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Research Article

Twin load of hypertension and diabetes amongst adults: community based study from Jammu and Kashmir, India

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ABSTRACT

Background: Data regarding the occurrence of hypertension and diabetes in the community are crucial for optimum allocation and utilization of health resources. Objective was to assess the efficacy of such field based exercise in detection of new undiagnosed cases and calculation of the consequent prevalence.
Methods: A cross sectional community based study was carried out to find out prevalence of hypertension and diabetes amongst adults (35-64 years) in Chatergam, Budgam (Jammu and Kashmir) during Oct 2011 to Feb 2012 on a pre-tested structured questionnaire. Blood pressure was measured in 2077 adults and random blood sugar (RBS) was measured in 1732 subjects to detect diabetes. Data was analyzed to find out the distribution of systolic (SBP) and diastolic (DBP) and the prevalence of hypertension and diabetes along with 95 percent confidence intervals.
Results: Mean SBP and DBP of 2077 subjects were 130.7 ± 40.3 and 83.1 ± 11.4 mm of mercury respectively. Values were the highest for both SBP and DBP amongst women of urban areas and in the 55 – 64 years of age. Quarter of studied persons (24.4%) had the family history of hypertension or diabetes or both. Based on the criteria of JNC 7, 41.1% subjects (95 % CI 38.9 – 43.2) were found hypertensive including 593 known cases (496 alone & 97 in combinations with diabetes). Prevalence of new cases of hypertension was 17.5 percent; it significantly increased with increasing age and was high amongst males and those residing in urban areas. 4.6% subjects (95% CI 3.6-5.7) were positive for diabetes based on RBS.
Conclusions: Considering high load of twin diseases and their impact on coronary vascular diseases (CVD), study emphasizes the need to implement an integrated population-based cost-effective control program with a focus on primordial and primary prevention.

Keywords: Hypertension, Diabetes, Community based cross sectional study, Jammu & Kashmir

INTRODUCTION

Hypertension (HT) and type 2 Diabetes mellitus (DM) are major risk factors for Cardio vascular diseases (CVD) - globally the number one cause of death.[1] Approximately 15% of hypertensive patients are diabetic and 75% of Type 2 diabetic patients are hypertensive.[2] People with both DM and HT have approximately twice the risk of CVD than a non-diabetic person with HT. Prevalence of HT in patients with DM is 1.5 - 2 times greater than in an appropriately matched non diabetic population.[3] Primary prevention targeting the reduction in incidence of these diseases is meaningful as they are incurable and require lifelong medication along with life style modification. Both the diseases when co-exist, complicate the scenario making their management even more difficult. While planning a community based primary prevention program for HT and DM, it is necessary to know the area specific prevalence of diseases. With this background, this study was undertaken to document the prevalence of HT and NIDDM amongst the adult residents from an administrative block of J & K. An additional objective was to assess the efficacy of such

field based exercise in detection of new undiagnosed cases and calculation of the consequent prevalence.

METHODS

It was a cross sectional community based study, undertaken amongst adults (35-64 years) who were the residents of Chatergam block located in Budgam District in Kashmir valley (J & K), India. Budgam district till recently part of Srinagar District has an area of 1371 square kilometers; it is bounded by the districts of Baramulla and Srinagar in the north, Pulwama in the south and the Poonch border in the south-west side. Population of Chatergam (Census 2011)[4] is 99882 spread out in 17805 households in 101 villages. It includes five zones namely Chanpora, Pohru, Nowgam, Lasjan and Chatergam. Chatergam block is semi urban in nature with a total population of 99882. Presuming that half of the population of this block will be adult in the age group of 35 - 64 years of age, it came out as 50000. There are several field based studies amongst adult population which depending up on the age group studied, reported a prevalence of HT between 20 and 40 percent.[5-9] Taking an average prevalence of 25 percent with 99 percent confidence levels and 2.5 percent of allowable errors, and the size of universe being 50000, sample size was 1915.[10] Considering some refusals and drop outs, it was decided to enrol additional 5 percent subjects taking the total to 2010. After deciding the sample size, a total five research teams each comprising of at least one doctor and 3- 4 paramedics were formed. Team members were trained by the investigators before the field survey. Each team was assigned to one administrative zone with a target to cover 505 persons. Total 2077 subjects underwent for BP measurement and 1732 for RBS level.

Field work was done by the trained personals between October 2011 and February 2012 on a pre-tested structured questionnaire for collection of data regarding the age, gender and residence (of subjects), readings of DBP, SBP and RBS level. Informed oral consent was obtained from each subject prior to the survey. Mercury sphygmomanometers were used to measure the BP which was calibrated from time to time. Measurements were recorded in left upper arm in sitting posture. SBP and DBP were taken at phase 1 and phase 5 of Korotkoff sounds respectively. A total of two readings with an interval of minimum 5 minutes were obtained for each subject and average of two readings was taken into the consideration. Criteria used to define HT were based on JNC 7.[11]

Similarly to define diabetes, the cut-off point used was RBS level more than 140 mg per 100 ml. Information was also gathered about the family history and previous history of these two illnesses and also the treatment details if any. Data was analysed in MS Excel 2007 to find out the distribution of SBP/ DBP (in terms of mean, standard deviations) and prevalence of HT and DM along with 95 percent confidence intervals in study population and its sub groups. Chi square test (simple & for trend), F test were used to test the statistical significance of observations in various sub groups.

RESULTS

Profile of study population

All five survey teams covered a population of 2078 against the targeted sample size of 2010. However, the form of 1 subject was incomplete hence the data was analysed for 2077 persons. It included 653 (31.4%) males and 1424 (68.6%) females, 1428 (68.8%) belonged to rural areas and 649 (31.23%) from urban areas. Mean age of female (49.1 ± 9.6 years) and male respondents (49.2 ± 9.3 years) was comparable. When inquired about, a quarter of total studied persons (24.4%) had the family history (amongst parents or siblings or both) of HT or DM or both including 15% with a history of HT, 4.4% with a history for DM and another 5% with a history for both disorders. Therefore during survey, a numbers of subjects were found suffering from HT (496) or DM (41) or both (97) and were aware of their disease status. Out of them 514 (81.1%) were on some medication.

Distribution of blood pressure

Distribution of both SBP and DBP (mean & standard deviation) in population and its sub groups is presented in table 1 and figure 1. Values of both SBP and DBP were highest in females (N = 168) who were aged between 55 – 64 years and were the resident of urban areas being 141.3 ± 48.8 and 87.9 ± 10.7 respectively. Between the two, SBP showed more variation (measured by the standard deviation) than DBP, further the age related increase was also seen more in case of SBP (Figure 1).

Prevalence of hypertension and diabetes

Based on the JNC 7,[5] amongst 2077 individuals, 852 were found as HT (41.1%) with another 910 (43.9%) as pre-hypertensive (PHT). Those with HT (852) included 593 known cases, therefore the newly detected cases of HT were 259 in a population of 1484 (2077 – 593). The prevalence of new cases of HT in this survey was 17.5%. Together, the groups of HT and PHT accounted for 85% of total subjects. Isolated systolic hypertension (ISH) was seen in 130 persons with a prevalence of 6.3%. Prevalence of HT significantly increased with age from 27.7% (35 – 44 years) to 56.7% (55 – 64 years). The prevalence was marginally high in females than males; difference was statistically not significant. Prevalence of HT was significantly high amongst residents of urban areas than their rural counterparts (table 2). In order to detect the cases of DM, population was screened with the RBS. A total of 1732 subjects could be covered and 79 were positive (4.6%). Trends similar to that of HT were observed here as well. Prevalence increased with age and was high amongst males and those residing in urban areas (Table 3).

Table 1: Age and sex wise distribution of SBP/DBP in the study population (N= 2077).

Variable	Population	SBP (mm of mercury)		DBP (mm of mercury)		Statistical significance
		Mean	SD	Mean	SD	
Age (Years)						
35 - 44	741	123.4	13.9	80.5	11.1	F = 62.2, p < 0.0000 (SBP) F = 41.4 , p < 0.0000 (DBP)
45 - 54	622	129.2	11.6	83.2	11.6	
55 - 64	714	138.8	41.6	85.9	11.3	
Gender						
Male	653	132.4	43.0	82.7	11.5	F = 2.7, p < 0.1 (SBP) F = 4.2, p < 0.04 (DBP)
Female	1424	130.0	23.6	83.8	11.4	
Residential status						
Rural	1428	129	31.8	82.14	11.4	F = 11.2, p < 0.0008 (SBP) F = 31.2, p < 0.0000 (DBP)
Urban	649	133.9	29.1	85.2	11.2	
Total	2077	130.7	40.3	83.1	11.4	

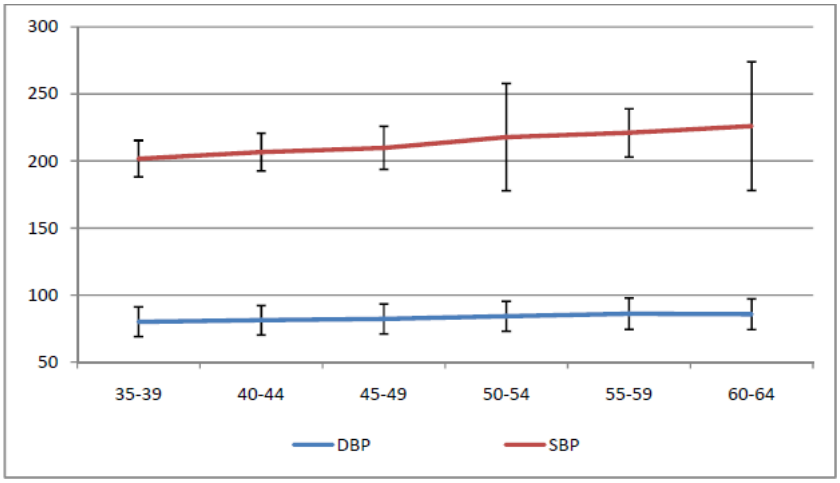

Figure 1: Distribution of SBP/DBP in mm of mercury (Mean & standard deviation) in different age groups (N = 2077).

DISCUSSION

HT the single most useful test for identifying individuals at a high risk of CVD[12] is directly responsible for 24% of all CVD deaths in India.[5] Mean SBP and DBP in present study were more in men (than women), urbanites and found increasing with age. Increasing age showed a significant and consistent linear association with blood pressure in present as well as other studies as well.[6] In the present study, increase with age was more pronounced in case of SBP than DBP. Because of the study design (field based from house to house) males especially from younger age groups are underrepresented as only those males who are elderly or ill are likely to be at home during survey; this possibly explain the higher values of SBP and DBP in males more so in those who were of higher age group. Reddy et al.[7] also with similar study design found higher measurements among men in higher age groups. Urban living contributes towards increase in BP because of the lifestyle. HT prevalence is lower in the rural Indian population, although there has been a steady increase over time here as well.[13] Risk of CVD begins at 115/ 75 mm of mercury doubles with each increment of 20/ 10 mm of mercury and this association is continuous, consistent and independent of other risk

factors.[11] In the present study prevalence of new cases was 17.4 percent, but when the existing cases included it was 41.1% higher than shown in Surat (24.1%).[6] Age as mentioned earlier was most contributory for increase in the prevalence of HT in present study; same is also reported by other studies.[6,8] Beyond the age of 50 years, SBP (> 140 mm of mercury) is more important risk factor for CVD than the DBP.[11] ISH which is more age dependent was seen in 6.3 percent subjects compared to 4.3 percent in a study.[9] Detection of hypertensive (BP > 139/ 89 mm of mercury) is important to put them on therapy and life style modifications to keep their BP under control and reduce the risk of complications including CVD, however, the detection of PHT (SBP between 120 – 139 & DBP between 80 - 89 mm of mercury) in such community surveys is even more important for health promoting life style modifications to reduce the risk of CVD.[11]

Table 2: Prevalence of hypertension in study population (N = 2077).

Variable	Population	Hypertension	Prevalence (%)	95 % CI	Statistical interpretations
Age (years)					
35 - 44	741	205	27.7	24.5 - 31.0	X^2(for trend)= 327.7, d f = 1, p < 0.000 (Highly significant)
45 - 54	620	242	39.0	35.2 - 43.0	
55 - 64	714	405	56.7	53.0 - 60.4	
Gender					
Male	652	261	40.0	36.3 - 43.9	X^2 = 0.41, df = 1, p < 0.51 (Not significant)
Female	1423	591	41.5	39.0 – 44.1	
Residential status					
Rural	1427	521	36.5	34.0 - 39.0	X^2 = 39.1, df = 1, p < 0.000 (Highly significant)
Urban	648	331	51.1	47.2 - 55.0	
Total	2075	852	41.1	38.9 - 43.2	

Table 3: Prevalence of diabetes based on RBS level in study population (N = 1732).

Variable	Population	Diabetes	Prevalence (%)	95 % CI	Statistical interpretations
Age (years)					
35 - 44	576	13	2.3	1.2 - 3.8	X^2(for trend) = 9.7 d f = 1, p <.01 (Significant)
45 - 54	537	29	5.4	3.7 - 7.7	
55 - 64	619	37	6.0	4.2 - 8.1	
Gender					
Male	558	27	4.8	3.2-7.0	X^2 = .146 d f = 1, p < 0.5 (Not significant)
Female	1174	52	4.4	3.3-5.8	
Residential status					
Rural	1089	36	3.3	2.3-4.6	X^2 = 10.6 d f = 1, p < 0.01 (Significant)
Urban	643	43	6.7	4.9-8.9	
Total	1732	79	4.6	3.6-5.7	

There is a strong epidemiological connection between HT in DM and adverse outcomes of diabetes. In NIDDM, HT is often present as part of the metabolic syndrome of insulin resistance.[14] WHO has projected maximum increase in the number of diabetics in India and with nearly 33 million diabetic subjects, its burden of India is enormous.[15] Prevalence of DM was significantly more in urbanites and showed significant associated with age and similar to community based study done by Cythera (2010).[16] One heartening aspect of present study was that a total of 81.1 percent of subjects suffering from one or both diseases (aware of their status), were taking regular treatment. It was cent percent in another study from South India,[7] however, the effective control of HT here was seen only in 41.7% subjects.

CONCLUSION

HT and DM may occur independently but co exists more frequently due to common risk factors therefore there is a need to implement an integrated population-based cost-effective control program. This program can be delivered through existing public health network with a strong focus on the primordial/ primary prevention (prevent new incident cases) and secondary prevention (active detection of hypertensive / pre hypertensive cases, life style modification & referral for treatment). An integrated common health educational package can be developed targeting both diseases together to generate awareness and facilitate the early detection. The high yield of cases of HT (17.5%) and DM in this study justifies the role of such community surveys not only in generating awareness amongst masses but also in detection of cases.

Limitations

1. It was a field based study where the data was gathered through house to house visits. Male population was under represented as many of them were absent at the time of survey.

2. Information about various individual characteristics such as body weight, education, occupation, exercise and personal habits such as dietary pattern, consumption of alcohol and tobacco products etc. were not gathered.

3. Prevalence of DM in present study was solely based on RBS levels which have limitations in diagnosing diabetes. Hence the prevalence is likely to be under reported as no attempt was made to link the past history of DM (recall of subject) with current RBS level.

4. Two readings of blood pressure at 5 minutes interval are good only to find out the prevalence in the community but cannot be taken as diagnostic for an individual to initiate the medication.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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