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Prevalence of Hypertension and Associate Risk Factors among Workers at Hawassa University, Ethiopia: An Institution Based Cross Sectional Study

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Abstract

Background: Hypertension is a serious public health concern which alone is estimated to cause 7.5 million deaths (12.8% of all causes of death) per year and it doubles the risk of many cardiovascular diseases.

Objectives: To assess the prevalence of hypertension, the associated risk factors and knowledge plus practice related to hypertension among workers at Hawassa University, Ethiopia.

Materials and methods: The study was conducted in January-March, 2014. Using simple random sampling technique 620 participants were selected. Data were collected by structured questionnaire. Data were analyzed using SPSS version 16 computer software.

Result: The response rate of the study was 99.6%. Majority, 61.7% (376), of the respondents were male and 47.8% (272) were aged 25-34 years. Among respondents 19.7% (122) were found to be hypertensive either by systolic or diastolic blood pressure out of which 44% (54) were found hypertensive by both. Out of 122 hypertensive persons, 36.9% (45), did not know their hypertension status. Some 31% (192) of the respondents had a BMI score of 25 and above out of which 21.4% (41) were obese. Respondents whose BMI measures ranged from 25-29.99 and those who were 30 years old and above were at increased risk of hypertension AOR=3.8 (95%CI 1.22-12) and AOR=3.90 (95%CI 1.10-14.01), respectively.

Conclusion: Prevalence of hypertension among the study subjects was significantly high and many of them didn't know their hypertension status. The level of hypertension related knowledge and practice of protective healthy life style were very low calling for urgent intervention.

Keywords: Body-mass-index; Waist-circumference; Hypertension; Obesity; Ethiopia

Background

Hypertension is clinically defined as a blood pressure of 140/90 mmHg or more, based on at least two readings on separate occasions [1]. Non-communicable diseases (NCDs) which include hypertension are reported to be the leading causes of death globally, killing more people every year than all other causes of death together [2]. It is estimated that Hypertension alone causes 7.5 million deaths (12.8% of all causes of death) per year and it increases the risk of cardiovascular diseases such as stroke, congestive heart failure, coronary heart diseases, renal failure, and peripheral arterial diseases by double [3].

Unlike the popular opinion, available data shows that nearly 80% of NCD deaths occur in low and middle-income countries [2]. Sub-Saharan Africa (SSA) has a disproportionate burden of both infectious and chronic diseases compared to other world regions. For Sub-Saharan Africa the current disease estimates are only based on limited data, but projections indicate that the existing demographic and epidemiologic transitions increase in non-communicable diseases (NCDs) [4].

In Ethiopia, according to reports by the Federal Ministry of Health hypertension accounted for 1.4 percent of all deaths in 2000/01, making it the 7th leading cause of death in the country for the year [5]. According to 2014 WHO report also Ethiopia lost 691,000 lives in the year of which 30% was due to NCDs [6].

Healthy work force is essential in the context of optimal productivity and enhanced competitiveness. Thus several studies explored the problem of hypertension amongst different groups of workers in India, Brazil and other countries [7,8]. Generally the information on hypertension in Ethiopia is limited to our knowledge and there is no previous data on hypertension prevalence and associated factors among occupational groups conducted in Ethiopia.

Methods

Study design and setting

A cross sectional study design was employed from January, 2014 to March, 2014. The study was conducted in Hawassa University: Main, Agriculture, Wendo Genet, Awada and Referral campuses. Hawassa is located 273 km south of Addis Ababa and is the regional capital of Southern Nations Nationalities and Peoples Region. The University has nearly 7,000 permanent and other contractual workers. The study subjects were selected from each department (administrative, academic and hospital) based on simple random sampling technique from lists obtained from all Colleges and the Institute of Technology human resource offices. Using EPI INFO version 6.04 sample sizes was calculated based on single population proportion. Based on this 622 staff members were selected out of which 620 respondents were obtained.

Data collection

All data were collected following a well-developed, structured questionnaire consisting of close ended questions. The questionnaire covered demographic data: Knowledge and practice of the participants and anthropometric measurement space filled by experienced nurse data collectors. Pilot study was carried out at Hawassa College of Teacher's Education to evaluate the validity of the questions before actual data collection. The English version of the questionnaire was translated into Amharic, the official language of the study area and was back-translated to English to ensure consistency. Confidentiality of the findings was strictly maintained on all collected data.

A digital scale was used for weight measurement. Standardized height measuring device was used for height measurements. Waist circumference was measured with a soft tape on standing subjects midway between the lowest rib and the iliac crest. A private area was chosen for a tape measurement. Application of the tension tape over the marked point making sure that the tape was horizontal across the back; and making the recording at the point of normal expiration.

BP was measured with a regularly serviced mercury sphygmomanometer. At the subject's first BP assessment, BP was measured while both arms were placed on the table with the palm facing upwards. The artery position mark was aligned with the brachial artery. The subject remained resting for 5 minutes at the data collection center and it was made sure that they didn't take caffeine, alcohol, and had physical activity/exercise for at least 30 minutes earlier the BP measurement. The second BP measurement was taken after 10 minutes from the first measurement. Employees who worked in the University as a permanent worker during the data collection period and were willing to take part in the study were included while daily contract workers, severely sick during the data collection period, employees who are on annual/study leave and out of town during the data collection period, pregnant women during the data collection period and women within 45 days after delivery were excluded from the study.

Data quality assurance

Questionnaires were checked for completeness, accuracy, clarity and appropriateness on a daily basis by the investigators at the time of data collection. Experienced nurses were selected for the data collection procedure. Training was given to data collectors and facilitators by the investigators and guest senior internist to increase the quality of data.

Ethical issues

Ethical clearance was obtained from the Institutional Review Board of Hawassa University College of Medicine & Health Sciences before the start of the research and all ethical requirements were adhered to.

Results

Data from a total of 620 respondents who completed the structured questionnaire were eligible for analysis, providing an overall response rate of 99.6%. The majority, 48.4% (300) and 21.3% (132) of the respondents participated from the Main Campus and College of Medicine and Health Sciences, respectively. The mean age of the respondents was 33.9 years (SD=9.0) and those 25-34 years old dominated the sample, accounting, 47.8% (272). Out of 609 respondents who reported their marital status, 60% (365) were married, 36.5% (222) were single and 2%(12) were divorced. Out of this study's 620 rrespondents, 50.9% (312) were protestant and 43.2% (265) were Orthodox Christians. Details of socio-demographic characteristics of the respondents are presented in Table 1.

Characteristics	Frequency	%
Campus		
Main	300	48.4
Medical	132	21.3
Wendo Genet	90	14.5
Agriculture	60	9.7
Awada	38	6.1
Age (years)		
<=24	62	10.9
25-34	272	47.8
35-44	151	26.5
45-54	63	11.1
=>55	21	3.7
Sex		
Male	376	61.7
Female	233	38.3
Level of Education		
≤ Grade 12 complete	175	28.5
Diploma	203	33.1
First degree	179	29.2
≥ Second degree	57	9.3
Occupation		
Health Professional	59	9.9
Adm-staff	472	78.9
Academic Staff	67	11.2
Monthly Income (ETB)		
<1000	131	30.2
1000-3000	179	41.2
3001-5000	66	15.2
>5000	58	13.4

Table 1: Socio-demographic and Economic characteristics.

Only 70% (434) responses were obtained in relation to information about income of the household. The reported median monthly income of the households in this study was 1500 (IQR=1500) Ethiopian birr.

Prevalence of Hypertension

The prevalence of hypertension in this study refers to the number of respondents whose average value of either systolic blood pressure 140 or above mmHg or diastolic blood pressure measured 90 mmHg or above. Therefore, a person whose average BP ≥ 140/90 mgHg, was classified hypertensive. The number of cases satisfying the above definition was divided by the total number of all individuals whose blood pressure was measured at least twice and then, multiplied by one hundred.

Out of the 620 respondents, 19.7% (122) were found to be hypertensive either by systolic or diastolic blood pressure out of which 44% (54) were found hypertensive both by systolic and diastolic blood pressure. Out of 122 hypertensive persons, 23% (28) reported that they have already known their hypertensive status, while 40% (49) said that they never been hypertensive, and the remaining 36.9% (45) did not know their hypertension status (Figure 1). Among the study's 604 respondents, 22.7% (137), responded that they have hypertension case among their family members while 77.3% (467) responded that there is no hypertension case in their family.

Respondents' Knowledge about Hypertension and Related Practices

Knowledge levels

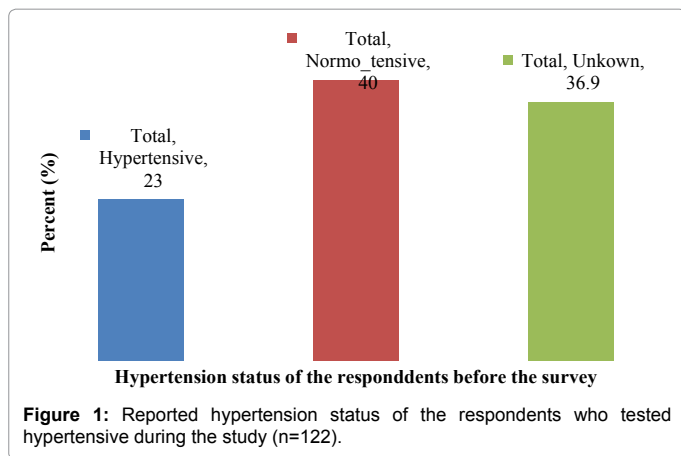Respondents' knowledge levels about hypertension could influence

Figure 1: Reported hypertension status of the respondents who tested hypertensive during the study (n=122).
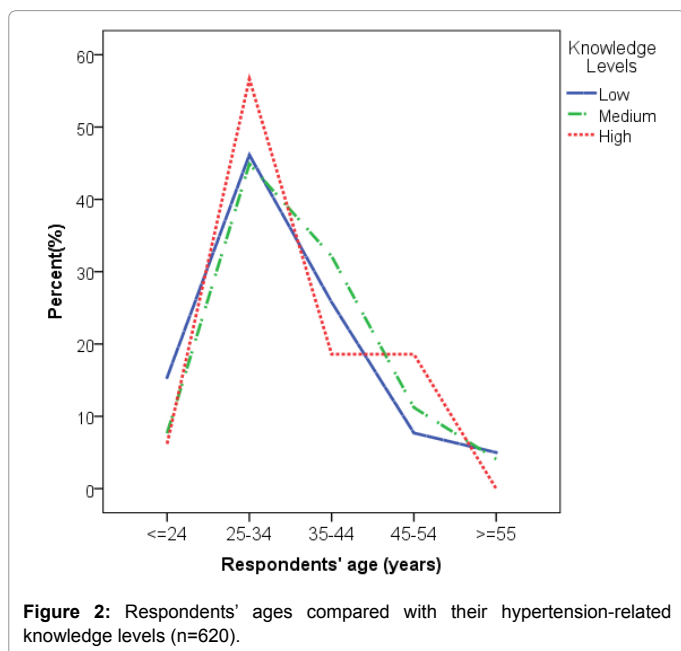

Figure 2: Respondents' ages compared with their hypertension-related knowledge levels (n=620).

their preventive and control actions. The knowledge of the respondents who participated in this study was described based on individual items using frequencies and corresponding percentages. The overall knowledge level was also assessed by computing scores for correct responses of all relevant items into a single composite variable. This approach was used to perform further analyses about respondents' hypertension-related knowledge.

The overall proportion of correct responses to questions that assessed knowledge of the respondents about hypertension ranged from a minimum of 53.4% to 97.7%.

The overall knowledge of the interviewees was computed from the 9 knowledge items and categorized into a single composite variable with three ordinal response options. There were 46.1% (286) of the respondents with "low level" knowledge about hypertension, of them had "medium level" knowledge, and 19% (118) had "high level" knowledge (Figure 1). The median and inter quartile range of knowledge score were 7 and 3 out of possible 9 points.

Associations of selected socio-demographic characteristics of the respondents and their overall level of knowledge about hypertension

were examined using Pearson Chi-square tests. Outputs of association between the levels of knowledge and socio-demographic variables are presented in Table 2. Age had a significant effect on the respondents' knowledge levels about prevention and control of hypertension. Out of 113 participants who had high knowledge levels, 64 (56.6%) were aged 25-34 years (Figure 2). Only 44.1% (n=120) of this age group out of 260 had low levels of knowledge about hypertension compared to other age categories. In this study, level of education of the respondents, occupation, age and monthly income of the family were significantly associated with the level of the respondents' knowledge about hypertension ($p<0.001$). However, knowledge levels did not vary with sex and marital status of the study participants ($p>0.05$) (Table 2).

Practices related to hypertension

Out of 588 respondents, 49.7% (292) had checked their blood pressure in the last one year and the remaining 50.3% (296) did not. Similarly, out of 591, 45.5% (269) reported that they do some physical exercises with the frequencies ranging from once a day (14.7%) to only 1-3 times per week (24.2%). On the other hand, the majority 54.5% (322) never practiced any exercise. With regard to the undesirable behaviors, only 1.2% (7) and 11.8% (68) and of the respondents reported that they smoke cigarettes and drink alcohols, respectively.

Anthropometric measurements

Among the anthropometric measurements taken during the study; waist circumference and BMI which summarizes the height and

Variables	Knowledge Categories			X^2	P
	Low	**Medium**	**High**		
Sex (n=609)					
Male	178	135	63		
Female	101	79	53	3.4	0.19
Age (years) (n=569)					
≤ 24	40	15	7		
25-34	120	88	64		
35-44	67	63	21	30.3	0.001
45-54	20	22	21		
≥ 55	13	8	0		
Highest education attended (n=614)					
≤ Grade 12	105	57	13		
Diploma complete	94	77	32	50.7	0.001
First degree complete	72	59	48		
Second degree and above	12	22	23		
Monthly income (n=434)					
<1000	80	42	9		
1000-3000	72	73	34		
3001-5000	19	25	22	43.9	<0.001
>5000	14	24	20		
Occupation (n=598)					
Health professional	2	22	35	100	<0.001
Administrative staff	249	165	58		
Academic staff	23	20	24		
History of hypertension in the family (n=604)					
Yes	42	9	36	16.5	<0.001
No	234	152	81		
Marital status (n=609)					
Single	115	65	42	10.4	0.108
Married	162	149	76		
*The test is significant at α =0.05					

Table 2: Association of knowledge levels and selected socio-demographic characteristics of the respondents, May 2014.

weight data have been tabulated below. One-fourth of males scored wait circumference of at least 94 cm and one third of the females scored waist circumference of at least 80 cm. Over 192 (31%) of the respondents had a BMI score of 25 and above out of which 41 (21.4%) were obese (had a BMI exceeding or equal to 30.0).

The association of waist circumference and the systolic blood pressure was examined using a simple logistic regression model. The result showed that as the waist circumference increased by one centimeter, the SBP increased by 0.24 mm of mercury (95%CI: 0.17, 0.30).

The SBP of the respondents consistently increased as the BMI increased.

Socio-demographic and economic predictors of hypertension among the study subjects

Identification of factors that could explain prevention and control practices of hypertension at the household level was one of the core objectives of this study. There was no association between the hypertension status of the respondents and some socio-demographic characteristics (p>0.05). These included: sex, marital status, occupation of the respondent and monthly household income (Table 3).

Association of practices and anthropometric measures of study subjects with their hypertension status was examined (Table 4). The output showed that, those who did not check their hypertension status over the last 12 months preceding the study were less likely to test

positive for hypertension compared to those who did the checkups, AOR=0.49 (95%CI 0.29, 0.86). BMI was another independent factor that predicted hypertension. Respondents whose BMI measures ranged from 25-29.99 and those who were 30 years old and above were at increased risk of hypertension AOR=3.8 (95%CI 1.22-12) and AOR=3.90 (95%CI 1.10, 14.01), respectively. On the other hand, performance of the physical exercise, consumption of alcohol and knowledge level about hypertension did not affect hypertension status of the respondents.

Discussion

This study revealed the following main findings. The prevalence of hypertension (blood pressure ≥ 140/90 mmHg) among the study population was 19.7%, of which 44% tested hypertensive by both systolic and diastolic measures. Regarding the level of awareness of the respondents about hypertension, only 22% had high level of knowledge. About 49.7% of the participants reportedly said that they regularly check their BP and 45% perform exercises on a regular basis. Almost all (98.8%) never smoked cigarettes and 88.2% did not take alcohol. About 31% of the respondents had a BMI measure of at least 25. Age, taking regular BP checkups and BMI were among the factors identified to independently predict hypertension status of the study participants.

The reported hypertension prevalence of 19.7% in the study's sample is less than the finding reported by Mulenga and Siziya among academic staff from University of Zambia, which reported a prevalence of 40% [9]. The observed difference might be attributed to the reported level of exposure to the risk factors for hypertension. In the Zambian

Predictors	Hypertension		COR (95%CI)	AOR (95% CI)
	Normal	**Hypertensive**		
Sex				
Male	284	92	1	1
Female	28	28	0.42 (0.27,0.67)*	0.57 (0.30,1.08)
Age (years)				
≤ 24	58	4	1	1
25-34	231	41	2.6 (0.89,7.50)	2.2 (0.59,7.89)
35-44	113	38	4.9 (1.70,14.30)*	4.58 (1.17,17.89)*
45-54	36	27	10.9 (3.5,33.6)*	7.35 (1.65,32.79)*
≥ 55	16	5	4.5 (1.10,18.9)*	2.17 (0.33,14.39)
Educational status				
Grade 12 or less	144	31	1	1
Diploma complete	167	36	1.0 (0.59,1.70)	2.14 (1.02,4.46)*
First degree complete	144	35	1.1 (0.66,1.9)	1.87 (0.81,4.36)
Second degree or above	38	19	2.3 (1.2,4.6)*	2.46 (0.63,9.67)
Marital status				
Single	196	26	1	1
Married	279	86	2.3 (1.4,3.7)*	1.38 (0.74,2.57)
Divorced	11	1	0.69 (0.09,5.5)	0.72 (0.07,7.41)
Widowed	5	5	7.5 (2.0,27.8)*	5.3 (0.94,29.94)
Occupation (n=857)				
Health professional	50	9	1	1
Administrative staff	376	96	1.4 (0.67,2.9)	1.89 (0.65,5.57)
Academic staff	53	14	1.47 (0.58,3.70)	1.21 (0.32,4.63)
Monthly income (ETB)				
<1000	106	25	1	1
1000-3000	138	41	1.3 (0.72,2.20)	0.78 (0.39,1.54)
3001-5000	53	13	1.04 (0.49,2.20	0.66 (0.22,1.96)
>5000	43	15	1.48 (0.71, 3.10)	0.69 (0.22,2.17)

*The test is significant at α <0.05

Table 3: Socio-demographic and economic predictors of hypertension among Hawassa University staff, 2014.

Predictors	Hypertension		COR (95%CI)	AOR (95% CI)
	Normal	Hypertensive		
Check their hypertension status				
In the past six months	146	56	1	1
In the past 12 months	72	18	0.65 (0.36,1.19)	0.70 (0.36,1.36)
I didn't have checkups in the last 12 months	255	41	0.42 (0.27,0.66)*	0.49 (0.29,0.86)*
Perform physical exercises				
Daily	72	15	1	1
1-3 times/week	197	36	1.6 (0.82,3.20)	1.70 (0.79,3.56)
4-6times/week	34	5	0.71 (0.24,2.10)	0.76 (0.24,2.43)
Never	202	60	1.10 (0.59,0.93)	0.94 (0.46,1.89)
Consume alcohol				
Yes	48	20	1	1
No	415	91	0.53 (0.29,0.93)*	0.54 (0.29,1.01)
BMI				
<18.5	47	5	1	1
18.5-24.99	323	51	1.48 (0.56,3.90)	1.35 (0.45,4.10)
25-29.99	101	50	4.65 (1.74,12.43)*	3.83 (1.22,12.0)*
≥ 30	26	15	5.4 (1.7,16.62)*	3.93 (1.10,14.01)*
Knowledge levels				
Low	209	47	1	1
Medium	179	50	1.24 (0.79,1.94)	0.84 (0.49,1.45)
High	110	25	1.01 (0.59,1.73)	0.61 (0.32,1.19)

*The test is significant at α<0.05

Table 4: Association of practices and anthropometric measures with hypertension status of the participants.

study, 22% smoke cigarettes and 63% consume alcohol which is very high compared to the current findings (only 1.2% smoked and 11.8% consumed alcohol).

The current study's prevalence is also lower compared to finding from a systematic review that involved 45 different studies conducted in West African countries, an overall prevalence ranging from 12%-68.9% was reported among different workforces [10]. Specifically, the prevalence of hypertension among health care, bank workers and civil servants ranged from 17.5% to 37.5%. The prevalence of hypertension observed in this study is also lower compared to that reported among staff in Nigerian teaching hospital which was 36.6% [11].

This study showed that respondents older than 35 years were over four folds more likely to be hypertensive compared to those at most 24 years of age. Similar findings about the overall role of age in increasing the risk of hypertension among university staff were reported from Zambia [9] and West Africa [10].

Conclusions

From this study it might be concluded that prevalence of hypertension among the study subjects is significantly high (19.7%) and out of these 77% didn't know their hypertension status. This could be considered an alarming figure with potential consequences in not making the necessary adjustments in modifiable risk factors and monitoring the progression of the disorder. Moreover, the level of knowledge related on hypertension and practice of protective healthy life style also pose serious public health concern.

Recommendation

Based on the findings in this study we strongly recommend: wider scale, multicentre investigations with more parameters for better picture on the point. Aggressive work by all stakeholders in synergistic approach towards awareness creation regarding hypertension, promotion of healthy life style and improving health checkups among the community is also highly recommended.

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