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Research Article

Cardiovascular Disease Risk Profiles and Associated Factors Among Health Care Workers in Ethiopia

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Abstract

Background: Cardiovascular diseases (CVD) are the leading cause of morbidity and mortality in the world accounting for 31% of all deaths globally. It was thought to be the problem of the developed world, but currently becoming a public health concern for the developing countries including for Ethiopia. It is affecting individuals across different walks of life including health care workers (HCWs). However, studies related to the risk and associated factors of CVD specifically among the HCWs are limited to non-existent in Hawassa and Ethiopia. The aim of this study is to examine CVD risk profiles and associated factors among health care workers (HCWs).

Methods: A cross sectional study design and probability sampling technique was employed. Pre-tested, structured, and self-administered survey questionnaire abstracted and adapted from relevant literatures (WHO-STEPS questionnaire) was used to collect the required information. Descriptive statistics was computed to determine the risk profile and P Value < 0.05 and odds ratio with 95% CI was estimated to identify factors associated with certain CVD risks using multivariate logistic regression in the SPSS version 20.0 software.

Results: The prevalence of CVD risk profiles were as follows: nearly a third (30.3%, 95% CI = 24.7, 36.0) had high BMI and 31.9% had hypertension (95% CI = 26.2, 38.0) on physical examination, but only 6(2.4%) reported to have hypertension. Similarly, 5(2.0%) reported to have Diabetes Mellitus, but of the total 112 participants who reported their FBS, 10(3.9%) had Diabetes Mellitus (DM) based on FBS (126 Mg/dl or more) while, many others 142(55.91%) did not know their FBS level. Likewise, only 17(6.7%) of participants knew their lipid status, of which 2 of them had high total cholesterol. Of the total, 120 (47.2%) were physically inactive. Eating meat for 3 or more days per week (AOR = 2.73; 95%CI = 1.57, 4.73), increased age (AOR = 3.03, 95%CI: 1.64, 15.61) and midwifery profession (AOR = 4.74, 95%CI = 1.74, 12.89) have increased risk of High BMI. Similarly, male sexes, increased income, eating animal source butter are associated with hypertension.

Conclusion and Recommendations: Nearly a third had high BMI and hypertension and nearly half were physically inactive. Eating habit, age and profession were associated with high BMI. Similarly, eating habit, sex and income were associated with hypertension. Many participants did not know their B/P, FBS level and lipid status. Therefore, behavior change communications on diet, regular exercise, checking of B/P, blood sugar, and lipid status are recommended.

Keywords: *HCWs; Cardiovascular Diseases; Risk Factors; BMI; Hypertension; DM; Ethiopia*

Abbreviations

BMI: Body Mass Index; BP: Blood Pressure; CDC: Center For Disease Control; CHD: Coronary Heart Disease; CRP: C-Reactive Protein; CVD: Cardiovascular Diseases; DM: Diabetes Mellitus; EDHS: Ethiopian Demographic Health Survey; ETB: Ethiopian Birr; FMOH: Federal Ministry Of Health; GYN/OBS: Gynecology And Obstetrics; HCWS: Health Care Workers; HDL: High Density Lipoprotein; HIV/AIDS: Human Immuno Virus / Aquired Immuno Deficiency Syndrome; HUCSH: Hawassa University Comprehensive Specialized Hospital; IRB: Institutional Review Board; LDL: Low Density Lipoprotein; LMIC: Low And Middle Income Countries; NCD: Non-Communicable Diseases; PAD: Peripheral Artery Disease; WHO: World Health Organization

Introduction

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in the world [1,2]. Risk factors such as hypertension, metabolic syndrome, cigarette smoking, diabetes mellitus, elevated blood glucose, cholesterol levels, and obesity or being overweight are the top causes of death globally [3]. The Emerging risk Factors Collaboration incorporating 160,309 study participants demonstrated the independent predictive value of C-reactive protein (CRP) for coronary heart disease (CHD) and stroke, the clinical utility of CRP and fibrinogen in CVD risk prediction, and the limited role of adding the novel lipid markers apolipoprotein A-I, lipoprotein (a), apolipoprotein B, and lipoprotein-associated phospholipase A2 to traditional lipid measures [4,5].

According to the World's Health Organization (WHO) Committee for Africa, the burden of CVD is increasing rapidly in Africa, and these conditions are now a public health problem throughout the continent. Cardiovascular diseases, including stroke, heart failure and kidney disease, have been common in sub-Saharan Africa for many years, and rapid urbanization is causing an upsurge of ischemic heart disease and metabolic disorders. At least two-thirds of cardiovascular deaths now occur in low- and middle-income countries, bringing a double burden of disease to poor and developing world economies. Hypertension is by far the commonest underlying risk factor for cardiovascular disease. Its prevention, detection, treatment and control in sub-Saharan Africa is haphazard and suboptimal. This is due to a combination of lack of resources and health-care systems, non-existent effective preventive strategies at a population level, lack of sustainable drug therapy, and barriers to complete compliance with prescribed medications. The economic impact for loss of productive years of life and the need to divert scarce resources to tertiary care are substantial [6].

Cardiovascular diseases have been neglected in sub-Saharan Africa, including in Ethiopia, but there are recent efforts trying to gather information on their epidemiology, clinical characterization and outcomes. Cognizant to this, the study will find out the CVD risks and associated factors, and thereby, will help create preventive strategies and contribute to reduce related morbidity and mortality.

The extent of the problem

Cardiovascular diseases (CVDs) are the main non-communicable conditions that are major public health concern worldwide; take the lives of 17.7 million people every year, which amounts to 31% of all global deaths. Among these, 75% occur in low and middle income countries where the majority of these deaths are preventable, and despite preconceptions that men are more susceptible, women are in fact equally likely to be affected; 80% of all CVD deaths are due to heart attack and stroke [7]. To put this into perspective: malaria, HIV AIDs and TB caused a combined annual mortality of 3.86 million. Turkmenistan saw the highest rate of deaths from cardiovascular disease in 2012, with 712 deaths per 100,000 people. Kazakhstan has the second highest rate, with 635 deaths per 100,000. Mongolia, Uzbekistan, Kyrgyzstan, Guyana, Ukraine, Russia, Afghanistan, Tajikistan and the Republic of Moldova all have more than 500 deaths per 100,000 [8]. Triggering these diseases are tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol. These in turn show up in people as raised blood pressure, elevated blood glucose, overweight and obesity, risks detrimental to good cardiac condition [7].

From a global perspective, the large and diverse African population is disproportionately affected by cardiovascular disease (CVD). The historical balance between communicable and non- communicable pathways to CVD in different African regions is dependent on external

factors over the life course and at a societal level. The future risk of non-communicable forms of CVD (predominantly driven by increased rates of hypertension, smoking, and obesity) is a growing public health concern. The incidence of previously rare forms of CVD such as coronary artery disease will increase, in concert with historically prevalent forms of disease, such as rheumatic heart disease, that are yet to be optimally prevented or treated [9].

Whilst effective measures are being put in place in high-income countries resulting in a decline in the rate of CVD [10] CVD mortality is on a steady rise in Low and Middle Income countries (LMICs) with rates of up to 300–600 deaths attributed to CVD per 100,000 population, and is projected to increase causing preventable loss of lives [11]. The uncontrolled CVD epidemic is associated with increasing socio-economic costs with high levels of disability and loss of productivity, exacerbating poverty and increasing health inequalities. Much of the population risk of CVD is attributable to nine modifiable traditional risk factors, including smoking, history of hypertension or diabetes, obesity, unhealthy diet, lack of physical activity, excessive alcohol consumption, raised blood lipids and psychosocial factors. Eight of these risk factors (excessive alcohol use, tobacco use, high blood pressure, high body mass index (BMI), high cholesterol, high blood glucose, dietary choices and physical inactivity) account for 61% of CVD deaths globally [12].

Cardiovascular diseases are the main non-communicable diseases (NCD), are major public health concern worldwide and account for 9.2% of total deaths in the African region, where they are the leading cause of death in those over the age of 45. Similarly, cardiovascular diseases account for 7-10% of all adult medical admissions to hospitals in Africa [13]. A systematic review between 1960 and 2011 done to identify prevalence of four NCD in Ethiopia, showed cardiovascular disease accounted for 24% of deaths in Addis Ababa, diabetes causes 5%. Several studies also reviewed the impact of these diseases on hospital admissions found out cardiovascular disease accounted for 3%-12.6% and have increased between 1970s and 2000s; and diabetes accounts for 0.5%-1.2% [14].

However, studies that examine CVD risk factors comprehensively are limited in Ethiopia, specifically in Hawassa. Therefore this study will examine the prevalence of the main cardiovascular risk and associated factors among Health care workers of Hawassa University Comprehensive specialized hospital.

Significance of the study

According to literatures from other nations, some of CVD risks were found to be significantly higher among Health care workers as compared to the general population, while other risks had either comparable or lower frequency among HCWs [8,9]. This underscores the fact that HCWs are not immune to this global health problem, and they could very well be targets for intervention. While there are studies that focused on the prevalence of a specific CVD risk among general population in our country, there is a scarcity of studies that assesses CVD risks among HCWs. So this study will be one of its kinds and will serve as a stepping stone for further studies. Furthermore, the results would provide new opportunities for developing more effective preventive and curative interventions. Meanwhile, the study would also contribute to raise awareness about the magnitude of the problem among HCWs and can be used as an input for policy development by FMOH and other relevant organizations.

Methods and Materials

Study area and period

A cross sectional hospital-based study was conducted among HCWs of Hawassa University Comprehensive specialized Hospital. Hawassa is the capital city of South Nations Nationalities and People Regional (SNNPR) state. It is 273 km south of Addis Ababa, the capital city of Ethiopia. Hawassa University Comprehensive specialized Hospital provides comprehensive services for a population of 18 million throughout South Ethiopia and neighboring Oromia region. The hospital has different departments including Surgery, Pediatrics, Gynecology/Obstetrics, Internal medicine, Ophthalmology, ENT, Psychiatry, Dermatology, Anesthesia and others. It also has health care workers with different specialty areas including Surgeons, Gynacologists, pediatricians and internist, Nurses and midwives, pharmacists and laboratory technologists. The study was conducted from October 1- 30, 2018.

Study design

Institutional based cross-sectional study design was conducted.

Population

Source population

All HCWs in Hawassa University Comprehensive specialized Hospital.

Study population

Sampled HCWs from the source population.

Inclusion criteria

All HCWs willing to participate in the study who were on job during the study period.

Exclusion criteria

All HCWs who were not willing and those who were on extended leave.

Sample size determination

Sample size was determined by using single population proportion formula, considering the following assumptions:

- Z (∝/2) =1.96 (95% confidence level for two sides)
- P = proportion expected prevalence; P= 30% proportion of CVD risk factors, (one of the CVD risk factors highest proportion from recent published study (hypertension) [15].
- D= margin of error (degree of accuracy) 5%
- 20% contingency for non-respondents, and the sample size is:

$$n = \frac{(Za/2)^2 p(1-p)}{(D)^2}$$

$n_i = \frac{(1.96)^2 * 0.3(0.7)}{(0.05)^2} = 278$

Since the source populations are less than 10,000, correction formula used to calculate the final sample size. Therefore, the total sample size was (N = 944):

$$Nf = \frac{ni}{1+\frac{ni}{N}}$$

Where ni = initial sample size = 278.

nf = final sample size=215.

N= Source population (944 HCWs).

By adding 20%, non-response rate the final sample size was 258.

Sampling procedures

Then study participants were identified by using systematic sampling technique. The calculated sample size was proportionally allocated to each health care specialty areas. The interval used to select the participants was determined by constant number "K" which is calculated by dividing the total number of source population by the sample size i.e. K= 3.6. The name list of participants used as a sampling frame. Then, the first participant was picked by lottery method. Then, every 4^{th} interval of participants was picked.

Study variables

- **Dependent variable** - CVD risk factors (Hypertension, BMI).

Independent variables

Socio-demographic characteristics such as: Age, Ethnicity, Educational status, marital status, Sex, Religion, profession, monthly income, physical activity and dietary pattern.

Data collection instruments and procedures

Part I-deals with the socio-demographic characteristics and CVD risk factors of study participants by using structured questionnaire adapted from WHO STEPS 1 questionnaire [11]. Part II- deals with resting blood pressure measurement using standardized procedures with a mercury syphingomanometer with standard adult size cuff. The mean of three measures performed at least 3 minutes apart used for all analyses. Height was measured with a calibrated stadiometer to the nearest 0.5 cm, weight in light clothes with a standard weight Scale balance rounded to the nearest 0.1 kg, adapted from WHO STEPS 2 questionnaire [11]. The data was collected by 4 trained medical interns using a structured questionnaire which is prepared after revising different relevant literatures. The questionnaire was pre-tested on 5% of study population to check appropriateness of wording, at a different site to prevent information contamination.

Data analysis

Each questionnaire was checked for completeness, missed values and unlikely responses. The collected data were coded and entered into a computer SPSS version 20:0 (IBM Corporation, Armonk, NY) for analysis.

Descriptive statistics (frequencies) and binary logistic regressions were performed. In the binary logistic regression, both bi-variate and multivariate analysis were carried out. All exposure variables with a p value < 0.25 in crude analysis were considered as a candidate for multivariate analysis and those variables with a p value < 0.05 in the multivariate analysis were considered as significant predictor of the outcome. Hosmer- Lemeshaw goodness of fit test was used to see model fitness and all variables entered into the model were P.V > 0.05, showing model fitness.

Operational definitions

BMI (Kg/M^2) [16]

- Underweight-BMI<18.5
- Normal-BMI 18.5-24.9
- Overweight-BMI 25-29.9
- Obese-BMI ≥30.

Physical activity

Adopted from (World Health Organization, Global recommendations on physical activity for health, 2010) [17].

Physical activity

Defined based on the WHO global recommendation on involvement in any physical activity (including the movement made in our work) for 30 minutes or more per day.

Active physical activity

Involvement in any physical activity for 30 minutes or more per day.

Inactive

Involvement in any physical activity for less than 30 minutes per day.

Hypertension

Those reported Yes to have Hypertension and /or either having a systolic B/P of 130 MM Hg or more, or Diastolic B/P 80 MM Hg or more or both B/P of (≥130/80 MMHg), [18].

Diabetes mellitus

Those reported Yes to have DM and /or (FBS more than 126 Mg/dl on two different days) [19].

Smoking [20]

- Ever smoker was defined as a person who had smoked sometime in their lifetime before, but does not smoke currently.
- Current smoker is a person who smoke every day or some days in a week.
- **Daily smoker**: Someone who smokes on a daily base.
- **Someday smoker/ occasional smoker:** Participant who has smoked at least 100 cigarettes in his or her lifetime, who smokes now, but does not smoke every day.

Diet [17]

- **Risky Diet**: Consumption of meat daily or 3 or more days a week.

- **Not risky diet**: No consumption of meat or eat red meat for less than 3 days per week.

Ethical cconsiderations

Ethical clearance was obtained from Institutional Review Board (IRB) of college of medicine and health sciences, Hawassa University. Official letter was written to Hawassa university comprehensive specialized hospital. Before interview, each respondent was informed with the aim of the study, the possible benefit from the study and confidentiality. Then informed verbal and written consent was obtained from participants willing to participate. They were also assured that their identity will be kept anonymous and have a full right to refuse to participate.

Results

The current study was conducted on 254 participants with a response rate of 98%. The mean age of study participants was 29 ±5.56 years. Of the total, 135 (53.1%) were males, 153 (60.2%) were single, 76 (29.9%) Amhara ethnic group, and 134 (52.8%) belong to the Orthodox Christian. Likewise, 135(53.1%) of participants were nurse professionals, 169 (66.5%) BSc degree holders and the median monthly income was 5000 ETB (Table 1).

	Categories	No.	Percent
Age, Mean and SD 29±5.56)	20-29	172	67.7
	30-39	69	27.2
	40+	13	5.1
Sex	Male	135	53.1
	Female	119	46.9
Marital status	Single	153	60.2
	Married	99	39.0
	Divorced and Widowed	2	0.8
Ethnicity	Amhara	76	29.9
	Oromo	63	24.8
	Sidama	28	11.0
	Wolayita	17	6.7
	Gurage	15	5.9
	Others, (Kembata, Tigre, Gamo, Somali, Hadiya, Derashe…..)	55	21.7
Religion	Orthodox	134	52.8
	Protestant	94	37.0
	Muslim	20	7.9
	Others, (Wakefeta, Catholic,)	6	2.4
Profession	Physician (any)	55	21.7
	Nurse	135	53.1
	Midwife	30	11.8
	Pharmacist	12	4.7
	Laboratory	12	4.7
	Others (Health officer, Anesthesia, psychiatry…)	10	3.9
Level of education	GP/DDM	14	5.5
	Resident	32	12.6
	MD specialist/Senior	9	3.5
	Diploma	24	9.4
	BSc	169	66.5
	MSc/MPH	6	2.4
Monthly income (ETB)	2000-4000	74	29.1
	4001-6000	112	44.1
	6001-8,000	25	9.8
	8001-10,000	22	8.7
	>10,000	21	8.3

Table 1: *Socio-demographic variables of participant HCWs, (N=254).*

As shown in table 2, of the total participants, 36 (14.2%) of had a family history of cardiovascular disease. The BMI status of participants: underweight 13(5.1%), overweight, 59(23.2%), obese 18(7.1%), while 4(1.6%) of participants were current smokers.

Risk factors	Category	No.	%
Having family history of cardiovascular disease	Yes	36	14.2
	No	218	85.8
BMI	Underweight	13	5.1
	Normal	164	64.6
	Overweight	59	23.2
	Obese	18	7.1
Smoking status	Current smoker	4	1.6
	Quit smoking	4	1.6
	Never smoked	246	96.9
History of eating fruit	Yes	240	94.5
	No	14	5.5
Frequency of eating fruit per week	3 or more times	109	42.9
	Less than 3 days	145	57.1
Type of butter most often used for meal	Animal source	146	57.5
	Plant source	108	42.5
History of eating meat	Yes	247	97.2
	No	7	2.8
Frequency of eating meat per week	3 or more days	94	37.0
	Less than 3 days	160	63.0
History of eating vegetable	Yes	250	98.4
	No	4	1.6
Frequency of eating vegetable/week	3 or more days	159	62.6
	less than 3 days	95	37.4
Activity			
History of doing vigorous physical activity	Yes	89	35.0
	No	165	65.0
How much time do you walk every day (average)	Less than 30 minutes	120	47.2
	30 minutes or more	134	52.8
Medical history and P/E			
Do you have Hypertension	Yes	6	2.4
	No	245	96.5
	I don't know	3	1.2
Latest B/P in MM/Hg (P/Ex)	Normal B/P	173	68.1
	Hypertension	81	31.9
Do you have diabetes mellitus	Yes	5	2.0
	No	238	93.7
	I don't know	11	4.3
What is your latest Fasting Blood Sugar level	126 Mg/dl or more	10	3.9
	Less than 126 Mg/dl	102	40.16
	I don't know	142	55.91
Do you know your lipid status	Yes	17	6.7
	No	237	93.3

Table 2: *Cardiovascular risk profile of participant HCWs, (N=254).*

As shown in table 2, of the total participants, 36 (14.2%) of had a family history of cardiovascular disease. The BMI status of participants: underweight 13(5.1%), overweight, 59(23.2%), obese 18(7.1%), while 4(1.6%) of participants were current smokers.

Diet

Of the total participants, 145 (57.1%) reported eating fruit for less than three days per week, 146(57.5%) having animal source butter, 94(37.0%) eating meat three or more days per week, and 95(37.4%) reported eating vegetable for less than 3 days per week.

Activity

Of the total participants 120 (47.2%) walk for less than 30 minutes every day.

Medical history and P/E

Only 6(2.4%) reported to have hypertension while, on physical examination 81(31.9%) had hypertension. Similarly, 5(2.0%) reported to have diabetes mellitus, and 10 (3.9%) had DM based on FBS (126 Mg/dl or more) while, many others 142 (55.91%) did not don't know their FBS level. Surprisingly, only 17(6.7%) of participants knew their lipid status, of which two of them had high total cholesterol while 15 had normal lipid status.

Logistic regression analysis (Table 3) depicted participants of 30 years and older have more than 3 times increased risk of high BMI compared to younger ones, **(**AOR = 3.03, 95%CI: 1.64, 15.61), P < 0.001. Similarly, midwives are nearly 5 times more likely to be overweight and obese compared to physicians (AOR = 4.74, 95%CI = 1.74, 12.89).

Variables	Categories	BMI		COR, 95%CI	AOR, 95%CI	P.V
		Normal and Under Wt. No (%)	Over Wt. and Obese No (%)			
Age	20-29	129(75.0)	43(25.0)	1	1	
	30+	48(58.5)	34(41.5)	2.13(1.22,3.72)	3.03(1.64,15.61)	< 0.001
Sex	Male	99(73.3)	36(26.7)	0.69 (0.40,1.18)	0.74(0.39,1.36)	0.33
	Female	78(65.5)	41(34.5)	1	1	
Marital status	Single, divorced and widowed	115(74.2)	40(25.8)	1	1	
	Married	62(62.6)	37(37.4)	1.72(0.99,2.95)	1.11(0.58,2.13)	0.74
Ethnicity	Amhara	50(65.8)	26(34.2)	1	1	
	Oromo	51(81.0)	12(19.0)	0.45 (0.21,0.99)	0.45(0.19,1.02	0.05
	Sidama and Wolayita	32(71.1)	13(28.9)	0.78 (0.35,1.74)	0.89(0.38,2.12)	0.81
	Gurage and others	44(62.9)	26(37.1)	1.14 (0.58,2.24)	1.11(0.54,2.30)	0.78
Religion	Orthodox	95(70.9)	39(29.1	1		
	Muslim	13(65.0)	7(35.0)	1.31(0.49,3.54)	NI	
	Protestant	64(68.1)	30(31.9)	1.14 (0.65,2.02)		
	Others	5(83.3)	1(16.7)	0.49 (0.06,4.31)		

Profession	Physician (any)	41(74.5)	14(25.5)	1	1	
	Nurse	101(74.8)	34(25.2)	0.99(0.48,2.03	1.02(0.49,2.14)	0.96
	Midwife	15(50.0)	15(50.0)	2.93(1.15,7.48	4.74(1.74,12.89)	0.002
	Pharmacist, Lab and others	20(58.8)	14(41.2)	2.05(0.82,5.11	2.53(0.97,6.57)	0.057
Monthly income (ETB) (Median)	5000 and more	87(68.0)	41(32.0)	1.18 (0.69,2.01)	NI	
	Less than 5000	90(71.4)	36(28.6)	1		

Table 3: *Association of socio-demographics of the participants with BMI, (N=254).*

**NI- Not included into the model as it is not a candidate.*

Table 4 illustrates, participants of 30 years and older are nearly 2 times increased risk of having hypertension (AOR = 1.73; 95%CI = 0.97, 3.11) but did not reach a statistical significance (marginal significance).Whereas, male sex have more than 2 times increased risk of having hypertension compared to females (AOR = 2.21; 95%CI = 1.25, 3.90). Similarly, those monthly earning 5,000 ETB or more are more likely to have hypertension compared to those earning less (AOR = 1.79; 95%CI = 1.01, 3.18). Furthermore, as shown in table 5, those eating meat for 3 or more days in a week are nearly 3 times more likely to have high BMI (AOR = 2.73; 95%CI = 1.57,4.73) while, those participants eating animal source butter are nearly twice more likely to be hypertensive (AOR = 1.91; 95%CI = 1.09, 3.32) compared to those using plant source butter.

Variables	**Categories**	**Blood Pressure**		**COR, 95%CI**	**AOR, 95%CI**	
		Normotensive No (%)	**Hypertensive No (%)**			**P.V**
Age	20 - 29	126 (73.3)	46 (26.7)	1	1	
	30+	47 (57.3)	35 (42.7)	2.04 (1.17, 3.55)	1.73 (0.97, 3.11)	0.064
Sex	Male	80 (59.3)	55 (40.7)	2.46 (1.41, 4.28)	2.21 (1.25, 3.90)	0.006
	Female	93 (78.2)	26 (21.8)	1	1	
Marital status	Single, divorced and widowed	104 (67.1)	51 (32.9)	1	NI	
	Married	69 (69.7)	30 (30.3)	0.89 (0.52, 1.53)	-	-
Ethnicity	Amhara	59 (77.6)	17 (22.4)	1	1	
	Sidama and Wolayita	40 (63.5)	23 (36.5)	1.99 (0.95, 4.20)	1.97 (0.90, 4.29)	0.09
	Oromo	30 (66.7)	15 (33.3)	1.74 (0.76, 3.95)	1.70 (0.71, 4.08)	0.23
	Gurage and others	44 (62.9)	26 (37.1)	2.05 (0.99, 4.24)	2.07 (0.97, 4.42)	0.06

Religion	Orthodox	94 (70.1)	40 (29.9)	1	NI	
	Muslim	11 (55.0)	9 (45.0)	1.92 (0.74, 4.99)	-	-
	Protestant	64 (68.1)	30 (31.9)	1.10 (0.62, 1.95)	-	-
	Others	4 (66.7)	2 (33.3)	1.18 (0.21, 6.68)	-	-
Profession	Physician (any)	32 (58.2)	23 (41.8)	1	1	
	Nurse	97 (71.9)	38 (28.1)	0.55 (0.28, 1.05)	0.95 (0.44, 2.02)	0.885
	Midwife	24 (80.0)	6 (20.0)	0.35 (0.12, 0.99)	1.06 (0.32, 3.57)	0.924
	Pharmacist, Lab and others	20 (58.8)	14 (41.2)	0.97 (0.41, 2.32)	1.33 (0.53, 3.32)	0.543
Monthly income (ETB)	5000 and more	76 (59.4)	52 (40.6)	2.29 (1.33, 3.95)	1.79 (1.01, 3.18)	0.047
	Less than 5000	97 (77.0)	29 (23.0)	1	1	

Table 4: Socio-demographic characteristics associated with CVD risk factor High (B/P), N=254.

Variables	Categories	High BMI		P.V	Hypertension		P.V
		COR, 95%CI	AOR, 95%CI		COR, 95%CI	AOR, 95%CI	
Frequency of eating fruit	Less than 3 days/week	1.57 (0.92, 2.69)	1.65 (0.95, 2.87)	0.079	1.23 (0.72, 2.10)	1.18 (0.67, 2.09)	0.570
	3 or more days/week	1	1		1	1	
Type of butter used for meal	Animal source	1.23 (0.72, 2.13)	1.01 (0.56, 1.82)	0.964	1.91 (1.09, 3.32)	1.91 (1.09, 3.32)	0.022
	Plant source	1	1		1	1	
Frequency of eating meat	3 or more days/week	2.67 (1.54, 4.62)	2.73 (1.57, 4.73)	<0.001	1.26 (0.73, 2.17)	1.08 (0.62, 1.90)	0.781
	Less than 3 days per week	1	1		1	1	
Frequency of eating vegetable	Less than 3 days/week	1.07 (0.61, 1.86)	0.98 (0.54, 1.79)	0.944	1.43 (0.87, 2.46)	1.33 (0.77, 2.31)	0.311
	3 or more days/week	1	1		1	1	
Length of walk per day	Less than 30 minutes	0.76 (0.45, 1.30)	0.81 (0.47, 1.42)	0.467	1.63 (0.96, 2.78)	1.52 (0.88, 2.60)	0.131
	30 minutes or more	1	1		1	1	

Table 5: *Life style (dietary pattern and physical activity) associated with CVD risk factor (High BMI and Hypertension), (N = 254).*

Discussion

A total of 254 participants involved in this study, with a response rate of 98%. The mean age and SD of participants was 29±5.56 years and 135 (53.1%) were males. In this study the prevalence of hypertension, DM and high BMI was 31.9%, 3.9%, and 30.3% respectively. Moreover, 47.2% of participants were physically inactive, 14.2% had a family history of cardiovascular disease and 1.6% were current smokers. A recent study among health care workers in Ghana identified the prevalence of hypertension (16.07%), over weight (38.39%), obese (12.50%), and diabetes mellitus (4.50%) [21]. A 2016 study in Angola among health care workers at a private tertiary health care center showed the prevalence of hypertension (17.93%), diabetes (2.69%), overweight (34.44%) and obesity (19.85%) [22]. Another recent study among adults in Jimma town, Ethiopia, found out the traditional risk factors including hypertension, diabetes mellitus, and current cigarette smoking were 29.5%, 6.8% and 12.5% respectively [15]. The difference in the prevalence between these studies may be explained by a difference in measurements and socio-demographic characteristics of the participants.

It is claimed that obesity shortens life and several studies have found that obese people and people with high BMI are at increased risk of premature death [23] It is also evidenced that the prevalence of chronic NCD is increasing in Ethiopia [24]. A systematic review in Ethiopia illustrated cardiovascular disease accounts for 24% of deaths in Addis Ababa [25]. In our study, nearly a third had high BMI (Over Wt and Obese). The finding of our study is almost similar with a recent study done in Hawassa university that reported 31% of workers had a high BMI [26] while a study in Jimma town showed, 26.8% were overweight/obese [27]. Moreover, in the current study, physical examination revealed 31.9% of participants had hypertension, but only 6(2.4%) reported to have hypertension. This finding is in concordance with a sub-Saharan African estimates that noted hypertension remains the most threatening risk factor, with the national prevalence ranging between 15% and 30% in adults [28]. Another study in Cameroon showed the prevalence of hypertension among primary care physicians 26.2% [8] and a study in Jimma town showed 23.8% of participants were hypertensive [27]. Another recent study in Hawasa University revealed that 19.7% workers had hypertension [26]. In our study, out of 122 hypertensive persons, 36.9% did not know their hypertension status. Another study in Jimma University adult OPD reported 13.2% participants were hypertensive but only 35.1% of them were aware of their hypertensive status [29]. The difference in the prevalence of hypertension among these studies might be explained by the difference in the definition of hypertension (B/P ≥130/80 MMHg), and socio-demographic differences. It is also worth noting that using the previous cut-off for predicting hypertension would lead to underestimation and misclassifies the risk of CVD significantly. On the other hand, a studies defining hypertension based on the recent American College Cardiology/American Heart Association (ACC/AHA) high blood pressure guideline are not available but in USA it is predicted that this new cut off has increased the prevalence of hypertension by 14 - 16%. Nevertheless, a recent study in Ethiopia developed the optimal cut off values for anthropometric indicators of obesity and markers of metabolic syndrome for Ethiopian adults including for high B/P (i.e, B/P ≥130/85 MMHg), to define hypertension [30].

Similarly, of the total respondents, only 5(2.0%) participants in our study reported to have diabetes mellitus, while a study in Jimma town showed the prevalence of DM 6.2% [27]. The current study also indicated a total 112 participants knew their fasting blood sugar (FBS) level, of which 10 (3.9%) had diabetes mellitus (FBS 126 Mg/dl or more) while, many others 142 (55.91%) did not know their FBS level. Surprisingly, only 17(6.7%) of participants knew their lipid status, of which 2 of them had high total cholesterol while 15 had normal lipid status. This rings a bell to all HCWs that there is a gap in screening for common CVD risk factors, as well as between the actual and perceived CVD risk status.

Multivariate logistic regression analysis exhibited in this study age, profession and eating meat frequently were significantly associated with high BMI. Hence, participants of 30 years and older have increased risk of having high BMI compared to younger ones. Similarly, in the current study midwifery profession is at an increased risk of having High BMI (overweight and obese) compared to physicians. A study in Australia showed nurses and midwives had higher prevalence of obesity and overweight than the general population [31]. Another study in England demonstrated high obesity prevalence among nurses compared to other health care professionals including physicians

[32]. More rigorous research is required to explain the link between profession and high BMI and its impact on the ability to carry out professional duties and responsibilities effectively. Furthermore, those eating meat for 3 or more days in a week are nearly 3 times more likely to have high BMI compared to their counterparts. Another study also confirmed the link between eating meat and the risk of CVDs [33]. Likewise, participants of 30 years and older are nearly 2 times increased risk of having hypertension in our study, but did not reach a statistical significance (P.V = 0.06). The association between advanced age and hypertension is also confirmed by many other studies [21,22,25,26,33]. In concordance with studies done by [34] our study identified eating meat frequently was associated with high BMI and eating animal source butter is significantly associated with high B/P (hypertension), The current study also showed that male sex has more than 2 times increased risk of having hypertension compared to their counter parts, which is also in line with a national survey study in Jordan [35] Similarly, those earning 5,000 ETB or more monthly salary are more likely to have hypertension compared to those earning less in the current study. Studies also highlighted that the increase in earning capacity and change in lifestyle has been accompanied by substantial risk of heart disease for males in developing countries [33]. The relationship between increased earning linked with hypertension in our study, in Ethiopia, might be explained by the fact that those earning an increased income are more likely to eat fatty diet (animal source butter and meat), as it is more expensive for those with less earning. In contrast to this, many literatures illustrated that in the rich societies, excess weight and related CVDs are more common among disadvantaged groups [36-41]. This might be further explained by the fact that, in the rich countries, fatty foods, such as "McDonald's Burger" are cheaper and affordable for the poor, consequently, putting their health at risk, but in the poor courtiers like Ethiopia, fatty foods are more expensive and unaffordable for the poor than vegetables. This explanation however, warrants further rigorous investigation in future.

Strength and limitation of the study

The use of standard and /pretested questionnaire, primary data, training and supervision of data collectors by the principal investigator and assistants, using systematic sampling method may have enhanced the strength of the result. However, as the participants are health care workers who have knowledge on the subject studied, there might be social desirability bias and underreporting. Furthermore, this study being cross sectional design, neither a causal nor temporal ordering of the associations can be inferred. We focused on physical examination to collect anthropometric data as we had limited resource. Thus, large scale longitudinal study with laboratory data and more detail measurements will help to produce better precisions and inform policy makers.

Conclusion and Recommendations

Considerable number of participants had high BMI and hypertension. The new ACC hypertension guideline has increased the prevalence of high BP; this was also seen in the USA. Eating meat for three or more days per week, age, and midwifery profession were significantly associated with high BMI. Similarly, male sex and increased income, eating animal source butter are associated with hypertension. It is also worth noting that many participants did not know their B/P status and / its interpretation, FBS level and lipid status. Nearly half were physically inactive.

Based on the findings of our study we made the following recommendations: As employees are the best asset of every organization, and putting effort into employee wellness can encourage better teamwork, increased productivity and reduce sick leave, thus FMOH needs to promote regular health checkups to all health care workers so that it will have a healthy Health Work Force. While, infrastructure (fitness center) needs to be availed for regular indoor and outdoor exercise at work place to all health care workers. All HCWs, especially those with advanced ages, need to have a regular screening of CVD risk profile including B/P, blood sugar, lipid status….etc. Behavior change communication on a culture of healthy diet, exercise and recent definitions for the diagnosis of hypertension should be adapted by all HCWs and the public. Strengthen early preventive life style modification program based on major society guidelines and the recently developed and validated cut-offs for Ethiopia to prevent life threatening CVDs.

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Conflict of Interests

The authors declared that they have no conflict of interests.

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