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A Cross Sectional Study on Cardiovascular Risk among Adults in Urban field Practice area of a tertiary care Hospital, Hyderabad

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Abstract
Introduction: *India is experiencing an epidemiological transition from communicable diseases to non communicable with cardiovascular diseases as a leading cause of mortality and morbidity. India suffers the highest loss in potentially productive years of life, due to deaths from Cardiovascular Diseases (CVDs). As a target for Sustainable Development Goals (SDGs) India aims to achieve a 25% relative reduction in the risk of premature mortality from Cardiovascular Diseases (CVDs), cancer, diabetes or chronic renal disease. Risk profiling of the people provides relevant results that can be used for various preventive strategies.*
Objectives: *1.To study the prevalence of cardiovascular risk factors among adults attending urban health and training centre of Osmania Medical College, Hyderabad. 2. To estimate the risk of cardiovascular event using WHO/ISH risk prediction charts among the study participants.*
Methodology: *A cross sectional study was carried for five months from July to November 2017. The sample size included 243 adult males and females from the urban field practice area of a tertiary care hospital. WHO/ISH risk prediction charts were used for estimating the risk of a major cardiovascular event.*
Results: *The prevalence of Hypertension, Diabetes and tobacco consumption was around 35%, 23% and 19% respectively. Males had a higher prevalence of tobacco and alcohol consumption (P<0.01). Almost equal proportion of males and females were found to be Overweight/Obese (BMI $\geq$ 25 kg/m^2) with overall prevalence of 56.38% among study participants. The estimated 10 year risk of cardiovascular event (myocardial infarction or stroke) was <10%, 10% to <20%, 20% to <30%, 30% to <40% and >40% in 67.9%, 16.5%, 9.4%, 4% and 2.2% of study subjects respectively.*
Keywords: *Cardiovascular risk assessment, Non Communicable Diseases, risk factor.*

Introduction

India is in the stage of epidemiological transition where the disease burden is shifting from communicable diseases to non communicable diseases. Among NCDs, the category of cardiovascular diseases is the leading cause of death [(1)]. The Sustainable Development Goals (SDGs) target 3.4 calls for a one third reduction in premature mortality from NCDs by 2030[(2)]. The Global Voluntary Indicator for India has a National target of 25% relative reduction in the risk of premature mortality from CVD, cancer, diabetes or chronic renal disease [(3)]. India suffers the highest loss in potentially productive years of life, due to deaths from Cardiovascular Diseases (CVD) in people aged 35 – 64 years when

compared to other countries in the world. Major Cardiovascular diseases among adults include Ischaemic Heart Disease (IHD), Hypertension and Stroke. Proportion of total disease burden from cardiovascular diseases - Premature death accounting for 64.4% and Disability or morbidity for 35.6%[4].

The leading individual cause of death in India in 2016 was ischaemic heart disease (28.1%). The number of DALYs caused by ischaemic heart disease rose by 104% over 1990 to 2016. Percent contribution of DALYs due to CVDs has increased by more than double from 1990 to 2016 i.e. 6.9% to 14.1%.

The risk factors for CVDs including unhealthy diet, high blood pressure, high blood sugar, high cholesterol, and overweight and tobacco use. The prevalence of risk factors is also increasing in India (10% in 1990 to 25% in 2016)[4].

The average life expectancy in Telangana State is 73.2 years for females and 69.4 years for males in 2016. NCDs constitute to 59.2% of the total disease burden in Telangana out of which CVD contribute to 61.6% of premature deaths and 38.4% of morbidity. Premature death due to IHD will have devastating consequences for the individual, the family, and the society [4,5,6].

The three strategies for achieving a reduction in CVD morbidity and premature mortality include (i)Population based reduction of risk factors for CVDs (ii) Individual-based primary prevention strategies targeted at high-risk groups to prevent the onset of CVD through risk factor reduction (iii)Treatment and secondary prevention of disease progression in people with established CVDs[7]. The primary prevention strategies have been more successful with a reported decline of 42% to 60% of CVD deaths, while treatment and secondary prevention of complications has reported a reduction of 23% to 47% of CVD deaths[8-13].

Methodology

The research was carried after obtaining the clearance from institutional ethics committee of Osmania Medical College. A Cross sectional study was carried out in Harrajpenta, Urban field practice area of department of Community Medicine, Osmania Medical College, Hyderabad. The study was carried out for duration of five months from July 2017 to November 2017. Considering the anticipated frequency for cardiovascular risk factor as 32.2% prevalence (Prevalence of Hypertension in Andhra Pradesh for 2016)[4], allowable error of 20% relative precision and 95% confidence the sample size (n) is calculated using $n= Z^2pq/l^2$ where Z = 1.96, p = 32, q = 68, l = 6.4. A minimum sample size of 204 is obtained. Considering the non response the data collection was done for 243 individuals. Systematic sampling technique was followed including every fifth person attending the Urban Health Training Centre. Adults aged $\geq$ 40 years attending the Urban Health & Training Centre who are permanent residence of the Urban field practice area. The subjects were enrolled in the study after taking a fully informed consent. Those with established coronary artery disease, stroke or atherosclerotic disease, pregnant ladies and critically ill patients and those not willing to participate in the study were excluded from the study.

Study tool: WHO STEPS instrument. World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction chart for India

These charts indicate 10-year risk of a fatal or non-fatal major cardiovascular event (myocardial infarction or stroke), according to age, sex, blood pressure, smoking status and presence or absence of diabetes mellitus[14].

Anthropometric variables such as weight (kg) nearest to 100 g and height (cm) nearest to 0.2 cm were measured using standard equipment and procedures. Three measurements of blood pressure using a mercury sphygmomanometer were taken in reclining position for all men and women. Average reading of the blood pressure was considered for diagnosing hypertension in these individuals.

Statistical Analysis

EPI Info™ (Version 7.2.2.2, Centers for Disease Control and Prevention, Atlanta, Georgia, USA) was used for analysis. Prevalence rates were calculated for various risk factors and expressed in percentages. Continuous data were handled using mean ± standard deviation. Categorical variables were analyzed using chi‑square test. All analyses were two tailed, and $P < 0.05$ was considered to be statistically significant.

Results

Table 1 shows the socio-demographic characteristics of the study participants. Total sample studied included 243 individuals among these 128 (52.67%) were males and 115 (47.33%) were females. Numbers of subjects aged 40 years or more were 224 among these 110 (49.11%) were males and 114 (50.89%) were females. Majority of the study subjects were aged between 40 to 49 years (48.14%). Mean age of the study participants was 50.1 ± 10.93 years. About 44% of the study subjects were educated up to high school and around 56% had their education higher than secondary schooling.

Table 1 Socio - demographic details of study subjects

Variable	Males (%)	Females (%)	Total N (%)
Gender	128 (52.67%)	115 (47.33%)	243 (100%)
Age Distribution of study subjects			
Age Group			
Less than 40 years	18 (94.74%)	1 (5.26%)	19 (7.82%)
40 - 49 years	55 (47%)	62 (53%)	117 (48.14%)
50 - 59 years	28 (50%)	28 (56%)	56 (23.05%)
60 - 69 years	18 (54.54%)	15 (45.45%)	33 (13.58%)
≥ 70 years	9 (50%)	9 (50%)	18 (7.41%)
Mean Age[#]	49.93 ± 11.47 years	50.28 ± 10.34 years	50.1 ± 10.93 years
Educational Status			
Up to High School	46 (43%)	61 (57%)	107 (44.03%)
Intermediate/Diploma	12 (48%)	13 (52%)	25 (10.29%)
Graduate	35 (67.30%)	17 (32.70%)	52 (21.40%)
Postgraduate or Professional	35 (59.32%)	24 (40.68%)	59 (24.28%)

[#] P >0.05

Table 2 shows the various risk factors for cardiovascular diseases. The prevalence of hypertension was 35.40% (86), among these 56.98%(49) were males and 43.02% (37%) were females.

Table 2 Prevalence of Cardiovascular Risk factors based on gender

Variable	Males	Females	Total	P value
Tobacco Consumers	37 (78.72%)	10 (21.28%)	47 (19.34%)	0.0001
Alcoholics	58 (72.50%)	22 (27.50%)	80 (32.92%)	0.0096
Family h/o Hypertension	42 (53.85%)	36 (46.15%)	78 (32.10%)	0.80
Family h/o Diabetes	29 (40.85%)	42 (59.15%)	71 (29.22%)	0.0176
Medical History				
Known cases of Hypertension	49 (56.98%)	37 (43.02%)	86 (35.40%)	0.32
Known cases of Diabetes	27 (48.21%)	29 (51.79%)	56 (23.04%)	0.45
Blood Pressure Measurements during Examination				
Normal	14 (35%)	26 (65%)	40 (16.46%)	
Pre Hypertension	66 (50.38%)	65 (49.62%)	131 (53.90%)	
Hypertension Stage 1	17 (58.62%)	12 (41.38%)	29 (11.93%)	
Hypertension Stage 2	31 (72.09%)	12 (27.91%)	43 (17.69%)	
Body Mass Index				
Under weight BMI ≤ 18.5 Kg/m^2	4 (80%)	1 (20%)	5 (2.06%)	
Normal Range (18.50 - 24.99 Kg/m^2)	56 (55.45%)	45 (44.55%)	101 (41.56%)	
Overweight ≥ 25 Kg/m^2	68 (49.64%)	69 (50.36%)	137 (56.38%)	0.28
Pre Obese (25.00 - 29.99 Kg/m^2)	50 (58.14%)	36 (41.86%)	86 (35.39%)	
Obese Class 1 (30.00 - 34.99 kg/m^2)	18 (41.86%)	25 (58.14%)	43 (17.69%)	
Obese Class 2 (35.00 - 39.99 kg/m^2)	0 (0%)	7 (100%)	7 (2.89%)	
Obese Class 3 (≥ 40.00 kg/m^2)	0 (0%)	1 (100%)	1 (0.41%)	

The difference in the prevalence of hypertension among males and females was not statistically significant (p=0.32). Tobacco consumption (smoking and chewing) was reported by 19.34 % (47). Around 33% of the study subjects reported to be alcoholics. The prevalence of tobacco consumption and alcohol had a statistically significant difference for males (p<0.01). Blood pressure measurement recorded during data collection showed only 16.46 % (40) subjects to be normotensive, 53.9%(131) were pre hypertensive, stage 1 hypertension was observed in 11.93%(29) and stage 2 hypertension among

17.69%(43). Majority of the subjects i.e. 56.38% (137) were overweight. There was no statistically significant difference for the prevalence of overweight among males (49.64%) and females (50.36%), p value =0.28Figure 1 shows the risk profiling of the study subjects aged 40 years or more for a 10 year predicted risk of a fatal or non fatal major cardiovascular event using WHO/ISH chart. The estimated 10 year risk was <10%, 10%-<20%, 20% -<30%, 30%-<40% and ≥40% in 67.9%, 16.5%, 9.4%, 4% and 2.2% of the study subjects respectively. Figure 1 and figure2 shows the gender wise distribution of various risk categories. Females overall had a lesser risk than males.

Figure 1 Predicted 10 year Risk of a Fatal or Non Fatal Major Cardiovascular Event (Stroke or Myocardial Infarction)

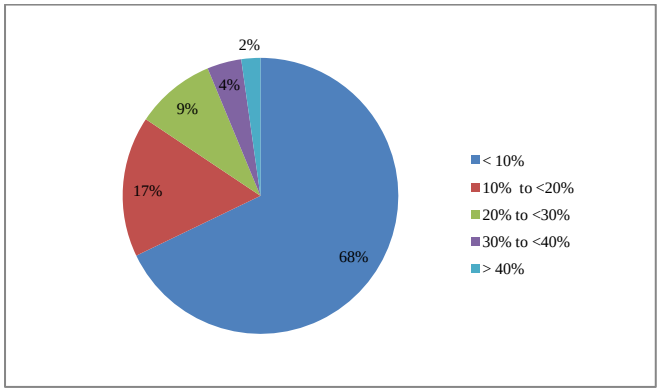
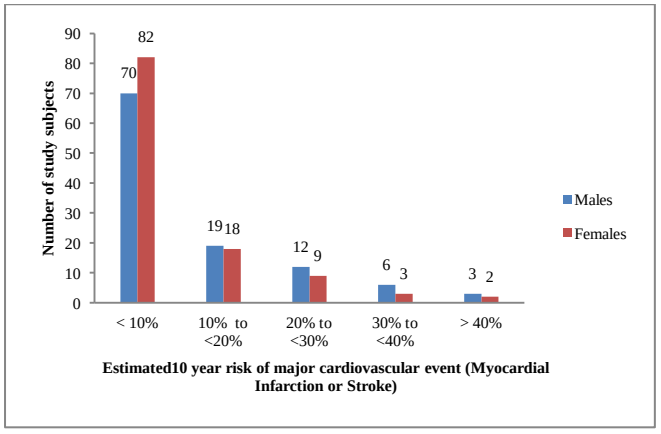


Figure 2. Gender wise distribution of Estimated Cardiovascular Risk among the study subject



Discussion

The present research was carried out to study the risk factors for cardiovascular diseases and to estimate the predicted 10 year risk of a major fatal or non fatal cardiovascular event of stroke or myocardial infarction among the study subjects. The prevalence of Hypertension, Diabetes and Overweight was 35%, 23% and 56% respectively. Prevalence of Hypertension was higher among males than females whereas Prevalence of Diabetes and Overweight was almost equal in both males and females. Similar results were recorded by a population based survey by National Institute of Nutrition in 2016[5] which reported prevalence of hypertension, diabetes and overweight as 32.2%, 20.65% and 39% respectively. In contrast to the current research the prevalence of overweight was reported which was higher among males than females in recent National Family Health Survey – 4 (NFHS4) of Hyderabad district[15] with the prevalence of overweight in females 47.9% and for males 33.7%. The prevalence of consumption of any form of tobacco in the present study was 19.34% and for alcohol consumption was 33%. Recent NFHS-4 data for Telangana mentions the tobacco consumption prevalence of 25% and of Alcohol consumption to be around 46%. The possibility of subjects not revealing the correct history of tobacco and alcohol consumption cannot be excluded.

Review by Shah and Mathur[16] in 2010 reported the prevalence of hypertension in urban areas of India to be 30.2% among males and 25.7% among females. The prevalence of hypertension in the present study is higher than this research. A multicentric study across different regions of India by Sekhri et al[17] reported prevalence for overweight/obesity of 46.1% among males and 55.3% among females. The difference between males and females was statistically significant however no such difference was observed in this study.

A study done by Bundela et al[18] in rural areas of Kurnool district of Andhra Pradesh in 2016 found the estimated cardiovascular risk in 98.3% of study subjects to be <10%, 5.48% had 10%-30% risk and only 0.69% had >30% risk. Another

study conducted in 2016 among the supporting staff of a tertiary hospital by Savitharani et al[19] recorded that the 10 year risk >10% for a major cardiovascular event was found in 1.7% of study subjects.

Limitations

This was a facility based study that hinders generalization of the findings. The other investigations of lipid profile, plasma glucose and psychosocial stress etc were not estimated in this study due to financial constraint.

Conclusions and Recommendations

There is a high prevalence of risk factors for cardiovascular diseases among adults of urban slums of Hyderabad. Around 16% had a ten year estimated risk of more than 20% for a major fatal or non fatal cardiovascular event. The results of this study can be used for population based primary prevention approach and strengthening of the National Programme for the prevention and control of Cancers, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS).

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