using chi-square to assess associations between categorical variables or t-test for continuous variables. Statistical significance was set at a p -value of < 0.5.

Hypertension was categorised as: No hypertension (SBP < 120 and DBP < 80), pre-hypertension (SBP of 120 – 139 or DBP of 80-89), Stage 1 hypertension (SBP of 140 – 159 or DBP of 90 – 99) and Stage 2 hypertension (SBP > 160 or DBP > 100) (8).

Body Mass Index was categorised as: Underweight (<18.5), Normal weight (18.5 – 24.9), Overweight (25 – 29.9), Class I obesity (30 – 34.9), Class II Obesity (35.0 – 39.9.) or Class III obesity (>40) (9).

Waist Hip Ratio (WHR) was categorised as either normal or high risk (above 0.85 for women or 0.9 for men) Ethical considerations:

This study was approved by the Kenyatta National Hospital - University of Nairobi Ethics and Research Committee. To ensure confidentiality, no identifying data were analysed or disseminated.

RESULTS

Subjects' Characteristics: We analysed data for 3,197 clients who had complete information on blood pressure and age. They were all HIV positive and most (97.8%, n=3087/3197) were on anti-retroviral therapy. The mean age was 39.7 years (standard deviation = 8.8, range 18-74) and nearly three quarters were female (Table 1).

Table 1
Subjects' Characteristics

Characteristic (N)	Women – n (%)	Men - n (%)	Overall - n (%)
Age in years (n = 3197)	**2316**	**881**	**3197**
Mean	38.5	42.87	39.7
Standard deviation	8.53	8.60	8.8
Range (Min - Max)	18 - 70	18 - 74	18 - 74
Age groups in years (n = 3197)	**2316**	**881**	**3197**
Below 30	338 (14.6)	35 (4)	373 (11.7)
30 – 39	1006 (43.4)	292 (33.1)	1298 (40.6)
40 – 49	706 (30.5)	353 (40.1)	1059 (33.1)
50 and above	266 (11.5)	201 (22.8)	467 (14.6)
Baseline CD4 Count (n=3182)	**2302**	**880**	**3182**
Median	295	244	282
Interquartile Range	243	250	246
Education (n = 361)	**256**	**105**	**361**
None	8 (3.1)	1 (0.95)	9 (2.5)
Primary	136 (53.1)	47 (44.8)	183 (50.7)
Secondary	84 (32.8)	47 (44.8)	131 (36.3)
Tertiary	28 (11)	10 (9.5)	38 (10.5)
Marital status (n = 346)	**240**	**106**	**346**
Married	118 (49.2)	88 (83.0)	206 (59.5)
Single	54 (22.5)	7 (6.6)	61 (17.6)
Widowed	25 (10.4)	4 (3.8)	29 (8.4)
Separated	43 (1.9)	7 (6.6)	50 (14.5)
Religion (n = 340)	**234**	**106**	**340**
Christian	222 (94.9)	101 (95.3)	323 (95.0)
Muslim	9 (3.8)	4 (3.8)	13 (3.8)
Traditional	3 (1.3)	1 (0.9)	4 (1.2)
Occupation (n = 337)	**238**	**99**	**337**
Unemployed	95 (39.9)	14 (14.1)	109 (32.3)
Business	66 (27.7)	21 (21.2)	87 (25.8)
Casual worker	48 (20.2)	41 (41.4)	89 (26.4)
Other	29 (12.2)	23 (23.2)	52 (15.4)
Monthly Income in KES* (n = 100)	**65**	**35**	**100**
Median	7,000	10,000	8,000
Interquartile range	6,500	11,000	10,175

**1 U$D is approximately Kenya Shillings (KES). 100*

Hypertension: The prevalence of hypertension was 7.7% (n = 246/3197); 10.7 % in men and 6.6% in women. This included anyone with systolic hypertension, diastolic hypertension or on treatment for hypertension. Of all the subjects, 3.9% (125/3197) had systolic hypertension, 4.9% (158/3197) had diastolic hypertension; about 1% (28/3333) were on treatment for hypertension. Some were in more than one of these categories. Figure 1 demonstrates subjects' blood pressure levels into various categories.

Correlates of Hypertension: Hypertension was significantly associated with being overweight or obese, or having a high-risk waist hip ratio ($p< 0.001$). The odds of having hypertension in obese subjects were 2.2 (1.5 – 3.4) compared to non-obese subjects. Increasing age and being male were also associated with hypertension ($p<0.001$). The odds of male subjects having hypertension were 1.7 (1.3 – 2.2) compared to female subjects. Higher income was also associated with hypertension, but this was not statistically significant ($p = 0.06$, n = 104). There was no significant association between hypertension and baseline CD4 count. Correlates of hypertension are shown in Table 2.

Figure 1
Subjects' blood pressure categories

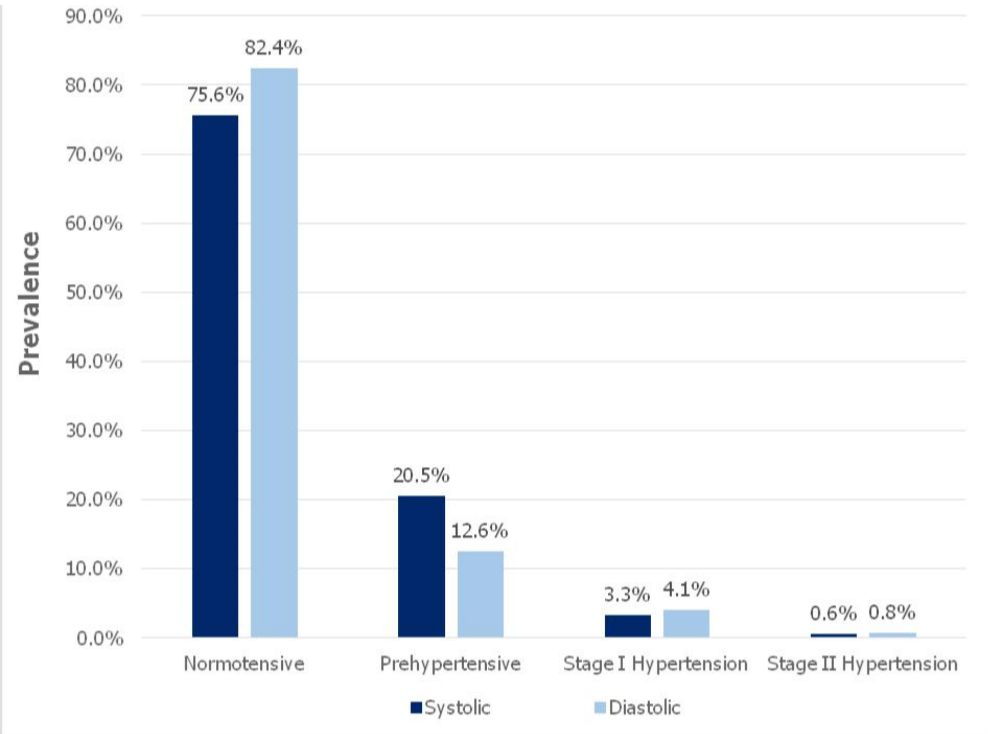

Table 2
Correlates of Hypertension

Characteristic	Odds Ratio	p-value	Significant
Age	-	<0.001	Yes
Male Gender	1.7 (1.3-2.2)	<0.001	Yes
Overweight or obese	1.6 (1.2-2.2)	0.001	Yes
Obese	2.2 (1.5-3.3)	<0.001	Yes
High-risk waist-hip Ratio	1.5 (1.1-2.0)	0.004	Yes
Menopause (Women only)	3.1 (2.1-4.8)	<0.001	Yes
Anti-retroviral therapy	0.9 (0.4-2.3)	0.853	No
Baseline CD4 count	-	>0.05	No
Level of Education	-	0.826	No
Monthly Income	-	0.083	No

Obesity: Two thirds (59%) of the subjects had a normal Body Mass Index (BMI) within 18.5 to 24.9 kg/m2. Thirty one percent (798/2590) were either overweight or obese (had a BMI of 25 kg/m2 or greater) whereas 8.7% (225/2590) were obese (BMI > 30 kg/m2). Ten percent of all subjects were underweight. Figure 2 summarizes subjects' BMI into categories.

Waist hip Ratio: The median waist hip ratio was 0.837 (Interquartile range (IQR) = 0.11, n = 1881) for women and 0.89 (IQR=0.10; n= 834) for men. Nearly half (46.5%) of women had a WHR greater than 0.85, while 47.6% of men had a WHR greater than 0.90; overall, 46.9% (1272/2715) of all participants had a high risk WHR.

Correlates of Obesity: Female subjects, older subjects and menopausal women were more likely to have obesity. There was no significant association between obesity and anti-retroviral therapy, level of education or income. In addition, after controlling for gender, there was no significant correlation between obesity and baseline CD4 count. Table 3 shows the correlates of Obesity.

Figure 2
Subjects' Body Mass Index (BMI) Categories

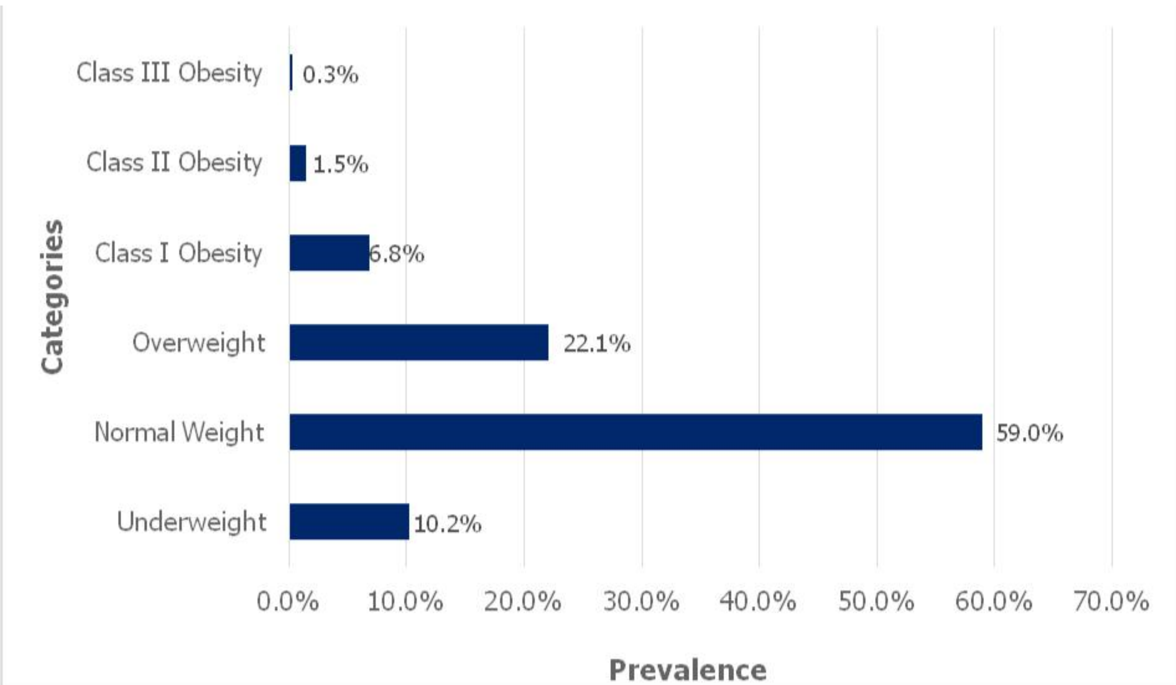

Table 3
Correlates of obesity

Parameter	Odd Ratio	p-value	Significant
Age	-	<0.001	Yes
Gender (Female/Male)	3.4 (2.2-5.0)	<0.001	Yes
Menopause (Women only)	1.8 (1.1-2.9)	0.012	Yes
On Anti-retroviral therapy	0.8 (0.3-2.3)	0.709	No
Baseline CD4 count	-	>0.05	No
Level of Education	-	0.436	No
Monthly Income	-	0.374	No

DISCUSSION

Anti-retroviral therapy has markedly improved the survival and quality of life in HIV patients resulting in an aging HIV-positive population which is afflicted by an increasing burden of non-communicable diseases. By highlighting the prevalence of these two diseases in a population that has regular contact with healthcare providers, we hope to underline the need for increased attention and resources towards cardiovascular disease control and management, especially in existing HIV care Programmes.

In this study we found that 7.7% of the subjects had hypertension which is comparable to other studies in Kenya. A recent retrospective analysis of about 50,000 health records in a large HIV programme in Kenya reported systolic hypertension as 5%(10) and a hospital-based study in rural western Kenya reported hypertension in 6% of the participants(11). A recent systematic review concluded that hypertension is common in HIV patients, ranging from 9 to 46% in low and middle income countries (12). Our findings contrast with a study in Uganda which reported hypertension in 28% of the subjects (13). Another study in peri-urban South Africa reported a prevalence of 65% (14). These studies show that the prevalence of hypertension is highly variable in different parts of sub-Saharan Africa. Thus, control strategies and resources would need to be tailored to suit local contexts.

The correlates of hypertension in this study are increasing age, male gender, being overweight or obese and menopause in women. These factors have been linked to hypertension in other studies locally and globally.

We found that 31% of study subjects were either overweight (22.1%) or obese (8.7%) with higher rates in women. This approximates with global estimates of overweight or obese adults at 35% and 10% respectively (15). However, the picture is highly variable with studies reporting prevalence of obesity in HIV patients ranging from 1.5% in Ethiopia (16), to 8% in Nigeria (17) and 12% in Uganda (18)

The majority of subjects in this study were sex-workers who face challenges in accessing health services from ‘mainstream’ health facilities. They are also more likely to engage in high-risk lifestyles such as substance abuse which may increase their cardiovascular disease risk (19, 20). To the best of our knowledge, this is the first study in such a population in Kenya and highlights the need to take the opportunity to provide cardiovascular disease care to sex-workers alongside infectious disease management.

LIMITATIONS

A major limitation of this study was incomplete data. Many patient records lacked key correlates such as age, occupation, income, education, substance use and contraception. This limited our ability to exhaustively analyse correlates of hypertension and obesity.

In conclusion, this study underpins the growing significance of cardiovascular disease burden in sub-Saharan Africa. It also shows a need to integrate HIV care with preventive and curative services for cardiovascular diseases in order to avoid losing some of the gains by anti-retroviral therapy. Existing HIV care clinics can be reoriented to address non-communicable diseases. In addition, health records need to be bolstered to provide the necessary data required for planning and resource mobilisation.

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