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PREVALENCE OF CARDIOVASCULAR RISK FACTORS IN THE RURAL AREAS OF KHYBER PAKHTUNKHWA

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ABSTRACT

Objective: To assess the prevalence of cardiovascular disease (CVD) risk factors in the rural areas of Khyber Pakhtunkhwa, Pakistan.

Methodology: This was a community based cross sectional study carried out, from February 2011 to July 2013. We evaluated healthy subjects following the WHO Stepwise approach to Chronic Disease Risk Factor Surveillance (STEPS). Individual consent was obtained. Data was collected on proforma prepared in the light of WHO core version 2.1, during a free medical camp campaign. Social class (Upper, Middle, Lower) was assigned to each participant based on their occupation. The variables recorded were pertinent clinical history, BP, body mass index (BMI), waist circumference, tobacco use, dietary habits, physical activity, Random Blood Sugar and total Cholesterol. Data was analyzed using SPSS version 16.

Results: A total of 2569 adults were analyzed. Mean age was 45.97 ±12.1 (25-64) years. Prevalence of hypertension (BP ⩾ 140/90) was 26.7% with 11.1% newly diagnosed cases. Mean BMI & waist circumference were 23.64 ±2.69 (17-35) and 86.30 ±7.98 (70-108), respectively with abdominal obesity more prevalent in females (21.7% vs. 18%, $p<0.0001$). Prevalence of DM was 7.9%, more in male 4.6%, with 2.1% newly diagnosed cases. Tobacco use and Physical inactivity was 24.4% and 23.6% respectively. Positive CVD family history was present in 11.9%.

Conclusion: There is higher prevalence of CVD risk factors in the rural population of Khyber Pakhtunkhwa.

Key Words: Risk Factors, Rural, Khyber Pakhtunkhwa

INTRODUCTION

The prevalence of cardiovascular disease is increasing globally, particularly in the developing world.[1] The number of people, who die from CVDs, will increase to reach 23.3 million by 2030.[2] Our South Asian region is one of the worst affected areas where peoples suffer CVDs at a relatively younger age.[3-5] It has been observed that this pandemic is due to an increasing prevalence of CVDs associated risk factors, majority of which are behavioral and thus preventable such as tobacco use, unhealthy diet and obesity, physical inactivity, and dyslipidemia. In Pakistan the prevalence data of cardio vascular diseases and its risk factors is scarce.

The National Health Survey of Pakistan (1990-1994) reported hypertension prevalence to be 18% in rural areas and this is consistent with reports from neighboring countries.[4,5] In a nationally representative sample, the prevalence of diabetes in rural areas is 6.9% in men and 2.5% in women, respectively.[6]

Waist circumference, BMI and physical inactivity all independently contributed to development of CVDs.[7] In a recent cross sectional study mean BMI was found to be 25.6 (±3.9) in the rural areas of Punjab Pakistan.[8] Today, nearly two out of three Americans are overweight or obese, with the 1999 to 2000 National Health and Nutrition Examination Survey (NHANES) showing 64.5% of men and women classified as overweight, of which 30.5% were obese in US.[9]

It has also been known that almost two million deaths per year worldwide are attributable to physical inactivity, which is one of the most common modifiable risk factors for CVD. Data from the National Health Interview Survey (NHIS) have suggested that 70 percent of U.S. adults do not meet the current recommendation of 30 minutes of light to moderate physical activity at least 5 days a week or vigorous activity for at least 20 minutes on 5 or more days of the week.[10]

One of the most consistent findings in observational dietary research is that individuals who consume higher amounts of fruits and vegetables have lower rates of heart disease and stroke.[11,12]

It was found in the NHIS that there are 20.6% current smokers in the United States.[12] The male preponderance and smoking being the major risk factors has been well documented in many local studies.[13] In a prospective study of women, more than 90 percent of all incident cases of diabetes occurred in those who failed to exercise, had a BMI greater than 25, smoked, or had poor dietary habits.[14]

For planning preventive and treatment strategies, the prevalence of the disease and its risk factors must be known. Because risk modification is the foundation of cardiovascular disease prevention, it is essential to estimate these risk factors in population sub-groups to identify those at higher risk. This study was therefore carried out to determine the burden of cardiovascular risk factors in Pakistan.

METHODOLOGY

This community based cross sectional study was carried out, from 1st February 2011 to 31st July 2013. We evaluated healthy subjects (25 to 64 years old) following the World Health Organization (WHO) Stepwise Approach to Chronic Disease Risk Factor Surveillance (STEPS). Individual consent was obtained, following approval from the hospital ethical committee. Data was collected on preformed proforma prepared in the light of WHO core version 2.1, during a free medical camp campaign organized by the local District health authorities with the help of Pakistan Army deployed Unit.[15] The variables recorded were relevant clinical history and CVD risk factors including hypertension (HTN), body mass index (BMI), waist circumference, tobacco use, dietary habits and physical activity. Random blood sugar and Cholesterol levels were measured using Glucose and Cholesterol meter. Data was analyzed using SPSS version 16.

Hypertension was defined as systolic blood pressure (SBP) $\geqslant$ 140mmgh and or diastolic blood pressure (DBP) $\geqslant$ 90mmhg or history of HTN.[16] Patients with either history of diabetes or random Blood sugar (RBS) $\geqslant$ 200 mg/d were included as diabetics. BMI was categorized as normal from18.5-22.9 kg/m^2,overweight for 23.0 to 24.9 kg/m^2, obesity $\geqslant$ 25 kg/m^2, and Sub optimal $<$ 18.5 kg/m^2 values.[17] Those who had ever smoked 100 (cigarette, Naswar or snuff or other form of tobacco) were considered as smoker.[12] Waist circumference $\geqslant$ 90cm in male and $\geqslant$ 80cm in female was considered as abdominal obesity.[18] Significant family history was considered pertinent when atherosclerotic disease was found in male before the age of 55 or before 65 years in female patients.[19] Those involved in physical activity for $\geqslant$ 30minutes at least $\geqslant$ 5time a week, were considered physically active. Social class was assigned to each participant on the basis of their occupation:

1. Upper class were professionals (those with executive jobs in the government or private sectors)

2. Middle class were non-manual workers (skilled individuals and or with office jobs)

3. Lower class was manual workers (unskilled workers or farmers).

Non-working women were assigned the social class of their husband or parents (if unmarried). Picture of local fruits and vegetables were used to take dietary history. Each picture was representing the size of a serving. Participants were asked how many days of a typical week they used such serving of fruits and vegetable in their daily life.

Table 1: Distribution of Selected Risk Factors in the Study

	Age	BMI	Waist Circumference	Random Blood Sugar	Random Total blood Cholestrole	Systolic BP	Diastolic BP
Mean	45.9704	23.6478	86.3063	136.7376	164.7170	128.9120	81.7696
Median	46.0000	23.8000	87.0000	122.0000	157.0000	118.0000	78.0000
Std. Deviation	1.21084	2.69127	7.98128	46.13011	32.81274	27.82034	1.01450
Range	39.00	18.00	38.00	250.00	170.00	170.00	80.00
Minimum	25.00	17.00	70.00	80.00	120.00	80.00	60.00
Maximum	64.00	35.00	108.00	330.00	290.00	250.00	140.00

Body Mass Index, Blood Pressure

RESULTS

A total of 2880 adults were evaluated but due to missing information of 311, data of 2569 subjects were available for final analysis. Mean age was 45.97 ±12.1 (25 to 64) years. The number of males and females was approximately equal (51.1% and 48.9% respectively). Mean BMI and waist circumference were 23.64 ±2.69 (17-35) and 86.30 ± 7.98 (70-108) respectively. Mean total Cholesterol and RBS were 164.7170±32.81 (120-290) & 136.74 ±46.1 (80-330) respectively as shown in Table 1.

Majority of the male population 531(20.7%) studied were from age group 55-64 years while female mostly 369(14.4%) were from age group 25-34 years.

Prevalence of hypertension was 26.7% (n= 686) with 11.1% newly diagnosed cases. Age group analysis of HTN showed that the prevalence was 4.7%, 17.3%, 33.9% and 35.7% in the age groups 25-34, 35-44, 45-54 and 55-64 years, respectively Mean Systolic & Diastolic BP were 128.91 ± 27.82 (80-250) and 81.76 ±10.1 (60-160), respectively.

Using the revised BMI categories for Asian populations, 41.9% of the participants were overweight while 36.5% were obese. Abdominal obesity was more prevalent in female population 21.7% (n=455) vs. 18% (n=462). Prevalence of Diabetes was 7.9% (n= 203) with male 4.6% and female 3.3%, with 2.1% newly diagnosed cases. Tobacco use was 24.4% (n= 627) with smokeless being 11.15% and smoking 9.1%. Physical inactivity was 23.6%. Less than 3 servings of fruits & vegetables daily were used by 66.35% and 29.9% of subjects. Positive pertinent CVD family history was present in 11.9% (n = 306), as shown in Table 2.We observed the most frequent presence of different risk factors in the age group 55-64 years as shown in Table 3.

DISCUSSION

Extensive clinical and statistical studies have identified several factors that increase the risk of CVDs. Fortunately majority of the risk factors like Diabetes Mellitus, Hypertension, Dyslipidemia, Obesity, Waist / Hip ratio, Smoking , Sedentary life style healthy are modifiable. Much of the attention has been focused on these modifiable risks factors, to identify them early and address them accordingly.[20]

In the present study we evaluated healthy subjects (25 to 64 years old) following the World Health Organization (WHO) Stepwise Approach to Chronic Disease Risk Factor Surveillance (STEPS).The mean age of the population studied was 45.97 ±12 with about equal number of male to female ratio (51.1% and 48.9% respectively). The most common risk factor observed was abnormal BMI. The prevalence of overweight and obese population was 41.9% and 36.5%, respectively. Tareen et al has recently mentioned about similar frequencies for overweight (44.1%) and obesity (28.4%) from the rural areas of Punjab province.[21] But fortunately the abdominal obesity which is considered more atherosclerotic was 20.4% with significant female predominance (female vs. male, 21.7% vs. 18%) ($p<0.001$).

The second most prevalent risk factor found was hypertension 26.7%, with 11.1% newly diagnosed cases. This is inconsistent with population based study from India (HTN, 27.5%), but a bit higher from our previous reports. We found 4.7%, 20.3%, 29.9% and 38.6% HTN in the age groups 25-34, 35-44, 45-54 and 55-64 years, respectively. Many studies have reported similar observations.[22,23] This also shows that advancing age increases the burden of hypertension.

The overall prevalence of physical inactivity was 23.6% in our study. Physical inactivity has been identified as the fourth leading risk factor for global mortality. Globally around 23% of adults aged 18 and over were not active enough in 2010.[24] Direct comparisons cannot be made with previous studies since different definitions were used for assessing physical inactivity.[25,26]

Table 2. Prevalence of Risk Factors Gender Wise

Variable	Male	Female	Total
Age			
25-34	192 (7.5%)	369(14.4%)	561(21.8%)
35-44	311 (12.1%)	309(12.0%)	620 (24.1%)
45-54	280(10.9%)	229 (8.9%)	509(19.8%)
55-64	531(20.7%)	348(13.5%)	879(34.2%)
Hypertension	372 (14.4%)	314(12.2%)	686(26.7%)
Diabetes Mellitus	167 (6.5%)	124 (4.9%)	293 (11.4%)
BMI Normal	22 (68.8%)	200(7.8%)	426(16.6%)
Overweight	595 (23.2%)	481(18.7%)	107(641.9%)
Obesity	450(17.5%)	487(19.0%)	937(36.5%)
Suboptimal	43(1.7%)	87(3.4%)	130(5.1%)
Abdominal Obesity	462 (18%)	557 (21.7%)	525 (20.4%)
Smokers	506 (19.6%)	19.6% 121(4.71%)	24.4% (n, 627)
Cigarette	226 (8.8%)	7 (0.3%)	
Naswar	192(7.5%)	98(3.8%)	
Snuff	36(1.4%)	12(0.5%)	
Others	52(2.0%)	4(0.2%)	
Social class Lower Class	782 (30.4%)	735 (28.6%)	1517 (59.1%)
Middle class	456 (17.8%)	426 (16.6%)	882 (34.3%)
Upper Class	76 (3%)	94(3.7%)	170 (6.6%)
Positive Pertinent family history	166 (6.5%)	140 (5.4%)	306 (11.9%)
Physical inactivity	283 (11%)	324 (12.6%)	607 (23.6%)
Number	1314(51.1%)	1255(48.9%)	2569
<3 servings of fruits	66.35%		
<3 servings of vegetables daily	29.9%		

This is the first study to determine the frequency of various form of tobacco use in rural areas of KPK, Pakistan. In the present study the overall prevalence of smoking was 24.4%. The most frequent form of tobacco being used was 'Naswar' 11.3% including 3.8% of females. According to CDC the prevalence of current smokers and ex-smokersis 18.8% and 25.5%respectively in the United States.[27] A recent Indian national survey conducted by Reddy and his colleagues revealed that more than 25% of adolescents aged 13 to 15 years in India had used tobacco, and17% reported current use.[28] The frequency of tobacco use was recently reported 29.4% among different occupational groups in Pakistan.[29] Thus tobacco use in our study is comparable in other international and national surveys.

Positive Pertinent family history of CVDs was present in 11.9%. This reflects a bit higher prevalence which could be due our participant selection which majority were relative of patients visited the free medical camp campaign. In a recent randomized trial 5% of participants in each group (5.9% in the control group vs. 5.4% in the intervention group) had a family history of premature CHD recorded in their health records, which increased to 29.2% in the intervention group when information from the family history questionnaire were added.[30]

Majority of the population (59.1%) was from the lower socioeconomic class based on individual skills. Less than 3 servings of fruits & vegetables daily were used by 66.35% and 29.9% of subjects. So a relative expensive diet rich in fruits (as compared to vegetable) can be explained by lower socioeconomic class. Though in Pakistan, social class by occupation does not essentially reflect an individual's wealth, which may influence an individual's health behavior.

LIMITATIONS

The study has some potential limitations. First, the generalization of these results to other regions of Pakistan may be limited by the data was collected during free medical camp campaign where majority of participants were

Table 3: Prevalence of Selected Cardiovascular Risk Factors by Age in the Study Population

	Age Groups (years)			
	25-34	35 - 44	45 - 54	55-64
Physical Inactivity	130 (23.2%)	137(22.1%)	114(22.4%)	226 (25.7%)
Overweight	224(8.7%)	257 (10.0%)	207 (8.1%)	388(15.1%)
Obesity	226 (8.8%)	196 (7.6%)	204 (7.9%)	311(12.1%)
suboptimal	32 (1.2%)	47 (1.8%)	16 (0.6%)	35 (1.4%)
Systolic Hypertensive	95 (3.7%)	134 (5.2%)	177 (6.9%)	280 (10.9%)
Diastolic Hypertensive	85 (3.3%)	132 (5.1%)	175 (6.8%)	269 (10.5%)
Cigarette	33 (1.3%)	53 (2.1%)	61(2.4%)	86(3.3%)
Naswar	58 (2.3%)	89 (3.5%)	47 (1.8%)	96 (3.7%)
Snuff user	14 (0.5%)	10 (0.4%)	6 (0.2%)	18 (0.7%)
Other	10 (0.4%)	9 (0.4%)	12 (0.5%)	25 (1.0%)
Diabetics	47 (1.8%)	56 (2.2%)	56 (2.2%)	134 (5.2%)

patients relative, though the camp was not only for CVDs evaluation. In addition, because the general population was not randomly sampled, the study may not be true representative of the rural populations. Second, most of those with diabetes mellitus and hypertension were self-reported cases; the self-reporting of these conditions might have introduced information bias into study estimates, because it depends upon awareness of their own health and better access to healthcare facilities which is meager in rural areas.

Despite its limitations, this study provides evidence that targeted intervention and awareness campaign is required.

CONCLUSION

Cardiovascular risk factors are more prevalent in the rural areas of khyber Pakhtunkhwa. These include obesity, hypertension, smoking especially Naswar use, sedentary life style and diabetes mellitus in the population of low socioeconomic class. Appropriate steps must be taken to low these CVS risk factors.

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