Knowledge of cardiovascular disease risk factors, practice, and barriers of community pharmacists on cardiovascular disease prevention in North West Ethiopia

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1. Introduction

Cardiovascular diseases (CVD) are a group of disorders that involve the heart or blood vessels or both. They include coronary heart disease (CHD), cerebrovascular, rheumatic heart disease, congenital heart disease and deep vein thrombosis, and pulmonary embolism [1,2]. Diabetes mellitus, hypertension, cigarette smoking, dyslipidemia, obesity, and physical inactivity are established risk factors for cardiovascular diseases (CVD) [3–5].

Cardiovascular diseases are considered as the most common cause of mortality around the world. More than 80% of total deaths caused by CVD occur in middle and low-income countries. This is expected to increase significantly, especially in third-world countries including Ethiopia [1]. Cardiovascular disease (CVD) is the leading cause of death both in developed and developing countries. In 2008, 30% (17.5million) of the global human mortalities were due to CVDs. Of these, 6.2 and 7.3 million people were due to stroke and CHD, respectively. It is expected to increase to 23.3 million by 2013 [2].

Cardiovascular diseases risk factors are preventable and community pharmacists can make a considerable impact in preventing, controlling,
and management of CVD and its risk factors [6]. Pharmacists traditionally considered as “medication dispensers” are highly accessible health care providers who can play a vital and critical role in the success of modifying CVD risk factors. Pharmacist’s intervention can be conducted through education of patients, screening for risk factors, and monitoring and referral to physicians or management of medication. Different studies support these collaborative and patient-centered roles of pharmacists [7]. Collaborative practice agreements are important to integrate pharmacists into health care teams to maximize their impacts such agreements expand the role of pharmacists in initiating, modifying, discontinuing, and monitoring drug therapy, ordering or administrating laboratory tests, and performing limited physical examinations such as checking vital signs and assessing edema [8]. In addition, clinical pharmacy services can provide valuable impact in identifying drug-related problems and providing suggestions on how they might be avoided [9].

Community pharmacists are highly accessible healthcare professionals in most communities and have demonstrated an effective role in the management of CVD and the risk factors. With the rising prevalence of CVD risk factors, community pharmacists have a significant role. However, there is no adequate research work conducted on the knowledge of cardiovascular disease risk factors, practice, and barriers of community pharmacists in the study area. Therefore, this study was conducted based on the following major significances. This study will clearly show the knowledge gap among community pharmacists on CVD and its risk factors that will help health care service providers’ competence in CVD prevention, control, and management service by understanding the knowledge gap of community pharmacists. Moreover, the result of this study can be used by the Ministry of Health and other stakeholders to develop new policies. It also helps as an entry point for other researchers who want to conduct further studies on cardiovascular disease, the risk factors, and practice. Thus, the main goal of this study is to assess knowledge of cardiovascular disease risk factors, practice, and barriers of community pharmacists on cardiovascular disease prevention in North West Ethiopia.

2. Methods

2.1. Study design, area, and period

The study was conducted using a cross-sectional study design from the first March to May 30, 2020 at Gondar Town. The Town is located in North Gondar administrative zone, Amhara regional state, and 750 km to the North West of Addis Ababa. In Gondar city, there are 78 community pharmacies, and 128 community pharmacists were discovered working there. These pharmacies serve roughly 500000 people in the city.

2.2. Population

2.2.1. Source population

The source populations were all pharmacists working in Gondar town community pharmacies.

2.2.2. Study population

All pharmacists working in Gondar town community pharmacies during the study period and who volunteered to take part in the study were used for the study.

2.2.3. Inclusion criteria

➢ The study participants whose working experience was greater than one year.
➢ Individuals volunteered to take part in the study.

2.2.4. Exclusion criteria

➢ Individuals did not volunteer to take part in the study.

2.3. Sample size & sampling technique (procedure)

In this study, all of the pharmacists found during the data collection period were included in the study.

2.4. Study variables

2.4.1. Independent variables

➢ Socio-demographic characteristics
  ✓ Age
  ✓ Sex
  ✓ marital status
  ✓ years of working experience
  ✓ education status

2.4.2. Dependent variable

➢ Knowledge and practice of community pharmacists on cardiovascular disease and its risk factors

2.5. Data collection instrument & technique

A self-administered questionnaire was used to collect the information. Data collection was monitored and supervised by the principal investigator. Information about participant’s age, sex, and working years of practice. The second part of the data abstraction format consisted of Knowledge of CVD risk factors using Heart Disease Fact Questionnaire (HDFQ). The third and fourth parts of the data abstraction format consisted of participants’ practice and barriers to the prevention of CVDs.

2.6. Data quality assurance

In order to control the quality of data, a pretest was done on the data abstraction format before the main data collection in randomly selected pharmacists. The pretested papers were not included in the study and appropriate adjustment was done to the data abstraction format. In addition to this, the principal investigator supervised the data collectors during data collection. The collected data were checked for completeness and consistency on daily basis.

2.7. Data analysis and interpretation

The collected data were entered into Epi Info version 7 and exported to the statistical package for the social sciences (SPSS) version 20 for statistical analysis. The results were presented by using tables and figures. Frequency distribution was calculated. A chi-square test was applied to test the relationship between knowledge of community pharmacists on CVD and independent variables. P-value ≤ 0.05 was considered as statistical significance.

3. Result

3.1. Socio-demographic characteristics

Data from the current study shows that male participants were slightly dominant over females (1.25:1 ratio). The age distribution demonstrates that 59.3% of the participants were below 30 years of age. Data also demonstrate that 51.9% of the study participants had a BSc degree in Pharmacy and 50.6% of them were married. The majority of the study participants (97.5%) were working in urban but only 2 of them
were working in rural areas. The work experience of the study subjects showed that the majority (49.4%) had less than 5 years of practice (Table 1).

3.2. Patient cases and risk factors observed among the community pharmacies

This study also assessed the different types of patient cases and risk factors for cardiovascular disease observed among the community pharmacies. Accordingly, the average number of hypertensive and diabetes cases seen per month was 27 for each of them (Table 2).

3.3. Assessment of knowledge of the pharmacists on the risk factors for cardiovascular disease

Knowledge assessment was made among the study participants on the diagnostic cut-off value of HTN, FBS, Obesity, and TC. Accordingly, the majority (50.6%) of the study participants responded to the cut-off value for HTN as 140/90 mmHg, and 56.8% of them responded to the diagnostic cut-off value for FBS as 126 mg/dl. Fifty-eight percent of the subjects responded positively to questions such as controlled BP reduces disease, respectively. In addition, 72.8%, 96.3%, 80.2% of the study showed that 18.5%, 77.8%, 93.8% of them respond yes to the knowledge-related responses of the study subjects on CVD risk factors showed that 18.5%, 77.8%, 93.8% of them respond yes to the questions about whether a person knows when they have heart disease, the risk of family history of heart disease to develop once heart disease, old age as a risk for heart disease, and smoking as a risk factor for heart disease, respectively. In addition, 72.8%, 96.3%, 80.2% of the study subjects responded positively to questions such as controlled BP reduces the risk for CVD, high BP is a risk for heart disease, and high cholesterol is a risk for developing heart disease, respectively. On the other hand, 77.8% of the study subjects respond falsely that eating fatty foods does not affect blood cholesterol. On the other side, the majority of the study subjects (95.1%) responded yes to questions such as being overweight increases the risk of heart disease, regular exercise lowers the chance of having heart disease (86.4%), Diabetes is the risk factor for developing heart disease (86.4%). In this study, only 21% of the study participants had known the existence of HTN guidelines in Ethiopia (Table 3).

Table 2
The different types of patient cases and risk factors observed among the community pharmacies.

| Risk factors | Frequency | Percentage |
|--------------|-----------|------------|
| Number of hypertensives seen per month | | |
| <10 | 27 | 33.3 |
| 10-20 | 33 | 40.7 |
| ≥20 | 21 | 25.9 |
| Number of diabetes seen per month | | |
| <10 | 29 | 35.8 |
| 10-20 | 31 | 38.3 |
| >20 | 21 | 25.9 |
| Number of smokers seen per month | | |
| <10 | 46 | 56.8 |
| 10-20 | 15 | 18.5 |
| >20 | 20 | 24.7 |

Among the study participant, only 17 replied that they have known the existence of different guidelines in Ethiopia. The existence of standard treatment guidelines was confirmed by 6 study participants. On the other hand, only two study participants demonstrated the existence of non-communicable disease treatment guidelines whereas only one study subject confirmed the existence of a hypertension treatment guideline and the other participant confirmed the existence of a clinical guideline.

3.4. Assessment of the practice of the pharmacists on the risk factors for cardiovascular disease

In this study, 56.8% of the study participants reported the unavailability of functional BP Sphygmomanometers in their pharmacy and 58% of them did not routinely measure the BP of hypertensive clients. Data also showed that 39.5% and 24.7% of them had functional Glucometer to measure blood glucose levels and routinely measure BMI/waist circumference. The study subjects also demonstrated that they only sometimes inform hypertensive or diabetic patients to check their cholesterol level (49.4%) and advise hypertensive and diabetics on lifestyle management (64.2%) (Table 4).

3.5. Barriers to promoting cardiovascular health in community pharmacy

Assessment of barriers to the promotion of CVD in the community was designed on Pharmacist related factors, practice site, financial factors, legal and regulatory factors, patient-related factors, and other factors. Accordingly, only 18.5% of the pharmacists had a lack of time, 65.4% replied that they do have the inability to identify targeted patients, 23% had a lack of knowledge and 26% had a lack of communication. On the other hand, the major practice-related factor identified (86.4%) was lack of tools and 74% responded lack of reimbursement to implement changes as a financial factor. Data on legal and regulatory factors showed that 28.4% lack official recognition for health promotion activities. Patient-related factors showed that 64.2% complained of a lack of patient awareness about pharmacists’ expertise in counseling, 66.7% lacked patient acceptance of pharmaceutical care but only 17.3% demonstrated a lack of patient trust in the ability of the pharmacists (Table 5).

3.6. Association of knowledge fact questions on cardiovascular disease among the study subjects

In this study, a participant was graded knowledgeable when he/she scored ≥70% of the organized questions forwarded for this study. Accordingly, the overall assessment of the pharmacists demonstrated that 45 out of the 81 participants (55.6%) were found knowledgeable. Among the knowledgeable study participants, 28(62.2%) were under the age of 30, 12(26.7%) were between the age of 31–45, two of them (4.4%) were between the age of 46–59 and 3 of them (6.7%) were above 60 years of age. However, $X^2$ statistical analysis showed that there was
no statistically significant association between the age of the study participants with that of knowledge fact questions on cardiovascular disease (P = 0.82). Among the 45 knowledgeable study participants, 19 (47.2%) were females but the other 26(57.8%) were male. Data showed that gender has no statistically significant association with knowledge fact questions on cardiovascular disease (P = 0.661). On the other hand, out of the 45 knowledgeable study participants, 19(42.2%) were single, 24(53.3%) married and 2(4.4%) divorced. Data showed no statistical association between marital statuses with knowledge fact questions on cardiovascular disease (P > 0.50). Among the knowledgeable participants, data on the number of years of practice showed that 22 (48.9%) had less than 5 years of practice,11(24.4%) had 6–10 years of practice and 12(26.7%) had greater than 10 years of practice. However, X² analysis demonstrated that there was no statistically significant association between the number of years of practice with knowledge fact questions on cardiovascular disease (P = 0.796) (Table 6).

4. Discussion

Pharmacists have roles in the prevention and management of CVD that extend beyond the traditional dispensing of medicines. These roles range from the provision of educational materials, through screening and monitoring of conditions such as blood pressure, to interventions in areas such as smoking cessation, lifestyle modification, medicines management, and medicines adherence [10]. Studies in international literature have shown that Community Pharmacists can make a considerable impact in controlling cardiovascular disease risk factors. There is ample evidence in the international literature for pharmacist involvement in the prevention and management of cardiovascular disease (CVD) conditions in primary care. Systematic reviews and meta-analyses have confirmed the significant clinical benefits of pharmacist interventions in a range of CVD conditions and risk factors [11].

Knowledge assessment of the current study showed that 50.6% of the community pharmacists working in Gondar city responded that the cut-off value for HTN was 140/90 mmHg. This contrasts with the findings from a similar study done amongst staff members of a tertiary institution in South West Nigeria where only 19.9% of the community pharmacists had good knowledge of CVD risk factors [12]. High blood pressure, also known as hypertension, occurs when the force of blood against the artery walls is too high. High blood pressure is often called the “silent killer” because many people don’t know they have it. Over time, high blood pressure can lead to a heart attack, stroke, and other serious conditions. Recent guidelines categorize blood pressure as normal <120 mmHg/<80 mmHg, elevated blood pressure 120–129 mmHg/<80 mmHg, Stage 1 high blood pressure 130–139 mmHg, stage 2 high blood pressure 140 mmHg/<90 mmHg. It’s important to note that the new guidelines replace the term “pre-hypertension” with “elevated” blood pressure [13].

On the other hand, 56.8% of the community pharmacists confirmed the diagnostic cut-off value for FBS as 126 mg/dl. Moreover, 58% of the males and 51.9% of the females demonstrated the diagnostic cut-off value for obesity as >102 cm and >88 cm, respectively. Moreover, 50.6% of the Pharmacists responded that the diagnostic cut-off value for TC was 200 mg/dl. According to the American Diabetes Association, fasting plasma glucose is normal when less than 100 mg/dl, pre-diabetes when 100 mg/dl to 125 mg/dl and diabetes when greater than 126 mg/dl. In Nigeria, knowledge of the community pharmacists on diabetes and obesity was reported lower. This was reflected in the lower number of participants who correctly identified the diagnostic cut-offs for diabetes and abdominal. Some of the reasons for this might be due to the invasive nature of screening for diabetes with a glucometer could be a demotivation for them and their clients. For obesity, the technicalities for measuring parameters for obesity (waist circumference and body mass index) accurately may be exerting on the pharmacists in addition to time and space constraints. These may discourage them from screening for obesity. A similar study in Australia found the availability of space a determinant of screening for obesity [14].

Knowledge-related responses of the study subjects on CVD risk factors showed that 18.5%, 77.8%, 93.8% of them respond yes to the questions about whether a person knew when they have heart disease, the risk of a family history of heart disease to develop once heart disease, old age as a risk for heart disease, and smoking as a risk factor for heart disease.
disease, respectively. There are two types of risk factors for CVD: non-modifiable and modifiable. The non-modifiable risk factors include genetic factors, ethnicity, gender, and age. The modifiable risk factors include body weight, blood pressure, lipid and lipoprotein levels, and smoking status. Health-promoting behaviors aimed at modifiable risk factors can prevent or reduce CVD. Through exercise, proper diet, medications, and smoking cessation an individual can decrease their risk of developing CVD [15,16]. There is strong epidemiologic evidence for

| Table 3 Knowledge-related response of the study subjects on cardiovascular disease and its risk factors. |
|---------------------------------------------------------------|
| Variables | Frequency | % | Variables | Frequency | % |
| A person always knows when they have heart disease? | True | 15 | 18.5 | High blood pressure is a risk for heart disease? | True | 78 | 96.3 |
| | False | 57 | 70.4 | | False | 2 | 2.5 |
| | I don’t know | 9 | 11.1 | | I don’t know | 1 | 1.2 |
| If someone has a family history of heart disease he/she is at risk of developing heart disease? | True | 36 | 44.4 | High cholesterol is a risk of developing heart disease? | True | 65 | 80.2 |
| | False | 30 | 37.0 | | False | 6 | 7.4 |
| | I don’t know | 15 | 18.5 | | I don’t know | 10 | 12.3 |
| The older the person is the greater their risk of having heart disease? | True | 63 | 77.8 | Eating fatty foods does not affect blood cholesterol? | True | 11 | 13.6 |
| | False | 10 | 12.3 | | False | 63 | 77.8 |
| | I don’t know | 8 | 9.9 | | I don’t know | 7 | 8.6 |
| Smoking is a risk factor for Heart disease? | True | 76 | 93.8 | If someone’s good cholesterol (HDL) is high he/she is at risk factor for heart disease? | True | 14 | 17.3 |
| | False | 2 | 2.5 | | False | 48 | 59.3 |
| | I don’t know | 3 | 3.7 | | I don’t know | 19 | 23.5 |
| A person who stops smoking will lower their risk of heart disease? | True | 68 | 84 | If someone’s bad cholesterol (LDL) is high he/she is at risk for heart disease? | True | 65 | 80.2 |
| | False | 6 | 7.4 | | False | 3 | 3.7 |
| | I don’t know | 7 | 8.8 | | I don’t know | 13 | 16.0 |
| Keeping blood pressure under control will reduce a person’s risk for developing heart disease? | True | 59 | 72.8 | being overweight increases a person’s risk for heart disease? | True | 77 | 95.1 |
| | False | 19 | 23.5 | | False | 2 | 2.5 |
| | I don’t know | 3 | 3.7 | | I don’t know | 2 | 2.5 |
| Variables | Frequency | % | Variables | Frequency | % |
| If someone’s bad cholesterol (LDL) is high he/she is at risk for heart disease? | True | 65 | 80.2 | High blood sugar can cause cholesterol level high and increase his/her risk of heart disease? | True | 60 | 74.1 |
| | False | 3 | 3.7 | | False | 16 | 19.8 |
| | I don’t know | 13 | 16.0 | | I don’t know | 5 | 6.2 |
| being overweight increases a person’s risk for heart disease? | True | 77 | 95.1 | Diabetes can reduce the risk of developing Heart disease if? | True | 45 | 55.6 |
| | False | 2 | 2.5 | | False | 28 | 34.6 |
| | I don’t know | 2 | 2.5 | | I don’t know | 8 | 9.9 |
| Regular physical activity lower chance of heart disease? | True | 70 | 86.4 | Persons with diabetes rarely have high Cholesterol? | True | 52 | 64.2 |
| | False | 7 | 8.6 | | False | 18 | 22.2 |
| | I don’t know | 4 | 4.9 | | I don’t know | 11 | 13.6 |
| Only exercising at gym or in an exercise class will lower a person’s chance of developing heart disease? | True | 20 | 24.7 | keeping cholesterol under control will help lower chance of having heart disease? | True | 47 | 58.0 |
| | False | 54 | 66.7 | | False | 21 | 25.9 |
| | I don’t know | 6 | 7.4 | | I don’t know | 13 | 16.1 |
| Walking at gardening is considered an exercise that will help lower a person’s chance of developing heart disease? | True | 64 | 79 | Diabetes will tend to have low HDL (good) cholesterol? | True | 35 | 43.2 |
| | False | 15 | 18.5 | | False | 32 | 39.5 |
| | I don’t know | 2 | 2.5 | | I don’t know | 14 | 17.3 |
| Diabetes is a risk factor for developing heart disease? | True | 70 | 86.4 | Diabetes can reduce developing heart disease if blood pressure is under control? | True | 49 | 60.5 |
| | False | 6 | 7.4 | | False | 24 | 29.6 |
| | I don’t know | 5 | 6.2 | | I don’t know | 8 | 9.9 |
| Variables | Frequency | % | Variables | Frequency | % |
| High blood sugar puts a strain on heart? | True | 62 | 76.5 | Men with diabetes have higher risk of heart disease than women with diabetes? | True | 43 | 53.1 |
| | False | 9 | 11.1 | | False | 21 | 25.9 |
| | I don’t know | 10 | 12.3 | | I don’t know | 17 | 21.0 |
| A person who has diabetes can reduce his/her risk of developing heart disease if he/she keeps his/her weight under control? | True | 52 | 64.2 | Do you know the existence of HTN guidelines for Ethiopia? | True | 64 | 79 |
| | False | 19 | 23.5 | | False | 17 | 21 |
| | I don’t know | 10 | 12.3 | | I don’t know | 21 | 26 |
the familial aggregation of CVD. Researchers from the Framingham Study reported that having CVD in at least one parent doubled the 8-year risk of CVD among men and increased the risk among women by 70% [17]. Cigarette smoking directly increases free radical production, cardiac mitochondrial damage, and nicotine-induced free fatty acid release which are well-described pathways of CVD disease [18].

In this study, 77.8% of the study subjects respond falsely to the question that eating fatty foods does not affect blood cholesterol. However, there are reports documented that populations in which the average serum cholesterol level is less than 180 mg/dl are virtually free of both atherosclerosis and heart disease. In contrast, those groups of people in which the average serum cholesterol level is above 220 mg/dl have high rates of heart attacks. Further evidence for linking high blood cholesterol levels with the incidence of heart disease comes from many studies of people within a particular population group [19].

On the other side, the majority of the study subjects (95.1%) responded yes to questions such as being overweight increases the risk of heart disease, and regular exercise lowers the chance of having heart disease (86.4%). Cardiovascular disease (CVD) mortality and morbidity are elevated in individuals who are overweight, particularly with central deposition of adipose tissues [20], and abdominal obesity is a risk factor for CVD worldwide [21]. Obesity may be associated with hypertension, dyslipidemia, diabetes, or insulin resistance, and elevated levels of fibrinogen and C-reactive protein, all of which increase the risk of CVD events [22]. Inactivity or a sedentary lifestyle is associated with increased cardiovascular events and premature death [23]. Regular physical activity helps reduce several cardiovascular risk factors including obesity, dyslipidemia, hypertension, metabolic syndrome, and diabetes mellitus [24].

In this study, only 21% of the study participants had known the existence of HTN guidelines in Ethiopia. The national comprehensive guidelines for prevention, screening, diagnosis, treatment, and care for non-communicable diseases (NCDs) are one among many efforts to lead

| Table 4 | The response of the study subjects on practice related questions on cardiovascular disease and its risk factors. |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Variables                        | Frequency | %    | Variables                        | Frequency | %    | Variables                        | Frequency | %    |
| Availability of functional BP sphygmomanometers? | Yes 35 | 43.2 | No 46 | 56.8 | Routinely measure the BP of hypertensive client? | Yes 34 | 42.0 | No 47 | 58.0 |
| Presence of glucometer to measure blood glucose? | Yes 32 | 39.5 | No 49 | 60.5 | Routinely measure BMI/waist circumference? | Yes 20 | 24.7 | No 61 | 75.3 |
| Frequency of informing hypertensive or diabetics to check their Cholesterol level? | Very often 8 | 9.9 | Sometimes 40 | 49.4 | Rarely 11 | 13.6 | Never 22 | 27.2 |
| Frequency of advising hypertensive or diabetics on lifestyle Management? | Very often 21 | 25.9 | Sometimes 52 | 64.2 | Rarely 4 | 4.9 | Never 4 | 4.9 |

| Table 5 | Pharmacist, practice site, financial, legal and regulatory, patient-related, and other factors that are potential barriers to promote cardiovascular health among the community pharmacies. |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Pharmacist related factors | Frequency | %    | Practice site factors | Frequency | %    | Financial Factors | Frequency | %    |
| Lack of time | Yes 15 | 18.5 | No 66 | 81.5 | Lack of privacy | Yes 7 | 8.6 | No 74 | 91.4 |
| Inability to identifying targeted patients | Yes 53 | 65.4 | No 28 | 34.6 | Lack of space | Yes 6 | 7.4 | No 75 | 92.6 |
| Lack of knowledge | Yes 23 | 28.4 | No 58 | 71.6 | Lack of personnel | Yes 6 | 7.4 | No 75 | 9.6 |
| Misconception about CV | Yes 9 | 11.1 | No 72 | 88.9 | Lack of tools | Yes 70 | 86.4 | No 11 | 13.6 |
| Lack of support | Yes 18 | 22.2 | No 63 | 77.8 | Lack of reimbursement to implement changes | No 60 | 74.1 | No 21 | 25.9 |
| Lack of motivation | Yes 16 | 19.8 | No 65 | 80.2 | Pharmacists’ workload | Yes 8 | 9.9 | No 73 | 90.1 |
| lack of communication | Yes 26 | 32.1 | No 55 | 67.9 | | | | |

| Table 6 | The association of knowledge fact questions on cardiovascular disease among the study subjects. |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Variable                        | Number of participants | %    | p-value |
| Age                             |                           |       |       |
| <30                             | 28                        | 62.2  | 0.82  |
| 31-45                           | 12                        | 26.7  | 0.82  |
| >50                             | 2                         | 4.4   | 0.82  |
| Gender                          |                           |       |       |
| Female                          | 19                        | 47.2  | 0.661 |
| Male                            | 26                        | 52.8  | 0.661 |
| Marital status                  |                           |       |       |
| Single                          | 19                        | 42.2  | >0.50 |
| Married                         | 24                        | 53.3  | >0.50 |
| Divorced                        | 2                         | 4.4   | >0.50 |
| Years of practice               |                           |       |       |
| <5                              | 22                        | 48.9  | 0.796 |
| 5-10                            | 11                        | 24.4  | 0.796 |
| >10                             | 12                        | 27.7  | 0.796 |
to the implementation of interventions to reduce the increasing burden of non-communicable diseases (NCDs) in Ethiopia. The national NCDs framework was developed in 2010 for selected NCDs: diabetes, cardiovascular diseases, respiratory diseases, chronic kidney diseases, HTN, and cancer, prioritized based on the WHO 2011 and global morbidity report [25,26].

The overall assessment of the pharmacists demonstrated that 45 out of the 81 participants (55.6%) were found knowledgeable. In this study, X² statistical analysis showed no statistically significant association between the ages, gender, marital statuses, or several years of practice with the knowledge fact questions on cardiovascular disease among the pharmacists. Previous reports documented that the knowledge of the risk factors for cardiovascular disease was found independent of age, gender, location of practice, duration of practice, and possession of additional qualifications which corroborates findings from similar studies [27].

The main barriers to the prevention of CVD for community pharmacists in this study were lack of time (18.5%), inability to identify targeted patients (65.4%), lack of knowledge (23%), and lack of communication (26%). Information based on a systematic review of barriers to promoting cardiovascular health in community pharmacy is currently lacking. However, a systematic review entitled “Barriers to promote cardiovascular health in community pharmacies” showed that the main barriers to cardiovascular health promotion in the community pharmacy included pharmacist-related factors; practice site factors; financial factors; legal factors; and patient-related factors [28].

4.1. Limitations and strengths of the study

The sample size is small in this study which makes it less representative of the general community pharmacists. The cross-sectional nature would not allow the cause-effect relationship to be established. Despite these limitations, our study is the first of its kind in our country; it contributes to the mapping of knowledge of community pharmacists in Gondar and serves as comparable baseline data for health policymakers and researchers.

5. Conclusion

The overall assessment of the pharmacists demonstrated that 45 out of the 81 participants (55.6%) were found knowledgeable. However, only a small proportion of the study participants had known about the existence of National guidelines for cardiovascular disease in particular and non-communicable disease in general. The majority of the study participants reported the unavailability of functional BP Sphygmomanometers in their pharmacy and 58% of them did not routinely measure the BP of the hypertensive clients. The study subjects also demonstrated that they only sometimes inform hypertensive or diabetic patients to check their cholesterol levels and advice hypertensive and diabetics on lifestyle management. Therefore, the provision of government policy that will regulate their training, certification, and practice for CVD screening and as well as provide a framework of incentives is recommended.

Ethical consideration

Ethical clearance was obtained from the Ethical Review Committee of College of Medicine and Health Science, School of Pharmacy, the University of Gondar, and the study was also conducted following the Declaration of Helsinki. Informed written consent was obtained from the study participants at the beginning of filling the survey. The information collected from respondents was kept confidential and there were no personal identifiers in the questionnaire.

Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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CRediT authorship contribution statement

Mequenent Kassa Birarra: Formal analysis, Data curation, Supervision, contributed to designing the study, manuscript preparation, and finalization, contributed to data analysis, and data interpretation, supervision of the study. Ermiyas Baye: Formal analysis, Data curation, Supervision, contributed to data analysis, and data interpretation, supervision of the study. Worku Tesfa: Formal analysis, Data curation, Supervision, contributed to data analysis, and data interpretation, supervision of the study. Zemene Demelash Kifle: Formal analysis, Data curation, Supervision, contributed to designing the study, manuscript preparation, and finalization, contributed to data analysis, and data interpretation, supervision of the study. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare that they have no competing interests.

Abbreviation

BSC Bachelor of Science
CMHS College of Medicine and Health Sciences
CP Community Pharmacists
CVD Cardiovascular Disease
DM Diabetes Mellitus
HTN Hypertension
MSc Master of Science
UOG University of Gondar

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