

Research Article



Screening of Cardiovascular Disease's Risk Factors Among Community Pharmacies in Rural India

Dr. Raghavendra S.K¹, Dr. Puneeth G.K^{1*}, Dr. Rajesh Venkataraman², Dr. Harsha C³, Dr. Sonakshi M⁴, Dr. Manisha HM⁵¹Assistant Professor, Dept. of Community Medicine, Adichunchanagiri Institute of Medical Sciences, B.G.Nagara-571448, India.²Professor & Head, Dept. of Pharmacy Practice, Sri Adichunchanagiri College of Pharmacy, Adichunchanagiri University, B.G.Nagara-571448, India.^{1*,3,4,5} Pharm D Interns, Department of Pharmacy Practice, Sri Adichunchanagiri College of Pharmacy, BG Nagara-571448, India.*Corresponding author's E-mail: g.k.puneeth17@gmail.com

Received: 03-11-2022; Revised: 18-12-2022; Accepted: 25-12-2022; Published on: 15-01-2023.

ABSTRACT

Introduction: The main prevention of cardiovascular disease (CVD) and healthcare cost reduction depend on the early identification and treatment of cardiovascular disease (CVD) risk factors through screening. Hypertension, obesity, a large waist circumference, smoking, poor diets, physical inactivity, and excessive alcohol consumption are well-known and potentially treatable risk factors for cardiovascular disease. This allows for early detection of instances, informs the start of CVD prevention medication, and is also very cost-effective.

Methods: At rural India, between March and August 2021, a cross-sectional survey was conducted in community pharmacies. One thousand two hundred healthy individuals were screened for signs of obesity, high blood pressure, waist circumference, and history of smoking and alcohol intake. A structured questionnaire was used to get participants' physical activity and diet.

Results: The gender split of the 1200 participants who were screened was 67.8% male and 32.3% female. Participants' ages ranged from 18 to 60 years old in 43.3% of cases, 41 to 60 years old in 26.3%, and over 60 in 30.4% of cases. There were 43.7% of drinkers and 47.3% of smokers, respectively. A BMI of 25 kg/m² or more indicates being overweight, whereas a BMI of 30 kg/m² indicates being obese. Using a diagnostic cutoff of >140/90mmHg prevalence of hypertension was 44.3%, and 14.9% out of these were previously hypertensive. 31.5% had high waist circumference, 13.9% had insufficient physical activity, and 34.9% had insufficient intake of fruits and vegetables.

Conclusion: The majority felt that screening for CVD risk factors was helpful, and more than one-fourth of the study participants had two or more CVD risk factors combined. A cost-effective strategy for the primary prevention of CVD that can have a positive influence on the healthcare delivery system is the capacity to further discover previously undetected risk factors.

Keywords: Cardiovascular disease, community pharmacies, screening, Smoking, alcohol, Hypertension.

QUICK RESPONSE CODE →

DOI:

10.47583/ijpsrr.2023.v78i01.016

DOI link: <http://dx.doi.org/10.47583/ijpsrr.2023.v78i01.016>

INTRODUCTION

A prominent cause of early mortality worldwide, cardiovascular disease (CVD), which includes coronary heart disease and stroke, is responsible for around 30% of all annual fatalities. It also significantly contributes to the burden of widespread disability and somatic loss of productivity in the world, with more than 150 million life years with a disability-adjusted. More than 80% of the burden of CVD, as well as a sizable burden of infectious and malnutrition-related diseases, poor infrastructure, and frail health systems, are carried by low- and middle-income countries (LMICs). Obesity, smoking, poor diets, physical inactivity, and alcohol abuse are well-known risk factors for cardiovascular disease that may be

managed. Other risk factors include hypertension, diabetes, dyslipidemia, and obesity. 90% of the population's attributable risk for coronary heart disease and stroke is due to this.¹

If risk factors are efficiently managed and under control, cardiovascular disease can be prevented. According to research, primary CVD prevention is a cost-effective way to reduce this burden. Due to the shortage of primary care doctors and the rapidly rising cost of healthcare, more community-based care models are being promoted. In these approaches, the pharmacist's function as a healthcare professional and member of the healthcare team is becoming more integrated. In most communities, community pharmacists are readily available healthcare providers who have shown benefit in managing several risk factors. Their knowledge of drugs, adherence to screening and management, and a rising involvement in health promotion have resulted in several awards.²

Despite a lower burden of risk factors in low-income countries compared to high-income countries, LMICs currently bear a more significant share of the global burden of CVDs than high-income countries. The predicted



expansion in this population will provide a serious challenge to the healthcare system given the high prevalence of cardiovascular disease (CVD) among older people in LMICs. 23% of the global burden of disease was brought on by disorders in persons 60 and older (GBD). In 2010, 30.3 percent of the total illness burden was attributed to CVDs, which were the most common ailment among older people. To estimate future disease burden and influence disease prevention, it is crucial to have a reliable and comparable analysis of CVD risks.³

The core of primary CVD prevention is opportunistic and widespread risk factor assessment. This is very economical and enables early detection of cases and early treatment for CVD prevention.⁴

High-risk individuals can be screened for CVD as a way to find subclinical CVD (such as coronary atherosclerosis, increased artery intima-media thickness, enlarged left myocardial ventricular mass, endothelial artery dysfunction, etc.), with treatment for these people seen as a way to improve the prognosis of such subclinical CVD (s). In this study, we define CVD as a clinical stroke or myocardial infarction, as well as the identification and treatment of persons at high CVD risk (even if they have not yet experienced overt CVD) as a strategy to prevent or delay the onset of overt CVD.⁵

Ethics approval: The research has been approved by the Institutional Ethics Committee of Adichunchanagiri Hospital and Research Centre, B.G. Nagara. (I.D-IEC/AH&RC/AC/006/2021)

Method: Three neighbourhood pharmacies served as the setting for this prospective, cross-sectional, observational investigation. In this study, a convenience sample size of 1200 people were used. The screening was done four days a week with an estimated 400 samples each pharmacy.

Materials

All materials involved in the screening are validated. These included digital sphygmomanometers, measuring tapes, a digital weighing scale, and a standard stadiometer.

Screening Procedures

The screening technique included those who went to pharmacies and were willing to give consent or participate in the study. Before starting the study procedure, we took COVID-19 precautions, and as soon as the participants arrived at the study area, we instructed them to rest for 5 minutes before recording their sociodemographic data and family history of diseases. The patient soon assumed a relaxed position with her feet flat on the ground, her arm at her chest, and her garments completely undressed. The blood pressure was measured using the appropriate sized cuffs and a bladder connected to an Omron HEM7233 (Osaka, Japan) digital sphygmomanometer (three BP measurements were taken at a two-to-three-minute interval, with an average of three readings used for analysis). The BMI of the participants was measured by measuring their height and weight, as well as their waist

circumference. On the basis of their daily routines and regular exercise, participants were questioned about their physical activity.

Dietary diversity is defined as the long-term eating of a variety of challenging foods or food groups. The number of food groups ingested by participants out of the fourteen food categories. Cereals, vitamin A-rich vegetables and tubers, dark green leafy vegetables, other vegetables, white roots and tubers, vitamin A-rich fruits, other fruits, flesh meat, organ meat, eggs, fish, pulses/legumes, nuts and seeds, milk and milk products, oils and fats were among the foods included in this study. Dietary variety categories were created using the 14 food groups: poor dietary diversity (three food groups), moderate dietary diversity (four to five food groups), and healthy dietary diversity (six food groups). Following that, the respondent's dietary diversity score was classified based on their position in the categories, and if any of them had irregularities, we referred them to a physician based on the referral letter.

Statistical Analysis

The data was analyzed for statistical significance when necessary, and the results were summarized in tables. A Microsoft Excel spreadsheet was used to enter the data, which was then verified twice for accuracy. For categorical values, frequency and percentage were determined. The IBM SPSS 20.0 programme was used to examine the data. The Chi-square test was employed to investigate the proportional differences. Using continuous, normally distributed data expressed as mean \pm SD, the Student's t-test was employed to determine differences between groups.

RESULTS

An average of 400 subjects each community pharmacy participated in the screening, which included 1200 total subjects.

Table 1 shows the respondents' general qualities. The individuals were 47.67 \pm 18.9 years old on average. 30.4% of those surveyed were older than 60. Of the 1200 participants, 813 (67.8%) were men and 387 (32.3%) were women. There were 567 (43.7%) current drinkers and 524 (43.7%) current smokers. 179 (14.9%) of the participants had a history of hypertension, while 352 (29.5%) had just received a diagnosis. 192 (16%) and 423 (35.3%) were obese and overweight, respectively. 378 (31.5%) were high waist circumference, and 167 (13.9%) were low physically active. Four to five servings of fruits and vegetables were ingested daily by 419 (34.9%) of the respondents. The three antihypertensives that the subjects used the most frequently were CCBs (Calcium Channel Blockers), ACE-1 (Angiotensin-Converting Enzyme), and ARBs (Angiotensin II Receptor Blockers).



Table 1: General characteristics of respondents (n=1200)

Parameter	n(%)
Age (in years)	
18-40	520(43.3%)
41-60	315(26.3%)
>60	365(30.4%)
Gender	
Male	813(67.8%)
Females	387(32.3%)
Smoking	
Current smoking	524(43.7%)
Previously smoking	11(0.9%)
Use of alcohol	
Current use	567(47.3%)
Previously use	08(0.7%)
BMI	
Obesity	192(16%)
Overweight	423(35.3%)
Waist circumference (high)	378(31.5%)
Hypertension	531(44.3%)
Hypertension (Previously known)	179(14.9%)
Family history	
Hypertension	440(37%)
Kidney disease	148(12.3%)
Diabetes mellitus	311(26%)
Other heart diseases	73(6.1%)

Prevalence of CVD risk factors

Tables 2 and 3 display the frequency of the CVD risk factors identified during screening.

Indicators of obesity

Table 2 displays the average BMI and waist circumference for all subjects for both genders. Males' BMI was higher than that of females, $p < 0.01$. In comparison to females, males had larger waist circumferences, $p = 0.08$

Table 2 shows that 58.1 percent of males and 37 percent of females were overweight (BMI 25 kg/m²) or obese (BMI

30 kg/m²), respectively. Males, on the other hand, were more overweight and obese than females, $p < 0.01$. When using the waist circumference as a gauge of obesity, 258 (31.7%) of the males and 120 (31.1%) of the females had abdominal obesity, $p = 0.08$. Obesity was most prevalent in people over the age of 60.

Prevalence of hypertension

The prevalence of hypertension was 44.3 percent in all participants, with 46 percent in males, and 40.6 percent in females, based on a diagnostic cutoff of $> 140/90$ mmHg, $p = 0.082$ (Table 2). The prevalence of hypertension was higher in those over 60 years old $p < 0.01$ (Table 3).

Smoking

Tobacco smoking was shown to be prevalent in 43.7 percent of the participants. Compared to females, males exhibited a greater prevalence of 63.2 percent, $p < 0.01$. (Table 2). Subjects over the age of 60 had a higher prevalence than those under the age of 60. (Table 3).

Alcohol use

Alcohol was consumed by 567 (47.3%) of the individuals, with males having a greater rate of consumption (Table 2). Between the ages of 18 and 40, consumption was at its peak. (Table 3).

Newly identified CVD risk factors

This included instrument-based testing, blood pressure readings, and the exclusion of smoking and obesity, which did not necessitate any particular screening tests. Newly diagnosed hypertensives accounted for 352 (29.4%) of the total.

CVD risk factors occurring simultaneously

A total of 318 individuals (27.3%) had multiple CVD risk factors. Table 4 displays the typical risk factor combinations. The most frequent pairings of risk factors were high blood pressure and a large waist circumference. (Figure 1)

Physician referral

For those who had a higher BP reading than the diagnostic cutoff of 140/90 mmHg, 531 (44.3%) of the patients were referred to their physicians for therapy of their risk factors.

Subjects' perception of CVD screening

Almost all participants (98.3%) thought the screening was helpful and valuable.

Table 2: CVD risk factor prevalence based on gender

Risk factors	All n (%)	Male n (%)	Female n(%)	p Value
Smoking status	524(43.7)	514 (63.2)	10 (2.6)	<0.01*
Use of alcohol	567 (47.3)	556 (68.4)	11 (2.8)	
Hypertension (Previously known)				
On treatment on ACE-1	76 (6.3)	48 (6)	28 (7.2)	0.468
On treatment, on ARB'S	15 (1.3)	11 (1.3)	4 (1)	
On treatment, on CCB	88 (7.3)	57 (7)	31 (8.1)	
Hypertension	531 (44.3)	374 (46)	157 (40.6)	0.082
Body mass index				<0.01*
Overweight	423 (35.3)	321 (39.5)	102 (26.4)	
Obesity	192 (16)	151 (18.6)	41 (10.6)	
Waist circumference				0.08
High	378 (31.5)	258 (31.7)	120 (31.1)	
Physical activity				
High	212 (17.7)	126 (15.4)	86 (22.2)	<0.01*
Low	167 (13.9)	97 (11.9)	70 (18.1)	
Diet				
High	231 (19.3)	138 (17)	93 (24)	<0.01*
Low	419 (34.9)	253 (31.1)	166 (42.9)	

Table 3: Prevalence of CVD risk factors according to age group

Risk factors	All n (%)	18-40 n (%)	41-60 n (%)	>60n (%)	p Value
Smoking status	524(43.7)	191 (15.9)	141 (11.8)	192 (16)	<0.01*
Use of alcohol	567 (47.3)	212 (17.7)	163 (13.6)	192 (16)	
Hypertension (Previously known)					
On treatment, on ACE-1	76 (6.3)	7 (0.6)	43 (3.6)	26 (2.1)	<0.01*
On treatment, on ARB'S	15 (1.3)	3 (0.3)	2 (0.2)	10 (0.8)	
On treatment, on CCB	88 (7.3)	7 (0.6)	39 (3.2)	42 (3.5)	
Hypertension	531(44.3)	77 (6.4)	165 (13.8)	289 (24.1)	<0.01*
Body mass Index					
Overweight	423 (35.3)	144 (12)	123 (10.3)	156 (13)	
Obesity	192 (16)	45 (3.8)	44 (3.6)	103 (8.6)	<0.01*
Waist circumference					
High	378 (31.5)	50 (4.2)	103 (8.6)	225 (18.7)	
Physical activity					<0.01*
High	212 (17.7)	183 (15.3)	16 (1.3)	13 (1.1)	
Low	167 (13.9)	19 (1.6)	43 (3.6)	105 (8.7)	
Diet					<0.01*
High	231 (19.3)	201 (16.8)	16 (1.3)	14 (1.2)	
Low	419 (34.9)	50 (4.2)	112 (9.3)	257 (21.4)	<0.01*

Table 4: CVD risk factor combination in the subjects

Risk factor	Frequency	Percent
None	872	72.7
High BMI, high waist circumference	32	2.7
High BMI, hypertension	10	0.8
High waist circumference, hypertension	165	13.7
High BMI, high waist circumference, hypertension	121	10.1



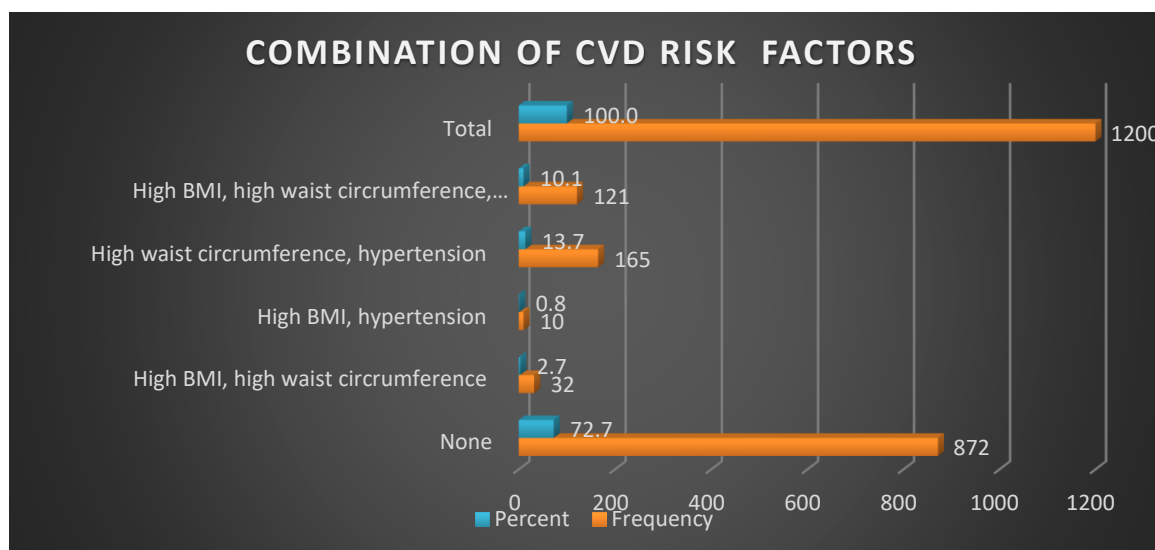


Figure 1: CVD factor combination in the subjects

DISCUSSION

This study demonstrates that we are effectively involved in the screening of cardiovascular risk factors by using recognized techniques. Our results are in line with those of earlier studies.^{1,6-8} This advantage results from the fact that local pharmacists reside there and are thus available to locals. When a person needs medical care without an appointment with a doctor, they are frequently the first and, in some situations, the only person to contact.⁹

A total of 1200 subjects from our study an average of 400 subjects per community pharmacy participated in the screening. The subjects' average age was 47.67 ± 18.9 years. 30.4% of people were older than 60. Out of 1200 participants, 813 (67.8%) were men and 387 (32.3%) were women. 889 subjects an average of 88 subjects per community pharmacy—participated in the screening, according to a 2018 study carried out in Nigeria. The subjects were 56.8 ± 12.1 years old on average. The bulk (60.4%) were in the 45–64 age range. There were 510 (57.3%) more females than males.¹

In our study, 63.2% of participants who were male and 2.6% of participants who were female reported that they were actively smoking. Under 60 years old, smoking history was higher. According to a 2018 Nigerian survey, 4.3% of the individuals smoked tobacco regularly. In comparison to females, males had an area valence that was higher by 9%.¹

In our study, 47.3% were current alcohol users of which 68.4% were male participants and 2. were female participants. 17.7% were current alcohol users between 18–40 years of age. According to a 2018 survey done in Nigeria, alcohol was drunk by 26.7% of the participants, with men drinking more than women. Consumption was highest in the under 45 years of age.¹

This objective focuses on the benefits and allure of screening. Our study's reported crude prevalence rates for the major CVD risk variables tested are another important

finding. In our study, the prevalence of hypertension was 44.3% using a cutoff of 140/90 mmHg. There are 1200 subjects, and 70.4% of the men and 29.6% of the women have high blood pressure. The greatest percentage of hypertensives over 60 was 54.4%. Another aspect we consider is the 14.9% of research participants who had hypertension in the past. According to a recently published study from Nigeria in 2018, the crude prevalence of hypertension using the readings > 140/90 mmHg and > 130/80 mmHg was 28.2% and 55.1%, respectively. [1] Using the above diagnostic standards, According to a study, Lagos had a 27.5% and a 55.0% prevalence of hypertension, respectively.¹⁰

In 2015, a meta-analysis of the national pooled prevalence of hypertension in Nigeria (using >140/90 mmHg) revealed a prevalence of 28.9% in the general population, 29.5 percent in men, and 25.0 percent in women. Additionally, they noted a prevalence of newly diagnosed hypertension of 18.2%.¹¹

In our study, 16% were obese, 35.3% were overweight, and 6.3% were underweight. 18.6% and 39.5% of males were obese and overweight, respectively, and 10.6% and 26.4% of females were obese and overweight, respectively. Obesity and overweight were highest above 60 years of age. Among 31.5% of participants who had high waist circumference, 68.3% were males and 31.7% were females. Abnormal waist circumference was highest above 60 years of age. A 2018 poll in Nigeria found that 59.7% of men and 71.5% of women were overweight (BMI 25 kg/m²) or obese (BMI 30 kg/m²), respectively. On the other hand, women were more likely to be obese than men were to be overweight. Using WC as a measure of obesity, it was discovered that 68 (17.9%) of males and 189 (37.1%) of females had abdominal obesity. Obesity was shown to be prevalent in 40% of research participants. Males (50 %) were found to have a higher prevalence than females (29%). Obesity was found to be 13% among young adults aged 39 in a previous study. The average waist

circumference was 71.66 ± 9.22 cm. This figure was a long way from the risk level.¹²

In our study, 27.3% of subjects had more than one CVD risk factor. The most combined risk factors are hypertension and high waist circumference. Similar findings were found in a 2018 study done in Nigeria, which found that 39.6% of the participants had two or more CVD risk factors. Risk factors were more likely to co-occur in females and people over 64. Hypertension and hypercholesterolemia were the most frequent risk factor combinations.¹

In our study, 44.3% of the individuals had their risk factors managed by a doctor once their blood pressure readings exceeded the diagnostic cutoff of 140/90 mmHg. In accordance with findings from a 2018 study carried out in Nigeria, a total of 700 (78.7%) participants had their risk factors definitively managed by their doctors. Those with hypertensive range blood pressure readings, high blood sugar levels, and hypercholesterolemia were among them.¹

In our study, 1200 participants expressed opinions on screening, and 98.3% of them thought it was helpful and efficient. Similar findings were seen in a 2009 study conducted in Sefton PCT, which found that almost all of the participants thought the screening was efficient, satisfactory, and helpful—findings that were in line with those in the literature.¹³

LIMITATIONS

Self-reporting was used to diagnose previously recognized CVD risk factors. This could have influenced the true prevalence of these risk factors in the general population. Longer interactions with participants were not possible due to the pandemic condition. It is not possible to apply the same findings generally because data were obtained only from a limited area of rural India.

CONCLUSION

In our study, more than 1/4th of study participants had a combination of two or more CVD risk factors, and most believed that screening CVD risk factors were beneficial. The ability to identify previously undiagnosed risk factors also serves as a cost-effective strategy for primary prevention of CVD, which has potential advantages that may favourably impact the healthcare delivery system. We observed that reliable and effective CD risk factors screening could be conducted within community pharmacies in rural India.

ACKNOWLEDGEMENT

Sri Adichunchanagiri College of Pharmacy supported this investigation. We sincerely thank to Dr. Rajesh Venkataraman, professor and head department of pharmacy practice SACCP & Dr. Raghavendra S.K, Assistant Professor, Dept. of Community Medicine, Adichunchanagiri Institute of Medical Sciences for there insightful comments on the work.

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Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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