Innovations

Prevalence and Associated Risk Factors of Hypertension: A Cross Sectional Study in Rural Amalapuram

[1]Dr. Kotha Prasanna, [2]Dr. Renu Vasant Sulakhe, [3]Dr. T. Divya Jyothi

[1,3] Assistant Professor, [2] HOD & Professor

[1,2,3] Department of community medicine, Konaseema Institute of Medical Sciences & Research Foundation, Amalapuram, Andhra Pradesh

Corresponding Author: **Dr. Kotha Prasanna**

Abstract

Background: *Hypertension, or high blood pressure, is a leading global health concern due to its association with cardiovascular diseases, stroke, and kidney disorders. Often referred to as the "silent killer," it remains asymptomatic in many individuals, making early detection essential for preventing complications. This study aimed to assess the prevalence, risk factors, and associations of hypertension among OPD attendees in selected healthcare facilities.* ***Methods:*** *A cross-sectional study was conducted among individuals above 20 years of age attending OPD services at PHC Ambajipeta, CHC P. Gannavaram, PHC Mummidivaram, and PHC EWS Colony. Data were collected using a semi-structured questionnaire through face-to-face interviews. Statistical analysis was performed using IBM SPSS Software version 20.* ***Results:*** *The prevalence of hypertension was 33.98%, with a higher occurrence in males (21.3%) compared to females (12.62%). Hypertension was significantly associated with advancing age, lower socio-economic status ($p = 0.02$), alcohol consumption ($p = 0.00001$), smoking ($p = 0.0003$), physical inactivity ($p = 0.0001$), and comorbidities ($p = 0.0012$). However, BMI did not show a statistically significant association ($p = 0.309$). Additionally, 21.4% of participants were newly diagnosed with hypertension, emphasizing the importance of routine screening.* ***Conclusion:*** *The study highlights the high burden of hypertension and its strong association with modifiable lifestyle factors. Public health interventions targeting smoking cessation, alcohol reduction, and increased physical activity are essential for mitigating hypertension risks. Early detection through regular screening and improved healthcare access, particularly for lower socio-economic groups, is crucial for effective hypertension management.*

Keywords: *Hypertension, Risk Factors, Prevalence, Lifestyle, Socio-Economic Status, Cross-Sectional Study*

Introduction

Hypertension, commonly known as high blood pressure, is a significant global health issue due to its high prevalence and association with serious complications such as cardiovascular diseases, stroke, and kidney disorders. The World Health Organization (WHO) estimates that hypertension is responsible for approximately 7.5 million deaths each year, accounting for 12.8% of all global deaths. Furthermore, projections indicate that by 2025, around 1.56 billion people will be living with hypertension, highlighting the increasing burden of this condition[1]

Often termed a "silent killer," hypertension typically does not present noticeable symptoms in its early stages, making it difficult to detect without regular blood pressure monitoring. While some individuals may experience symptoms such as headaches, dizziness, or visual disturbances, many remain unaware of their condition until serious health complications arise.[2] As a result, early detection and awareness play a crucial role in preventing long-term health consequences.

Various factors contribute to the development of hypertension, including lifestyle choices, aging, and environmental influences. Research indicates that individuals who consume alcohol, use tobacco products, or lead a sedentary lifestyle are at a higher risk of developing high blood pressure. Additionally, urbanization, dietary shifts, and an aging population have further contributed to the rising prevalence of hypertension worldwide. Identifying these risk factors is essential for implementing effective preventive strategies and improving hypertension management.[1]

According to the Joint National Committee 7 (JNC7) guidelines, normal blood pressure is classified as a systolic pressure of less than 120 mmHg and a diastolic pressure of less than 80 mmHg. Hypertension is diagnosed when systolic blood pressure reaches 140 mmHg or higher and/or diastolic blood pressure is 90 mmHg or higher. Individuals with blood pressure readings between 120-139 mmHg systolic or 80-89 mmHg diastolic fall into the "prehypertension" category, which places them at an elevated risk of developing hypertension later in life.[2]

Materials and Methods

Study Design: This was a cross-sectional study.

Study Participants: People above 20 years of age who attended OPD services participated in the study.

Study Setting: The study was conducted among outpatients of PHC Ambajipeta, CHC P. Gannavaram, PHC Mummidivaram, and PHC EWS Colony.

Sample Techniques: Convenient sampling

Inclusion Criteria: Subjects above 20 years of age were included in the study.

Exclusion Criteria:

1. Subjects below 20 years of age.

2. Patients unwilling to give consent, psychiatric patients, and unconscious patients were excluded.

Data Collection Procedure: After obtaining informed consent from the participants, data was collected through face-to-face interviews using a pre-designed, semi-structured questionnaire.

Confidentiality: The particulars and details of all participants were kept confidential throughout the study. Only summarized data was used for presenting the results.

Ethical Consideration: Approval from the Institutional Ethics Committee was obtained, and informed consent was taken from all participants.

Data Analysis and Interpretation: Data was entered into Microsoft Excel and analyzed using IBM SPSS Software version 20 (licensed).

Results

Table: 1 Demographic details of study participants

Parameters	Frequency	Percentage (%)
Age		
20-40 Years	59	57.3
40-60 Years	27	26.2
60-80 Years	17	16.5
Sex		
Male	51	49.5
Female	52	50.5
Socio-Economic Status		
Upper class	1	1
Upper middle class	48	46.6
Lower middle class	46	44.7
Lower class	8	7.8
Education		
Illiterate	4	3.9
Primary school	8	7.8
Secondary	13	12.6
Intermediate	27	26.2
Undergraduate	29	28.2
Post Graduation	15	14.6

Professional	7	6.8
Family Size		
1-2 members	12	11.7
2-4 members	71	68.9
>4 members	20	19.4

The majority of individuals (57.3%) fall within the 20-40 years age range, followed by 26.2% in the 40-60 years range, and 16.5% in the 60-80 years range. In terms of gender distribution, the sample is nearly equal, with 49.5% male and 50.5% female participants. Regarding socio-economic status, the largest groups belong to the upper middle class (46.6%) and lower middle class (44.7%), with a smaller proportion in the lower class (7.8%) and only 1% in the upper class. Educationally, the majority have at least an intermediate level of education, with 28.2% holding an undergraduate degree and 14.6% possessing a postgraduate qualification. Only 3.9% are illiterate. Family size data indicates that most households have 2-4 members (68.9%), while 19.4% have more than four members, and 11.7% have only 1-2 members.

Table: 2 Health Status and Lifestyle Factors of the Study Population

Parameters	Frequency	Percentage (%)
BMI		
Underweight	4	3.9
Normal	63	61.2
Overweight	27	26.2
Obese	9	8.7
History of Smoking		
Yes	18	17.5
No	85	82.5
History of Alcohol Consumption		
Yes	16	15.5
No	97	84.5
Physical Exercise		
Yes	73	70.9
No	30	29.1
Duration of Exercise		
< 15min/day	49	47.6

15-30 15min/day	46	44.7
>30 min/day	8	7.8
Comorbiditis		
Yes	18	17.5
No	85	82.5

In terms of BMI distribution, the majority (61.2%) fall within the normal weight category, while 26.2% are overweight, 8.7% are obese, and a small percentage (3.9%) are underweight. Regarding smoking history, 17.5% of individuals have smoked, whereas 82.5% have never smoked. Alcohol consumption follows a similar trend, with 15.5% reporting a history of drinking and 84.5% not consuming. Physical exercise is a common practice among the majority (70.9%), but 29.1% do not engage in regular physical activity. Among those who exercise, 47.6% do so for less than 15 minutes per day, 44.7% for 15-30 minutes daily, and only 7.8% for more than 30 minutes. Additionally, 17.5% of the individuals have comorbidities, while the remaining 82.5% do not report any existing medical conditions.

Table: 3 showing Distribution of study population according to Hypertension Profile: History, Duration, and Blood Pressure Ranges

Parameters	Frequency	Percentage (%)
History of Hypertension		
Non-Hypertensive	68	66
Previously Hypertensive	13	12.6
Newly Diagnosed	22	21.4
Duration of Hypertension		
Non-Hypertensive	68	66
1-5 years	22	21.4
5-10 Years	9	8.7
>10 years	4	3.9
Blood Pressure Measurement Range		
Systolic (<90mmhg) & Diastolic (<60 mmhg)	5	4.9
Systolic (90-120 mmhg) & Diastolic (60-80 mmhg)	63	61.2
Systolic (121-139 mmhg) & Diastolic (80-89 mmhg)	22	21.4
Systolic (>140mmhg) & Diastolic (>90 mmhg)	13	12.6

In terms of hypertension history, 66% were non-hypertensive, 12.6% had a prior diagnosis, and 21.4% were newly diagnosed. This results in a total hypertension prevalence of 34%. Regarding the duration of hypertension, 21.4% had hypertension for 1-5 years, 8.7% for 5-10 years, and 3.9% for over 10 years. Blood pressure measurements showed that 4.9% had hypotension (systolic <90 mmHg, diastolic <60 mmHg), 61.2% had normal readings (systolic 90-120 mmHg, diastolic 60-80 mmHg), 21.4% were in the prehypertension range (systolic 121-139 mmHg, diastolic 80-89 mmHg), and 12.6% had hypertensive readings (systolic >140 mmHg, diastolic >90 mmHg), indicating the need for medical attention.

Table 4. Association between Hypertensive Status and Gender

Hypertensive Status	Male	Female	Total	Chi-Square	P-Value
Hypertensive	22(21.3%)	13(12.62%)	35(33.98%)		
Non-Hypertensive	29(28.15%)	39(37.8%)	68(66.01%)		
Total	51(49.5%)	52(50.4%)	103(100%)	3.77	**0.05***

Out of the total 103 participants, among the hypertensive individuals i.e, 35 (33.98%), out of this, 22 (21.3%) were male, and 13 (12.62%) were female. Conversely, among the non-hypertensive group, 29 (28.15%) were male, and 39 (37.8%) were female. Which showed statistically significant with a P-value of 0.05.

Table 5. Association of Socio-Economic Status, Lifestyle Factors, and Comorbidities with Hypertension

Parameters	Hypertensive	Non-Hypertensive	Total	Chi-Square	P-Value
Socio-Economic Status					
Upper class	0	1(0.97%)	1(0.97%)		
Upper middle class	11(10.6%)	37(35.9%)	48(46.6%)	9.67	**0.02**
Lower middle class	18(17.4%)	28(27.1%)	46(44.6%)		
Lower class	6(5.82%)	2(1.94%)	8(7.76%)		
BMI					
Underweight	2(1.94%)	2(1.94%)	4(3.88%)		
Normal	17(16.5%)	46(44.6%)	63(61.16%)		

Overweight	12(11.6%)	15(14.56%)	27(26.13%)		
Obese	4(3.88%)	5(4.8%)	9(8.73%)	3.58	**0.309**
Alcohol Consumption					
Yes	13(12.6)	3(2.9%)	16(15.5%)	18.86	**0.00001**
No	22(21.3%)	65(63.1%)	87(84.4%)		
Smoking Consumption					
Yes	9(8.73%)	2(1.94%)	11(10.67%)		
No	26(25.24%)	68(64.07%)	92(89.32%)	12.56	**0.0003**
Physical Exercise					
Yes	12(11.65%)	61(59.2%)	73(70.87%)		
No	13(12.6%)	7(6.71%)	20(19.4%)	18.835	**0.0001**
Comorbiditis					
Yes	12(11.65%)	6(5.8%)	18(17.4%)	10.38	**0.0012**
No	23(22.33%)	62(60.1%)	85(82.5%)		

The association of socio-economic status, lifestyle factors, and comorbidities with hypertension reveals significant correlations. Socio-economic status shows a clear connection ($p = 0.02$), with hypertension being more prevalent in the lower middle and lower classes. BMI, however, does not show a statistically significant association ($p = 0.309$). Lifestyle factors, including alcohol consumption ($p = 0.00001$), smoking ($p = 0.0003$), and lack of physical exercise ($p = 0.0001$), are strongly associated with hypertension, indicating that unhealthy habits significantly increase the risk. Additionally, comorbidities are significantly linked to hypertension ($p = 0.0012$), suggesting that individuals with other health conditions are more likely to be hypertensive.

Discussion

The present study found a hypertension prevalence of 33.98%, with a higher occurrence among males (21.3%) than females (12.62%). This trend aligns with Singh et al. (2017), who reported a prevalence of 32.9%, with a higher rate among males (40.9%) compared to females (26.0%).[3] Similarly, Ghosh and Kumar (2015–2016) observed a higher prevalence in males (13.8%) than females (10.9%), reinforcing the notion that males are at greater risk. The elevated prevalence among males may be attributed to lifestyle factors such as smoking, alcohol consumption, and occupational stress, as suggested in prior studies (Singh et al., 2017; Ghosh & Kumar, 2015–2016).[4]

The study identified age as a significant factor associated with hypertension, with prevalence increasing in older age groups. Kurjogi et al. (2021) similarly reported that advancing age contributes to higher hypertension prevalence due to physiological changes, reduced arterial elasticity, and increased comorbidities. Other studies also confirm that metabolic imbalances and cardiovascular strain associated with aging contribute to hypertension risk (Kurjogi et al., 2021).[5]

A significant correlation was found between socio-economic status and hypertension ($p = 0.02$), with higher prevalence among lower middle and lower-income groups, while the upper class exhibited the lowest prevalence. These findings align with Ghosh and Kumar (2015–2016),[4] who reported an increased hypertension risk in lower socio-economic groups due to limited healthcare access, poor dietary habits, and elevated stress levels. These disparities highlight the importance of targeted public health interventions.

Alcohol consumption ($p = 0.00001$), smoking ($p = 0.0003$), and physical inactivity ($p = 0.0001$) were strongly associated with hypertension in the present study. These results corroborate findings by Kurjogi et al. (2021) and Murarkar et al. (2019),[6] who confirmed the impact of unhealthy lifestyles on hypertension. The vascular damage, increased sympathetic activity, and endothelial dysfunction caused by smoking and alcohol consumption are well-documented, further substantiating these findings (Murarkar et al., 2019).[6]

The study found a significant association between hypertension and comorbidities ($p = 0.0012$), with 17.5% of participants having pre-existing health conditions. Murarkar et al. (2019) similarly reported that individuals with diabetes and obesity had a higher hypertension risk due to metabolic dysregulation and increased cardiovascular strain. These findings emphasize the need for integrated healthcare approaches for individuals with comorbidities.[6]

Unlike other risk factors, BMI was not significantly associated with hypertension in this study ($p = 0.309$). Similarly, Ahmed et al. (2014), obesity was not found to be a significant factor.[7] However, Singh et al. (2017) and Erem et al. (2009) identified obesity as a significant risk factor.[3] This discrepancy may be due to differences in sample size, dietary patterns, or genetic predispositions. Despite this variation, global studies continue to highlight obesity as a major contributor to hypertension (Erem et al., 2009).[8]

The study found that 21.4% of participants were newly diagnosed with hypertension, comparable to the 27.75% reported by Kurjogi et al. (2021).[5] Their study also confirmed that advancing age, alcohol consumption, smoking, and sedentary lifestyles were significant risk factors, aligning with the present study's findings ($p<0.05$).

Conclusion

The study highlights a significant prevalence of hypertension (33.98%), with a higher occurrence among males and older age groups. Key risk factors include lower socio-economic status, alcohol consumption, smoking, physical inactivity,

and comorbidities, while BMI did not show a significant association. The findings emphasize the importance of early detection, lifestyle modifications, and targeted public health interventions to reduce hypertension-related complications and improve overall health outcomes.

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