



HYPERTENSION AS A SILENT KILLER: ENORMITY AND DEFINITIVE FACTORS AMONG HABITANT LIVING WITH RETROVIRUS

Shambel Wedajo¹, *Prema Kumara², Wondwossen Yimam³, Assresie Molla⁴ and Yeshiwas Abaynew⁵

¹Department of Public Health, College of Medicine and Health Sciences (CMHS), Wollo University, Ethiopia

² Department of Comprehensive Nursing, College of Medicine and Health Sciences, Wollo University

³Msc, Lecturer, Dean, School of Nursing and Midwifery, CMHS, Wollo University, Ethiopia

^{4,5}MPH, Lecturer, Department of Public Health, CMHS, Wollo University, Ethiopia

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ABSTRACT

Background: Globally, non communicable diseases (NCDs) are the leading causes of morbidity, hospital admission and death, those diseases kill 38 million people each year, of which almost three 28 million of NCD deaths occur in low and middle income countries and sixteen million NCD related deaths occur before the age of 70; 82% of these "premature" deaths occurred in low and middle income countries. A number of emergent organ-specific NCDs found in people with HIV which include hypertension also known as Silent Killer. Available data on hypertension among patients on ART are almost exclusively from established HIV cohort data in high-income countries. **Objective:** To assess the enormity (magnitude) and authoritative definitive factors of silent killer among people living with Retrovirus in Dessie Referral Hospital, North East Ethiopia, 2017. **Method:** Institutional based cross sectional study was carried out in August 2017. A total of 355 HIV infected individuals on ART were selected using systematic sampling method and data were collected using exit interview and direct blood pressure measurement. **Results:** Out of 355 HIV infect individual who were on ART, 8.4% [5.5% - 11.3%] had confirmed hypertension. Being urban residence [AOR= 2.1, 95%CI; (1.2-6.98)], having sedentary work activity [AOR= 5.9, 95%CI ;(2.3-15.3)], overweight [AOR= 2.7, 95%CI, (1.0-7.18)] and taking ART for more than three years [(AOR=3.2; 95%CI (1.5-7.2)] were positively associated with the development of hypertension. **Conclusion:** Generally this study shows that a significant number of HIV infected individuals were affected by hypertension as co morbidity. So that ART clinicians should screen ART clients for non communicable disease and better counsel them for life style modifications.

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INTRODUCTION

Globally, non communicable diseases are the leading causes of morbidity, hospital admission and death, those disease (NCDs) kill 38 million people each year, of which almost three quarters (28 million) of NCD deaths occur in low and middle income countries and sixteen million NCD deaths occur before the age of 70; 82% of these "premature" deaths occurred in low and middle income countries^(1,2,3). According to UNAIDS/WHO 2016 report, globally 36.7 million individual have HIV virus with in

the blood and Africa accounts 25.6 million, of which eastern and southern Africa accounts 51.7 % (19 million) out of 60% world population who know their HIV status. Similarly in 2016 there were 1.8 million newly infected individual, of which 1.2 million occurred in Africa and 1.0 million AIDS death^(1,2,4). People living with HIV have high rate of developing hypertension. This may relate to HIV infection itself and to the side effects of some of the medicines used to treat HIV infection^(5,6).

Ethiopia is a country with high HIV prevalence and now a day there also NCD as emerging public health problem

*Corresponding author: **Prema Kumara**

Department of Comprehensive Nursing, College of Medicine and Health Sciences, Wollo University

including hypertension. However, still there is no enough evidence on magnitude and risk factors in local context. So this study will answer the magnitude of silent killer or hypertension and definitive factors among HIV positive individual who start ART.

MATERIAL AND METHODS

Study design and period

Institution based cross-sectional study was conducted in August 2017.

Study area

The study was carried out at Dessie referral hospital, which is found in Dessie Town. The Dessie referral hospital is one of the oldest hospitals in Amhara region, serves for a million of people. The hospital has different departments, of which ART clinic/department is one of the main departments in the hospital that provides chronic HIV care services for thousands of HIV/AIDS patients.

Source and Study population

All HIV clients who start ART in Dessie referral hospital considered as source population where as those ART clients who were available at the time of data collection considered as study population.

Inclusion criteria and Exclusion Criteria

All adult (age >18yr) people or habitants living with Retrovirus/HIV who attended at Dessie referral hospital were included in this study. However, seriously ill patient who cannot respond for data collection tools, ART clients who took ART less than one year was excluded from the study.

Variables of the study

Dependent Variable: Hypertension

Independent variables

- Socio-demographic and economic characteristics which include Residence, Ethnicity, sex, Age, Religion, Marital status, Educational status, Occupation, Family size, Monthly income, B/P and BMI.
- HIV/AIDS and ART related characters
- Behavioral and personal factor

Sample size determination

The required sample size was determined using Epi Info statistical software version 7.2, single population proportion formula by taking 50% proportion of hypertension among HIV positive individual who start ART and 95 % level of confidence, 5% marginal error and which yield 384 study subjects.

Sampling procedure

Using ART registration book sampling frame was made by excluding new ART clients. Then the required study subjects was selected using systematic sampling method from the list of ART register in every K^{th} interval, in which $k^{\text{th}} = N/n = 5972/384 = 15^{\text{th}}$.

Data collection and procedure

Standard mercury sphygmomanometer BP cuff with the appropriate cuff size that covers two-thirds of the upper arm was used to measure the blood pressure (BP). Two BP measurements were taken on each participant on the left arm in a sitting position, with at least 5 minute intervals of rest between measurements and a condition of no smoking or caffeine intake 30 minutes before measurement was assured by the staff nurse. The average of the first and second BP measurements was finally calculated to determine the participant's BP. The mean BP value for each participant was calculated and the diagnosis of HTN was made according to the WHO criteria as systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg. Participants who were taking antihypertensive medication were assigned in hypertensive group regardless of their level of blood pressure. Study participants who were found to have high blood pressure were advised and linked to the ART OPD for subsequent management.

Weight measurement was taken using a SECA® weighing scale on a flat hard surface. Patients were instructed to remove any heavy clothing (such as coats) and shoes and stand still on the weighing scale, with hands by their sides. The weighing scales calibrated daily according to manufacturer's instructions.

Height was measured with a SECA® Stadiometer, while a patient is facing directly ahead. Patients instructed to remove their shoes, caps or head scarf, keep their feet together, and stand with their arms by the sides. Measurement was taken with heels, buttocks and upper back in contact with the Stadiometer.

BMI was calculated as weight (in Kilograms) divided by height squared (m^2) for each participant. The BMI results categorized as: overweight if the BMI ≥ 25 kg/m² and not overweight if BMI < 25 kg/m².

Data collection was carried out by using structured exit interview questionnaire. The questionnaire was prepared first in English and translated into Amharic (local language). The data were collected by two data collectors for one month duration. To insure the quality of the data, one day training was given for data collectors on the objective of the study, the questionnaire and extent of explanations, the way of keep the privacy and confidentiality and measurement techniques. Pre-test of questionnaires was also done other than the study site. Further, inspection for completeness of questionnaires was carried out by principal investigators during the field work.

Data analysis procedures

The collected data were entered to EpiData version 3.1 software after checking errors and completeness. For further analysis data were exported to SPSS version 23. To explain the study population in relation to relevant variables descriptive statistics like frequency distribution table, graph and summery measures were computed.

Further, to identify statistically significant associated factors, first bivariate binary logistic regression analysis was made for each independent variable to outcome variable separately. And those variables P-value ≤ 0.3 in

bivariate imported to multivariate binary logistic regressions. In multivariate binary logistic regressions those variables P-value < 0.05 were considered as statistically significant variable and presented with 95% CI and AOR and P value.

Ethical consideration

Ethical clearance was obtained from Research Ethical Review committee of Wollo University, College Medicine and Health sciences research office. Further ethical issue was secured from Dessie referral hospital medical director office and ART clinic. For any of the eligible study participant the purpose, benefits, confidential nature, discomforts (spent time for interview) and right of withdrawal or stop filling the questioner was described and discussed with each participant. Only those who were willing to take part in the study and gave a written consent were included in this study.

RESULTS

Socio-demographic Characteristics

The response rate in this study was 92.4%. Regarding the magnitude of hypertension among sampled HIV positive individual was 8.4%. Out of 355 respondents, 61.7% (219) were females and of which 8.2% (18) participants had hypertension.

Concerning residence and age distribution of respondents, about 64.8% (230) and 55.2% (196) were urban residence and belongs to age group less or equal to 35 years old respectively. Similarly, 37.5% (133) participants were not formally educated and of whom 11.27% participants had hypertension. Regarding marital status and occupation of respondents, 70.4% (250) and 45% (160) participants were married and private worker respectively (Table I).

fruit regularly and ate meat products respectively. Out of 80 participants who ate meat products regularly, 10(17.5%) had hypertension and similarly about 342(96.3%) participants used saturated oil for cooked (Table II)

Physical measurement

About 9.9% (35) participants were overweight (BMI >25Kg/m²). And of which 9(25.7%) participants had hypertension. Similarly about 33.2% (118) participants were most of their work activity was not movable and of those 7(5.9%) participants had hypertension. Concerning annual health screening and counseling service from health care providers, about 91.8% (326) and 65.9% (234) participants had at least one times annual health checkup and gate counseling on avoiding Chat and alcohol respectively.

HIV/AIDS and ART related characters

Regarding participant profile about HIV/AIDS condition and ART, about 27% (96) participants were taken antiretroviral therapy (ART) for more than five year. Concerning current CD4 count and virus detectability with in serum, about 62.5% (222) and 74.6% (265) participants had CD4 count less than 500 cells per mm³ and detectable virus with in the blood respectively. Most of study participants were taken TDF/3TC/EFV and Stage 3 WHO clinical stage.

Factors associated with Hypertension

Urban residences were 2.1 times more likely to develop hypertension problem as compared to rural residence among HIV positive individuals who start ART. (AOR= 2.1, 95% CI; 1.2-6.98).

Table I Socio-demographic Characteristics of HIV positive individual who follow their ART in Dessie referral hospital August, 2017.

Study variables	Frequency	Percent	Hypertension status	
			No	percent
Smoking cigarette currently				
- yes	9	2.5	2	22.2
- No	346	97.5	28	8
Drinking Alcohol currently				
- yes	93	26.5	3	3.2
- No	262	73.8	27	10.3
Chewing kchat currently?				
- Yes	79	22.3	1	1.2
- No	279	77.7	29	10.5
Did you eat fruit regularly?				
- Yes	275	77.5	21	7.6
- No	80	22.5	7	8.7
Commonly/daily taken food item				
- Legume Product	201	56.6	13	6.4
- Meat products	57	16.1	10	17.5
- Fruit and vegetable	97	27.3	7	7.2
Commonly used cooked oil				
- Yes	342	96.3	27	7.8
- No	13	3.7	3	23
- Unsaturated				

Behavioral measurement/factors

Regarding unhealthy behavioral characteristics of respondents, 26.2% (93) and 22.3% (79) of participants were drank alcohol and chew chat respectively. Similarly, about 22.5% (80) and 16.1% (57) participants were not ate

Clients who pass most of their work activity being not movable were 5.9 times more likely to develop hypertension problem as compared to movable among HIV positive individuals who start ART. (AOR= 5.9, 95% CI; 2.3-15.3).

Table II: Behavioral factors/measurement of HIV positive individual who follow their ART in Dessie referral hospital August, 2017

Hypertension variables	Frequency	Percent	Hypertension status	
			No	percent
Smoking cigarette currently				
- yes	9	2.5	2	22.2
- No	346	97.5	28	8
Drinking Alcohol currently				
- yes	93	26.5	3	3.2
- No	262	73.8	27	10.3
Chewing kchat currently?				
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Did you eat fruit regularly?				
- Yes	275	77.5	21	7.6
- No	80	22.5	7	8.7
Commonly/daily taken food item				
- Legume Product	201	56.6	13	6.4
- Meat products	57	16.1	10	17.5
- Fruit and vegetable	97	27.3	7	7.2
Commonly used cooked oil				
- Yes	342	96.3	27	7.8
- No	13	3.7	3	23
- Unsaturated				

Table III Physical measurement and status of hypertension among HIV positive individual who follow their ART in Dessie referral hospital August, 2017

Study variables	Frequency	Percent	Hypertension status	
			No	percent
Conducted regular exercise				
- yes	65	66.8	2	3.0
- No	290	33.2	28	9.6
Type of work in relation to exercise (Mostly)				
- Movable	237	66.8	23	9.7
- Not movable	118	33.2	7	5.9
Do you conduct annual health screening?				
- Yes	326	91.8	25	7.6
- No	29	8.2	5	1.7
Body Mass Index (BMI)				
- Overweight	35	9.9	9	25.7
- Not overweight	320	90.1	21	6.5
Type of counseling you got from health professionals?(multiple answer possible)				
- Salt reduction	35	9.8	4	8.5
- Weight reduction	18	5	9	50.0
- Voiding chat and Alcohol	234	65.9	7	2.9
- To do regular exercise	83	23.3	6	7.2
- About balanced diet	312	87.9	4	1.2

Table IV HIV/AIDS and ART related variables among HIV positive individual who follow their ART in Dessie referral hospital August, 2017.

Study variables	Frequency	Percent
Duration on ART		
- ≤5 yr	259	73
- >5 yr	96	27
Current CD4 count		
- ≤500 cells per mm ³	222	62.5
- >500 cells per mm ³	133	37.5
Viral load		
- Detectable	265	74.6
- Undetectable	90	25.4
Current regimen of ART		
- 1c	14	3.9
- 1d	99	27.9
- 1e	224	63
- 1f	18	5.1
WHO clinical staging		
- Stage 1	9	2.5
- Stage 2	67	18.9
- Stage 3	189	53.2
- Stage 4	45	12.7

Overweight (BMI >25Kg/M²) clients were 2.7 times more likely to develop hypertension problem as compared to not overweight individuals among HIV positive individuals who start ART. (AOR = 2.7, 95% CI, 1.0-7.18).

Those HIV individuals who taken antiretroviral therapy for more than three years were 3.2 times more likely to develop hypertension as compared to those who taken for not longer than three years (AOR= 3.2;95%, CI 1.5-7.2)

DISCUSSION

In this study the proportion of hypertension among HIV positive individuals who start antiretroviral therapy were found to be 8.4%. This result was too low as compared to other studies done in Zimbabwe (34.9%), Senegal (28.1%), Tanzania (30%), South Africa (19.5%) and Cameroon (38%)^(7 - 10). This study concluded that hypertension is an emerging problem for those HIV infected individuals.

Urban residences were 2.1 times more likely to develop hypertension problem as compared to rural residence among HIV positive individuals who start ART.

Table V Bivariate and multivariate binary logistic regression analysis on factors associated with Hypertension among HIV positive individual who follow their ART in Dessie referral hospital August, 2017.

Significant Variable	Hypertension status		COR (95%CI)	AOR (95%CI)	P-value
	Hypertensive	Not Hypertensive			
Place of residence					
- Urban	24(10.4%)	206(89.6%)	2.3(.92-5.8)	2.1(1.2-6.98)	0.05
- Rural	6(4.8%)	119(95.2%)	1	1	
Type of work in relation to exercise (Mostly)					
- Not movable	23(19.5%)	95(80.5%)	7.95(3.3-19)	5.9(2.3-15.3)	< 0.001
- Movable	7(3%)	230(97%)	1	1	
Body Mass Index (BMI)					
- Overweight	9(25.3%)	26(74.3%)	4.9(2.0-11.8)	2.7(1.0-7.18)	0.049
- Not Overweight	21(6.6 %)	299(93.4%)	1	1	
Duration on ART					
- < 3years	21(6.7%)	294(93.3%)	1	1	< 0.001
- ≥ 3years	9(22.5%)	31(77.5%)	4.0(1.7-9.6)	3.2(1.5-7.2)	

This finding was in line with study done in South Africa⁽¹⁰⁾. In this study there is possible association due to that urban dwellers have different life styles as compared to rural that expose to have luxurious and sedentary way of living.

Similarly, Clients who stayed most of their work being not movable were 5.9 times more likely to develop hypertension problem as compared to movable participants taking ART. This finding was also in line with studies done in Zimbabwe⁽⁷⁾. As we know sedentary way of living have great risk for development hypertension, this was also true for HIV infected individuals as well.

Another most important predictor of hypertension in this study found to being overweight, Overweight (BMI>25Kg/M²) clients were 2.7 times more likely to develop hypertension problem as compared to not overweight individuals among HIV positive individuals who start ART. This finding also supported by studies conducted in Senegal, Tanzania, South Africa and Cameron^(8 - 11). This study revealed that, an overweight individual were significantly differ in way of living as compared to non overweight. This is most ignored area among HIV infected individuals in which mostly they affect being under nourished so that gaining weight considered as important though, the risk of overweight was less emphasized.

Besides the above factors, those HIV individuals who taken antiretroviral therapy for more than three years were three times more likely to develop hypertension as compared to those who taken for not longer than three years period. This result was in line with study done in Zimbabwe⁽⁷⁾. In current research found the association with long time taking of antiretroviral therapy may increase possibility of developing long term side effects like weight gain.

CONCLUSION AND RECOMMENDATIONS

Hypertension is one of the common co-morbidity among habitants living with retrovirus most commonly known as HIV and on ART treatment.

Anti Retroviral Therapy (ART) clinicians should counsel and screen all client on ART either with long term and short term therapy for non communicable disease like hypertension and other risk factors like obesity. Federal ministry of health can emphasize on an updated guidelines in considerations for non communicable diseases like Hypertension among client on antiretroviral therapy.

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