Screening of cardiovascular risk factors among, urban, semiurban, and rural residents in Jammu district of Jammu and Kashmir

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Abstract

Background: The prevalence of cardiovascular disease risk factors has increased in the developing countries.

Objective: To study the cardiovascular disease risk factors in urban, semiurban, and rural population.

Materials and Methods: A cross-sectional study was conducted by the Department of Cardiology of Super Speciality Hospital in the urban, semiurban, and rural areas of Jammu district of Jammu and Kashmir state, India, for a period of 2 years. Of the 4,050 volunteers screened, 1,030 were in urban, 1,270 in semiurban, and 1,750 in rural areas; the demographic profile, blood pressure, and blood sugar were observed, and the results were evaluated in percentages.

Result: The mean age of the screened subjects was above 50 years of age, and the male to female ratio was, approximately, 1.5:1 at urban, 4:1 at semiurban, and 2.5:1 at rural areas. The majority of them were smokers, and about 58.9% of urban, 60% of semiurban, and 39.9% of rural volunteers were overweight and obese. The systolic prehypertension was 30%, 29.8%, and 30.9% and hypertension was 42.7%, 44.2%, and 44.9% among urban, semiurban, and rural population, respectively. The random blood sugar was positive in 9.3%, 12.8%, and 11.5% in urban, semiurban, and rural population, respectively.

Conclusion: Hypertension, obesity, smoking, and increased blood sugar are the cardiovascular risk factors, and their prevalence has increased in urban, semiurban, and rural population, and these screening programs further help in the management of the disease.

KEY WORDS: Cardiovascular disease, hypertension, diabetes, screening

Introduction

Cardiovascular disease (CVD) is the leading cause of death worldwide. In today's world, most deaths are attributable to noncommunicable diseases (36 million), and just over half of these (17 million) are as a result of CVD, and more than one-third of these deaths occur in middle-aged adults.[1]

In India, it is estimated that there were, approximately, 46.9 million patients with CVD in the year 2010, and 2.33 million people died of this disease during 2008.[1] India, when compared with other countries, experienced a lot mostly in the age group of 35–64 years. Reddy reported that mortality from CVD declined in developed countries from 1970 to 2015 but doubled in developing countries, and it has been predicted that, by 2020, there would be a 111% increase in cardiovascular deaths in India, which is much more than 77% for China, 106% for other Asian countries, and 15% for economically developed countries.[2]

In the Indian setup, the increased incidence of this disease is owing to increase in risk factors, which include sedentary lifestyle, high intake of calories, fats, salt, alcohol, and tobacco chewing. Public awareness about the disease is very less; so, the major task nowadays is to provide knowledge, education, and screening of the disease. The American Heart Association recommends that all asymptomatic adults should receive a global cardiovascular risk screening, which includes measurements of blood pressure (BP) and blood glucose levels.[3] The US Preventive Services Task Force recommends BP screening by a primary-care provider for all adults older than 18 years of age[4] and diabetes screening for adults with BP of greater than 135/80.[5]

In India, such screening programs are very less, and in our setup, this survey is the first of its kind, which is done in rural, semiurban, and urban residents.

Materials and Methods

This cross-sectional health survey was conducted by the team of doctors from the Cardiology Department of Super speciality Hospital of Government Medical College, Jammu, for a period of 2 years from March 2013 to April 2015 at different locations after prior announcements for free medical checkups. These locations were in rural, semiurban, and urban areas. The urban settings were in city, while the semiurban was around the city outside the notified municipal areas, and the rural were in villages about 80 to100 km from the city.

In the urban settings, the people were informed by using electronic media, whereas in urban and rural areas, they get the information from their ward leaders and person-to-person communication.

On the screening day, volunteers reported at their designated location, and, then, their demographic profile, BP, blood sugar, and anthropometric measurements were carried out on site. For the BP measurement, mercury sphygmomanometer; for blood sugar, Aqua check touch glucometer; and for weight and height, digital machine and stadiometer, respectively, were used. The total numbers of volunteers reported were 4,050 in urban, semiurban, and rural areas.

Result

A total of 1,030 urban, 1,270 semiurban, and 1,750 rural residents were examined presenting the age from 35 to 70 years, of which most of them were older than 50 years. The mean age was 53.5, 56.9, and 52.6 years in urban, semiurban, rural settings, respectively. The people who participated in the screening program include 618 male and 412 female subjects in the Urban, 254 female and 1,016 male subjects in semiurban, and 1,225 male and 525 female subjects in rural areas. The male to female ratio of the study population was, approximately, 1.5:1 at urban, 4:1 at semiurban, and 2.5:1 in rural survey.

The mean height (cm) was 158.5, 163.7, and 160.3 in the urban, semiurban, and rural population, respectively. Similarly, the mean weight was 66.3 among urban, 68.8 in semiurban, and 63.2 in rural residents [Table 1].

The average urban residents were overweight with a mean body mass index (BMI) of 26.4 kg/m², and 58.9% of them showed a BMI equal or greater than 25 kg/m², whereas 25.87 kg/m² mean BMI was found in semiurban with 59.9% of them being overweight and obese. The rural residents revealed a normal BMI of 24.64 with 39.9% of them were overweight & obese [Tables 1 and 2]. Smoking of cigarettes was common in all the population, and it was 9.7% in urban, 11.6% in semiurban, and 13.2% in rural settings.

The patterns of the systolic and diastolic blood pressure (SBP and DBP) are shown in Tables 3 and 4. The mean SBP (mm Hg) was 136.4, 130.2, and 129.6 in urban, semiurban, and rural residents respectively that they were in prehypertensive stage, according to the JNC-7 classification of hypertension. Similarly, the mean DBP was also 86.2 among urban, 88.0 in semiurban, and 85.6 in rural population, which was again in prehypertensive stage [Table 1]. Systolic prehypertension was observed in 30% of urban, 29.8% of semiurban, and 30.9% of rural volunteers, whereas systolic hypertension was more in urban 39.2%, 29.9% in semiurban, and 29% in rural participants [Table 3]. Similarly, diastolic prehypertension was more in 29% of urban, when compared with 27.5% of semiurban and 22.9% of rural population, whereas, diastolic hypertension was more in rural (44.9%) when compared with 42.7% in urban and 44.2% in semiurban volunteers [Table 4].

The results of blood sugar showed that 56 (9.3%) of the tested 600 urban residents, 96 (12.8%) of the 750 semiurban, and 137 (11.5%) of the 1,188 in rural population were showing glucose test aspositive [Table1]. The volunteers who showed positive glucose test were later confirmed to present diabetes in keeping with the American Diabetic Association criterion of fasting plasma glucose of 7.0 mmol/L.

Discussion

CVD is the major risk factor causing death. Migration from rural areas of India contributes to urbanization, which has increased the risk of hypertension, obesity, and diabetes. Initially, we thought that the urban population has more chances of CVD. In India, in 1901, only 11% of population was living in urban areas, and this proportion has increased to 20.2% in 1971 and to 26.1% in 1991.[6]

Increased urbanization, industrialization, and increase in gross domestic product (GDP) growth has lead to an increase in the prevalence of coronary heart disease. The per capita net domestic product in India has, approximately, doubled in the last 30 years. The agriculture sector in GDP has decreased, but there is increase in the industry and manufacturing sector. So, this has caused an increase in the employment generation and along with various programs by the government

Table 1: Demographic profile of the participants—characteristics of the participants according to the location

Feature	Urban residents (%) (1,030)	Semiurban residents (%) (1,270)	Rural residents (%) (1,750)
Age (years) (mean)	53.5	56.9	52.6
Sex			
Male	618	1,016	1,225
Female	412	254	525
Height (cm) (mean)	158.5	163.7	160.3
Range	144–170	155–175	150–175
Weight (kg) (mean)	66.3	68.8	63.2
Range	50–80	45–80	55–78
BMI (kg/m^2)(mean)	26.40	25.87	24.64
Range	23–31.5	19–32	19.5–34
Smokers	100 (9.7)	148 (11.6)	232 (13.2)
SBP (mm Hg)(mean)	136.4	130.2	129.6
Range	110–170	100–170	100–175
DBP (mm Hg)(mean)	86.2	88.0	85.6
Range	60–110	70–120	70–106
Glucose test (positive)	56 (9.3)/600	96 (12.8)/750	137 (11.5)/1188

Table 2: Body mass index distribution

Category	BMI range	Urban residents, *N* (%)	Semiurban residents, *N* (%)	Rural residents, *N* (%)
Underweight	<20	10 (0.97)	125 (9.84)	340 (19.4)
Normal	20–24.9	412 (40)	383 (30.1)	710 (40.5)
Overweight	25–29.9	518 (50.2)	500 (39.37)	524 (29.9)
Obese	>30	90 (8.7)	262 (20.6)	175 (10)

Table 3: Systolic blood pressure pattern

Description	SBP range (mm Hg)	Urban, *N* (%)	Semiurban, *N* (%)	Rural, *N* (%)
Normal	<120	310 (30.09)	510 (40.1)	700 (40)
Prehypertension	120–139	316 (30.06)	379 (29.85)	542 (30.9)
Stage 1	140–159	199 (19.3)	250 (19.6)	350 (20)
Stage 2	>d160	205 (19.9)	131 (10.3)	158 (9)

Table 4: Diastolic blood pressure pattern

Description	DBP range (mm Hg)	Urban, *N* (%)	Semiurban, *N* (%)	Rural, *N* (%)
Normal	<80	290 (28.15)	368 (28.97)	562 (32.1)
Prehypertension	80–89	299 (29.02)	350 (27.5)	402 (22.9)
Stage 1	90–99	330 (32)	308 (24.25)	455 (26)
Stage 2	>100	111 (10.77)	254 (20)	331 (18.9)

resulted in decrease in poverty. This has caused an increase in the socioeconomic status of Indian population resulting in an increased intake of vegetables, milk, animal products, and edible fats with more consumption of saturated hydrogenated fats, increased intake of calories, sweets, polished grains instead of coarse grains resulting in decreased fiber intake and, ultimately, more of calories, resulting in hypertension, obesity, and diabetes. Smoking and tobacco chewing, which are the other risk factors, are more prevalent in the rural and urban population of India. In this study, we observed that the

maximum number of volunteers exhibited either prehypertension or hypertension or were overweight, whereas smaller percentage showed diabetes. JNC-7 report concluded that individuals in the prehypertension stage should be advised for lifestyle modifications to reduce the BP and the risk of developing CVD.[7] In our study, approximately, 30% of the urban, semiurban, and rural volunteers were prehypertensive with SBP, whereas 23% among rural, 27.5% in semiurban, and 29% in rural population were showing prehypertension with DBP. Recent studies were carried out by ICMR during 2007–2008 to identify the risk factors has given the report that prevalence of hypertension was varying from 17% to 21% in all the states with marginal rural–urban difference,[8] whereas earlier studies done by Dutta,[9] Dubey,[10] Gupta and Sharma,[11] and Sathe[12] have shown more prevalence in urban population, but subsequent studies reported gradually increasing hypertension in rural areas of India, which corresponds with these results.

The most recent national data (2005) for India gave an adult prevalence for obesity (BMI > 25 kg/m², Indian standard) among employed—people of 20% in urban areas and 6% in rural areas,[13] which is lower in our observations where 50% in urban, 39.3% in semiurban, and 30% in rural areas were overweight, and 8.7% in urban, 20.6% in semiurban, and 10% in rural areas were obese. Cigarette smoking and tobacco chewing, other common factors have shown pulmonary and CVDss in South Asia, and studies reported that smoking prevalence is as low as 10% to as high as 80% in rural population.[14,15] In our study, the smokers represented 9.7% in urban, 11.6% in semiurban, and 13.2% in rural population. Diabetes is a metabolic disorder characterized by hyperglycemia, glycosuria, hyperlipidemia, negative nitrogen balance, and ketonemia. Insulin resistance refers to suboptimal response of body tissues, especially, liver, skeletal muscle, and fat to physiological amounts of insulin, and it is the integral part of type 2 diabetes mellitus (DM) advanced age, obesity, and sedentary lifestyle promoting insulin resistance.[16]

The first authentic data on the prevalence of noninsulin-dependent DM in India was a result of multicenter trial conducted by the ICMR and reported a prevalence of 3.0% in urban and 1.3% in rural population.[17] In another study, Ramchandran et al.[18] found an age-adjusted prevalence of 8.2% in urban and 2.4% in rural subjects in southern India. The studies showed a wide difference in the prevalence of diabetes in urban and rural population. In our study, people with diabetes were found to be 9.3%, 12.8%, and 11.5% in the urban, semiurban, and rural population, respectively. The difference is not so much, but diabetes has increased in rural population, as recently, it has been reported increased from 2% to 6% in rural south India.[19]

This study has several limitations, as the people who presented for screening were only screened and no sampling method was used; for instance, the low level of abnormal BP in stage 2 hypertension among semiurban and urban areas may not reflect a low level of this risk factor. Second, there is only one BP measurement (when multiple elevated readings are used to diagnose hypertension),[20] a casual blood glucose value to suggest diabetes (when either a casual value plus symptoms or a fasting value is preferred).[21] Then, we have not done lipid profile and ECG of these volunteers.

Conclusion

There is a greater burden of cardiovascular risk factors, particularly, obesity, hypertension, diabetes in urban, semiurban, and rural population, especially for semiurban and rural population who have remained largely unstudied for the centuries. In the urban area, residents present awareness about the disease and the risk factors because of education status, whereas, in rural and semiurban areas people do not have so much of knowledge and awareness. So, in the present scenario, the screening programs should be done at primary health-care level, and for that, we need to strengthen our health-care centres, and these populations may likely to get benefit from these screenings.

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