



# **Knowledge of Coronary Heart Disease and Practices on Detection and Management of Its Risk Factors among Primary Health Care Workers in Sokoto, Nigeria**

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## **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors KJA, AAS and MTOI gave the study concept and design, and drafted the manuscript. Authors TI, MBB and ZI gave the study concept and design and performed data collection, analysis and interpretation. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Introduction:** Hitherto considered to be exclusive to the developed countries, the burden of coronary heart disease (CHD) is now high and continues to rise in the developing countries. This has been attributed to the increasing prevalence of its risk factors, linked to trends in urbanization and changes in lifestyle. This study aimed to assess the knowledge of CHD and practices regarding detection and management of its risk factors among primary healthcare workers in Sokoto, Nigeria.

**Methods:** A cross-sectional descriptive study was conducted among 152 PHC workers selected by

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universal sampling. Data were collected with a set of standardized, semi-structured, self-administered questionnaire, and analyzed using the IBM SPSS Version 20 statistical computer software package.

**Results:** Although, most 147 (96.7%) of the 152 respondents were aware of CHD, less than half of them (41.4%) have ever attended any seminar or workshop on prevention and control of CHD. Most of the respondents had good knowledge of the symptoms and signs (81.6%), risk factors (86.2%) and prevention (92.1%) of CHD, but their knowledge of detection of the risk factors of the disease was poor. The respondents' practices on detection and management of the risk factors of CHD were sub-optimal. Barely a third of respondents consistently screen their clients and patients for the risk factors of CHD; and less than half of them consistently counsel, treat or refer their clients and patients appropriately.

**Conclusion:** This study showed good knowledge of the symptoms and signs, risk factors and prevention of CHD, but poor knowledge and sub-optimal practices on the detection and management of its risk factors among PHC workers in Sokoto, Nigeria. Periodic in-service training of PHC workers on detection and management of CHD risk factors is crucial to the curtailment of the emerging epidemic of CHD in the developing countries.

*Keywords: Knowledge; practices; CHD risk factors; detection; management; PHC workers.*

## 1. INTRODUCTION

Coronary heart disease (CHD) is one of the leading causes of deaths in most industrialized countries of the world and it is now also considered as a prominent health problem in the developing countries [1]. CHD was previously considered to be rare in sub-Saharan Africa, but at the turn of the 21<sup>st</sup> century, CHD now ranked eight among the leading killers in the region, just behind cerebrovascular diseases in both men and women, and in people aged  $\geq 60$  years, it is already the leading cause of deaths in men and the second leading cause of deaths in women in the African region [2]. The World Health Organization (WHO) estimated that in 2005, CHD caused approximately 361,000 deaths in the African region, and current projections suggest that this number will nearly double by 2030. More recent projections of mortality and burden of disease suggest that by 2030, CHD will become the leading cause of death in low-income countries, contributing 13.4% of total deaths, versus 13.2% from HIV/AIDS. In addition, CHD is projected to rank fifth among the 10 leading causes of disability-adjusted life years (DALYs) in low-income countries by 2030 [3]. The increasing prevalence of CHD and related morbidity in sub-Saharan Africa is believed to be due to adverse behavioral and lifestyle changes associated with urbanization.

CHD was previously reported to be relatively uncommon among Nigerians in spite of high prevalence of hypertension [4]. A study reported an evidence of increasing occlusive coronary heart disease in Nigerians especially among

elderly affluent and hypertensive patients exposed to Western diets and habits [5]. A similar trend has been reported in other developing countries where their diets and lifestyle appear similar to those of the developed countries [6]. An analysis of causes of deaths among patients admitted to medical wards in many urban centers in Nigeria more than 2 decades ago shows that from the 5<sup>th</sup> decade, cardiovascular diseases (CVD) replace infection as a major cause of death [7]. Hypertension has since become the medical illness most frequently diagnosed in elderly Nigerians [8], and cardiovascular mortality constitutes the major cause of deaths in the 35 to 69 years age group [7], which is the age group of the highest economic activity. A more recent report showed high prevalence of CHD risk factors in Nigeria [9]. In 2008, the prevalence of hypertension in Nigeria was estimated at 42.8%, diabetes mellitus was estimated at 8.5%, obesity was estimated at 6.5%, raised cholesterol was estimated at 16.1%, current daily smoking of tobacco was estimated at 4.6%, while the cardiovascular diseases (CVDs) accounted for an estimated 12% of all deaths in Nigeria [9].

Studies from most industrialized countries where decline in mortality from coronary heart disease has been recorded have shown that reduction in major risk factors (primary prevention) contributed to the decline at about the same level as specific medical treatment and interventions (secondary prevention) for coronary heart disease [10,11]. A study by Ford et al. [10], showed that, about 44% of the decline in US deaths due to CHD from 1980 through 2000 was

attributable to reductions in major risk factors, and approximately 47% to evidence-based medical treatments. It has also been shown that improving cardiac related knowledge to further healthy lifestyle is the best preventive strategy against CHD [12]. In studies by Holiman et al. [13] and Alm-Roijer et al. [14], it was reported that, knowledge of risk factors of CHD improves adherence to advice on lifestyle changes and medication.

Appropriate assessment and management of the risk factors of CHD is vital to prevent fatal and non-fatal heart attacks and strokes, and to improve health outcomes in individuals at high risk of cardiovascular events. These risk factors such as hypertension, diabetes, smoking, high blood lipids, physical inactivity, obesity and a positive family history often occur together and need to be treated comprehensively. A previous study in Sokoto (the study area) reported 13.6% and 23.1% prevalence of a combination of up to three risk factors of CHD among male and female civil servants respectively [15].

Primary Health Care (PHC) facilities account for the majority (85.5%) of the estimated 23,640 health facilities in Nigeria in 2010 [16], and they serve as filtering units for cases that require specialized services at the higher levels of care. Thus, PHC workers are the gatekeepers to healthcare services delivery in Nigeria. Screening of all patients presenting at the first level of care for the risk factors of CHD such as hypertension and diabetes mellitus has been identified as an important strategy for its prevention and control in a wide range of resource settings [17]. Prevention of CHD cannot be promoted by PHC workers if they lack knowledge of it; and control of the disease cannot be achieved unless its risk factors are detected early enough among their clients and patients (through screening) and managed appropriately. Gaps have been identified in the knowledge of PHC workers, particularly those in the rural areas (where a majority of Nigerians reside) regarding responding satisfactorily to identified health problems [18]. This study was conducted to assess the knowledge of CHD and practices on detection and management of its risk factors among PHC workers in Sokoto, Nigeria.

## **2. MATERIALS AND METHODS**

A cross-sectional descriptive study was conducted among health workers working in the

PHC facilities in the 4 Local Government Areas (Sokoto-North, Sokoto-South, Wamakko and Dange-Shuni) in Sokoto metropolis, Nigeria, between June and July 2013. Health workers who have worked in the selected PHC facilities for at least 6 months and consented to participate in the study were considered eligible for this study.

The sample size was estimated at 120 using the Fisher's formula for calculating sample size for cross-sectional descriptive studies [19], a 6.7% prevalence of knowledge of diagnostic criteria for hypertension among PHC workers from a previous study [20], a precision level of 5% and an anticipated participant's response rate of 80%. All the 152 eligible health workers who were on duty in the respective PHC facilities in the metropolis during the survey, and gave informed consent to participate in the study were enrolled.

A standardized, semi-structured, self-administered questionnaire was developed and used to obtain information on participants' socio-demographic characteristics, knowledge of CHD (symptoms, risk factors and prevention) and practices on detection and management of the risk factors of CHD. The questions on knowledge of CHD were adapted from the American Heart Association's questionnaire that was used for a national survey on knowledge of heart disease among women [21]. The questions on practices on detection and management of risk factors of CHD were adapted from the WHO CVD-risk management package for medium- and low-resource settings [17]. It was reviewed by researchers in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria to ascertain content validity. The questionnaire was pretested on 15 PHC workers in Kware Local Government Area of Sokoto state, Nigeria. Some questions were rephrased for clarity based on the observations made during the pre-testing. Five resident doctors assisted in questionnaire administration after being trained on the conduct of survey research, the objectives of the study, and administration of survey instrument.

Institutional ethical clearance was obtained from the Ethical Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. Permission to conduct the study in the PHC facilities was obtained from the Chairmen of the respective LGAs where the study was conducted. Informed written consent was also

obtained from the participants before questionnaire administration.

Data were analyzed using the IBM SPSS Version 20 statistical computer software package. Respondents' knowledge of symptoms or signs of CHD was scored and graded on a 5-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of '0' and a maximum score of '5' points. Those that scored  $\geq 3$  of 5 points were considered as having 'good' knowledge, while those that scored  $< 3$  of 5 points were graded as having 'poor' knowledge. Knowledge of risk factors of CHD (likewise prevention of CHD) was scored and graded on a 7-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of '0' and a maximum score of '7' points. Those that scored  $\geq 5$  of 7 points were considered as having 'good' knowledge, while those that scored  $< 5$  of 7 points were graded as having 'poor' knowledge. Frequency distribution tables were constructed; and cross tabulations were done to examine the relationship between categorical variables. The chi-square test was used to compare differences between proportions. All levels of significance were set at  $p < 0.05$ .

### 3. RESULTS

#### 3.1 Socio-demographic Characteristics of Respondents

The ages of the 152 respondents ranged from 20 to 59 years (mean =  $34.61 \pm 7.92$ ), and a larger proportion 67 (44.1%) were aged 30 – 39 years. Majority of the respondents 85 (55.9%) were females; most of them were married (76.3%) and practiced Islam as religion (94.1%). Majority of the respondents 103 (67.7%) were community health extension workers (CHEWs) and have been in practices for 10 years and below (66.4%) as shown in Table 1.

#### 3.2 Awareness of Coronary Heart Disease among Respondents

Almost all, 147 (96.7%) of the 152 respondents have ever heard of CHD, and most of them 116 (76.3%) had document guideline on prevention and control of the disease in their respective health facilities. Less than half of respondents 63 (41.4%) have ever attended any

seminar/workshop on prevention and control of CHD since they have been practicing (Fig. 1).

#### 3.3 Respondents' Knowledge of the Symptoms and Signs of Coronary Heart Disease

Majority, 124 (81.6%) of the 152 respondents had good knowledge of the symptoms and signs of CHD. The symptom and signs of CHD most commonly known to the respondents were sudden death and chest pain that radiates to neck, shoulder and arm. One hundred and eighteen (77.6%) knew sudden death as a sign of CHD, while 110 (72.4%) knew chest pain that radiates to neck, shoulder and arm as a symptom of CHD. Most of the respondents also knew the other symptoms and signs of CHD as shown in Table 2.

**Table 1. Socio-demographic characteristics of respondents**

Variables	Frequency (%) n = 152
<b>Age group (in years)</b>	
20-29	45 (29.6)
30-39	67 (44.1)
40-49	34 (22.4)
50-59	6 (3.9)
<b>Sex</b>	
Male	67 (44.1)
Female	85 (55.9)
<b>Marital status</b>	
Single	35 (23.0)
Married	116 (76.3)
Widowed	1 (0.7)
<b>Religion</b>	
Islam	143 (94.1)
Christianity	9 (5.9)
<b>Cadre</b>	
Doctor	2 (1.3)
Community Health Officer	12 (7.9)
Nurse/midwife	35 (23.0)
SCHEW	44 (28.9)
JCHEW	59 (38.8)
<b>Length of practice (in years)</b>	
1-10	101 (66.4)
11-20	37 (24.3)
21 and above	14 (9.3)

#### 3.4 Respondents' Knowledge of the Risk Factors of Coronary Heart Disease

Most, 131 (86.2%) of the 152 respondents had good knowledge of the risk factors of CHD. The

risk factors of CHD most commonly known to the respondents were hypertension and cigarette smoking. One hundred and forty two (93.4%) knew hypertension as a risk factor of CHD, whereas 136 (89.5%) knew cigarette smoking as a risk factor of CHD. Most of the respondents also knew the other risk factors of CHD as shown in Table 3.

### 3.5 Respondents' Knowledge of Prevention of Coronary Heart Disease

Most, 140 (92.1%) of the 152 respondents had good knowledge of prevention of CHD. The preventive measures for CHD most commonly known to the respondents were ensuring appropriate treatment of hypertension and avoiding or quitting cigarette smoking. One hundred and forty two (93.4%) knew ensuring appropriate treatment of hypertension, whereas 136 (89.5%) knew avoiding or quitting cigarette smoking as preventive measures for CHD. Most of the respondents also knew the other preventive measures for CHD as shown in Table 4.

### 3.6 Distribution of Respondents' Knowledge of Coronary Heart Disease by Cadre

There were variations in the proportion of respondents with good knowledge of the symptoms and signs, risk factors and prevention of coronary heart diseases across the cadres.

Although, all the doctors (100%), 94.3% of nurses/midwives, 91.7% of CHOs, 79.5% of SCHEWs and 72.0% of JCHEWs had good knowledge of the symptoms and signs of CHD, the differences were statistically insignificant ( $\chi^2 = 8.116$ ,  $p = 0.087$ ). Similarly, even though, all the doctors (100%), 91.4% of nurses/midwives, 86.4% of SCHEWs, 83.3% of CHOs and 83.1% of JCHEWs had good knowledge of the risk factors of CHD, the differences were statistically insignificant ( $\chi^2 = 1.699$ ,  $p = 0.791$ ). Also, all the doctors (100%), 97.1% of nurses/midwives, 93.2% of SCHEWs, 91.7% of CHOs, and 88.1% of JCHEWs had good knowledge of the preventive measures for CHD, but the differences were statistically insignificant ( $\chi^2 = 2.745$ ,  $p = 0.601$ ) as shown in Table 5.

### 3.7 Respondents' Knowledge on Detection of the Risk Factors of Coronary Heart Disease

Knowledge of detection of the risk factors of coronary heart disease was poor among the respondents. A little above half, 83 (54.6%) of the 152 respondents knew the cut – off point for diagnosing hypertension, about a third 50 (32.9%) knew the cut – off point for diagnosing diabetes mellitus, whereas 60 (39.5%) knew the body mass index (BMI) cut – off point for diagnosing obesity (Fig. 2). There was no statistically significant difference ( $p > 0.05$ ) in the proportion of respondents that knew the cut-off points for diagnosing the risk factors of CHD among the different cadres.

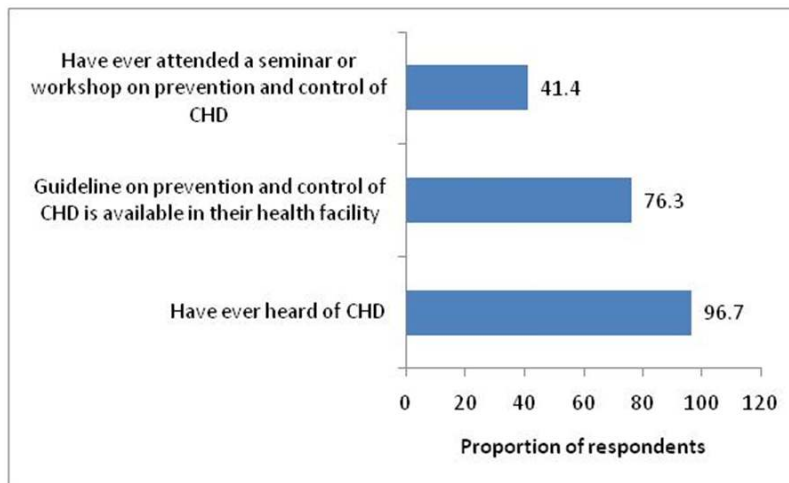


Fig. 1. Awareness of coronary heart disease among respondents

**Table 2. Respondents' knowledge of the symptoms and signs of CHD**

Symptom and sign of CHD	Correct response frequency (%) n = 152
Chest pain after doing some work but goes after rest	109 (71.7)
Chest pain that radiates to the neck, shoulder and arm	110 (72.4)
Chest tightness or shortness of breath after doing some work	105 (69.1)
Feeling tired quickly after a little work, or even without doing any work	106 (69.7)
Sudden death	118 (77.6)
<b>Knowledge grade</b>	<b>Frequency (%)</b>
Good	124 (81.6)
Poor	28 (18.4)

**Table 3. Respondents' knowledge of the risk factors of CHD**

Risk factors of CHD	Correct response frequency (%) n = 152
As age increases	105 (69.1)
Lack of regular physical activity	100 (65.8)
Overweight/obesity	119 (78.3)
Cigarette smoking	136 (89.5)
Hypertension	142 (93.4)
Diabetes mellitus	101 (66.4)
Eating foods containing too much fat	121 (79.6)
<b>Knowledge grade</b>	<b>Frequency (%)</b>
Good	131 (86.2)
Poor	21 (13.8)

**Table 4. Respondents' knowledge of prevention of CHD**

Preventive measures for CHD	Correct response frequency (%) n = 152
Engage in regular moderate exercise	100 (65.8)
Maintain normal weight	115 (75.7)
Avoid or quit cigarette smoking	136 (89.5)
Ensure appropriate treatment of hypertension	142 (93.4)
Ensure appropriate treatment of diabetes mellitus	101 (66.4)
Reduce consumption of fatty foods	111 (73.0)
Eat fruits and vegetables regularly	114 (75.0)
<b>Knowledge grade</b>	<b>Frequency (%)</b>
Good	140 (92.1)
Poor	12 (7.9)

**Table 5. Distribution of respondents' knowledge of coronary heart disease by cadre**

Cadre	Knowledge of the symptoms or signs n = 152		Knowledge of the risk factors n = 152		Knowledge of prevention n = 152	
	Good No (%)	Poor No (%)	Good No (%)	Poor No (%)	Good No (%)	Poor No (%)
Doctor (n = 2)	2 (100)	0 (0)	2 (100)	0 (0)	2 (100)	0 (0)
CHO (n = 12)	11 (91.7)	1 (8.3)	10 (83.3)	2 (16.7)	11 (91.7)	1 (8.3)
Nurse/midwife (n = 38)	33 (94.3)	2 (5.7)	32 (94.1)	3 (8.6)	34 (97.1)	1 (2.9)
SCHEW (n = 44)	35 (79.5)	9 (20.5)	38 (86.4)	6 (13.6)	41 (93.2)	3 (6.8)
JCHEW (n = 59)	43 (72.9)	16 (27.1)	49 (83.1)	10 (16.9)	52 (37.1)	7 (11.9)
	$\chi^2 = 8.116, p = 0.087$		$\chi^2 = 1.699, p = 0.791$		$\chi^2 = 2.745, p < 0.601$	

### 3.8 Respondents' Practices on Detection and Management of the Risk Factors of Coronary Heart Disease

Only 50 (38.8%) of the 152 respondents consistently obtain history of angina, stroke and heart attacks from their clients and patients, whereas 51 (33.6%) consistently obtain history of tobacco use from them. Less than half, 74 (48.7%) of the respondents consistently screen all their clients and patients for hypertension; and barely a third of the respondents consistently perform urine test for sugar 52 (34.2%) to screen for diabetes mellitus, and estimate weight and height 55 (35.5%) to screen for overweight and obesity.

Less than half, 63 (41.4%) of the respondents consistently counsel their clients and patients on the drug treatment for the diagnosed risk factors of CHD, and only 58 (38.2%) consistently start

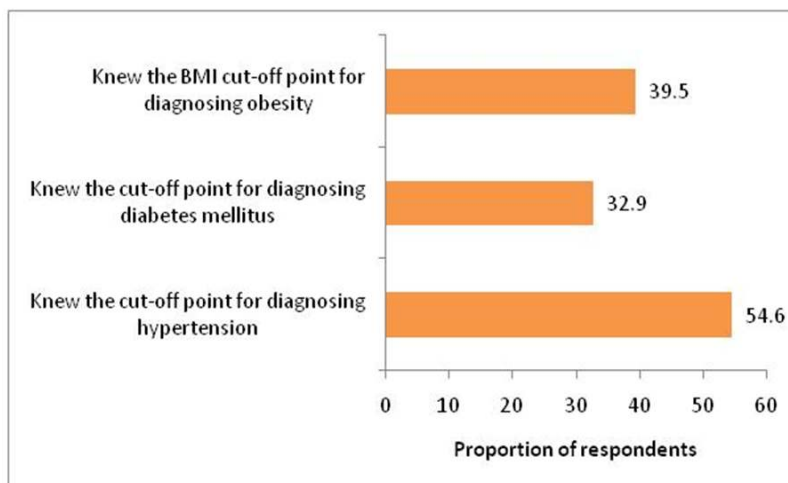
their clients and patients on the first line drugs for the diagnosed risk factors of CHD. Also, less than half, 75 (49.3%) of the respondents consistently refer their patients diagnosed with the risk factors of CHD to physicians for treatment (Table 6).

### 4. DISCUSSION

The preponderance of females (55.9%) among the respondents in this study could be due to the fact that apart from doctors, other cadres of PHC workers are often considered as nurses, and the nursing profession is generally perceived as a female profession. Likewise, the preponderance of CHEWs (67.7%) among the respondents in this study could be due to the fact that they essentially constitute the bulk of the work force in the PHC facilities across Nigeria. These findings are in agreement with the findings from studies conducted among PHC workers in other parts of

**Table 6. Respondents' practices on detection and management of the risk factors of CHD**

Practices	How often			
	Always No (%)	Very often No (%)	Occasionally No (%)	Never No (%)
Take history of angina, stroke and heart attack	50 (38.8)	33 (21.7)	40 (26.2)	20 (13.2)
Take history of tobacco use	51 (33.6)	27 (17.8)	61 (40.1)	13 (8.6)
Measure blood pressure	74 (48.7)	35 (23.0)	36 (23.7)	7 (4.6)
Measure weight and height	54 (35.5)	33 (21.7)	48 (31.6)	17 (11.2)
Test urine for glucose	52 (34.2)	46 (30.3)	42 (27.6)	12 (7.9)
Counsel patients on the diagnosed risk factors of CHD	63 (41.4)	29 (19.1)	52 (34.2)	8 (5.3)
Start patients on first-line drugs	58 (38.2)	32 (21.1)	40 (26.3)	22 (14.5)
Refer patients to physicians for further treatment	75 (49.3)	39 (25.7)	30 (19.7)	8 (5.3)



**Fig. 2. Respondents' knowledge on detection of the risk factors of coronary heart disease**

the country. A study among PHC workers in Zaria and Kaduna North LGAs of Kaduna State, North-Western Nigeria, reported a preponderance of females (71.4%) and a larger proportion (48.1%) of the study subjects were CHEWs [22]. Another study among PHC workers in Enugu, South-East Nigeria also reported a preponderance of females (87.3%) and majority of the study subjects (65.3%) were CHEWs [23].

Although awareness of CHD was high (96.7%), and most of them (76.3%) had document guideline on prevention and control of CHD, less than half of the respondents (41.4%) have ever attended any seminar or workshop on prevention and control of CHD since they have been practicing. Several studies across sub-Saharan Africa including Nigeria [24], Tanzania [25], and Kenya [26] have reported poor on the job training of PHC workers, with adverse effects on their morale, quality of care rendered to patients, patients' confidence in the health care system, utilization of health care services by the populace, and retention of health workers in service.

This study showed good knowledge of the symptoms and signs of CHD by most of the respondents (81.6%). Similarly, a high proportion of the respondents (86.2%) had good knowledge of the risk factors of CHD. The findings in this study differ from the findings in studies conducted among teachers in Calabar, Nigeria [27], and among members of a university community in Ile-Ife, Nigeria [28], that reported poor knowledge of CHD risk factors. In contrast to the good knowledge of CHD prevention shown by majority (92.1%) of the respondents in this study, another study among middle and older people by Wei-Chien et al.[29] reported that three-quarters of the participants were not sure if CHD is preventable or not. The good knowledge of CHD among the respondents in this study could be related to the high level of awareness of the disease among them and its increasing burden in the country.

Even though knowledge of detection of the risk factors of CHD appears to be poor among the respondents with barely half (54.6%) knowing the cut-off point for diagnosing systolic hypertension, and about a third knowing the cut-off point for diagnosing diabetes mellitus (32.9%) and obesity (39.5%); it is far better than the poor knowledge of diagnostic criteria for hypertension (6.7%), obtained in a study among primary health care workers in Damma, Saudi Arabia [30].

Less than half of the respondents in this study consistently screen their clients and patients for the risk factors of CHD. Similarly, only a few of the respondents consistently comply with the standard CHD risk factors management protocol. The sub-optimal practice of the primary healthcare workers in detecting and managing the risk factors of CHD is of serious concern as it constitutes a major challenge to the prevention and control of the disease. These findings underscore the need for periodic in-service training of PHC workers on detection and management of CHD risk factors to enable them contribute substantially to the curtailment of the emerging epidemic of CHD in the developing countries.

## 5. CONCLUSION

This study showed good knowledge of the symptoms and signs, risk factors and prevention of CHD, but poor knowledge and sub-optimal practices on the detection and management of its risk factors among PHC workers in Sokoto, Nigeria. Periodic in-service training of PHC workers on detection and management of CHD risk factors is crucial to the curtailment of the emerging epidemic of CHD in the developing countries.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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