

Prevalence of Cardiovascular Disease Risk Factors in Urban and Rural Areas of Hyderabad, Sindh, Pakistan

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Abstract: Background: CVDs are a major public health concern in Pakistan. The major CVD risk factors are age, gender, obesity, hypertension, hyperglycemia and hyperlipidemia. However, prevalence and risk factors associated with population of urban and rural Hyderabad are unexplored. This study was set up to find out CVD among population of Hyderabad. **Methodology:** This cross-sectional study was carried out on 304 participants living in the urban and rural areas of Hyderabad, Pakistan. Out of 304, 161 were men and 143 were women with age range from 30 to 70 years. Data was collected through interview based questionnaire. Weight and height were measured for calculation of BMI. Systolic Blood pressure (SBP) and Diastolic Blood Pressure (DBP) was measured using sphygmomanometer. Biochemical analysis was carried out for the assessment of Fasting Blood Sugar (FBS), Triglycerides (TG), Total Cholesterol (TC) and Low density Lipoproteins (LDL) using standard kit methods. Ethical consent was obtained before collection of data. SPSS version 22 was used for statistical analysis. **Results:** Hyperlipidemia was highly prevalent CVD risk factor particularly increased LDL 61.2%, followed by hypertension 46.8%, Obesity 14.8% and hyperglycemia 8.8%. Except hyperlipidemia, which was higher in women 63.6%, men had higher prevalence of obesity 17.4%, hypertension 48.4% and hyperglycemia 9.3%. Participants from urban area had higher prevalence of hypertension 47.3%, hyperglycemia 9.7% and hyperlipidemia 62.4%. However, Obesity was slightly higher 16.6% in rural population. **Conclusion:** This study indicates Men had higher prevalence of CVD risk factors, and according to geographic location, urbanized population based higher prevalence of CVD risk factors.

Keywords: Cardiovascular Disease, Risk Factors, Prevalence, Rural, Urban, Hyderabad

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Introduction

Cardiovascular Disease (CVD) risk factors are the major public health problem both in developed countries and underdeveloped countries[1]. CVD risk factors are either modifiable or non-modifiable. Modifiable CVD risk factor can be controlled, treated and modified while non-modifiable CVD risk factors cannot be controlled treated and modified [2-4]. Modifiable risk factors for CVD include Obesity, hypertension, diabetes and hyperlipidemia[5, 6]. Other risk factors are smoking, stress and sedentary life style, mainly associated with increased in urbanized population [5, 7, 8]. Irrespective of CVD risk factors, these factors largely contribute in the development of Cardiovascular Diseases.

According to estimations for year 2030, the deaths from CVD will increase with largest number in South-East Asia region and it will be the cause of 33% of all deaths [9]. Cardiovascular diseases are the major cause of morbidity and deaths in almost all over the world and the number one non communicable disease[10, 11]. South Asians are noticed at a risk of CVD in comparison with general population of the world, According to expatriate and native South Asian studies, extreme and non risk of CVD and increased ratio of disorders are estimated by the lower age at



which they suffer with disease[12, 13]. Increase in migration from rural areas to urban areas cause an increase in urbanization, urbanized life has been linked with increased CVD risk factors [8] In Pakistan, differences in the prevalence of major risk factors among urban, rural and between different social groups have been shown, with more rich economic status groups showing increase prevalence rates than lower economic classes. Several studies have documented the prevalence of CVD risk factors in Pakistani Population[14]. Lack of awareness also has been linked as the factor for increase in CVD risk factors [15]. Urbanized population have been reported to have increased in CVD risk factors than rural areas, both in men and women [7]However, there is still scarcity of literature regarding CVD risk factors in Pakistan. The current study will assess CVD risk factors among men and women living in Hyderabad, Pakistan. Hyderabad is the southern part of Pakistan; it has the population of approximately 2 millions. Population of Hyderabad includes both urban and rural population.

Methodology

Study setting and sampling

This cross sectional community based study was carried out from August 2018 to July 2019 in urban and rural areas of Hyderabad, focusing on both male and female gender. Different households were confirmed for data collection. Data was collected through interview based pre tested structured questionnaire. Random sampling was done, and sample size was calculated. The participants having age 30 years old and above age with no previous history of cardiac diseases and diabetes, and were not on any medication were included. The participants who were hesitant and were not willing to take part in study were excluded. The pregnant women and physically handicapped subjects were also excluded from the study.

CVD risk factor Assessments

A general blood pressure examination was performed with the aneroid Sphygmomanometer of ABN™ Health Care System. Fasting venous blood was collected before breakfast between 7:00 and 9.00am. The blood was centrifuged to collect the plasma. All the biochemical tests were performed on plasma portion of blood. Plasma glucose concentrations were immediately determined using the EasyMax® B-Glucose analyzer. Triglycerides, total cholesterol and LDL cholesterol were analyzed on a Merck Micro lab 300, by using kit method from Merck (Merck category 15760, 11300 and 14992) respectively in accordance with the manufacturer's instructions.

Statistical analysis

Data was first added on Microsoft excel, then it was transferred on SPSS sheet, and before detailed statistical analysis, the data was edited for any possible errors. Average (Mean) and Standard deviations (SD) of age and BMI was obtained first via Microsoft excel and later confirmed through SPSS (Statistical Package for Social Sciences) version 22.0. Prevalence was shown as percentages and frequencies.

Ethical considerations

Prior to collection of data, ethical consent was obtained through departmental ethical review committee. Oral information about the study was explained to all participants in their local languages (Sindhi and Urdu). It was shared earlier with the participant that they can withdraw from the study at any time and their data secrecy will be maintained during and after the completion of work.

Results



The mean age was 49.9 ± 19.9 years. A total 304 adults aged 30 years and above were included in this study. Out of 304, 161 men (53%) and 143 (47%) women participated and duly completed the all necessary components of this study, including answering of research questionnaire. The participants who belonged to the urban geographic area were 226 (74.3%) and those who belonged to the rural areas were 78 (25.7%).

Prevalence of CVD risk factors in men and women

Table 1 shows Anthropometric data of the participants, which suggests the overall prevalence of obesity, the major CVD risk factor was 14.8%, Men had higher prevalence of obesity 17.4% than women 11.9%. Assessment of modifiable CVD risks factors such as increased systolic blood pressure (SBP) and Diastolic Blood Pressure (DBP), increased FBS and hyperlipidemia were assessed in both gender men and women. Overall the prevalence of increased DBP was 59.2% followed by increased SBP 46.8%. Men had slightly higher prevalence of increased SBP (48.4%) and increased DBP (61.5%) than Women (increased SBP, 44.8% and increased DBP 56.6%). Out of 304, only 8.8% participants had increased FBS, gender wise distribution indicated no major differences between men 15 (9.3%) and women 12 (8.4%). Hyperlipidemia was detected by analyzing the abnormally high values of Cholesterol, Triglycerides and LDL. Increase in total cholesterol assessment reflects no major differences among both genders women 12 (8.4%), and in men 12 (7.5%). Women had higher risk of increased Triglycerides 35% than men 30.1%. The LDL assessment in both genders indicates higher prevalence of increased LDL values in women 63.6% than men 59%.

Table 1. Gender Wise Distribution of CVD Risk Factors

Variables		Women	Men	Overall
		n (%)	n (%)	n (%)
BMI (kg/m ²)	Underweight (<18.5)	3 (2.1)	3 (1.9)	6 (1.97)
	Normal weight (18.5-24.9)	80 (55.9)	82 (50.9)	162 (53.3)
	Over weight (25-29.9)	43 (30.1)	48 (29.8)	91 (29.9)
	Obese (≥ 30)	17 (11.9)	28 (17.4)	45 (14.8)
Blood Pressure (mmHg)	SBP normal (<140)	79 (55.2)	83 (51.6)	162 (53.2)
	SBP increased (≥ 140)	64 (44.8)	78 (48.4)	142 (46.8)
	DBP normal (<90)	62 (43.4)	62 (38.5)	124 (40.8)
	DBP increased (≥ 90)	81 (56.6)	99 (61.5)	180 (59.2)
Blood Sugar (Fasting) mg/dl	Normal (<110)	131 (91.6)	146 (90.7)	277 (91.2)
	Increased (≥ 110)	12 (8.4)	15 (9.3)	27 (8.8)
Hyperlipidemia (mg/dl)	Cholesterol Normal (<200)	131 (91.6)	149 (92.5)	280 (92.2)
	Cholesterol (High) (≥ 200)	12 (8.4)	12 (7.5)	24 (7.8)
	Triglyceride Normal (<150)	93 (65)	98 (60.9)	191 (62.8)
	Triglyceride High (≥ 150)	50 (35)	63 (30.1)	113 (37.2)
	LDL Normal (<160)	52 (36.4)	66 (41)	118 (38.8)
	LDL High (≥ 160)	91 (63.6)	95 (59)	186 (61.2)

Prevalence of CVD risk factors in urban and rural areas

The geographic and living areas can effects individual's life, lifestyle and wellbeing. In this study the population was assessed having different lifestyle and wellbeing. Table 2 shows the overweight population (BMI, 25-29.9 kg/m²) was higher in urban areas whereas the obese population (BMI, ≥ 30 kg/m²) was slightly higher in rural living areas. Assessment of modifiable



CVD risks factors was carried out in both geographic areas, which were Urban and Rural areas of Hyderabad, Sindh, Pakistan. Hypertension with an Increased SBP and DBP were more prevalent in urban areas (SBP 47.3% and DBP 47.3%) in comparison to rural areas (SBP 44.9% and DBP 42.3%). Blood Sugar Fasting (BSF) was observed after 12-14 hours fasting in both geographic and data reflects slightly increased in urban area's individuals among living areas, urban (9.7%) and rural (8.7%). Hyperlipidemia was observed in study population by measuring the total cholesterol, triglyceride and LDL. Higher prevalence of abnormally high values of cholesterol, triglyceride and LDL were observed in urban population (8.8%, 39.4% and 62.4%) than in rural population (6.4%, 30.8% and 57.7%) respectively.

Table 2. Distribution of CVD risk factors according to Urban and Rural Areas

Variables		Urban		Rural	
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
BMI (kg/m ²)	Underweight (<18.5)	5	2.2	1	1.3
	Normal weight (18.5-24.9)	117	51.8	45	57.7
	Over weight (25-29.9)	72	31.9	19	24.4
	Obese (≥ 30)	32	14.1	13	16.6
Blood Pressure (mmHg)	SBP normal (<140)	119	52.7	43	55.1
	SBP increased (≥140)	107	47.3	35	44.9
	DBP normal (<90)	119	52.7	45	57.7
	DBP increased (≥90)	107	47.3	33	42.3
Blood Sugar (Fasting) mg/dl	Normal (<110)	204	90.3	72	92.3
	Increased (≥110)	22	9.7	6	8.7
Hyperlipidemia (mg/dl)	Cholesterol Normal (<200)	206	91.2	73	93.6
	Cholesterol (High) (≥200)	20	8.8	5	6.4
	Triglyceride Normal (<150)	137	60.6	54	69.2
	Triglyceride High (≥150)	89	39.4	24	30.8
	LDL Normal (<160)	85	37.6	33	42.3
	LDL High (≥160)	141	62.4	45	57.7

Discussion

Cardiovascular disease is not only disease however it is a serious social issue and cause of mortality and morbidity in all over the world especially in developing countries. The data we have collected here suggest an overall prevalence of obesity at 14.8%, which is lower than previously reported [16, 17]. The lower prevalence of obesity in our study reflects the fact that we have detected obesity with BMI ≥ 30 kg/m² instead of south Asian specific BMI. In our study men had significantly higher prevalence of obesity than women, these findings are not consistent with previously published study[17], increase in obesity in women might be due to fact that majority of women might have attended the menopause, moreover, women tend to have sedentary life style.



Prevalence of hypertension in our study suggests, a rise in hypertension this is consistent with already published studies. Plausible explanation for higher prevalence of hypertension in our study is the age of participants is 30 years and above, moreover, men had higher prevalence of hypertension than women, this is consistent with previous reports from Pakistan and elsewhere [18, 19]. In contrast to our study women were reported to have higher prevalence of hypertension [18, 20], our study also included women of 40 years and above, this is also the fact that majority of women attend menopause, which has been associated with increase hypertension [21].

In our study women had higher prevalence of hyperlipidemia, our finding supports our previous study where we have shown women had higher prevalence of metabolic syndrome, along with higher prevalence of hyperlipidemia in women [22]. Previous study from urbanized population reported no significant difference in hyperglycemic level in men and women [23]. All these studies were carried out in the peripheries of urban areas; which are in transition from rural to urbanized settings. There is a need to set up the study in the future from remote rural areas of Pakistan.

The data we present here indicate prevalence of CVD risk factors in urban areas, it is quite understandable there has been increase in urbanization, and urbanized life is marked with sedentary life style, eating food at hotels and non availability of walking and sports grounds. Except obesity all other CVD risk factors were high in urban population. Slightly higher obesity in rural areas might be due to the fact that rural areas of Hyderabad are located at the periphery of urban areas.

The prevalence of hypertension of studied population in Urban (47.3%) and Rural (44.9%) areas has no major differences. While the population belongs to urban areas have slightly higher prevalence of hypertension in comparison of rural areas population. Our study presents slightly higher prevalence of hypertension in urban population, this is consistent with already published study [20]. Our study is not consistent with the study which reports higher prevalence of hypertension in rural population [19].

Several studies have reported the coexistence of hypertension and hyperlipidemia, coexistence of hyperlipidemia and hypertension is not well understood [12, 19, 24]. However, growing suggest hyperlipidemia might cause vascular dysfunction and atherosclerosis, which is a risk factor for hypertension and also the leading cause of mortality across the world [24, 25]. Those with abnormal lipid profile are at higher risk of developing hypertension in future. Increasing evidence suggest a link between renin-angiotensin system (RAS) and coexistence of hypertension and hyperlipidemia [26]. Involvement of RAS in development of hypertension and hyperlipidemia could also be used as the target for treatment strategies in prevention of hypertension [26, 27]. The exact and detailed role of RAS and other related factors needs to be investigated for the better understanding, treatment and prevention strategies for hyperlipidemia and hypertension.

Prevalence of CVD risk factors, which are also the component of metabolic syndrome has been reported in several study settings from urban areas [7, 23]. A detailed study on urban and rural areas of Pakistan indicate no significant difference between urban and rural population regarding hyperlipidemia [19].

Conclusion

Overall CVD risk factors were higher in men than women. Women had higher prevalence of hypertension. Except obesity all other CVD risk factors were higher in urban population. This study puts an insight into understanding the prevalence of CVD risk factor regarding urbanized population; there is a need to give attention to these areas where population is having higher prevalence of CVD risk factors.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.



HUMAN AND ANIMAL RIGHTS

No animals were used in this study. The study on humans was conducted in accordance with the ethical rules of the Helsinki Declaration and Good Clinical Practice.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

None.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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