ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Prevalence of Hypertension in a Fishermen Colony of District Kollam, Kerala: A Cross-sectional Study.

Ahmad Nadeem Aslami [*1], Abraham Jobby[2], Vincy Nelson[1], and Sony Simon[1].

[1]Department of Community Medicine, Travancore Medical College, Kollam, Kerala, India.
[2]Department of Forensic Medicine, Travancore Medical College, Kollam, Kerala, India.

ABSTRACT

Hypertension is one of the major public health issues in World today. In Kerala, the prevalence of hypertension is increasing rapidly due to several factors including fast life style and longevity. The objective of this study was to find out the prevalence of hypertension in a fishermen colony of Jonakapuram, Kollam, Kerala. A community based cross sectional study was conducted in the field practice area of Urban Health Training Centre of a Medical College. 985 study subjects aged 19 years and above were selected for the study. The study period was from January 2013 to December 2013. A house to house survey was conducted by using systematic random sampling. Percentiles, chi square test and multiple logistic regression was done on SPSS Software version 12. The prevalence of hypertension was 28.02% and it was significantly more in females as compared to males. The factors associated with hypertension were age, body mass index, additional salt intake, smoking, alcohol consumption and diabetes mellitus. 71.74% study subjects were aware about their hypertensive status and about 61.59% were on antihypertensive medication. The prevalence of hypertension in Jonakapuram is slightly high as compared to national average. A community based 'high risk screening' program to prevent the modern epidemic of chronic NCD's like hypertension is necessary.

Keywords: Hypertension, Kollam, prevalence, body mass index, awareness, compliance

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Worldwide, there is a shift from communicable diseases occurring in children towards Non-Communicable Diseases (NCD's) affecting adults. In 2010, one of the leading risk factors for global disease burden was high blood Pressure (BP) or hypertension in south Asia. [1] Hypertension is a key NCD and it appears to be increasing in prevalence, possibly associated with developmental and lifestyle changes. [2]

The prevalence of hypertension in India ranges from 25-33% in different part of country as given by several studies. [3] Among the several NCD's, hypertension is an important cause for nearly 10% of all deaths. [4] It is responsible for 24% of acute myocardial infarction and 29% of strokes and so, by preventing and controlling hypertension we can reduce the huge amount of cardiovascular deaths. [5]

There is still a paucity of field based studies on hypertension in India. Keeping in view of this fact we conducted a study to find out the prevalence of hypertension in a fishermen colony of district Kollam, Kerala; to determine the association of selected factors with hypertension and to know the awareness about hypertension among adult population.

MATERIAL AND METHODS

A community based cross sectional study was done in the field practice area of urban health training centre of Travancore Medical College. The centre is about 8 kilometres away from the college in Jonakapuram, Kollam, Kerala. It is a coastal area with the main bulk of population comprising of fishermen. Sample size was calculated as 896 based on 30% prevalence of hypertension as observed in the pilot study.

Jonakapuram area was having 1060 houses with total population of 4250 (19 years and above). We did a house-to-house survey by systematic random sampling method by selecting every fourth household. A total of 985 persons of 19 years and above from 265 houses were interviewed. A team of third year medical students of our college who were posted in urban centre visited the selected households under the guidance of doctors and other staff. They were trained to measure blood pressure (BP).

We collected socio-demographic profile of study subjects and also asked them about their personal habits like smoking, alcohol and salt consumption. Of the 1060 usual residents in the study area 75 (7.07%) were excluded due to reasons like non-availability, non-local residents and non-cooperation. The overall response rate was 92.93%. We measured BP in the sitting position after a resting period of 5 minutes using a mercury sphygmomanometer. Two more BP measurements were done on each participant within 30 minutes and we calculated the mean value of the recorded BP.

The survey was completed in a period of one year in 2013. After the interview, we gave a brief awareness class to the study participants and discussed about the risk factors of hypertension and importance of regular BP check up.

Statistical analysis

Data was collected, assembled and entered in MS excel 2007 and analysis was done by using Statistical Package of Social Sciences (SPSS) 12. Appropriate statistical tests were applied. The Chi-square test was applied. A p value of <0.05 was taken as statistically significant. Univariate analysis was done. Multiple logistic regression analysis was also performed. Hypertension was kept as dependent variable and independent variables were age, BMI, Salt intake, DM, Smoking, Alcohol, Occupation, history of hypertensive parents and familial history.

RESULTS

Results are presented in table no 1 to table no 4 and figure no 1.

ISSN: 0975-8585

Table 1: Age-wise prevalence of hypertension among study subjects

Age group (in years)	Hypertensive N (%)	Normotensives N (%)	Odds Ratio (OR)	95% C.I. of O.R
19-40	42 (7.37)	528 (92.63)	01.00	-
41-59	142 (51.64)	133 (48.36)	17.72	03.81 – 112.61
≥ 60	92 (65.71)	48 (34.29)	74.52	16.23 – 462.77
Total	276 (28.02)	709 (71.98)	-	-
χ^2 = 295, DF = 2, p < 0.001; highly significant, figures in parenthesis are in percentages.				

Table 2: Study variables and their association with hypertension: Univariate analysis

Variables	Particulars	Hypertensives N (%)	Normotensives N (%)	Odds ratio	95% C.I. of O.R	P value
Sex	**Males**	111 (24.61)	340 (75.39)	1	-	0.029
	Females	165 (30.90)	369 (69.10)	1.37	1.03-1.81	
BMI	**≤ 18.5**	25 (11.01)	202 (88.99)	1	-	0.000
	18.6 – 24.9	170 (29.67)	403 (70.33)	1.67*	0.79-3.22	
	25.0 – 29.9	69 (42.86)	92 (57.14)	13.14	5.71-31.22	
	≥ 30	12 (50.00)	12 (50.00)	18.44	4.33-71.52	
Salt intake	**Yes**	69 (41.82)	96 (58.18)	2.12	1.50-3.01	0.000
	No	207 (25.24)	613 (74.76)	1	-	
Alcohol Intake	**Yes**	52 (35.61)	94 (64.39)	1.51	1.04-2.20	0.027
	No	224 (26.70)	615 (73.30)	1	-	
Smoking	**Yes**	40 (44.44)	50 (55.56)	2.23	1.43-3.47	0.000
	No	236 (26.37)	659 (73.63)	1	-	
DM	**Yes**	122 (61.00)	78 (39.00)	6.40	4.58-8.95	0.000
	No	154 (19.62)	631(80.38)	1	-	
*Not significant, figure in parenthesis are in percentages						

Table 3: Contribution of individual risk factors on SBP and DBP (n=985)

Variable	SBP			DBP		
	R^2 change%	F change	*p*	R^2 change%	F change	*P*
Age	18.42	255.33	**	11.42	150.57	**
BMI	3.42	45.22	**	3.95	56.89	**
Salt intake	3.11	39.44	**	2.24	36.25	**
DM	1.55	29.67	**	1.27	23.67	**
Smoking	1.22	26.53	**	1.14	19.56	**
Alcohol	0.25	05.24	*	0.67	11.45	*
Occupation	0.11	01.89	*	0.28	3.46	NS
Parents hypertensive	0.05	01.01	*	0.17	2.56	*
Family history	0.01	0.08	NS	0.06	2.34	*
NS : Not significant; *p < 0.05 ; **p < 0.001; R^2: Coefficient of multiple determination (Multiple Regression)						

Table 4: Awareness and practices among study subjects (≥19 yr) about hypertension

Particulars	A	B	C	D
	N	Hypertensives (B/A)	Awareness present (C/B)	On treatment (D/B)
Age group (yrs)				
19-40	570	42 (7.37)	24 (57.14)	10 (23.81)
41-59	275	142 (51.64)	104 (73.24)	94 (66.20)
≥ 60	140	92 (65.71)	70 (76.09)	66 (71.74)
Total	985	276 (28.02)	198 (71.74)	170 (61.59)
Gender				
Men	451	111 (24.61)	65 (58.56)	50 (45.04)
Women	534	165 (30.90)	133 (80.61)	120 (72.73)
Figure in parenthesis are in percentages				

ISSN: 0975-8585

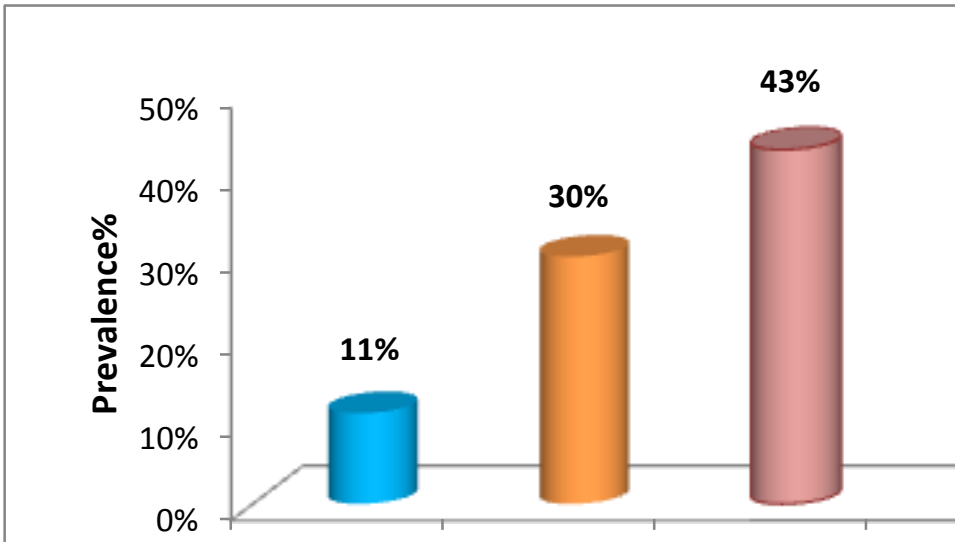

Figure 1: Bar diagram showing prevalence of hypertension according to BMI

Out of 985 subjects examined, 276 were having hypertension. So, the prevalence of hypertension was 28.02%. The age wise distribution of our study subjects along with the prevalence of each group is shown in Table 1. The prevalence of hypertension increased with increasing age. The lowest prevalence was in the age group of 19-40 years (7.37%). The prevalence of hypertension in the age group of 41-59 years and among subjects more than or around 60 years was 51.64% and 65.71% respectively. This association between increasing age group and hypertension was statistically significant ($p < 0.001$).

Table 2 analyses the risk factors of hypertension by univariate analysis. The prevalence of BP in females (30.90%) was significantly high as compared to males (24.61%). 58.17% study subjects were in the range of normal BMI (18.6-24.9 kg/m^2). 29.67% of these were having hypertension although the risk is more in this group as compared to the other group having BMI less than or equal to 18.5 kg/ m^2. But the difference was statistically not significant (OR = 1.67; 95% of CI 0.79-3.22). The subjects who were having BMI more 25 were having significantly higher prevalence of hypertension as compared to subjects having BMI less than or equal to 18.5 kg/ m^2 (OR = 13.14; 95% of CI 5.71-31.22) [Figure 1].

We defined additional dietary salt intake if more than or equal to two pinches of salt per meal excluding the previously added normal salt to the meal during cooking is taken by the individual. 16.75% subjects were consuming additional dietary salt. Out of these 41.82% were having hypertension. The individuals taking additional dietary salt were having more prevalence of hypertension as compared to those who were not taking extra salt. (OR = 2.12, 95% CI 1.50-3.01).

14.82% subjects were having a habit to consume regular alcohol. Of these, 35.61% study subjects were found to have hypertension. These alcoholics were having 1.5 times higher risk as compared to non-alcoholics (OR = 1.51). 9.14% study subjects were having a habit of smoking, of these 44.44% were having hypertension and 55.56% were not having hypertension. The risk was nearly 2 times for smokers as compared to non-smokers (OR = 2.23). Out of 985 study subjects, 200 (20.30%) had Diabetes Mellitus (DM). 61% of these had hypertension. The risk of having hypertension among diabetics was nearly 6 times.

Table 3 shows multiple logistic regression analysis. We found that as far as individual role of each factor is concerned, after controlling for other variables, age is an important factor for both Systolic blood pressure (SBP) and Diastolic blood pressure (DBP) (Table 3). The second most important factor came out to be BMI. The other factors which were significantly associated were salt intake, DM, smoking, alcohol intake, occupation and history of parental hypertension.

Awareness about hypertensive status and its antihypertensive treatment is shown in Table 4. Overall 71.74% subjects were aware about their hypertensive status and 61.59% were on medication for the same. The awareness increased as we go higher in age group, 57.14% for 19-40 years, 73.24% for 41-59 years and maximum 76.09% for the subjects of age above or around 60 years. The subjects who were taking treatment for hypertension also showed similar trend; 23.81% for age group 19-40 years, 66.20% for age group 41-59 years and 71.74% for age equal to or around 60 years. Out of 111 male hypertensive, 58.56% were aware of their hypertension and 45.04% were on antihypertensive treatment. In comparison, 80.61% of female hypertensives were aware of their condition and 72.73% were on medication for hypertension.

DISCUSSION

The overall prevalence of hypertension in fishermen colony of Jonakapuram area was 28.02% (276 of 985). The prevalence was maximum (65.71%) in the study subjects more than or around 60 years [Table 1], while it was minimum i.e. 7.37% in the age group 19-40 years. So prevalence of hypertension increased with increasing age.

The prevalence was much higher than the previously reported pooled prevalence of about 16–20% in India. [6-8] The prevalence of hypertension is higher in Kerala as compared to other parts of India. This has been attributed in previous studies to an epidemiological transition existing in Kerala. [9-11] The environmental factors like stress and fast life may be a reason for this.

Of the total 276 subjects with hypertension, 111 (24.61%) were males and 165 (30.90%) were females i.e. higher hypertension prevalence was observed in females as compared to males. Also, this difference was statistically significant. Our finding is opposite to the studies done previously. Gupta S found that males are at higher risk for hypertension as compared to females.[12] Vimala A *et al*. did a study in an urban population in Kerala and they found equal sex ratio in hypertensives.[13] The reason for this difference needs further investigation. Body mass index and hypertension was found to be highly positive in our study. Persons having BMI more than or equal to 25 were having higher risk. The similar findings were also reported by a number of epidemiological studies [8, 14]

It has been a proven fact that extra salt intake is an important modifiable risk factor for hypertension. This is proved once again in this study. The hypertension prevalence was higher (41.82%) in subjects following additional dietary salt intake compared to those who gave no history of additional dietary salt consumption. A 2.12 times higher risk was found in study subjects with additional dietary salt consumption. Similar findings between salt and hypertension have been observed by Bhansali *et al* 2015, [15] and Bhadoria *et al* 2014. [16] Alcohol consumption and hypertension were directly associated. Higher prevalence (35.61%) was seen among study subjects with history of regular alcohol consumption. 1.5 times higher risk was observed in alcohol consumers (OR = 1.51). The same situation is with association of smoking and hypertension. 44.44% of study subjects who were current smokers were found to be hypertensive and the risk was nearly 2 times as compared to those who were non smokers (OR = 2.23). The similar findings related to alcohol consumption and smoking was observed by many studies.[17, 18]

It is a well known fact that hypertension and diabetes go hand in hand and this was found true in our study. 20.34% of study subjects were having confirmed diabetes mellitus; of these 61% were having hypertension while 39% were not having hypertension. Diabetics were more hypertensives as compared to non diabetics. 6.40 times higher risk was found in diabetics. (Table 2, OR = 6.40). This finding has been supported by various studies from other countries as well as India.[19, 20]

We performed multiple linear regression for SBP and DBP. The entire variable chosen for the study were given uniform numerical scores. Multiple logistic regression analysis revealed that the age as a single most important risk factor responsible for hypertension, others being BMI, extra salt intake, diabetes mellitus, smoking, alcohol, occupation, history of hypertension in parents and family history of hypertension in decreasing order.

Similar finding was observed by Sadhukhan *et al* who found the age as most important factor (16.57% for SBP and 7.90% for DBP), BMI (3.10% for SBP and 7.78% for DBP), occupation (3.18% for SBP and 0.66% for DBP), and additional salt intake (3.31% for SBP and 2.85% for DBP).[21]

The awareness of hypertension among hypertensive study subjects was adequate. Among hypertensive (n =276), about 71.74% were aware about the condition and about 61.59% were on treatment. The awareness and treatment was seen more among older individuals and women as compared to younger subjects and men respectively.

Vimala *et al* observed that awareness was lower among younger age group, but increased with increase in age.[13] Therefore, increasing awareness about the condition and regular BP check-up for an early diagnosis and control of hypertension should be strengthened in the community.

CONCLUSION

The overall prevalence of hypertension observed in our study subjects was 28.02%. We conclude that the prevalence increases gradually with age, BMI, additional salt intake, Alcohol consumption, smoking and patients suffering with diabetes mellitus. About 2/3 of the study subjects were aware about their hypertensive status. Women were more aware about their hypertensive status and they were taking regular treatment more as compared to men.

RECOMMENDATIONS

There is a dire need for a community based 'high risk screening' program to prevent the modern epidemic of chronic NCD's like hypertension. Information, education and communication (IEC) activities should be started to increase the awareness of common people to adopt healthy life styles like regular physical exercise in the form of brisk walking, restricted salt intake, avoidance of alcohol and smoking.

LIMITATION OF THE STUDY

The main limitation of this study is that BP has been checked only once. This is a limitation as single visit measurement may overestimate the prevalence of hypertension. However, since the study has been done in the community, the scientific relevance of the observations is high. Also, as the area is our field practice area, we will follow up the patients with subsequent visits. Intra-observer and inter-observer bias could have occurred. Recall bias is also a possibility.

ACKNOWLEDGEMENT

I sincerely acknowledge our 2010 batch students who did all data collection. I am grateful to health workers of our department of community medicine, Travancore Medical College, Kollam for entering data.

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