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Prevalence of Hypertension and Associated Factors among Adults of Legambo district, North East Ethiopia

[1]Samuel Anteneh, [2] Dr. Prem Kumar, [3] Moges Workneh Ayele

[1]*Lecturer, Department of Adult Health Nursing, Wollo University, College of Medicine and Health sciences (CMHS), Dessie, Ethiopia*
[2]*Asst. Professor, Department of Comprehensive Nursing, CMHS, Wollo University, Dessie, Ethiopia*
[3]*Lecturer, Department of Pediatrics and Child Health Nursing, CMHS, Wollo University, Dessie, Ethiopia*
Corresponding Author: Dr. Prem Kumar

Abstract: *Introduction: Hypertension is a major cause of premature death worldwide. About 1.13 billion people worldwide have hypertension, two-thirds population living in low - and middle-income countries. Many hospital based data reflect high prevalence in the study areas of Ethiopia.*
Objective*: This study was aimed to assess the prevalence of hypertension and its associated factors among adult residents of Akesta Town, Legambo District, South Wollo Zone, North East Ethiopia from April 16, 2019 to June 27, 2019.*
Methodology*: A Cross-sectional community based survey was conducted. Systematic sampling technique was used to select 373 adults aged 18 years and above. The sample size was calculated with 95% CI and considering other literature and we added 10% for contingency. The data was retrieved by using a pretested structured questionnaire prepared. Variables with P-value < 0.05 was considered as statistically significant variables and presented with 95% CI and AOR.*
Results: *The overall prevalence of hypertension in Akesta Town was 26.0% (95% CI 21.3 – 30.6). Family History of Hypertension [AOR 6.875, 95% CI; 2.855 - 16.558], Obesity [AOR 8.807, 95% CI; 3.559 - 21.791], Salt Use [AOR 7.824, 95% CI; 2.770 - 22.098] and Physical Activity [AOR 0.224, 95% CI; 0.102 - 0.492] were found to be risk factors for hypertension.*
Conclusion & Recommendation*: The prevalence of hypertension is found to be high when compared to other studies findings. Salt Use, having family history of hypertension, physical inactivity, and obesity were predictors of hypertension among adults. Recommended that, community level intervention measures with a particular emphasis on prevention by introducing lifestyle modifications.*
Keywords: *Hypertension, Prevalence, Akesta, Ethiopia.*

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I. Introduction

Hypertension is another name for high blood pressure. Hypertension is a major cause of premature death worldwide. It can lead to severe health complications and increase the risk of heart disease, stroke, and sometimes death. As of the Updated JNC-8 Guideline Hypertension (HTN or HT), also known as High or Raised blood pressure is a condition in which the blood pressure (BP) become ≥140/90 millimeters of mercury (mmHg), Hypertension (HTN), is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. This is basically the consistent elevation of a systemic blood pressure above the normal range. High blood pressure typically does not cause symptoms. Long-term high blood pressure, however, is a major risk factor for coronary artery disease, stroke, heart failure, atrial fibrillation, peripheral vascular disease, vision loss, chronic kidney disease, and dementia (1-3). High blood pressure is classified as either primary (essential) high blood pressure or secondary high blood pressure. About 90–95% of cases are primary, defined as high blood pressure due to nonspecific lifestyle and genetic factors. Lifestyle factors that increase the risk include excess salt in the diet, excess body weight, smoking, and alcohol use. The remaining 5–10% of cases is categorized as secondary high blood pressure, defined as high blood pressure due to an identifiable cause, such as chronic kidney disease, narrowing of the kidney arteries, an endocrine disorder, or the use of birth control pills (4,5). According to WHO, about 1.13 billion people worldwide have hypertension, most (two-thirds) living in low- and middle-income countries. In 2015, 1 in 4 men and 1 in 5 women had hypertension. Fewer than 1 in 5 people with hypertension have the problem under control. One of the global targets for noncommunicable diseases is to reduce the prevalence of hypertension by 25% by 2025 (baseline 2010). Blood pressure is expressed by two measurements, the systolic and diastolic pressures, which are the maximum and minimum pressures, respectively. For most adults, normal blood pressure at rest is within the range of 100–130

millimeters mercury (mmHg) systolic and 60–80 mmHg diastolic. For most adults, high blood pressure is present if the resting blood pressure is persistently at or above 130/80 or 140/90 mmHg. Ambulatory blood pressure monitoring over a 24-hour period appears more accurate than office-based blood pressure measurement (6). Approximately 7.6 million deaths (13–15% of the total) and 92 million disability-adjusted life years worldwide were attributable to high blood pressure. Hypertension doubles the risk of cardiovascular diseases, including coronary heart disease (CHD), congestive heart failure (CHF), ischemic and hemorrhagic stroke, renal failure, and peripheral arterial disease. It often is associated with additional cardiovascular disease risk factors, and the risk of cardiovascular disease increases with the total burden of risk factors. Although antihypertensive therapy reduces the risks of cardiovascular and renal disease, large segments of the hypertensive population are either untreated or inadequately treated (7).

Dietary Approaches to Stop Hypertension (DASH) is a flexible and balanced eating plan with a firm grounding in reducing and managing hypertension. Lifestyle changes and medications can lower blood pressure and decrease the risk of health complications. If lifestyle changes are not sufficient then blood pressure medications are used. Up to three medications can control blood pressure in 90% of people. High blood pressure affects between 16 and 37% of the population globally. (8,9). Chronic NCDs are rising fastest among lower–income countries (30). The regional prevalence of diabetes in the African population was estimated to be 2.1–6.7%. Ethiopia is estimated to have the fourth highest number of diabetes in the African region (1.3 million diabetes) (10). Hypertension morbidity is increasing every year by 1.4 times; whereas the trend of its mortality is decreasing by 30% from 2011 to 2015 in the same region (11).

Objective

- To determine the prevalence of hypertension among adults of Akesta town from April 16- June 27, 2019.
- To identify the factors associated with hypertension among adults of Akesta town from April 16- June 27, 2019.

II. Methods And Materials

2.1 Study Design: A community - based cross-sectional survey was employed.

2.2 Study Area & Period: **The study was conducted in Akesta Town, Legambo District, Amhara Region, North East Ethiopia** from January16 - June 18, 2019.

2.3 Source Population: People aged 18 to 64 years live in Akesta town.

2.4 Study Population: Selected people aged 18 to 64 years house hold adults live in Akesta town and avail during the study period.

23.5 Inclusion criteria

- Peoples who live in akesta town ≥ 6 months)
- Adults from18 years to 64 years old

2.6 Exclusion criteria: Household members who were not avail after three times checkup & severely ill peoples were excluded.

2.7 Sample size & technique: Sampling technique was used to select 373 adults aged 18 years and above.

2.8 Data collection plan

OMRON M2 Digital BP apparatus, Digital Adult Weighing Scale for weight, Portable height/length measuring board and Constant tension tape with Measuring tape known as Vinyl Tape Measure for height and waist circumference respectively and structured questionnaire that includes the dependent variables like blood pressure and independent variables like age, sex, weight etc. and it was developed based on the WHO and CDC guideline as well as other literatures.

2.8.1 Procedure

Blood pressure was measured using digital BP apparatus as this measurement technique avoids auscultation induced errors and minimizes white coat hypertension effects, as measurement can be taken without a health professional present. The subjects are calmed and rest for 5 minutes and be told not to take caffeine 30 minutes before measurement of blood pressure which was measured in sitting position in both arms in two measures 2 - 4 hours apart as different guidelines recommend at least two blood pressure measurements on at least two occasions.. Weight was measured using Adult Digital weight scale by first Asking the participant to remove their footwear (shoes, slippers, Sandals etc) and socks then the participant will step onto scale with one foot on each side of the scale with the participant standing still, face forward, place arms on the side and wait until asked to step off then recording the weight in kilograms.

Height was measured using a portable height/length measuring board after assembling the board through separating the pieces of board (3 pieces) by unscrewing the knot at the back and assembling the 3 pieces by attaching each one on top of the other in the correct order then locking the latches in the back and Positioning the board on a firm surface against a wall after the completion of such assembling process of the instrument the

height will be measured as firstly asking the study participant to remove their Footwear (shoes, slippers, sandals etc) and Head gear (hat, cap, hair bows, comb, ribbons, etc) then the participant stand on the board facing the data collector with Feet together, Heels against the back board and Knees straight then the participant asked to look straight ahead and not look up with making sure eyes are the same level as the ears and then move the measure arm gently down onto the head of the participant and asking the participant to breathe in and stand tall after that reading the height in centimeters at the exact point the participant will step away from the measuring board and the data collector will record the height measurement in centimeters. After the measurement of weight and height the BMI was calculated. Waist Circumference was measured with the data collector Standing to the side of the participant, locating and marking the inferior margin (lowest point) of the last rib and the crest of the ilium (top of the hip bone) with a fine pen with also a tape measure, finding the midpoint and marking the point. This will be a tape measure and marking the point then applying the tension tape over the marked midpoint and asking the participant to wrap it round themselves and then through standing with their feet together, place their arms at their side with the palms of their hands facing inwards, and breathe out gently and measuring waist circumference and reading the measurement at the level of the tape to the nearest 0.1 cm and recording.

2.8.2 Data collection & Quality Control

A structured interview questionnaire and anthropometric measurements which is weighing scale and measuring tape was used for the collection of quantitative data. The questionnaire was prepared in English and then translated to local language Amharic. Data was collected by trained Nursing students under supervision. Data collection procedure was thoroughly explained to the other data collectors with practical demonstration. To assure the data quality high emphasis was given into designing data collection instrument that was reviewed by Experts and using of standardized instruments. For its simplicity the questionnaire was first translated to local language Amharic and before the actual data collection pretest was done on 10% of the sampling size on one of the districts of Legambo District, Tikse (kebele 011) to check or to identify questions that do not make sense to participants or problems on questionnaire that may lead to biased answers and these responses was not be included on the actual data.

2.8.3 Data Processing, Analysis & Interpretation

Data was entered in to Epidata software v 3.1 and analysis was carried out using SPSS for windows version 20 and results was displayed using tables & figures. Furthermore, to identify statistically significant associated factors, first bivariate binary logistic regression analysis was made for each independent variable to the outcome variable separately. And those variables with P-value < 0.25in bivariate analysis were imported to multivariate binary logistic regressions. In multivariate binary logistic regressions variables with P-value < 0.05 was considered as statistically significant variables and presented with 95% CI and AOR.

III. Results

Socio-demographic characteristics

A total of 373 participants took part in this study with a response rate of 100%. From the study subjects enrolled in the study, 199 (53.4%) were males while the remaining 174 (46.6%) were females and the male to female ratio was ~1:1. The mean age was 36.64 years with range between 18 and 64 years with the majority (31.9%) was in the age ranges of 35 - 44. With regard to their educational status, Most of them had completed at least elementary school education as the majority (37.3%) was Tertiary Education and least had Grade 1-6. 62.5% of the study subjects were married while 10(2.7%) were widowed. Nearly 107(28.7) of the study populations were government employee but 12.9% were unemployed while the least 5(1.3%) were House Maid (See Table 1). The total family income summed up according to 2009 World Bank GNP calculated using World Bank atlas method was 831 - 3287 birr in 159(42.6%) and only 23.1% of the study subjects had income 3288-10162.50.

Table 1: Distribution of the demographic and socio-economic feature of adults 18 - 64 years old living in Akesta Town 2019.

Variables		Frequency	Percentage (%)
Age	18 – 24	47	12.6
	25 – 34	114	30.6
	35 – 44	119	31.9
	45 – 54	70	18.8
	55 – 64	23	6.2
Sex	Male	199	53.4
	Female	174	46.6
Religious	Orthodox Tewahedo	127	34.0
	Muslim	180	48.3
	Protestant	52	13.9

	Catholic	6	1.6
	Other	8	2.1
Educational Status	Illiterate	44	11.8
	Read and Write	46	12.3
	Grade 1-6	38	10.2
	Grade 7-12	106	28.4
	Tertiary Education	139	37.3
Marital Status	Married	233	62.5
	Single	94	25.2
	Divorced	36	9.7
	Widowed	10	2.7
Family Size	Small Family	167	44.8
	Medium Family	179	48.0
	Large Family	27	7.2
Occupation	Government Employee	107	28.7
	Unemployed	48	12.9
	Private Employee	59	15.8
	House Maid	5	1.3
	Merchant	48	12.9
	House Wife	60	16.1
	Daily Labour	12	3.2
	NGO Employee	20	5.4
	Other	14	3.8
Income *	<830 Birr	128	34.3
	831 – 3287	159	42.6
	3288 - 10162.50	86	23.1

* This is according to World Bank classification of 2009 GNI per capita calculated using World Bank atlas method per family income summed up.

Stages of Hypertension

Most of the study participants (38.5%) had Normal blood pressure level and (35.1%) of the study participants were pre Hypertensive but about (11.8%) study participants had Stage 2 Hypertension.

Table 2: The stages of Hypertension among Adult residents of Akesta Town, North East Ethiopia, 2019.

Stages	Frequency	Percent
Normal	145	38.9
Pre-Hypertension	131	35.1
Stage 1 HTN	53	14.2
Stage 2 HTN	44	11.8

Prevalence of Hypertension

The mean SBP and the mean DBP were 126.29 mmHg and 81.95 mmHg respectively. The overall prevalence of hypertension in the study subjects which defined as persistent elevation of SBP ≥140mmHg and/or DBP ≥90mmHg or previous diagnosis of hypertension was 26.0% (95% CI 21.3 – 30.6) from whom 15.0% were found to be females and the rest were found to be 11.0% males.

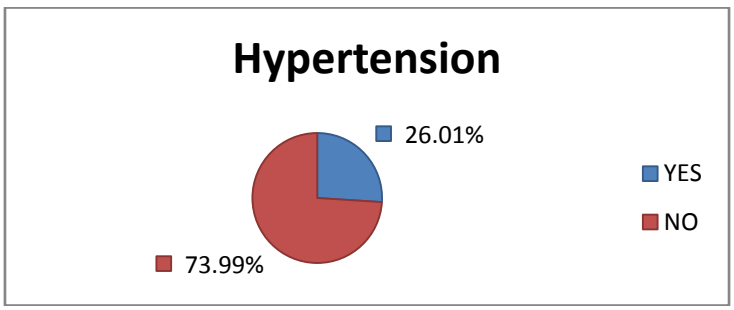

Figure 1: Prevalence of Hypertension among Adult Residents of Akesta Town, North East Ethiopia, 2019.

The mean systolic and diastolic blood pressure was 126.29mmHg and 81.95mmHg respectively. Among 75 subjects who had personal history of hypertension, it was diagnosed by symptoms in 24(32.0%) & during checkups for other reasons in 51(68.0%), patients for which 41.3% of them lived with the illness for <5 years. 75% of them had regular medical follow up and the same percentage were taking medications accordingly

but the remaining 24.5%were not taking medications due to fear of side effects (46.2%) and the rest for other reasons.

Factors Associated with Hypertension

Among the different risk factors assessed in this study; Bivariate analyses showed that older age, History of Diabetes Miletus, marital inconvenience, Higher BMI, lack of physical exercise, family history of hypertension and use of salt were associated with risk of hypertension. However, controlling for other variables on multivariate logistic regression, only Family History of Hypertension, use of salt, Higher BMI and physical inactivity remained independent predictors of hypertension.

The participants of the study who use salt on plate, they were 7.824 times [AOR 7.824, 95%CI; 2.770 – 22.098] more likely to be hypertensive than their counter parts. Participants who perform physical Activity continuously on daily basis were 87.6% [AOR 0.224, 95% CI; 0.102 – 0.492] less likely to be hypertensive. Whereas, adults who had family history of hypertension were about 6.875 times [AOR 6.875, 95% CI; 2.855 – 16.558] high likely to be hypertensive than those who did not have family history of hypertension and also nearly three fourth of participants (68.1%) had a normal BMI, whereas the rest were either overweight or obese. Overweight/obesity was found to be strong risk factor for hypertension [AOR 8.807, 95% CI; 3.559 – 21.791] (Table 3).

Table 3: Multivariate analysis of factors associated with hypertension, Akesta Town, North East Ethiopia, 2019.

Variables	Hypertension		COR (95% C.I.)	AOR (95% C.I.)
	NO	Yes		
Age				
18 – 24	44 (11.8%)	3 (0.8%)	1	1
25 – 34	108 (29.0%)	6 (1.6%)	0.815 (0.195 - 3.403)	0.370 (0.060 - 2.287)
35 – 44	81 (21.7%)	38 (10.2%)	6.881 (2.008 - 23.573)	1.180 (0.211 - 6.601)
45 – 54	30 (8.0%)	40 (10.7%)	19.556 (5.538 - 69.059)	2.495 (0.410 -15.195)
55 – 64	13 (3.5%)	10 (2.7%)	11.282 (2.698 - 47.186)	1.697 (0.201 -14.321)
Marital Status				
Single	86 (23.1%)	8 (2.1%)	1	1
Married	161 (43.2%)	72 (19.3%)	4.807 (2.213 - 10.445)	2.087 (0.606 - 7.185)
Divorced	25 (6.7%)	11 (2.9%)	4.730 (1.716 - 13.036)	.638 (0.119- 3.424)
Widowed	4 (1.1%)	6 (1.6%)	16.125 (3.753 - 69.288)	8.247 (0.663 - 102.547)
Family History				
No	224 (60.1%)	32 (8.6%)	1	1
Yes	28 (7.5%)	49 (13.1%)	12.250 (6.764 - 22.187)	6.875(2.855 - 16.558)*
Salt Use				
No	160 (31.1%)	12 (3.2%)	1	1
Yes	116 (31.1%)	85 (22.8%)	9.770 (5.101 - 18.714)	7.824 (2.770 - 22.098)*
BMI				
Normal	225 (60.3%)	29 (7.8%)	1	1
Under Weight	22 (5.9%)	1 (0.3%)	0.353 (0.046 - 2.715)	0.881 (0.093 - 8.390)
Obese	3 (0.8%)	10 (2.7%)	17.009 (9.299 - 31.114)	8.807 (3.559 - 21.791)*
Over Weight	26 (7.0%)	57 (15.3%)	25.862 (6.725 - 99.453)	5.251 (0.962 - 28.663)
History of DM				
No	269 (72.1%)	84 (22.5%)	1	1
Yes	7 (1.9%)	13 (3.5%)	5.947 (2.298 - 15.3092)	2.261 (0.656 - 7.791)
Physical Activity				
No	43 (11.5%)	53 (14.2%)	1	1
Yes	233 (62.5%)	44 (11.8%)	0.153 (0.092 - 0.257)	0.224 (0.102 - 0.492)*

* Statically Significant

IV. Discussion

Based this study findings the prevalence of hypertension of 26.0% (95% CI 21.3 – 30.6), When compared with findings elsewhere in the world, this result is lower than a community based cross sectional studies done in Mura ethnics in Amazonia, Brazil (40.2%), Europe and Central Asian region 32.0% and East Asia and Pacific region 35.7%, Middle East and North Africa region among adults < 65 years reported as (32.4%). (51, 55) and also Compared with recent studies in Ethiopia, our finding is still lower than that of 27.4% in Gonder (68). But this Study Finding is also comparable with the prevalence estimate of 26.0% for Latin America and Caribbean region and Middle East and North Africa region in 2015 (11).

Based on this study findings nearly three fourth of participants (68.1%) had a normal BMI, whereas the rest were either overweight or obese. Overweight/obesity was found to be strong risk factor for hypertension

[AOR 8.807, 95% CI; 3.559 – 21.791] and about (19.5%) adults were overweight/obese in this study; and 18% of them were hypertensive which was consistent with findings reported in community based studies in sub - Saharan Africa country (65). This observed consistency is may be due to the fact that as having higher BMI that is being overweight/obese has significant association to Hypertension in this study which is consistent with the global trend also in which when our body weight especially increases our BMI also increases making us overweight or obese that high accumulation of adipose tissue/fat and cholesterol in our body especially the blood vessels it narrows them as when the arteries narrow, they increase the resistance to blood flow. The heart works harder to pump more blood to make sure the same amount of blood circulates to all the body tissues. The more blood the heart pumps and the smaller the arteries, the higher the blood pressure (12,13).

According to this study findings adults who had family history of hypertension were about 6.875 times [AOR 6.875, 95% CI; 2.855 – 16.558] high likely to be hypertensive than those who did not have family history of hypertension. Equally observed association is due to the fact that family members may share similar life style and genetic factors (14).

As of this study findings the participants of the study who use salt on plate, they were 7.824 times [AOR 7.824, 95%CI; 2.770 – 22.098] more likely to be hypertensive than their counter parts. It has been demonstrated that people who reported ever use of salt on plate had a positive association with hypertension which was evidenced elsewhere (70, 75 - 78). The kidneys play a major role in the regulation of blood pressure. Kidneys secrete the hormone renin, which causes arteries to contract, thereby raising blood pressure. The kidneys also control the fluid volume of blood, either by retaining salt or excreting salt into urine. When kidneys retain salt in the bloodstream, the salt attracts water, increasing the fluid volume of blood. As a higher volume of blood passes through arteries, it increases blood pressure that it is already an established fact that a high salt diet disrupts the natural sodium balance in cells. It causes fluid to stay longer which increases the pressure exerted by the blood on arteries also it increases cardiac burden resulting in high blood pressure resulting in high blood pressure (15).

Seeing that the finding of this study availed Participants who perform physical Activity continuously on daily basis were 87.6% [AOR 0.224, 95% CI; 0.102 – 0.492] less likely to be hypertensive. Performing adequate physical activity have strong and independent role in reducing blood pressure which means less likely to expose people to Hypertension as physical activity has inverse significant association with HTN in this study. Consistent to what was previously reported from urbanized village of East Delhi, Myanmar and Northwest Ethiopia (16-22), this observed consistency is due to the fact that patients who did some physical activity were less likely to hypertension with no physical activity this may be also due to regular physical activity being a significant factor in weight and blood pressure reduction.

V. Conclusion

This cross-sectional survey illustrated that the overall prevalence of hypertension was 26.0% (95% CI 21.3-30.6) and it was also found to be high when compared to other studies findings. The study has demonstrated that among the associated of hypertension; Physical inactivity, family history, use of salt & higher BMI were highly prevalent.

Ethical concern

Ethical clearance was obtained from the Research Ethical Review committee of Wollo University, College of Medicine and Health Sciences research office. Moreover, ethical issues were secured from Akesta town administration office and Akesta district health office and also informed consent taken from the participants and confidentiality throughout the study.

Conflict of Interest: None

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