

Prevalence and Risk factors associated with hypertension in young and middle age population (15-45 years) in rural settings

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Abstract

Background: Paradigm shift from communicable to non-communicable disease generated need to study further for non-communicable disease. Hypertension is serious medical condition which can affect other organs of body and can lead to death. The burden of hypertension is felt disproportionately in low- and middle-income countries, where two thirds of cases are found, largely due to increased risk factors in those populations in recent decades. **Aims & Objectives:** To estimate the prevalence and associated risk factors of hypertension in young and middle-aged population (15-45years) **Methodology:** A cross-sectional community-based study was conducted in young and middle age population of rural setting of Aliabada village during period of September, 21 to February 2022. Total 246 participants were enrolled in study by simple random sampling from sampling frame of 5431 participants. Principal instrument for data collection was questionnaire form consist of socio-demographic details and risk factors of hypertension. Blood pressure of participants was measured and recorded in data collection form. Data were entered and analyzed in SPSS version 21. Multiple logistic regression was used to identify associated risk factors for hypertension. **Results:** Prevalence of hypertension was 17.03%. Higher age (AOR: 3.23 CI: 1.19-9.24, p=0.019), High salt intake > 10gms/day (AOR: 5.32 CI: 2.75-21.05, p=0.002), Obesity (BMI >25) (AOR: 0.27 CI: 0.11-0.72, p=0.007), and high stress score (27-40) (AOR:3.69 CI: 1.68-13.52, p=0.001) were significantly associated with increased risk of hypertension. While Gender, Marital status, education, and social class was showed higher odds of developing risk of hypertension suggested by Crude Odds Ratio but this was non-significant association. **Conclusion:** Overall prevalence of hypertension was 17.03%. Age, Salt intake, Obesity and Stress were independent risk factors for hypertension.

Key words: Hypertension, Rural setting, Risk factors

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Introduction

According to American Heart Association, Hypertension is a chronic medical condition in which the blood pressure is elevated [1]. Hypertension is one of the major cause of premature death worldwide. It is a serious medical condition that significantly increases the risks of

heart, brain, kidney and other diseases. An estimated 1.28 billion adult aged >30 year suffering from hypertension and 2/3rd of them living in low & middle income countries. What is seen in community is just a tip of iceberg of diagnosed cases, as many as 46% of adults with hypertension are not aware about their condition. One of the global targets for non-communicable diseases is to reduce the burden of hypertension by 33% by year 2030 of 2010 level [2].

High blood pressure is the most common cardiovascular disorder affecting approximately one billion people globally and remains the leading single contributor to global burden of disease and mortality [3]. In 2000, there were an estimated 972 million people with HTN, 65% of whom lived in the developing world with the number predicted to grow to 1.5 billion by 2025. In Africa, however, more than 40% (and up to 50%) of adults in many countries are estimated to have high blood pressure [4]. High blood pressure (BP) is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010) [5]. Hypertension exerts substantial public health burden on cardiovascular health and health care system of India [6, 7]. Systematic review on the prevalence of HTN in India, for studies published between 1969 and July 2011, reported a range between 13.9 to 46.3% and 4.5 to 58.8% in urban and rural areas of India, respectively [8]. The overall burden of high blood pressure related conditions is drastically rising in countries like India as a consequence of the aging population, increasing urbanization, and an increase in age-specific rates of conditions such as stroke [9,10]. In India, community surveys have documented that in the last five to six decades, the prevalence of hypertension has increased about 10 times in the rural areas [11]. India, the world's largest democracy, is undergoing a rapid economic growth. This growth has been accompanied by demographic, lifestyle and cultural changes which have had a large impact on the health profile of India's citizens and placed a significant strain on the country's healthcare system [12].

Globally overall prevalence of raised blood pressure in adults ages 25 years and over is around 40% in 2008 [13]. According to survey report, the prevalence of hypertension was varying from 17 – 21 percentage in all states with marginal rural-urban differences. Overall pattern of prevalence was found increasing with age groups in all levels. It was high in higher education. Hypertension was comparatively more prevalent in executive and service category in all states [14].

Materials & Methodology

Study design: Community based Cross-sectional study

Period of study: March, 2022 to Aug, 2022

Study setting: Study was carried out in Aliabada, Rural area under Rural Health Training Centre, Community Medicine Department of M. P. Shah Govt. Medical College, Jamnagar. Agriculture was the dominant occupation of village located almost 20 km from Medical College. Nearest tertiary care center is G.G. Govt. hospital, Jamnagar, Gujarat, India

Study Population: Young & Middle age population (15 -45 Years). According to house to house survey of Primary Health Centre Aliabada, total population of village was 9364 while population between 15 -45 years was reported to be 5431, hence finite population for calculation of sample size was 543.

Inclusion Criteria: Young and middle age population (15-45years) and willing to participate in study after knowing the purpose of the study and signed consent form. Participants must be from reside in study area for minimum 1 year.

Exclusion Criteria: Person suffering from chronic illness, Pregnant & lactating mothers, Migrants and visitors residing less than a year.

Sample size: Sample size was calculated by formula

$$n \geq \frac{NZ_{1-\frac{\alpha}{2}}^2 p(1-p)}{d^2(N-1) + Z_{1-\frac{\alpha}{2}}^2 p(1-p)}$$

Where, Alpha (@) = 0.05 (95 % CI)

Estimated Proportion = 21.3 % (based on prevalence of hypertension in rural area National Family Health Survey- 5)

d = Absolute error of 5 %

Population size = 5431 (population of 15-45 years from record of Primary Health Center, Aliabada).

Sampling technique: Simple Random Sampling was carried out to achieve required sample size. From PHC three streets head towards different three areas. Bottle rotated and street indicated by tip of bottle was chosen to start study and first house taken from that street. Study continued in same direction till we achieved required sample size. Houses were skipped if no person aged 15 -45 was found.

Variables of Hypertension

Socio-economic Classification: Modified upgraded BG prasad's classification (revised in 2021) used to classify families based on per capita Income of family. Families classified as Lower class (class IV & V), Middle class (class – 3) & Upper class (class 1 & 2) [15].

Salt Intake: Salt intake per family member per day was calculated by consumption of salt per month in grams per family divided by total family members x 30 days.

Stress Score: Stress of participant was assessed by Perceived Stress Score. It contains total 10 questionnaires. Each question carry score ranging from 0 to 5. Minimum score is 0 while maximum score is 40. Classify score based on total score of person [16].

Low stress: 0-13

Moderate score: 14-26

High stress: 27-40

Physical Activity: Brisk walking (speed of walking 5- 6 km /hr) for minimum 30 minutes per day for minimum 5 days per week. [17].

Measurement of Blood Pressure

Blood pressure was recorded in a sitting position using Digital BP Monitor. After explaining the purpose of the study first reading was taken five minutes which gives patient to be calm & quite. If first reading indicate normal blood pressure then it was noted as normotensive but if first reading indicate high blood pressure then second reading was taken at the end of interview, second reading was considered final. Hypertension was defined as BP \geq 140 mmHg systolic or \geq 90 mmHg diastolic BP, or a known hypertensive on medication. This is in accordance with the Joint National Committee (JNC) V criteria [18].

RESULTS

Socio-demographic Variables

Table 1 shows socio-demographic distribution of study population. Percentage of population aged 36-45 years was highest (45.13%), Male and female ration was almost 1130 males per 1000 females which gives 53.25% of males. Majority of participants were married (95.12%). Though it was good literacy rate but schooling greater than 10 years was completed by only 1/3rd of participants. Majority of participants were in middle socio-economic class.

Table 1: Socio-demographic variables of participants (n=246)

DEMOGRAPHIC VARIABLES	NO	PERCENTAGE
Age groups (yrs)		
15 -25	59	23.98
26-35	76	30.89
36-45	111	45.13
Gender		
Male	131	53.25
Female	115	46.75
Marital status		
Married	234	95.12
Unmarried	6	2.44
Others*	6	2.44
Education		
Schooling \geq 10 yrs	77	31.3
Schooling \leq 10 yrs	169	68.7
Socio-economic class		
Lower	83	33.74
Middle	109	44.31
Upper	54	21.95
Occupation		
Agriculture	90	36.58
Business	24	9.76
Service	12	4.88
Home make	68	27.64
Labour	52	21.14
* Others include Divorced /Seperated /Widow/Widower		

Risk factors of hypertension

Table 2 depicts distribution of various risk factors of hypertension. Few participants (12.6%) had positive family history. Prevalence of any form of tobacco chewing or smoking among participants was 38.21% and majority of them were males. Consumption of salt intake (>10gms/ day) was observed in more than 2/3rd of participants (68.29%). Almost one fourth of participants were obese (BMI > 25). Stress assessed by Perceived Stress Inventory showed high stress score (27-40) among 23.98% of participants. Physical activity observed in only 16.67% of participants.

Table 2: Risk factors of Hypertension in participants (n=246)

RISK FACTORS OF HYPERTENSION	NO	PERCENTAGE
Family History		
Yes	31	12.6
No	215	87.4
Smoking/Tobacco chewing		
Yes	94	38.21
No	152	61.79
Salt Intake		
\geq 10 gms	168	68.29
< 10gms	78	31.71

Obesity		
BMI \geq 25	84	34.15
BMI < 25	162	65.85
Stress		
Low stress score (0-13)	124	50.41
Moderate Stress score (14 -26)	63	25.61
High Stress Score (27-40)	59	23.98
Physical activity		
Yes	41	16.67
No	205	83.33

Regression analysis of various risk factors of hypertension

Table 3 shows Multi-variate logistic regression of hypertension with various risk factors. Overall prevalence of hypertension is 42 (17.03%). Risk of hypertension was almost 3 times as compared to 15-25 years (AOR 3.23, p=0.019). Females have 46% less risk of developing hypertension as compared to males (OR= 0.46, p=0.03) but this could be an effect of confounders (AOR =0.59, p= 0.51). High salt intake > 10gms /day carries almost 5 times risk of developing hypertension (AOR=5.32, p=0.0002). Obesity is one the risk factors of hypertension (p=0.007). High stress score >27 assessed by perceives stress inventory is an important risk factors of hypertension (Adjusted Odds Ratio =3.69, p=0.001).

Table 3: Uni-variate & Multi-variate logistic regression, risk factors for Hypertension(n=246)

Age groups (yrs)	No. (%)	Odd Ratio (95 % CI)	p value	AOR (95 % CI)	p value
15 -25	59(23.98)	1			
26-35	76(30.89)	2.02 (0.67 - 6.11)	0.21		
36-45	111(45.13)	3.13 (1.13 - 8.70)	0.02*	3.23 (1.19 - 9.24)	0.019*
Gender					
Male	131(53.25)	1			
Female	115(46.75)	0.46 (0.23 - 0.93)	0.03*	0.59 (0.16 - 1.01)	0.051
Marrital status					
Married	234(95.12)	1			
Unmarried/Other	12(04.88)	0.81 (0.26 - 3.16)	0.76		
Education					
Schooling \geq 10 yrs	77(31.30)	1			
Schooling \leq 10 yrs	169(68.7)	1.01 (0.49 - 2.09)	0.95		
Socio-economic class					
Lower	83(33.74)	1			
Middle	109(44.31)	1.17 (1.52 - 2.58)	0.69		
Upper	54(21.95)	2.07 (0.87 -4.90)	0.09		
Family History					
Yes	31(12.60)	1			
No	215(87.4)	0.54 (0.22 - 1.30)	0.17		
Smoking/Tobacco chewing					
No	152(61.79)	1			
Yes	94(38.21)	1.26 (0.64 - 2.47)	0.49		

Salt Intake					
< 10gms	78(31.71)	1			
≥ 10 gms	168(68.29)	7.8 (3.19 - 19.01)	0.0001*	5.32 (2.75 - 21.05)	0.0002*
Obesity					
BMI ≥ 25	84(34.15)	1			
BMI < 25	162(65.85)	0.31 (0.15 - 0.61)	0.0008*	0.27 (0.11 - 0.72)	0.0007*
Stress					
Low stress score (0-13)	124(50.41)	1			
Moderate Stress score (14-26)	63(25.61)	1.35 (0.52 - 3.51)	0.52		
High Stress Score (27-40)	59(23.98)	5.15 (2.31 - 11.47)	0.0001*	3.69 (1.68 - 13.52)	0.0001*
Physical activity					
Yes	41(16.67)	1			
No	205(83.33)	2.10 (0.70 - 6.26)	0.18		

DISCUSSION

Hypertension is the most important and reversible risk factor for serious conditions like strokes, diabetes, heart diseases and renal impairment, which directly contribute to the increased incidence of morbidity and mortality.

In this study 5431 participants were studied for existence of high blood pressure. 246 participants were found to have high blood pressure. Overall prevalence of hypertension found to be 17.03%. Study conducted by Shushil & colleagues found higher prevalence (30.9%) in males and 27.8% in females [19]. Results are consistent with study conducted in rural area of Ombe, Camroon with prevalence of 19.8% [20]. Anchala R et al in their meta-analysis of Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension, reported prevalence of 29.8% in India [21]. Higher prevalence had also been reported in Dharwad region of India i.e 27.75%. Low prevalence of hypertension in our study may be due to we have confined our study to young and middle age population and excluded > 45 years population.

Middle age carries significant higher risk of developing high blood pressure (AOR= 3.23, p=0.019). In addition to this High salt intake >10gms/day, Obesity and High stress score are also significantly associated with high blood pressure. Our findings are consistent with study conducted by Shushil et al [19] where significant increase in prevalence of hypertension was found with increased age (p=0.001), study conducted in Camroon (p=0.02) [20] & Systemic review and meta-analysis conducted in rural India [21], they also found higher age as significant risk factor for high blood pressure.

Study conducted in Dharwad, India by Kurjogi MM and colleagues [22] reported any form of tobacco chewing was significantly associated with increased risk of hypertension in smokers/tobacco chewers. This findings does not matches with findings of our study where tobacco chewers carry 1.26 times higher risk but not significantly associated (p=0.49). Fuh princewel et al in their study also found no significant associated between tobacco chewing and high blood pressure [20].

Physical activity is significantly associated with development of high blood pressure, our findings are consistent with findings of study conducted by Shushil et al, Fuh Princewel et al, Anchala R & Kurjogi MM [19,20,21,22].

CONCLUSION

This study shows that Prevalence of Hypertension was 17.03%. Though risk factors such as Gender, Marital status, Years of schooling, Economic status, Family history and salt intake have higher odds of developing high blood pressure but not significantly associated. Risk factors such as Age, Obesity, High stress and Physical activity were significantly associated with hypertension.

CONFLICT OF INTEREST

Authors declares no conflict of Interest

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AUTHOR'S CONTRIBUTION

All authors have contributed equally and satisfactorily throughout study

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