RESEARCH ARTICLE

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Prevalence and Predictors of hypertension, at Sriganganagar city of Rajasthan India.

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Abstract

Objective: The objective of this study is to determine the prevalence of essential hypertension among the population of Sriganganagar city of Rajasthan in north India and as well as to investigating the diseases and risk factors involved it its etiology.

Methods: An hospital based retrospective study was carried out to investigating the demographic details of disease and history of patients during the period Jan 2006 to December 2008 at the hospitals of Sriganganagar city of Rajasthan.

Results From a total of 613400 patients involved in retrospective study 29072 were identified as having essential hypertension. The overall prevalence of essential hypertension was 4.73%. The hypertensive prevalence was 60.1% and 39.87% among males and females, respectively. Study revealed that the risk of essential hypertension was significantly associated with body mass index, smoking status and a family history of essential hypertension.

Conclusion: As the prevalence of hypertension is high (4.73%), an appropriate intervention program shall be launched considering the modifiable risk factors in the area of Sriganganagar

Keywords: Hypertension, Body mass Index, Prevalence

INTRODUCTION

Hypertension is a major global chronic noncommunicable disease. One-quarter of the world's adult population has hypertension, and this is likely to increase to 29% by 2025. The absolute prevalence of hypertension in economically developed nations is 37.3% compared with 22.9% in developing nations (Kearney PM 2005). Hypertension is emerging as a major health problem. The prevalence of hypertension has increased in urban communities as Well as in rural people (Chobanian AV et al 2000). One of the earlier study carried out by Dubey VD and reported 4% prevalence of hypertension (Dubey VD1964). Another study carried out by ICMR in 1994 showing 25% and 29% prevalence of hypertension among males and females of urban Delhi respectively (ICMR 1994). Reports also suggest that prevalence of hypertension is rapidly increasing in developing countries and is one of the leading causes of death and disability in developing countries (Reddy KS 1962,Nissinen A1988). Several studies also conducted to find out the increasing burden of hypertension in Rajasthan state of India .Three serial epidemiological studies carried out during 1994, 2001 and 2003 demonstrated rising prevalence of hypertension (30%,36%,51%) respectively among males and 34%,38% and 51% among females in Rajasthan(Gupta R1995). Control of the predicted increase in cardiovascular diseases will require modification in the risk factors like lifestyle, stress, Technological advances etc. The present study was undertaken to further investigate hypertension in Rajasthan. The study aimed to assess the prevalence of

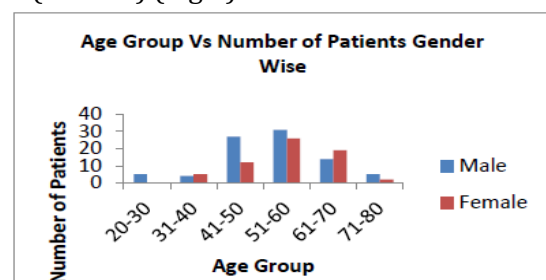| PREVALENCE OF HYPERTENSION IN DIFFERENT INDIAN REGIONS(dd)					
Regions	Year	Age Range (Year)	Study Sample Size	Age Standardised rate of Hypertension	
North India rural	1997	25	1935	23.1%	(Singh RB1997)
North Indian Urban	1997	25-64	1806	23.8%	(Gupta R1995)
West Indian Urban	1995	20	2122	30.7%	(Gupta R1994)
West Indian Rural	1994	20	3148	20.0%	(Arroyo P1999)

essential hypertension amongst population residing at Pakistan border   and to identify risk factor for essential hypertension.

METHODOLOGY

Place of survey and the population

A retrospective study was carried out at various hospitals of Sriganganagar city of Rajasthan with a sample size of 613,400 patients. Both urban rural populations reside in the Sriganganagar district. These patients were visited the hospital During Jan 2006 to Dec 2008. Only patients with essential hypertension were considered for the present study, patients with any form of secondary hypertension were excluded from the study.

Study design

Hospital based retrospective and prospective study was conducted during the period Jan 2006 to Dec 2008 during which data on all patients visiting the Outdoor Patient Department (OPD) and Indoor Patient Department (IPD) of the hospital was collected. Collected retrospective data suggested that a sufficient number of essential hypertensive patients were available to conduct a further study to identify risk factors for hypertension and to evaluation of different factors affecting the prevalence and predictors of hypertension in this population. For the prospective study information was collected for Various anthropometric characteristics like , sociodemographic profile, BMI ,as well as for smoking status and alcohol consumption using a questionnaire (IPAQ)(WHO, 1995), . One hundred and Fifty essential hypertensive patients were recruited into this part of the study based on some predetermined selection criteria as these patients were followed for response to antihypertensive therapy and pharmacogenomics studies. The control subjects were recruited from employees of the Seth G.L Bihani S.D Shikhsha Trust Sriganganagar. Only patients with essential hypertension, residing in the area at least for one year were considered, patients with any form of Secondary Hypertension were excluded from the study. Systolic blood pressure greater or equal to140 mmHg and diastolic blood pressure greater or equal to 90 mmHg were considered. Patients between 17 and 80 years of age included in the study Inclusion criteria for control group Systolic blood pressure less than 140 mmHg and diastolic blood pressure less than 90 mmHg, residing in the area at least for one year were considered Individuals who did not receive any anti-hypertensive therapy were considered. Patients between 17 and 80 years of age included in the study for the control group. Cases with essential hypertension were *matched* to normotensive controls with in different age groups and gender (Table 1) (Fig 1)

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Age group	Essential Hypertensive N= 150		Normotensive N=156	
	Male	Female	Male	Female
20-30	5	0	5	0
31-40	4	5	4	3
41-50	27	12	23	16
51-60	31	26	40	25
61-70	14	19	24	16
71-80	5	2	0	0
Total	86 (57.33%)	64 (42.665%)	96 61.53%	60 38.46%

Table: 1 Distribution of cases (essential hypertensive) and control (normotensive) matched by age and gender.

The normotensive control population comprised of 96 (61.53%) males and 60(38.46%) females. The age of males ranged between 24 and 70 years with a mean age of 54.91±1.05 years. In females the age ranged from 35 to 70 years with a mean age of 56.25±1.09 years. The cases with essential hypertensive comprised of 86 (57.33%) males and 64 (42.66%) females. The age of males ranged from 22 to 76 with a mean age of 54.27±1.21years and female age ranged between 32and 70 with a mean age of 56.99±1.23..The study was approved by Human Ethical Committee of the Seth G.L Bihani S.D College of Technical Education, Sriganganagar.

M esurement of blood pressure

Blood pressure was measured by using mercury sphygmomanometer and by the auscultatory method as per the guide lines of JNCVII. The individual was made comfortable and seated at least for five minutes in the chair before measurement. The pressures at which sound appeared and disappeared were taken as systolic blood pressure (SBP) and diastolic blood pressure (DBP) respectively. The measurements were made with individual in sitting position. Two readings were taken half an hour apart and average of two is reported here (http://www.mco.edu/org/whl/bloodpre.html).

Body weight was measured (to the nearest 0.5 kg) with the subject standing motionless on the weighing scale, height was measured (to the nearest 0.5 cm) with the subject standing in an erect position against a vertical scale . Body mass index (BMI) was calculated using the formula: weight (kg)/height (m2)(WHO, 1995). Anyone smoking at least one cigarette per day for a minimum of the past six months was considered a smoker, and others were classified as non-smokers. For alcohol intake, subjects were categorized as abstainers if they never consumed alcohol, and participants who consumed more than 30 ml of ethanol per day, that is, 720 ml of beer per day or 300ml per day of wine were categorized as heavy drinkers (Stamler et al., 1997).

Data entry & Analysis

Data was entered and statistically analyzed using SPSS 17.0 (SPSS Inc., Chicago, Illinois). Prevalence of essential hypertension is presented as a percentage together with a 95% confidence interval. Between groups comparisons were done using chi-square tests for categorical variables and student t-tests for numerical variables. Multivariate logistic regression models were used to examine the relationships of essential hypertension with body mass index, smoking, alcohol intake, age. Odds-ratios were calculated for different risk factors. p value less than 0.05 was used as the definition of statistical significance.

Results

There were 613400 subjects aged between 17-65 years and more with and without hypertension visited during Jan 2006 to Dec 2008. There were more males (60.1%) with essential hypertension than females (39.87%). The number of essential hypertensive patients was increased during the studied period: from 8808 cases in Jan2006- Dec2006, 9562 cases in Jan2007- Dec2007 and 10702 cases in Jan2008- Dec2008. There were more males (60.1%) with essential hypertension than females (39.73%).The comparison of the anthropometric and socioeconomic characteristics of cases and controls is shown in Table 2.

Parameters	Case with essential hypertension N=150	Normotensive N=156	P value
Ratio of Male/Female	86/64	96/60	ns
Mean age(years)	55±0.86	55.42±0.02	ns
Mean Height(cm)	5.29±0.02	5.31±0.02	ns
Mean Weight(Kg)	60.45±0.78	59.01±0.63	ns
Mean systolic BP(mmHg)	141.3±1.22	125.6±0.40	<0.0001
Mean diastolic BP(mmHg)	91.57±0.55	81.45±0.19	<0.0001
% of Urban	125(83.33%)	147(94.23%)	0.0032
% Rural	25(16.66%)	9(5.7%)	
% of Smokers	15(10%)	4(2.565)	0.0084
% of Non Smokers	135(90%)	152(97.43%)	
% of Alcohol consumers	10(6.66%)	6(93.84%)	
% of Alcohol non consumers	140(93.33%)	150(96.15 %)	0.311
BMI(Kg/m^2)	24.42±0.35	23.66±0.27	ns

Table: 2 Comparison of demographic and clinical features between normotensive controls and case.

The mean body mass index (p<0.05), body weight (p<0.05), were significantly not differ in essential hypertensive cases than normotensive controls. For

men, body mass index was not statistically significantly (p=0.6594) higher in cases with essential hypertension compared to normotensive controls (Table3).

Parameters	Case with essential hypertension N=150	Normotensive N=156	P value
Male			
Mean age(years)	54.27±1.21	54.91±1.05	ns
Mean Hight(cm)	5.37±0.028	5.36±0.025	0.88
Mean Weight(Kg)	60.94±0.99	59.84±0.84	0.3979
Mean systolic BP(mmHg)	141.3±1.39	125.9±0.54	<0.0001
Mean diastolic BP(mmHg)	90.85±0.78	81.34±0.24	<0.0001
BMI(Kg/M^2)	23.86±0.34	23.62±0.40	0.6594
Female			
Mean age(years)	56.99±1.23	56.25±1.09	0.6609
Mean Hight(cm)	5.20±0.03	5.22±0.033	0.6800
Mean Weight(Kg)	59.62±1.25	57.68±0.94	0.2308
Mean systolic BP(mmHg)	141.06±1.86	125.1±0.60	<0.0001
Mean diastolic BP(mmHg)	90.04±0.74	81.62±0.33	<0.0001
BMI(Kg/M^2)	25.09±0.65	23.93±0.49	0.1673

Table 3: Comparison of clinical parameters between hypertensive and normotensive participants stratified by gender.

Risk factors for essential hypertension

Risk factors for essential hypertension were analysed using chi square test and Multiple Logistic regression (Table 4).

Variable	Essential hypertension=150	Normotensive N=156	Odd ratio	P value
BMI			0.6452	0.979***
<22Kg/mm^2	35(23%)	50(32.05%)		
>2322Kg/mm^2	115(76.66%)	106(70.66%)		
Smoking			4.222	0.0084***
NO	135(90%)	152(97.43)		
Yes	15(10)	4(2.56)		
Alcohol use				
No	140(93.33%)	150(96.15%)	0.5600	0.3114ns
Yes	10(6.66%)	6(93.84%)		

Table 4: for determination of predictors of hypertension

The significant determinants of essential hypertension were body mass index (odd ratio: 0.6452, p<0.0001), smoking (odd ratio: 4.222, p<0.001) and use of alcohol (odd ratio: 0.5600, p<0.05). And considered not significant

DISCUSSION

It has been predicted that by the year 2020, there will be an increase by almost 75% in the global cardiovascular disease burden (Gupta R 1994) the situation in India is more alarming (Gupta R 1994). One disease with major impact in India is hypertension (Singh et al., 2006) which is an important cause of morbidity and mortality in the elderly population and is a risk factor for many other diseases. It has been predicted that by 2020, there would be a 111% increase in cardiovascular deaths in India. This increase is much more than 77% for China, 106% for other Asian countries and 15% for economically developed countries (Rodgers A2000).Trends in hypertension prevalence in India have shown a high prevalence of hypertension in both urban and rural areas. Several studies have been carried out to find out prevalence of hypertension in rural areas of north India and it was estimated that ranging from about 2% in 1958 to 21.2% in 1994 (Mathur et al.,1963; Malhotra 1970; Gupta et al., 1997) and it has increased to between 20% and 33% during the last decade (Gupta et al., 1995; Anand, 2000; Shantirani et al., 2003;Yadav et al., 2008) whereas (Yajnik, 2002) showed a lower prevalence (14%)among the rural population . Reasons for the increase in the prevalence of hypertension in urban Indian population may be due to dietary habits and lifestyle patterns, smoking.

In the present study, the overall prevalence of essential hypertension was 4.59%. Our data showed that the number of essential hypertensive patients presenting at our outdoor patient department increased during the study period. In the present study it was reveled that increase in BMI causes increase in the risk of hypertension several other Prospective studies also showed similar results (Kaplan NM,2006) This implies the importance of BMI in individuals as increased BMI has been positively correlated with high blood pressure. We also found that the risk of hypertension was more in the urban population as compared to rural population although increased level of education should decrease the risk of hypertension. A positive relationship between the use of smoking and blood pressure in men has been reported previously (Shey-Wiyosnge et al., 2004) present study also reveled similar results. Though most of the studies documented that hypertension is more prevalent in people with high educational level, such finding is expected in communities where the epidemiological transition is in advanced stage. The risk of hypertension did not differ significantly

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