

## Prevalence of Hypertension and its determinants among adults in a rural community of Koppal, Karnataka

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### Abstract

**Background:** Globally, Hypertension emerged as the major public health problem in the recent decades owing to demographic transition, increased urbanization and cultivation of unhealthy lifestyles. Hypertension is the single largest contributor to the avoidable deaths and diseases in India. **Objectives:** 1.To estimate the prevalence of Hypertension among adults in the study setting and 2.To determine various factors associated with Hypertension. **Methods:** A cross sectional community-based study was conducted in the field practice area of PHC, Irkalagada, Koppal for a duration of 3 months from September 2019 to November 2019. Cluster sampling technique was used for sample selection and a total of 629 adults were included. Data collection was done using pretested and semi structured questionnaire; BP measurement and anthropometric measurements were taken using standard techniques. Statistical analysis was done using WHO Epi info software version 3.5.4. **Results:** The prevalence of hypertension among adults was found to be 131 (20.82%) in the present study. The study found significant association between prevalence of hypertension and Age, Body mass index, Waist to hip ratio, Alcohol consumption, Smoking and Physical activity of the study participants. **Conclusion:** The present study revealed that the burden of hypertension among adults is high in the study setting and identifies multiple risk factors for effective planning of interventions.

**Keywords:** Hypertension, Adult, Smoking, Waist- Hip Ratio.

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### Introduction

Globally, hypertension has been emerging as a major public health problem in recent decades. It is a modifiable and major risk factor for Coronary artery disease, Cerebrovascular disease and Chronic renal failure. Hypertension is responsible for 45% of deaths due to cardiovascular disease and 51% of deaths due to stroke worldwide [3,4]. Globally, high systolic blood pressure (SBP) accounted for 10.2 million deaths and 208 million disability-adjusted life years (DALYs) in the year 2017[5]. It was also the third most important attributable risk factor for burden of diseases in South Asia[6]. The prevalence of hypertension varies widely across the regions of the world and is a serious public health threat in both developed and developing countries[1,2]. Different factors are responsible for this increase in the prevalence of hypertension like demographic ageing, increased urbanization and globalization of unhealthy lifestyles. As per recent estimates, currently 1.13 billion people have hypertension globally and this is estimated to increase to 1.56 billion by 2025[4,7,8]. During the last few decades, the prevalence of hypertension has increased drastically in India. In India, the prevalence of hypertension ranges between 20 – 40% in urban areas and 12–17% among rural adults[7,9]. As per recent data, there were 207 million people affected by hypertension in India and hypertension was attributed to 1.63 million deaths in the year 2016 [5]. Since hypertension exhibits “Iceberg phenomenon” in the community, its actual burden is always an under estimation of true burden. Despite the fact that hypertension is easily detectable and treatable, most of the cases go undetected and over a period of time

patients develop complications[7]. Because hypertension exerts a substantial impact on the cardiovascular health of the population, an estimation of its prevalence and identification of risk factors/ groups is essential for effective planning of interventions. With this background, the present study was undertaken in a rural community of Koppal district, which is considered as one of the backward districts in the Kalyan Karnataka region according to Article 371 J of the constitution.

#### Objectives of the study

- 1) To estimate the prevalence of Hypertension among adults in the study setting and
- 2) To determine various factors associated with Hypertension.

#### Materials and Methods

**Study design:** Community based cross-sectional study.

**Study setting:** Field practice area of PHC Irkalagada, Koppal.

**Study duration:** 3 months (September 2019 – November 2019)

**Study population:** All the adults in the study setting.

**Sample size:** Minimum sample size calculated was 600 with an absolute precision of 5%, significance level of 0.05 and design effect of 2, taking 25% prevalence of Hypertension in Karnataka as per recent estimates[7] and we included 629 adults in the present study.

#### Sampling technique

Cluster sampling technique was used for sample selection. All 11 villages in the field practice area of PHC Irkalagada, Koppal were considered as clusters and 6 such clusters were selected by Simple random sampling. In each of the selected cluster, house to house visit was done and 110 adults were included in the study. However, owing to disparities/ incomplete data in the questionnaires, only 629 adults could be used for final analysis.

#### Exclusion criteria

- 1) Adults not found in the house even after giving 2 visits.

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2) Adults residing in the study area for a period of less than 6 months.

3) Temporary visitors/ guests to the house.

**Study tools and Data collection**

**1) Questionnaire:** Pretested and Semi structured questionnaire, created by modifying WHO STEP Surveillance (STEPS) questionnaire version 3.1, was used for collection of data by interviewing the study participant, after taking an informed consent during house-to-house visit.

**2) Sphygmomanometer:** Blood pressure was recorded in the sitting position in the right arm supported at heart level, to the nearest 2 mm using sphygmomanometer, after a rest of 5 minutes. Two such measurements were taken for each participant and the third measurement was taken if the difference between the first and second measurement was more than 10 mm of Hg. The average of the two closest measurements was used to ascertain blood pressure.

**3) Weighing machine:** Body weight was measured without footwear to the nearest 0.1 Kg using LED digital portable weighing scale.

**4) Portable stadiometer:** Height was measured using a standard portable stadiometer to the nearest centimetres.

**5) Measuring tape:** Waist circumference and Hip circumference were measured to the nearest centimetres.

**Definition/ Classification of Some important study variables:**

**Hypertension:** Hypertension is considered to be present if SBP is 140 mm Hg or greater or DBP of 90 mm Hg or greater or both on

measurement as mentioned above, as per JNC VII criteria[11] OR If participant reports having been diagnosed with hypertension in the past by a health professional irrespective of their current blood pressure measurement or antihypertensive medication intake.

**Socio economic status:** classified according to Modified BG Prasad Classification[12]

**Body mass index (BMI):** classified as per WHO guidelines[13]

**Waist to Hip ratio:** classified as per WHO guidelines[14].

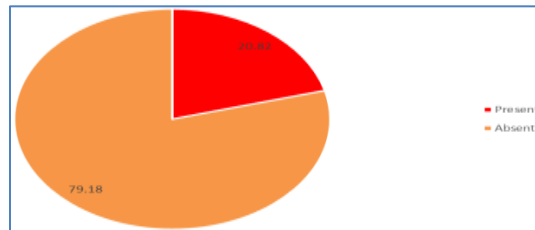
**Statistical analysis:** Data analysis was performed using the Epi info software version 3.5.4 (Centers for Disease Control and Prevention” (CDC), Atlanta, Georgia, United States of America).

**Ethical Clearance:** Ethical clearance was obtained from the Institutional Ethics Committee, Koppal Institute of Medical Sciences, Koppal.

**Results**

The present study included 660 randomly selected adults in the field practice area of PHC, Irkalagada. Owing to incomplete/ discrepancies in the questionnaires, 31 questionnaires were discarded, leading to sample of 629 in the final analysis.

**Fig 1:** shows the prevalence of hypertension among adults in the present study. The overall (self-reported and detected) prevalence of hypertension was found to be 131 (20.82%), out of which 29 (4.61%) had it controlled within normal limits.



**Fig 1: Prevalence of Hypertension among adults in the present study (N = 629)**

**Table No.1:** demonstrates prevalence of hypertension among study subjects according to certain socio demographic variables. Prevalence of hypertension was found to be directly proportional to age group in the present study except at  $\leq 25$  years and  $\geq 85$  age

groups and it was found to be statistically significant ( $P < 0.05$ ). However, the study could not find any significant association ( $P > 0.05$ ) between the prevalence of hypertension and other socio demographic variables.

**Table 1: Prevalence of Hypertension among study subjects according to certain Socio demographic variables (N = 629)**

Variable	Classification	Number of adults N	Hypertension n (%)		
			Present	Absent	
Age (in years)	$\leq 25$	11	2 (18.18)	9 (81.82)	$\chi^2 = 29.095$ $P = 0.000$
	26 - 35	196	21 (10.71)	175 (89.29)	
	36 - 45	152	28 (18.42)	124 (81.58)	
	46 - 55	71	17 (23.94)	54 (76.06)	
	56 - 65	111	34 (30.63)	77 (69.37)	
	66 - 75	67	23 (34.32)	44 (65.68)	
	76 - 85	14	5 (35.71)	9 (64.29)	
$\geq 85$	7	1 (14.28)	6 (85.72)		
Gender	Male	255	61 (23.92)	194 (76.08)	$\chi^2 = 2.491$ $P = 0.114$
	Female	374	70 (18.71)	304 (81.29)	
Diet	Vegetarian	141	32 (22.69)	109 (77.31)	$\chi^2 = 0.385$ $P = 0.535$
	Mixed	488	99 (20.28)	389 (79.72)	
Religion	Hindu	593	127 (21.41)	466 (78.59)	$\chi^2 = 2.263$ $P = 0.323$
	Muslim	35	4 (11.42)	31 (88.58)	
	Others	1	0 (0)	1 (100)	
Literacy	Illiterate	437	91 (20.82)	346 (79.18)	$\chi^2 = 0.164$ $P = 0.921$
	Literate but Primary	111	22 (19.81)	89 (80.19)	
	High school & above	81	18 (22.22)	63 (77.78)	
Marital status	Married	611	128 (20.94)	483 (79.06)	$\chi^2 = 0.194$ $P = 0.659$
	Unmarried	18	3 (16.66)	15 (83.34)	
Family type	Nuclear	302	54 (17.88)	248 (82.12)	$\chi^2 = 3.057$ $P = 0.080$
	Others	327	77 (23.54)	250 (76.46)	

Socio Economic Status	1	2	1 (50)	1 (50)	$\chi^2 = 2.178$ P = 0.703
	2	15	2 (13.33)	13 (86.67)	
	3	48	9 (18.75)	39 (81.25)	
	4	161	37 (22.98)	124 (77.02)	
	5	403	82 (20.34)	321 (79.66)	

Table No.2: reveals prevalence of hypertension among study subjects according to Body Mass Index (BMI) and Waist to Hip Ratio (WH ratio) and the prevalence of hypertension was found to increase both

with increase in BMI and Waist to Hip ratio and these associations were found to be statistically significant (P < 0.05).

**Table 2: Prevalence of Hypertension among study subjects according to Body Mass Index and Waist to Hip ratio (N = 629)**

Variable	Classification	Number of adults N	Hypertension n (%)		
			Present	Absent	
Body Mass Index	Underweight	112	10 (8.92)	102 (91.08)	$\chi^2 = 38.141$ P = 0.000
	Normal	360	63 (17.5)	297 (82.5)	
	Pre obese	128	43 (33.59)	85 (66.41)	
	Obese	29	14 (48.27)	15 (51.73)	
Waist to Hip ratio	Normal	378	68 (17.98)	310 (82.02)	$\chi^2 = 4.624$ P = 0.031
	High	251	63 (25.09)	188 (74.91)	

Table No.3: prevalence of hypertension according to certain lifestyle factors. Current status of alcohol consumption and smoking among study subjects were tested for association with hypertension and the study found significantly higher prevalence of hypertension among them. However, there was no significant association (P > 0.05)

between hypertension and smokeless tobacco use. Further, regular moderate exercise among adults in the present study was found to be protective against hypertension and the association was statistically significant (P < 0.05).

**Table 3: Prevalence of Hypertension among study subjects according to certain Lifestyle factors (N = 629)**

Lifestyle factors	Classification	Number of adults N	Hypertension n (%)		
			Present	Absent	
Alcohol consumption	Present	80	28 (35)	52 (65)	$\chi^2 = 11.166$ P = 0.001
	Absent	549	103 (18.76)	446 (81.24)	
Smoking	Present	72	22 (30.55)	50 (69.45)	$\chi^2 = 4.667$ P = 0.031
	Absent	557	109 (19.56)	448 (80.44)	
Smokeless tobacco use	Present	226	49 (21.68)	177 (78.32)	$\chi^2 = 0.156$ P = 0.693
	Absent	403	82 (20.34)	321 (79.66)	
Moderate exercise	Present	279	47 (16.84)	232 (83.16)	$\chi^2 = 4.819$ P = 0.028
	Absent	350	84 (24)	266 (76)	

**Discussion**

The present cross-sectional study was conducted among adults in the field practice area of PHC, Ikkalagada, Koppal. The prevalence of hypertension was found to be 131 (20.82%) similar to the findings of many other studies done in different parts of the country. However, while a number of studies found marginally lower prevalence of hypertension in their studies few others [6,9] found very high prevalence compared to the present study. This difference in the prevalence of hypertension could be due to differences in the study settings, study durations, profile of study subjects, sampling techniques, data collection tools etc. The prevalence of hypertension was found to be significantly associated with age of study participants in the present study in confirmation with other studies [8-11]. The present study, however did not find hypertension to be associated with any other socio demographic variables. On the contrary, a number of studies found gender to be significantly associated with hypertension in their studies. The prevalence of hypertension in the present study was found to be directly proportional to BMI and also high among those with high Waist to Hip ratio, in line with the findings of many other studies done in different settings [11-14]. The present study also found prevalence of hypertension to be significantly high among adults who were consuming alcohol at the time of study, similar to the findings of studies by Bhise MD et al in Maharashtra, Marinayanakoppu RR et al in Karnataka and Ghosh S et al using NFHS 4 data. Similarly, compared to non-smokers smokers had high prevalence of hypertension, in conformation with many studies done in different parts of the country [14,15,19]. However, there was no significant association between smokeless tobacco use and prevalence of hypertension. Further, regular physical exercise among study participants was found to be protective against hypertension as

evidenced by Tripathy JP *et al.* in India and Hasan M *et al* in Bangladesh in their studies.

**Conclusion**

The present study finds that one in every five adults was suffering from hypertension in the study area. The study also found prevalence of hypertension to be significantly associated with increasing age, high Body mass index, high Waist to hip ratio, habit of alcohol consumption and Smoking and reduced physical activity of the study participants, thereby emphasizing the need for lifestyle modifications for its prevention.

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