The Prevalence and Public Knowledge, Attitude, and Practice towards Cardiovascular Diseases Risk Factors in Jimma Town, South West Ethiopia

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Abstract

Objectives: Knowledge, attitude, and practice gaps of cardiovascular disease risk factors are significant obstacles to prevention and care. This study assessed the magnitude of cardiovascular diseases' risk factors and public knowledge, attitude, and practice towards it in Jimma town, southwest Ethiopia.

Methods: A Community based cross-sectional study was conducted in Jimma town southwest Ethiopia, from November 1 to 28, 2021. A multi-stage sampling technique was utilized to get a total sample size of 332. All Jimma town individuals of age 18 years or above who fulfilled inclusion criteria were included. The data were collected using an interviewer-administered structured questionnaire. Data entry was done by Epidata, version 3.2 software and analysed with SPSS, version 26.

Results: About 56.4% of the participants had good knowledge of cardiovascular disease risk factors. They had a poor attitude toward cardiovascular disease risk factors. About 70.2% didn't do moderate intensity and 85.2% didn't do vigorous-intensity exercise. Only 2.4% and 8.7% of the participants had consumed vegetables and fruits daily respectively. About 17.8% drank alcohol, 19.9% chewed khat and 11.4 % were either active or second-hand smokers. Only 22.3% had normal blood pressure. About 55% of females and 39.9% of males had central obesity. The average measured cardiovascular disease risk was 1.44±1.19 which 6.1 % of them had a family history of cardiovascular disease.

Conclusion & Recommendations: The knowledge, attitude, and practice of this population toward cardiovascular disease risk factors were low. We recommend that the local health bureau, the Ministry of Health, and other stakeholders should find a way to increase the knowledge, attitude, and practice of this population, through media campaigns, promotions &others.

Background

Cardiovascular disease (CVD) is a term that refers to a category of diseases that affect the heart or the blood vessels that run through it. Atherosclerotic Cardiovascular Diseases (ASCVDs) are disorders such as coronary artery disease, stroke, peripheral arterial disease (PAD), and other atherosclerotic vascular diseases that are primarily driven by modifiable CVD risk factors (1, 2).

ASCVDs are common in the general community, especially among adults, with most of this owing to poor execution of prevention strategies and uncontrolled ASCVD risk factors in several adults (3).

There are non-modifiable risk factors, such as advanced age, family background, or male gender. Smoking, hypertension (HTN), diabetes, dyslipidemia, obesity, physical inactivity, unhealthy diets, and high alcohol consumption are all modifiable risk factors (1).

Even though there were no wide-scale studies have done to show a strong association between chewing khat and CVDs, Chewing khat is currently considered one of the modifiable CVD risk factors (4).

CVD risk factor awareness refers to a person's understanding of disorders, nutritional patterns, and behavioral activities that, whether left unchecked or changed, will lead to CVDs (2). The general public's lack of awareness about CVDs and their risk factors is a major impediment to successful CVD prevention and care (5).

Evidence reports substantial gaps in awareness of cardiovascular risk factors across the general population in developing nations despite the increasing burden of CVD in these countries, there is minimal evidence available to increase the understanding of this region, which is crucial for the implementation of the preventive program (6).

Because of population-wide preventive strategies, efficient primary and secondary preventive healthcare, and improved treatment for acute events, deaths from CVDs have decreased steadily in high-income countries over the last three decades (7). In low and middle-income countries, however, rates of CVD deaths have risen over the same period (8, 9). In coupled with the increased prevalence of CVD risk factors in these settings, the increase in CVD deaths reflects a lack of population-based prevention and healthcare strategies (3).

The general public's lack of awareness about CVDs and their risk factors is a major impediment to successful CVD prevention and care (9).

CVD was stated to be among the most common morbidity triggers (between 4–24%), the most common reasons for hospitalization (between 3–31%), the most common reasons for admission to a hospital intensive care unit (between 8.9–9.8%), and among the major causes of mortality (range 8.9–9.8%) in a meta-analysis of studies performed in Ethiopia between 1960 and 2011(10). A study done on adult patients admitted with the diagnosis of heart failure to Jimma Medical Center, internal Medicine wards in 2015 has shown that ischemic heart disease and hypertensive heart disease are widely prevalent in this population. The study shows that morbidity due to ASCVDs is rising (16).

According to studies undertaken in various parts of Ethiopia, the prevalence rates of CVD risk factors are on the rise, with modifiable CVD risk factors being more prominent in Ethiopian adult populations (11–15).

No studies were done previously to assess community KAP toward CVD risk factors, and it has shown that the prevalence of modifiable CVD risk factors is following an alarming trend according to limited studies in this population and nearby studies(4, 11–14), and national studies (6, 15).

Individual understanding of CVD risk factors, as well as knowing the prevalence of modifiable CVD risk factors, is essential in combating the disease burden in the community (17).

The AHA /ACC 2019, practice guideline for primary prevention of ASCVD stated the most effective way to avoid ASCVD is to live a healthy lifestyle. Clinicians should evaluate the social determinants of health i.e. CVD risk factors every 4–6 years (18).

KAP towards the CVD risk factors and prevalence in Africa has not been well studied, which is also the case in Ethiopia (5). Therefore, this study intends to assess the magnitude of CVD risk factors and KAP towards CVD risk factors in Jimma town, southwest Ethiopia.

Significance of the study

This study will add knowledge to understanding the study population's KAP towards CVD risk factors and the magnitude of CVD risk factors among the study community. Additionally, it provides baseline information for physician caring in this population. The identified gaps may be input for health policymakers to give emphasis and develop programs, and develop a consolidated national guideline for the intervention of modifiable CVD risk factors for those at-risk individuals or at the community level that in turn play a key role in controlling the growing burden of CVDs at grass-root level.

Methods and Materials

Study area and period

The research was carried out at Jimma town, Ethiopia's largest town in the southwest from November 1 to 28, 2021. It lies 335km southwest of Addis Ababa, in the Oromia Region. According to the Central Statistical Agency, it had a population of 159,009 in 2005, with 80,897 men and 78,112 females with 2015 population projections of 177,900. Administratively, the town is split into 17 kebeles. The kebeles have assigned house numbers to all the dwellings to facilitate administrative tasks.

Study Design and population

A community-based cross-sectional study was conducted to include all residents of Jimma town of age ≥ 18 years, between 1st and 28th November 2021.

Eligibility Criteria

Inclusion Criteria

- All adult people of Jimma town of age ≥18 years.
- Volunteer individuals who were available during the data collection period.

Exclusion Criteria

- An individual with an established ASCVD diagnosis by a physician was excluded.

Sample size determination and sampling technique

The sample size was decided by employing a single population proportion formula. The subsequent assumptions were made, marginal error (d) that was tolerated on either side of the true proportion to be 5%, and using 95% confidence level. 5% were added to catch-up on non-responses and since the prevalence of CVD risk factors in Jimma town from the previous study was 70.9% which gives a P-value of 0.71 for the current study(11). The total sample size for WHO stepwise approach to surveillance (STEPS) 1, 2, and 3 (52), was calculated as nf.

$$sample\ size(n) = Z_{1-}a/_2{}^2P(1-P)/d^2$$

$$n = \frac{(1.96)^2 0.71(1-0.71)}{(0.05)^2} = 316$$

$$Assuming\ 5\%\ non\ response\ rate, nf = 316 + 0.05\ (316) = 332$$

Sampling procedures

Participants were chosen using a multistage stage sampling approach. Initially, simple random selection was employed to choose six kebeles from a list of 17 kebeles, based on the WHO rule of thumb of 30% inclusion for prevalence studies(53). The needed number of households was distributed proportionally across the kebeles. Households were picked from each kebele using systematic selection techniques with a predetermined sample interval with an estimated 1700 households per kebele; every 31st household, and approximately 56 participants per kebele. After that, a systematic sampling approach was used to choose households from each of the selected kebeles, and a bottle-spinning technique was used to select the first house from the middle of the selected

kebeles. Then, inside the sample interval, a random number was chosen, and the number of homes in the direction of the bottle's head was tallied until the selected number reached; finally, the next household was chosen by adding the sampling interval to the randomly chosen number. Finally, using simple random selection, one eligible adult was chosen from each home.

Study Variables

Dependent Variables

KAP towards CVD risk factors, random blood sugar, blood pressure measurement, smoking, physical inactivity, dyslipidemia, alcohol consumption, diet, body mass index, abdominal circumference, and Khat chewing Habit were analyzed as dependent variables.

Independent Variables

Socio-demographic variables (age, sex, marital status, education, income), health care provider counseling, and the last date seen by a healthcare provider were included.

Operational Definitions

Knowledge: The understanding of a condition or facts that was tested based on questions from the HDFQ retrieving details about risk factors. Good/optimal knowledge (score>=70%), fair knowledge (score 50 to 69%), and poor level of knowledCVDscore 50%) out of 100% (54).

Attitude: The individual's perception of CVDs risk factors as a health problem which was assessed by a Likert scale of agreement from "strongly agree" to "strongly disagree".

Practice: An individual's behavior in daily practice which can either lower or increase CVD risks. It was assessed by questions related to an individual's habit of risk factors.

Active Smoker: a person who smoked at least one cigarette within the past month of the study period.

Ex-smoker: a person who quit smoking for at least one month before the study period.

Current Khat chewer: a person who chewed khat within the past month of the study period.

Moderate-intensity exercise: refer to total physical activity MET- ≥ 600 minutes/week (18).

Vigorous intensity exercise: refers to total physical activity MET- ≥ 1500 minutes/week (18).

Data Collection Tools and Procedures

The data were collected using an interviewer-administered structured questionnaire which was translated into Afan Oromo & Amharic via a back-to-back translation approach by the interviewer. Individuals' demographics, health care access, socio-economic status, patient awareness of contributing risk factors, and risk factors assessment were recorded. The nine questions from HDFQ were used to determine the patient's knowledge level, as well as one additional question about khat chewing patterns on a three-point scale. The height and weight of participants were assessed using standardized methods to determine obesity and overweight, as suggested by the National Health and Nutrition Examination Surveys Procedures for Anthropometry and physical activity monitoring (57).

Based on JNC (Joint National Committee), eight recommendations for BP measurement, systolic and diastolic BP were measured for two readings with a digital BP machine, each separated by 5 min of rest in between (58). RBS measurement was taken with a digital glucose meter following the procedure explained to the participant. Finally, the questionnaire was prepared based on the WHO STEPS approach to non-communicable disease (NCDS) risk factor surveillance (52).

Data Quality Control

Effective training was provided for data collectors and supervisors on the data collection process. The collected data were checked for completeness and consistency on the same day of collection. The instruments were tested on 5% of the respondents in Jimma town to prevent data contamination. Supervisors performed the spot checking and review of all the completed questionnaires to ensure completeness and consistency of the information collected and those questionnaires which were incorrectly filled or incomplete were given back to the data collectors for completeness. The internal reliability and validity of the knowledge and attitude of CVD risk factors were checked by Cronbach's Alpha of 95% CI.

Data Entry, Analysis, and Processing

The generated data using questionnaires and biochemical analysis was cheeked, edited, coded, and entered Epi data version 3.1. Data analysis was conducted with “Statistical Package for Social Sciences” software (SPSS, version 26). Descriptive statistics were used to describe participant socio-demographics, distribution of risk factors, knowledge, attitude, and mean and comparison between two continuous variables was done with an independent samples T-test with a level of significance at a P-value of <0.05 and 95% CI.

Significant correlations between nominal or continuous variables and continuous outcomes were tested using a model of linear regression, whereas significant associations between nominal or continuous variables and nominal outcomes were tested using a model of binary logistic regression. Variables with a P-value of ≤ 0.25 on univariate logistic regression were chosen as candidates for multivariable studies. The goodness-of-fit test developed by Hosmer and Lemeshow was used to assess model fitness. Multicollinearity was also verified by seeing if the standard error was < 2, VIF<5, tolerance >0.1 matrix, and all tests were two-sided. For both linear and logistic regression the alpha was set at < 0.05 significance level for all reported p- values variables with only significant p-value selected and an AOR (Adjusted Odds Ratio) was calculated for binary logistic regression.

Ethical Considerations

A formal letter of ethical permission was gained from the institutional review board of Jimma University, and delivered to the administrator of the Keble chief. All the study participants were informed about the purpose of the study, the right to participate or to terminate time if they want, and ensured about the confidentiality of information obtained before the verbal consent. The beneficence of the participants was maintained throughout the study and national COVID-19 prevention protocol was followed.

Result

Socio-demographic characteristics

A total of 332 participants were included in the study with a response rate of 100%. The study population's mean age was 40.74 years with an SD of (± 15.19) with 187 (56.3%) females. 52% of the study population got overall counsel from healthcare professionals. About 26.5% had health care coverage and only 16.5% were either illiterate or read and write only. Most of them (62.2%) had low income (< 2250 birr/month). Regarding occupation, 26.5% were government employees and 25.9% were housewives. About 62% of them were between 18 and 44 years old (Table 1)

Table 1: Socio-demographic characteristics of the study participants (N = 332)

Knowledge of CVD risk factors

The most known risk factors identified by the participants were smoking and alcohol consumption (76.8%). Other mentioned risk factors were too much dietary salt intake (74.1%), physical inactivity (73.5%), improper diet (70.2%), obesity and overweight (62.7%), chewing khat (56%), HTN (56%), DM (54.2%) and dyslipidemia (52.1%). However, about 13.9% of the participants were unable to identify any risk factor (Fig. 1).

Figure 1: Proportion of participants' knowledge of CVD risk factors, (N = 332).

The participants' knowledge scores for CVD risk factors were summarized in Fig. 2. Only 56.4% of the participants had a good knowledge score.

Figure 2: CVD risk factors Knowledge score of participants, (N = 332)

The level of knowledge had a strong relationship with a variety of characteristics (Table 2). Those who were more educated had no habit of adding salt to a meal, had moderate or higher income, were government employees, and sat fewer hours a day had higher knowledge scores.

Table 2:Correlations of different variables on linear regression model at 95% CI

Attitude toward CVD risk factors

The mean score for the attitude section among participants who had a good knowledge score of CVD risk factors was 39.14 (19.00, 50.00) with a standard deviation of ± 6.27 (Table 3). Most of the participants answered they "strongly agree" or "agree" with increased alcohol consumption (86.6%), smoking (88.2%), a diet rich in fruits and vegetables (84%), routine physical activity (85.6%), as a predisposing or protective factor for developing CVDs respectively. However, only 68.4% agreed with the statement that looking at the salt level in food has health importance. On the linear regression model, the average attitude scores among the participants were positively correlated with higher knowledge scores, increased age, and moderate and higher income per month at a 95% confidence interval (table 5.2).

Table 3: Attitude toward CVD risk factors among study participants who have good knowledge score, (N = 187)

Practice toward CVD risk factors

Regarding the physical activity level of the participants, only 29.8% had the practice of doing moderate-intensity exercise of which 27.4% did ≥ 150 minutes/week. Similarly, most of them (85.2%) had no habit of perform vigorous-intensity exercise as a part of scheduled physical activity per week. Only 6.8% of them sat per day for seven hours and above. Regarding dietary patterns, only 2.4% of the participants had consumed fruits daily while only 8.7% of them had consumed vegetables daily. Most of them often add salt to each meal daily. Around 21.8% of them had consumed 1 to 2 servings of sweet food in a week (Table 4).

On multivariate binary logistic regression model, the habit of doing moderate exercise was correlated with being male gender, younger age group (< 45 years), recently visiting of health care provider (within the past 2 years), and being educated (elementary & above) (Table 5). On multivariate linear regression, the days of fruit and vegetables consumed per week were strongly correlated with moderate and higher income (Table 2).

Table 4: The practice towards CVD risk factors among the study participants, (N = 332)

Table 5: Correlations of variables in multivariate binary logistic regression model.

The magnitude of behavioral CVD risk factors of the participants

The proportion of participants who had consumed alcohol was 17.8% while 4 .8% of them had two and above drinks per day. The proportion of participants who usually chewed khat within one month of the study period was 19.9%. About 11.4% of them were either active smokers or second-hand smokers (Table 4).

In the multivariate binary logistic regression model, the practice of consuming alcohol was correlated with older age (≥ 45 years), male gender, and higher income while smoking practice was correlated with the male gender. The practice of chewing khat was strongly correlated with male gender and younger age (< 45 years) (Table 5).

Magnitude of measured CVD risk factors

The average SBP and DBP were 128.95 ± 20.443 and 87.90 ± 12.062, respectively (Table 3). Only 22.3% of them had normal BP (Fig. 3).

Figure 3: Blood pressure measurement category of the study population (N = 332)

The mean of WC of the female study participants was 81.9516 cm (± 12.74332) while for males was 79.9448 cm (± 9.66148) (Table 6). Out of 187 females, most of them (55%) had central obesity (WC ≥ 78cm) while out of 145 males, only 39.9% of them had central obesity (WC ≥ 87.3cm) (Table 7). There is no statistically significant difference between the WC of male and female participants on independent samples T-test (MD = -2.00679, p = 0.104).

Table 6 The mean of measured and biochemical parameters of the study participants.

The average BMI score of the male participants was 21.52 (± 3.41) kg/m² (Table 6). About 51.2% of them had obesity, and 6.7% of them were overweight. So, according to the new Ethiopian anthropometric standard, 57.9% of the total male participants were at risk of developing obesity. The mean BMI score for the female study population was 23.33 (± 4.319) Kg/m². Similarly, according to the new Ethiopian anthropometric standard out of 187 female participants, 29% were obese and 13.6% were overweight. Overall, 42.6% of the female subjects were at risk of developing obesity according to BMI classification. On independent samples, T-test females had higher BMI than males (MD = -1.81, p = 0.00, 95% CI [-2.63, -0.99).

The mean average RBS was 124.76 (± 48.11) mg/dl while the prevalence of RBS ≥ 200mg/dl was 5.5%. The average of measured CVD risk factors was 1.45± (1.187)(

Table 7).

Table 7: The magnitude of measured CVD risk factors among the study participants.

On the multivariate linear regression model increased SBP was correlated with increased age, BMI, the habit of often adding salt to a meal, and being married. Increased DBP was correlated with increased WC, increased age, and the habit of often adding salt to a meal. Increased BMI of the participants was correlated with increased WC, male gender, higher income, lower days of vegetable consumed/week, increased time of sitting/day, and lack of vigorous-intensity exercise while the increased WC was correlated with being married, higher time spent sitting/reclining per day, increased income, and increased RBS level (Table 5). The increased average of measured CVD risk factors was positively correlated with increased age, female gender, increased BMI, smoking cigarettes, alcohol consumption, and khat chewing habit (Table 5). About 6.1% of the participants had a family history of CVDs while 22% of the male participants were aged > 55 and 9.6% of the female study population were aged > 65.

Discussion

Knowledge of CVD risk factors

To the best of the researcher's knowledge, this was the first study in Ethiopia to conduct a community-based assessment of public knowledge, attitude, and practice toward CVD risk factors.

In this study, it was found that low level of knowledge of CVD risk factors among the study participants. Only about 56.4% of them had a good knowledge score of CVD risk factors. Regarding knowledge of the specific risk factors of CVDs assessed on closed-ended questions the most known risk factors by the participants were smoking and alcohol consumption, while the least known risk factors by the participants were chewing khat, hypertension, diabetes mellitus, and dyslipidemia. About 13.9% of them didn't identify even one CVD risk factor. The finding of this study was comparable to the results of most studies in sub-Saharan Africa in which the majority of adult populations had poor knowledge of CVD risk factors (5, 29). In addition, similar to the result of this study other community-based cross-sectional studies also reported a low level of knowledge of risk factors of CVDs in the community (27, 30–32). Contrary to the finding of this study high knowledge level has been reported in a study that targets special populations like cardiac patients in outpatient clinics in East Ethiopia (3).

When compared to a study done in Lebanese, the population in this study had a low knowledge score on HDFQ score assessed out of 100% (17); the difference can be explained by the low educational status, low income, and low health-seeking behavior among the population of the current study.

When asked about each CVD risk factor, 76.7% knew smoking and alcohol consumption, 62.7% knew overweight and obesity, 56.2% knew HTN, and 54.2% knew diabetes as a risk factor. This was lower than a study done in an outpatient cardiac clinic in eastern Ethiopia in which 96.7% knew about smoking, 91.3% knew about overweight and obesity, and 81.9% knew about elevated BP (3).

Compared to the current study subjects, a higher proportion of participants in Buea, Cameroon was knowledgeable that smoking, unhealthy diet, lack of exercise, obesity, high BP, and DM were risk factors for CVDs. This may be due to the participants in Buea, Cameroon had higher income, and higher education and the majority of them were students (27).

Regarding the knowledge of smoking, being overweight, and obesity as risk factors of CVDs, the proportion of participants in this study who were knowledgeable was comparable to a study done in Jordan(30), and the knowledge of HTN as a risk factor of CVDs was similar to a study done in Uganda (34). A community-based study in southwestern Nigeria revealed a lower proportion of the study population was knowledgeable of each CVD risk factor when compared to this study(35). This discrepancy may be due to the methodological difference between the two studies in which the study done in Nigeria used open-ended questions which required the participants to list the possible CVD risk factors.

A good knowledge score of CVD risk factors in this study was correlated with higher income, higher educational status, and being a government employee. Those who had good knowledge sat less hours and consumed less salt than those who had poor knowledge. As a result, primary preventive interventions, particularly health education, should be provided to enhance population knowledge of the hazards associated with diabetes, dyslipidemia/abnormal cholesterol, improper diet, exercise, and other CVD risk factors.

Attitude toward CVD risk factors

The attitude towards CVD risk factors of this population was lower than in the study done in Malaysia. Even when the attitude among the participants who had good knowledge scores of CVD risk factors were compared to the study done in Malaysia the majority of the participants said they "strongly agree" or "agree" with exercise (96%), consuming fruits and vegetables (91%), and read nutritional facts about each food (90%) were protective of CVD (33). But in this study, 85.6% agree or strongly agree with the fact that doing regular exercise lowers the risk of CVDs, 84% agree or strongly agree with the fact that a diet rich in fruits and vegetables is protective against CVDs, 72% agree or strongly agree with the fact that looking at the salt level on food has health importance. Regarding attitudes towards lowering or avoiding smoking decrease CVD chance, both groups had a similar proportion of respondents. The discrepancy in this result can be explained by the study conducted in Malaysia among patients attending outpatient follow-up clinics in which those study participants may have had more education and more knowledge of CVD risk factors.

Since those having higher knowledge scores and higher income had good attitude scores on multivariate linear regression, awareness creation on risk factors of CVDs is important to boost the attitude of the participants of this study.

Practice towards ASCVD risk factors

The majority of the participants in this study did not engage in moderate and high-intensity physical exercise which was significantly lower than the finding of a study conducted in rural Butajira and Addis Ababa (6) &North Ethiopia (15). This can be explained by the growing trend of a sedentary lifestyle in urban populations and the low level of knowledge and attitude of this study participants.

Only a minority of those participants in this study had eaten fruit and vegetables daily which was similar to the findings of a study done in rural Butajira and Addis-Ababa (6) and North Ethiopia (15). In contrast to this, the majority of participants in rural Tanzania(32), as well as, Lebanese had consumed fruit and vegetables daily (17). The discrepancy may be related to the difference in socio-economic status.

Table salt utilization habit of this population was very high similar to the finding of the study done in rural Tanzania (32).

The practice of doing moderate and high-intensity physical exercise was higher among the participants of this study who had higher income, higher education, were younger age (< 45 years), and male while fruit consumption was higher among participants who had a higher income. These findings suggest that awareness creation on physical exercise & dietary diversification to tackle rising CVD risk factors in this population is very important, especially targeting the female population and elderly age.

Magnitude of behavioral CVD risk factors

The proportion of participants who consumed alcohol and smoked a cigarette(both active and second-hand smokers) was higher than in a study done in Jimma town in 2013 & Gilgel Gibe field research center (12, 14). Despite this the proportion of participants who chewed khat was lower than the finding of those two studies which can be explained by a higher proportion of the study subjects in the current one being females & there may be increased awareness of the participants about the adverse health outcome of khat chewing from the effect of prior studies done in Jimma town, the area of the current study. In contrast to the findings of this study similar research which was done in Cameroon(27), Lebanese (17), and Jordan (30) has found that a higher proportion of their participants had consumed alcohol & smoked cigarettes which may be justified by the difference in socio-economic levels.

Those who were older (≥ 45years) (AOR = 2.656[1.378, 5.121], P = 0.004), male (AOR = 2.008[1.081, 3.732] p = 0.027), and had higher income/month (AOR = 2.534[1.250, 5.135)] p = 0.010) at 95% CI had higher alcohol consumption when compared to the corresponding groups respectively. This has shown that the elderly, males, and higher-income groups should get a special focus on alcohol-related CVD risk factor counseling.

The magnitude of measured CVD risk factors of the study participants

Using the new Ethiopian standard of anthropometric classification(56) about 55% of females and 39.9% of males were centrally obese, and about 29% of females and 51.2% of male participants met the criteria of obesity according to BMI which was comparable to a study done in North Ethiopia despite that study design was implemented the Western standards of anthropometry(15). In contrary to this finding the study done in West Ethiopia has shown slightly lower WC and BMI values than the current study (46). The increased overweight and obesity in this study can be explained by the higher urbanization &higher sedentary life of the participants compared to the study done in West Ethiopia.

Again, the prevalence of overweight and obesity in this study was much higher than those studies done 10 years prior in this area (11, 14). These trends of increased overweight&obesity can be explained by several factors; among these, the first is this study used new Ethiopian anthropometric cutoff values which used lower reading than the one which was used by the previous studies (the Western anthropometric standard), second was due to the increased magnitude of CVD risk factors in this community due to the increased trends of sedentary life, urbanization, low level of knowledge and poor attitude of CVD risk factors

On multivariate linear regression, those participants who had higher income, male gender, lower days of vegetable consumption /week, and those who didn't engage in vigorous-intensity exercise had higher BMI which were statistically significant at a 95% confidence level (Table 5.2).

In this study, almost a quarter of the study population had normal BP (both systolic and diastolic), while one-third were prehypertensive& the remaining were hypertensive. When compared to the result of different studies done in a similar area, the proportion of the population who were prehypertensive and hypertensive was increasing (11, 14), which may be explained by the changing dynamics of socio-demographic characteristics of the population associated with the increased practice of Western styles of life. However, the proportion of raised BP(prehypertensive & hypertensive) was lower than in the study done in Lebanese (17).

In multivariate linear regression, there was a positive correlation between increased age, BMI, the habit of usually adding salt to food, and being married to SBP while DBP was associated with WC, age, and the habit of adding salt to the diet. This shows us health education targeting dietary pattern and exercise are important in this population.

About 5.5% of the participants in this study were at risk of developing diabetes (asymptomatic RBS ≥ 200mg/dl) which was comparable to the prevalence of type II diabetes from the previous study done in this area(47). In multivariate logistic regression, age ≥ 45 years were independently correlated with RBS ≥ 200mg/dl with [AOR = 4.092,95% CI (1.360,12.317)].

The average of measured CVD risk factors (1.4455 ± 1.18696) was higher than a similar study previously done in this area which revealed that only 70.9% of the participants had at least one risk factor(11) but lower than a study done in Lebanese (17). The increased average of measured CVD risk factors was positively correlated with increased age, female gender, increased BMI, smoking cigarettes, alcohol consumption, and khat chewing habit, which were statistically significant with (p- values < 0.05 at 95% CI).

Magnitude of non-modifiable CVD risk factors

A significant proportion of these study participants especially women were in the age category which predisposed them to the traditional risks of ASCVDs. The proportion of participants who have a family history of CVDs was 6.1%. Even though there was no previous community-level study that assessed the magnitude of family history of CVDs, the family history of CVDs in a multi-ethnic hypertensive population cohort was 31% (48).

Even though we can not change the magnitude of non-modifiable CVD risk factors, still health education and awareness creation for early screening of at-risk individuals are recommended.

Conclusion

Despite the increasing magnitude of modifiable CVD risk factors at an alarming rate in this population, the public knowledge of CVD risk factors was low and the population's attitude towards them was poor even among subgroups of participants who had good knowledge scores. In addition, the practice of CVD risk reduction lifestyles in this community was very low. The low knowledge and poor attitude level of this community were due to low education & lack of health information, and low economic status. At the same time, the increasing prevalence of modifiable CVD risk factors was associated with low education, low knowledge level & lack of health education, inadequate level of physical exercise, inadequate consumption of cardioprotective fruits and vegetables, consumption of fried foods, the habit of often adding salt to meals and the shift of the trends towards sedentary ways of life.

Strength

To the best of the researcher's knowledge, this study was the first of its kind in Ethiopia to assess the public KAP towards CVD risk factors at the community level. In addition, by following standardized approaches like the WHO STEPS approach and other standardized data collection procedures it tried to generate high-quality data, results, and conclusions, as well as, objectives were met especially in filling the gap of why CVD risk factors were increasing in this community.

Limitation

Blood pressure measurement after 6 hours of interviewing the participants was not repeated because it was difficult to re-encounter the participants within the same day of the data collection.

Recommendations

The Jimma Town Health Bureau should consider the rising magnitude of modifiable CVD risk factors despite the low level of knowledge, attitude & practice towards modifiable CVD risk factors in this population and reinforce the existing chronic NCDS preventive strategy by combining high-risk and general-population methods. Through the employment of health extension professionals, the Town Health Office should increase its efforts to raise knowledge &attitude toward CVD risk factors to reduce the burden of CVDs. The Town Health Office, in partnership with the Sports Commission and other responsible parties, should encourage residents to become more physically active.

The Ministry of Health of Ethiopia should have a national consolidated guideline that would help the local community leaders, health extension workers, physicians, and other concerned bodies that would help with counseling and apply early preventive strategies at the individual and community level

To lower the risk of CVD burden, many outlets such as radio, informal meetings, and other social media should be used to raise awareness about the elevated risk of modifiable CVD risk factors.

The public should be aware of the problem of low level of knowledge & poor attitude towards CVD risk factors and the increasing magnitude of these risk factors, which are linked to physical inactivity, smoking, diabetes, abnormal weight/obesity, chewing khat, increased salt and alcohol consumption, and monotonous diet and consumption of fried and sweet foods.

For the researcher, there is a need to do this study at a national level to encourage the national health policy and extend the recommendation of this study nationwide

Declarations

Authors' contributions

A.A. and D.T.D. wrote the main manuscript text and prepared tables and figures. All authors reviewed and approved the manuscript.

Declaration of conflicting interests

The authors declare that there is no conflict of interest

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Tables

Table 1: Socio-demographic characteristics of the study participants (N=332)

Variables	Categories	Frequency	Percent
Gender	Male	145	43.7%
	Female	187	56.3%
Age (years)	18-45	206	62%
	>45	126	38%
Monthly income	Low (<2250 birr)	223	67.2%
	Medium (2500- 8900 birr)	98	29.5%
	High (>8900 birr)	11	3.3%
Occupation	Farmer	4	1.2%
	Merchant	41	12.3%
	Housewife	86	25.9%
	Healthcare professionals	3	0.9%
	Other government employee	88	26.5%
	Un employed	30	9%
	Others[1]	80	24.1%
Do you have healthcare coverage	Yes	88	26.5%
	No	244	73.5%
Education status	Illiterate	25	7.5
	Read & write	30	9
	Elementary	116	34.9
	High school	82	24.7
	College/University	79	23.8
Marital status	Single	55	16.6%
	Married	228	68.7%
	Divorced	18	5.4%
	Widowed/Widower	31	9.3%
Ethnicity	Oromo	162	48.8%
	Amhara	58	17.5%
	Dawro	33	9.9%
	Gurage	30	9%
	Others[2]	49	14.8%
Religion	Orthodox	134	40.4%
	Muslim	138	41.6%
	Protestant	56	16.9%
	Others[3]	4	1.2%
Counseled by health care professional	Yes	172	52%
	No	160	48%
Last date seen by a healthcare provider	Within the past year	187	56.3%
	Within the past 2 years	20	6%
	Within the past 5 years	26	7.8%
	>5 years	13	3.9%
	Never	86	25.9%

[1]self employed and student [2]Silte, Tigree, and Wolyeta [3]Catholic&Wakefata

Table 2:Correlations of different variables on linear regression model at 95% CI

Dependent variable (type)	Independent variable		ß[4]	P-value	Confidence Interval
Knowledge score (continuous)	A habit of adding salt to food	Yes	1	1	1
		No	.807	.000	(0.190, 0.262)
	Sitting hours/day	≥ 7 hours	1	1	1
		< 7 hours	.816	.000	(0.032, 0.047)
	Education status	Uneducated[2]	1	1	1
		Educated	.198	.000	(0.279, 0.933)
	Occupation status	Other[3]	1	1	1
		Government employee	0.532	.000	(0.019, 0.035)
	Income status	Moderate and high	1	1	1
		low	-0.118	.032	(-0.173, -0.008)
Average measured CVD risk factors (continuous)	Age (continuous)		.237	.000	(0.002, 0.005)
	Gender	Female	1	1	1
		Male	-.170	.001	(-0.120, -0.029)
	SBP (continuous)		.300	.014	(0.004, 0.031)
	Smoking	No	1	1	1
		Yes	.298	.013	(0.254, 1.967)
	Alcohol consumption	No	1	1	1
		Yes	.294	.013	(0.206, 1.618)
	Khat chewing	No	1	1	1
		Yes	.333	.007	(0.240, 1.399)
Attitude score (continuous)	Knowledge score (continuous)		.611	.000	(10.329, 13.559)
	Income/month	Low	1	1	1
		Moderat and high	.171	.000	(1.129, 3.271)
	Age (continuous)		.083	.049	(0.00, 0.076)
SBP (continuous)	Age(continuous)		-.232	0.000	(-0.047, -0.018)
	Added salt to food	Yes	1	1	1
		No	-.160	0.002	(-0.048, -0.011)
	Marital status	Married	1	1	1
		Single, Divorced, Widowed	-.147	0.006	(-0.044, 0.007)
DBP(Continous)	WC (continuous)		.182	0.001	(14.077, 55.690)
	Age(continuous)		-.162	0.004	(-6.774, -1.331)
	Added salt to food	Yes	1	1	1
		No	-.124	0.021	(-7.524, -0.606)
	Gender	Male	1	1	1
		Female	-.163	0.000	(-0.037, -0.013)
	Income per month	Moderate and high	1	1	1
		Low	-.139	0.001	(-0.036, -0.010)
	Days of vegetable consumption/week (continuous)		.144	0.000	(0.003, 0.010)
	Time spent sitting/reclining(continuous)		.081	0.037	(0.000, 0.005)
	Vigorous exercise	No	1	1	1
		Yes	.131	0.001	(-0.046, -0.011)

WC (continuous)	BMI (continuous)		.661	0.000	(0.009, 0.11)
	Marital status	Married	1	1	1
		Single, Divorced, Widowed	-.156	0.000	(-0.039, -0.012)
	RBS (continuous)		.086	0.032	(0.000, 0.000)
	Time spent sitting/reclining (continuous)		-.081	0.042	(-0.004, 0.000)
Days of fruit consumption/week (continuous)	Age (continuous)		.134	0.022	(0.051, 0.647)
	Income/month	Moderate and high	1	1	1
		Low	-.208	0.001	(-.855, -0.216)
Days of vegetable consumption/week (continuous)	Income/month	Moderate and high	1	1	1
		Low	-.175	0.008	(-1.094, -0.167)

[1]refernce group of dummy coded categorical variables [2]illitrate, read and write [3]merchant, farmer, student, self employed, [4]standardized cofficent

Table 3: Attitude toward CVD risk factors among study participants who have good knowledge score, (N=187)

Likert scale questions			
Items		Frequency	Percent
Looking at the salt level in food is of importance	Agree	136	72.7%
	Disagree	11	5.9%
	Neutral	40	21.4%
Avoiding khat chewing can decrease the chance of developing CVDs	Agree	128	68.4%
	Disagree	19	10.2%
	Neutral	40	21.4%
Lowering body weight protects you from developing CVDs	Agree	135	72.2%
	Disagree	13	7.0%
	Neutral	39	20.9%
Avoiding a diet high in Cholesterol decreases the risk of CVDS	Agree	136	72.7%
	Disagree	10	5.3%
	Neutral	41	21.9%
Lowering high blood sugar with diet decreases your CVD risk	Agree	140	74.9%
	Disagree	14	7.5%
	Neutral	33	17.6%
Lowering BP with drugs can decrease your CVD risk	Agree	148	79.1%
	Disagree	12	6.4%
	Neutral	27	14.4%
Routine physical activity can protect you from developing CVDs	Agree	160	85.6%
	Disagree	15	8.0%
	Neutral	12	6.4%
A diet rich in fruits and vegetables is protective against CVD	Agree	157	84.0%
	Disagree	13	7.0%
	Neutral	17	9.1%
Smokers are more likely to develop CVD than non-smokers	Agree	165	88.2%
	Disagree	10	5.3%
	Neutral	12	6.4%
Increased alcohol consumption predisposes to CVD	Agree	162	86.6%
	Disagree	11	5.9%
	Neutral	14	7.5%

Agree: sum of strongly agree and agree; Disagree: sum of strongly disagree and disagree

Table 4: The practice towards CVD risk factors among the study participants, (N=332)

Variables	Category	Frequency (N)	Percent (%)
Sitting hours/day	0-3 hours	172	51.8%
	3-7 hours	137	41.3%
	≥7 hours	23	6.9%
Moderate exercise in minutes per week	≤149 minutes/Week	8	2.4%
	≥150 minutes/Week	91	27.4%
	None	233	70.2%
Vigorous exercise in minutes/week	<75 minutes/Week	2	0.6
	75-150 minutes/Week	8	2.4%
	≥150 minutes/Week	39	11.7%
	None	283	85.2%
Kahat chewing habit	Usually	66	19.9%
	Occasionally	56	16.9%
	None	210	63.3%
Alcohol drinking per day	No drink	274	82.5%
	1 drink	42	12.7%
	2 drinks	11	3.3%
	≥ 3 drinks	5	1.5%
Days of fruit consumption per week	< 2 days	264	79.5%
	2-3 days	39	11.7%
	4-6 days	17	5.1%
	Daily	8	2.4%
	None	4	1.2%
Days of vegetable consumption per week	< 2 days	151	45.48%
	2-3 days	91	27.4%
	4-6 days	61	18.4%
	Daily	29	8.7%
Usually add salt before each meal	Yes	282	85%
	No	50	15%
Serving of sweet foods per week	None	257	77.4%
	1-2 serves	72	21.8%
	≥2 serves	3	0.9%
Serving of fried foods per week	Less than once	280	84.3%
	1-2 times	38	11.5%
	3-6 times	13	4.21%
Smoking status	Current smoker	12	3.6%
	Second-hand smoker	26	7.8%
	Ex-smoker	14	4.2%
	Never smoked	280	84.3%

Table 5: Correlations of variables in multivariate binary logistic regression model.

Dependent variable	Independent variable		Frequency	P-value at 95% CI for EXP(ß)	AOR(CI)
Do you do moderate-intensity exercise (nominal)	Gender	Female	43	1	1
		Male	56	0.001	2.551(1.500, 4.339)
	Age (years)	≥45	21	1	1
		<45	78	0.008	2.315(1.248, 4.295)
	seen by a healthcare provider	>2 years	39	1	1
		≤2 years	60	0.020	2.151(1.126, 4.108)
	Education status	uneducated	8	1	1
		[2]educated	91	0.005	2.338(1.307, 4.365)
Vigorous intensity exercise (nominal)	Age (years)	≥45	7	1	1
		<45	40	0.005	3.643(1.467, 9.052)
	Gender	Female	11	1	1
		Male	36	0.000	6.630(3.032,14.498)
Raised RBS (nominal)	Age (years)	<45	6	1	1
		≥45	12	0.012	4.092 (1.360,12.317)
Alcohol consumption (nominal)	Age (years)	<45	28		
		≥45	31	0.004	2.656 (1.378,5.121)
	Gender	Female	24	1	1
		Male	35	0.027	2.008 (1.081,3.732)
	Income per month	Low	25	1	1
		[3]High	30	0.010	2.534 (1.250,5.135)
Smoking (nominal)	Gender	Female	2	1	1
		Male	24	0.000	16.985 (3.899,73.99)
Khat chewing	Age (years)	≥45	24	1	1
		<45	98	0.000	3.571 (1.859, 6.861)
	Gender	Female	30	1	1
		Male	92	0.000	10.072(5.738, 17.679)
	Education	[2]Uneducated	25	1	1
		Educated	97	0.004	2.465 (1.338,4.541)

[1]Reference group after dummy coded; [2]Illitrate or read and write only; [3]Those who earned medium and high income/month.

Table 6 The mean of measured and biochemical parameters of the study participants.

Parameters	Mean±SD	Minumum	Maximum
SBP (mmHg) (n=332)	128.95±20.443	78	213
DBP (mmHg) (n=332)	87.90±12.062	52	130
RBS (mg/dl) (n=325)	124.76±48.113	67	443
WC of females in cm (n=331)	81.9516±12.74332	56.00	112.00
WC of malesin in cm (n=331)	79.9448±9.66148	64.00	125.00
BMI of males (n=328)	21.5212±3.41017	14.86	38.42
BMI females (n=324)	23.3256±4.31875	14.87	34.48
Knowledge score in %(n=332)	65.24±35.971	0.00	100.00
Attitude score (n=332)	35.9729±7.02666	11.00	50.00
Average of modifiable CVD risks (n=332)	1.4455±1.18696	0	7

Table 7: The magnitude of measured CVD risk factors among the study participants.

riables	Measurement categories	Frequency	Proportion
C of females[1] =331)	<78 cm	149	45.0%
	>=78 cm	182	55.0%
aist[1] cumference of ale (n=331)	<87.3 cm	199	60.1%
	>87.3 cm	132	39.9%
MI of nales[1](n=324)	Obese	94	29.0%
	Overweight	44	13.6%
	Normal	34	10.5%
	Mild to moderate chronic energy deficiency	38	11.7%
	Severe chronic energy deficiency	114	35.2%
MI of ales[1](n=328)	Obese	168	51.2%
	Overweight	22	6.7%
	Normal	86	26.2%
	Mild to Moderate chronic energy deficiency	48	14.6%
	Severe chronic energy deficiency	4	1.2%
S (n=325)	< 200mg/dl	307	94.5%
	≥200g/dl	18	5.5%

[1] *Newely defined Ethiopian anthropometric standard: Sinaga M, Worku M, Yemane T, Tegene E, Wakayo T, Girma T, Lindstrom D, Belachew T. Optimal cut-off for obesity and markers of metabolic syndrome for Ethiopian adults. Nutrition journal. 2018 Dec;17(1):1-2.*

Figures

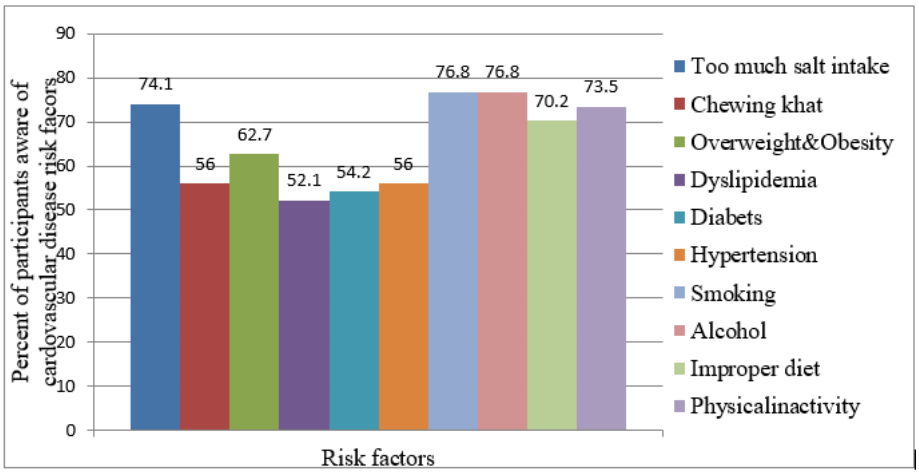

Figure 1

Proportion of participants' knowledge of CVD risk factors, (N=332).

The participants' knowledge scores for CVD risk factors were summarized in Figure 2. Only 56.4% of the participants had a good knowledge score.

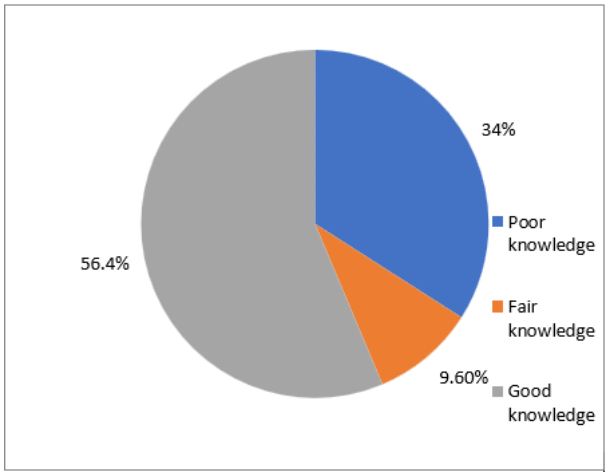

Figure 2

CVD risk factors Knowledge score of participants, (N=332)

The level of knowledge had a strong relationship with a variety of characteristics (Table 2). Those who were more educated had no habit of adding salt to a meal, had moderate or higher income, were government employees, and sat fewer hours a day had higher knowledge scores.

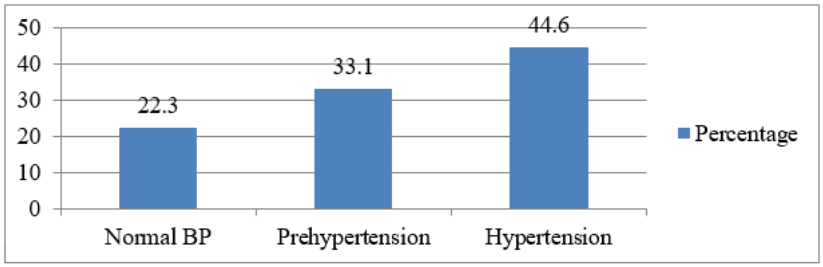

Figure 3

Blood pressure measurement category of the study population (N=332)

The mean of WC of the female study participants was 81.9516 cm (±12.74332) while for males was 79.9448 cm (±9.66148) (Table 6). Out of 187 females, most of them (55%) had central obesity (WC ≥ 78cm) while out of 145 males, only 39.9% of them had central obesity (WC ≥ 87.3cm) (Table 7). There is no statistically significant difference between the WC of male and female participants on independent samples T-test (MD = -2.00679, p= 0.104).