



Research Article

Section: General Medicine

A Study of Clinical Profile of Hypertension in Elderly Age Group in Tertiary Care Hospital

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HIGHLIGHTS

- Hypertension common in elderly population.
- Study analyzed 180 hypertensive patients.
- Obesity and inactivity major contributors.
- Diabetes and heart disease frequent comorbidities.
- Early screening prevents severe complications.

Key Words:

Hypertension
Elderly
Risk factors
Comorbidities
End-organ damage
Lifestyle modification
Peripheral Smear
Anaemia
Haematological Abnormalities

ABSTRACT

Introduction: Hypertension is a major cause of cardiovascular morbidity and mortality, with prevalence exceeding 60% in those above 60 years. Age-related vascular changes, sedentary lifestyle, and reduced renal function contribute to isolated systolic hypertension, making it a key public health concern. **Aim and Objective:** To study clinical profile, associated factors, and presentations of hypertension in elderly patients. **Materials & Methods:** A prospective observational study was conducted in the Department of General Medicine, a tertiary care hospital, from June 2023 to May 2025. A total of 180 hypertensive patients aged >60 years were enrolled. Data on demographics, comorbidities, lifestyle, and clinical/laboratory parameters (CBC, RFT, LFT, lipid profile, ECG, fundus exam, urine microscopy, and USG) were collected. Analysis was performed using SPSS with appropriate statistical tests; $p < 0.05$ was considered significant. **Results:** Among 180 elderly hypertensive patients, most were 60–70 years, females, and from lower socioeconomic backgrounds. Obesity, physical inactivity, smoking, and alcohol use were common, along with comorbidities like diabetes and ischemic heart disease. Laboratory and imaging findings revealed dyslipidemia, renal impairment, ECG abnormalities, and fundus changes, indicating early end-organ damage. **Conclusion:** Elderly hypertension is strongly associated with modifiable risk factors and multiple comorbidities. Early screening, lifestyle interventions, and comprehensive geriatric care are essential for preventing complications in this vulnerable group.



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INTRODUCTION

Hypertension is a chronic medical condition characterized by persistently elevated arterial blood pressure and is one of the leading contributors to cardiovascular morbidity and mortality worldwide, predisposing individuals to heart failure, ischemic heart disease, stroke, and chronic kidney disease [1]. Its prevalence is increasing globally, particularly among the elderly, due to vascular ageing, sedentary lifestyles, and longer life expectancy [2]. Age-related physiological changes, including arterial stiffness, endothelial dysfunction, and altered autonomic regulation, contribute to progressive rises in systolic blood pressure. This often manifests as isolated systolic hypertension, the most common type seen in older adults [3]. Declining renal function further exacerbates hypertension by promoting salt retention [4]. Studies estimate that the prevalence of hypertension exceeds 60% in individuals over 60 years of age, making it a major public health concern requiring effective screening, diagnosis, and management strategies [5].

Globally, around 1.28 billion people are hypertensive, with the majority residing in low- and middle-income countries where awareness, treatment, and control remain inadequate [6]. Over the last four decades, prevalence has nearly quadrupled, driven by high salt intake, low potassium consumption, obesity, and lifestyle changes [7]. In India, nearly one in three adults is hypertensive, with urbanization, poor dietary habits, sedentary lifestyle, and genetic predisposition contributing significantly to the rising burden [8,9]. However, treatment adherence and control rates remain suboptimal. Elderly patients pose additional challenges due to polypharmacy, comorbidities such as diabetes, dyslipidemia, and chronic kidney disease, as well as late diagnosis resulting from limited access to primary healthcare and routine screening.

Management in older adults is further complicated by factors such as white-coat and masked hypertension, frailty, orthostatic hypotension, and cognitive decline, which influence therapeutic decisions. Potential drug interactions and adverse effects, including falls, dizziness, and renal impairment, highlight the need for individualized treatment strategies [10]. Tertiary care hospitals play a pivotal role in managing elderly hypertension by providing comprehensive evaluation, advanced diagnostics, and multidisciplinary care. They also serve as important centers for patient education and lifestyle interventions, such as salt restriction, weight management, regular exercise, and dietary modifications like the DASH diet, all of which can significantly improve outcomes [11].

Given the rising prevalence and complexity of hypertension in the elderly, a better understanding of their clinical profile is essential. This study aims to assess the demographic factors, comorbidities, clinical presentations, and complications of hypertension in elderly patients admitted to a tertiary care hospital, thereby contributing to improved screening,

individualized management, and outcome-based care strategies.

MATERIAL & METHODS

This prospective observational study was conducted in the Department of General Medicine, a tertiary care hospital, from June 2023 to May 2025. A total of 180 hypertensive patients aged >60 years admitted during emergency duty days were included. Patients below 60 years or unwilling to provide consent were excluded. Data were collected using a standardized proforma, including demographic details, medical history, physical examination, and relevant investigations (CBC, RFT, LFT, lipid profile, ECG, serum electrolytes, fundus examination, urine microscopy, and abdominal ultrasound when indicated). Statistical analysis was performed using SPSS; qualitative variables were expressed as proportions, quantitative variables as mean $\pm$ SD, and associations were tested using Chi-square, Fisher's exact test, unpaired t-test, and Pearson's correlation coefficient. A p-value <0.05 was considered statistically significant.

RESULT

The majority of hypertensive patients (65%) were in the 60–70 years age group, followed by 27.72% in the 71–80 years group, while only 7.78% were above 81 years (**Figure 1**). Among elderly hypertensive patients, 45% were males and 55% were females, indicating a slight female predominance (**Figure 2**). The majority of hypertensive patients (73.89%) were undergraduates, while 18.33% had no formal education and only 7.78% were graduates (**Figure 3**). Among elderly hypertensive patients, the largest group were housewives (47.78%), followed by farmers (40%) and shopkeepers (5%) based on occupation (**Table 1**). The majority of hypertensive patients (70.56%) belonged to the lower class, followed by 20.56% from the lower-middle class, while only 5.56% were from the upper-lower class (**Table 2**). Out of 180 hypertensive patients, 51.67% had a positive family history, while 48.33% reported no family history (**Figure 4**). In personal history, 80% of patients reported smoking, while 73.33% consumed alcohol (**Figure 5**). Among elderly hypertensive patients, 43.33% had a normal BMI (18.5–24.9), 38.33% were overweight (25–29.9), and 13.33% were obese (BMI >30). Only 5% were underweight (BMI <18.5) (**Table 3**). Among hypertensive patients, 44.44% engaged in regular exercise, whereas 55.56% did not (**Figure 6**). In elderly hypertensive patients, 27.22% presented with headache, 20% with palpitations, and 17.78% with dizziness (**Table 4**). Among elderly hypertensive patients, 55.56% had hypertension as a comorbidity, 31.67% had diabetes mellitus, 20% had ischemic heart disease, and 15.56% had chronic kidney disease (**Table 5**). Among hypertensive patients, 41.11% had Grade 2 blood pressure, 36.67% had Grade 1, 17.78% had Grade 3, and 4.44%

presented with isolated systolic hypertension (**Figure 6**). In hypertensive patients, 77.78% had a pulse rate of 60–100/min, 16.11% had a rate >100/min, and 6.11% had a rate <60/min (**Table 7**). Among hypertensive patients, 71.67% reported micturition 6–8 times daily, 21.67% had a frequency of 8–10 times, and 6.67% experienced micturition 1–5 times daily (**Figure 7**). In urine examination, albumin was absent in 68.89% of patients, trace in 13.89%, 1+ to 2++ in 12.78%, and 3+ to 4++ in only 4.44% of patients (**Figure 8**). In urine examination of hypertensive patients, 66.11% had a normal pus cell count (0–5/hpf), 18.33% had 6–20/hpf, 13.89% had 20–60/hpf, and about 2% had >60/hpf (**Figure 9**). In urine examination, casts were absent in 82.22% of patients, while 10.56% had 0–4 granular casts, 5% had 4–6 casts, and 2.22% showed >8 granular casts (**Figure 10**). In kidney function tests, urea levels ranged from 12–50 mg/dL in 80.56% of patients,

51–100 mg/dL in 16.11%, and >101 mg/dL in 3.33% (**Figure 11**). In kidney function tests, creatinine levels were <1.1 mg/dL in 56.67% of patients, 1.1–5 mg/dL in 34.44%, and >5.1 mg/dL in 8.89% (**Figure 12**). In the lipid profile test, 62.22% of patients showed decreased HDL. Normal levels were observed in 55.56% for total cholesterol, 52.22% for LDL, and 51.11% for triglycerides. Elevated levels were found in 48.89% for triglycerides, 47.78% for LDL, and 44.44% for total cholesterol (**Figure 13**). In ECG findings of elderly hypertensive patients, 11.11% showed normal results, 20% had ischemic changes, 30% presented with LVH, and the majority (38.89%) had left axis deviation (**Figure 14**). Ultrasonography revealed that 84.44% of patients had kidneys of normal size on both sides, while 15.56% showed bilaterally reduced kidney size with loss of CMD (**Figure 15**). In fundus examination, 83.89% of hypertensive patients showed bilateral findings within normal limits.

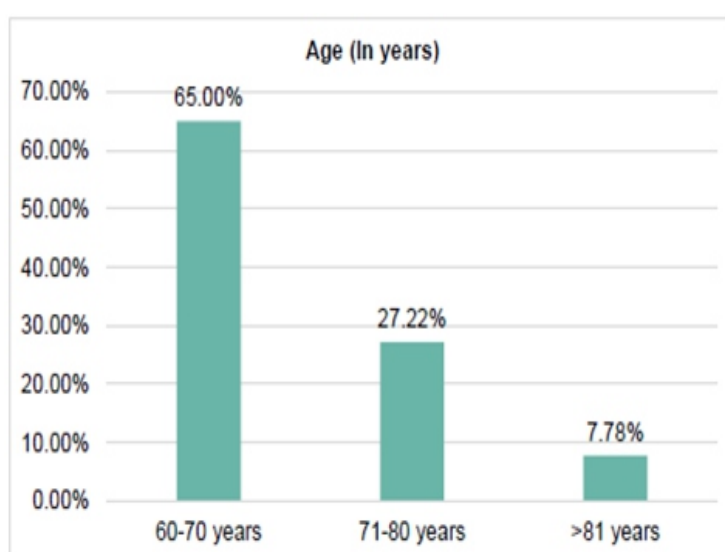


Figure 1: Age wise distribution of patients with hypertension in elderly age group



Figure 2: Gender of patients with hypertension in elderly age group

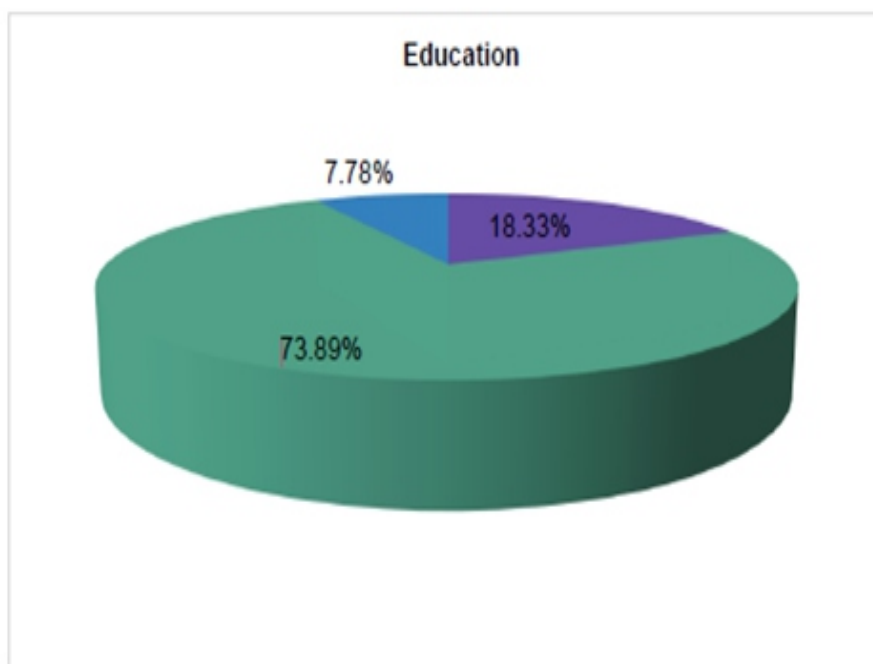


Figure 3: Education of patients with hypertension in elderly age group

Table 1: Occupation of patients with hypertension in elderly age group

Occupation	Count (%)
Driver	1 (0.56%)
Farmer	72 (40.00%)
Govt. Job	1 (0.56%)
Housewife	86 (47.78%)
Peon	2 (1.11%)
Police & Police (ret.)	2 (1.11%)
Shopkeeper	9 (5.00%)
Sweeper	1 (0.56%)
Teacher & teacher (ret.)	6 (3.33%)
Total	180 (100%)

Table 2: Socio Economic Status (SES) of patients with hypertension in elderly age group according to modified Kupp swamy classification

Socio Economic Status	Count (%)
Upper class	2 (1.11%)
Upper middle class	4 (2.22%)
Lower middle class	37 (20.56%)
Upper lower class	10 (5.56%)
Lower class	127 (70.56%)
Total	180 (100%)

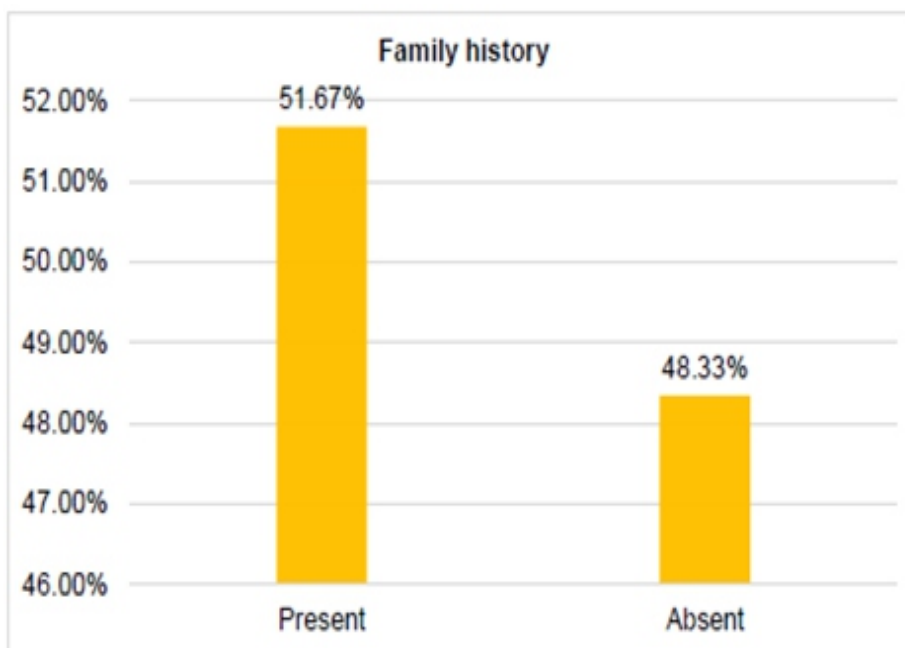


Figure 4: Family history of patients with hypertension in elderly age group

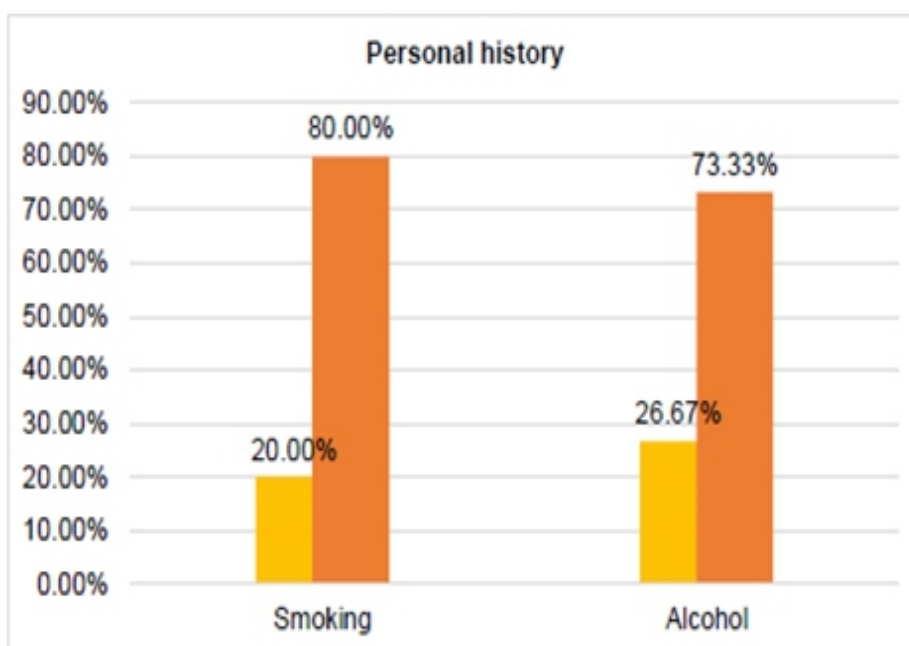


Figure 5: Personal history of patients with hypertension in elderly age group

Table 3: BMI of patients with hypertension in elderly age group

BMI (kg/m2)	Count (%)
<18.5 (underweight)	9 (5.00%)
18.5 -24.5 (normal weight)	78 (43.33%)
25-29.9 (overweight)	69 (38.33%)
>30 (obese)	24 (13.33%)
Total	180 (100%)

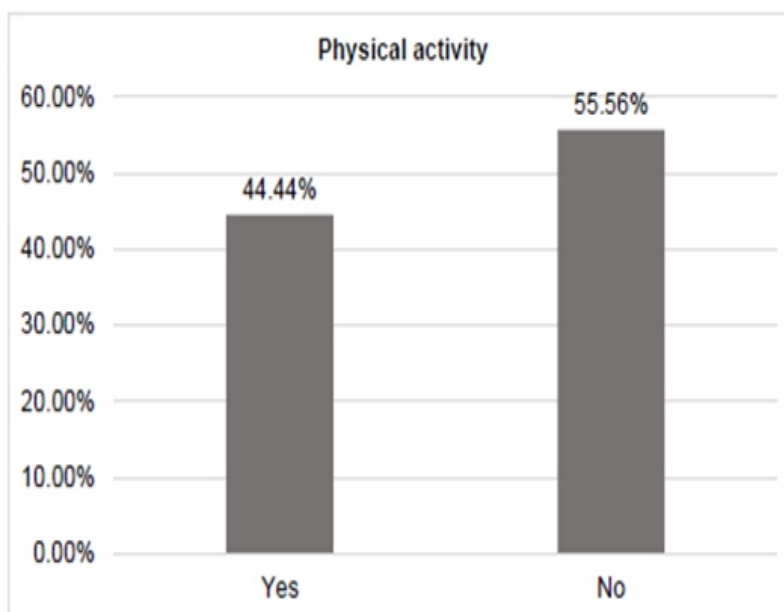


Figure 6: Physical activity by patients with hypertension in elderly age group

Table 4: Chief complaints of patients with hypertension in elderly age

Chief complaints	Count (%)
Headache	49 (27.22%)
Dizziness	32 (17.78%)
Palpations	36 (20.00%)
Shortness of breath	12 (6.67%)
Visual disturbances	22 (12.22%)
Cognitive decline	4 (2.22%)
Asymptomatic	26 (14.44%)
Total	180 (100%)

Table 5: Co-morbidities of patients with hypertension in elderly age group

Co-morbidities	Count (%)
Hypertension	100 (55.56%)
Diabetes Mellitus	57 (31.67%)
Chronic Kidney Disease	28 (15.56%)
Ischemic Heart Disease	36 (20.00%)

Table 6: Blood pressure of patients with hypertension in elderly age group

Blood pressure	Count (%)
Grade 1	66 (36.67%)
Grade 2	74 (41.11%)
Grade 3	32 (17.78%)
Isolated systolic HTN	8 (4.44%)
Total	180 (100%)

Table 7: Pulse rate of patients with hypertension in elderly age group

Pulse rate	Count (%)
<60/minutes	11 (6.11%)
60-100/ minutes	140 (77.78%)
>100	29 (16.11%)
Total	180 (100%)

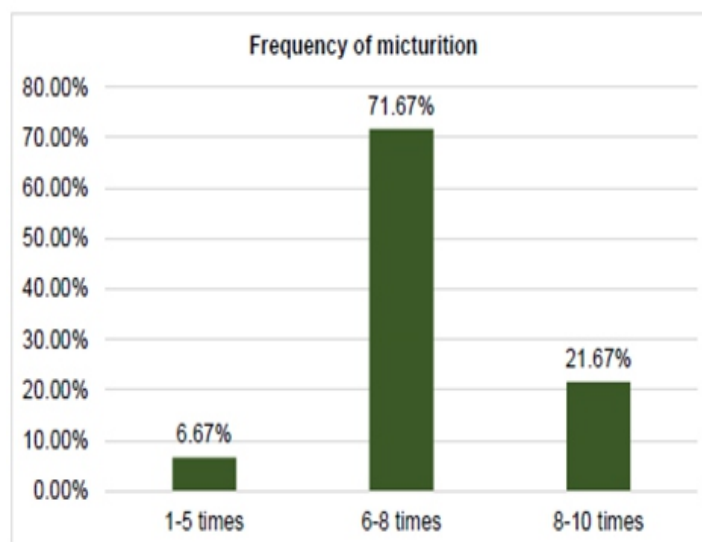


Figure 7: Frequency of micturition in day of patients with hypertension in elderly age group

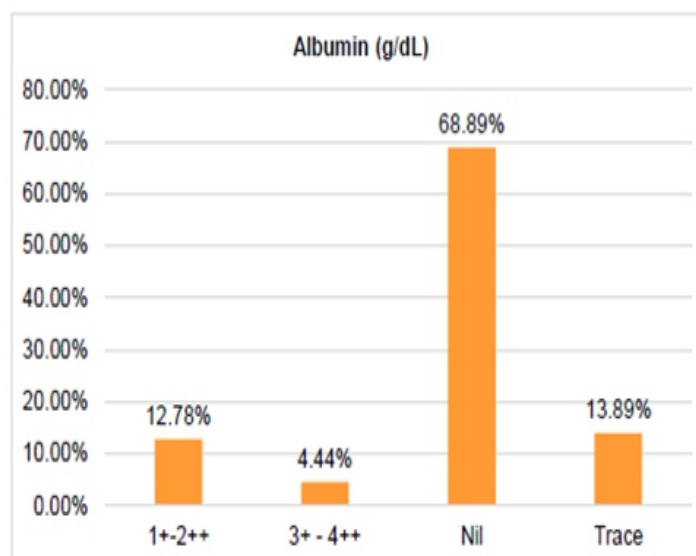


Figure 8: Urine Albumin examination of patients with hypertension in elderly age group

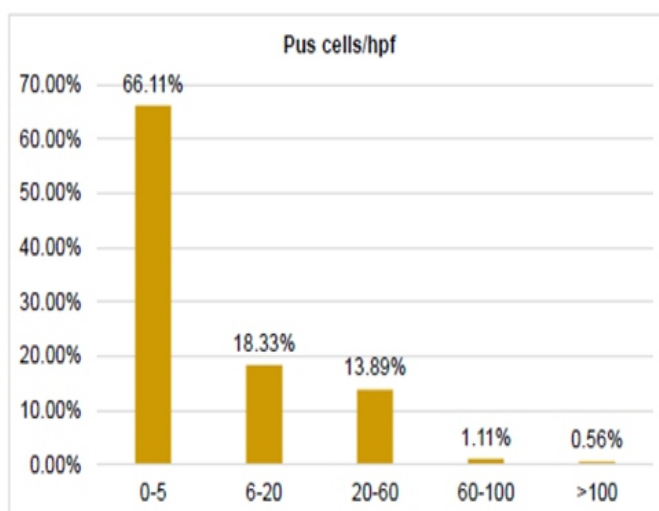


Figure 9: Urine pus cells/hpf examination of patients with hypertension in elderly age group

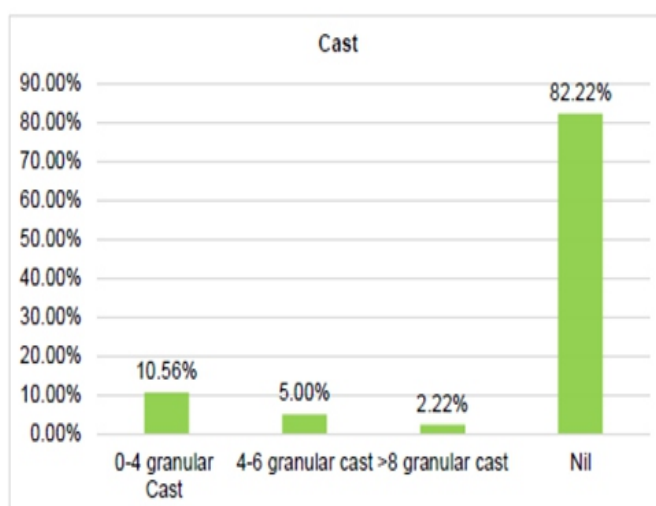


Figure 10: Urine cast examination of patients with hypertension in elderly age group

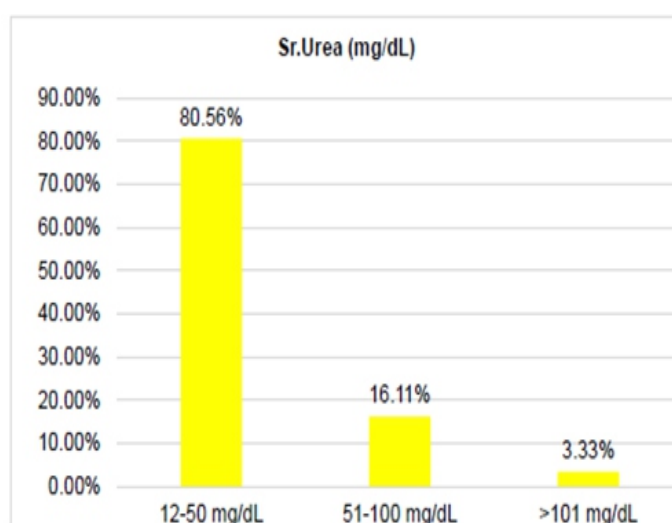


Figure 11: Sr. Urea (mg/dL) test of patients with hypertension in elderly age group

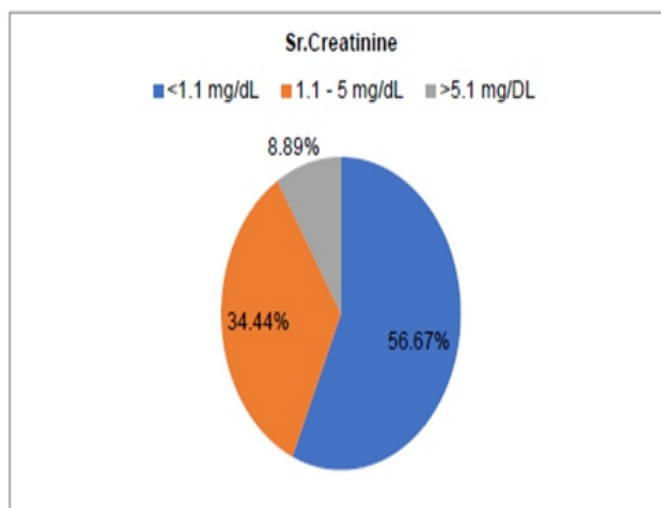


Figure 12: Sr. Creatinine (mg/dL) test of patients with hypertension in elderly age group

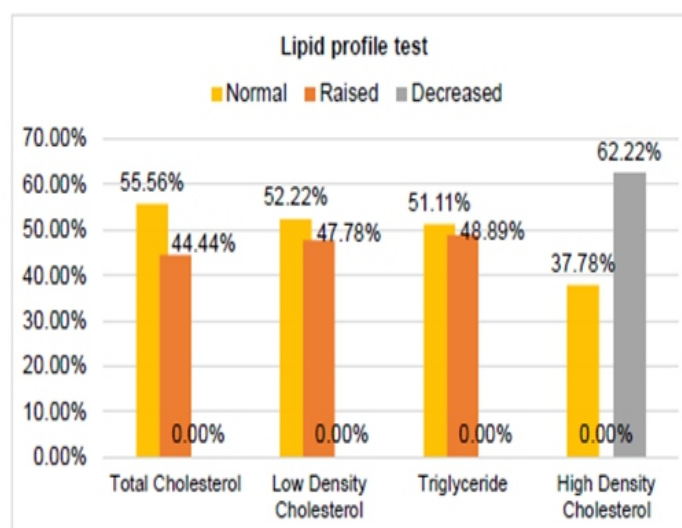


Figure 13: Lipid profile test of patients with hypertension in elderly age group

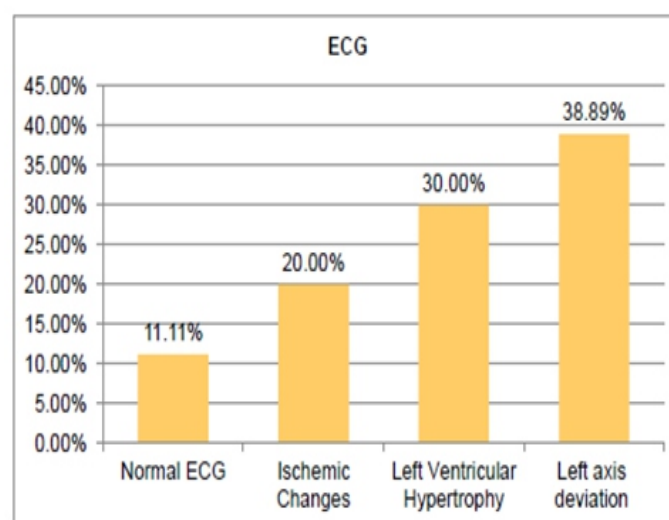


Figure 14: Electrocardiogram (ECG) of patients with hypertension in elderly age group

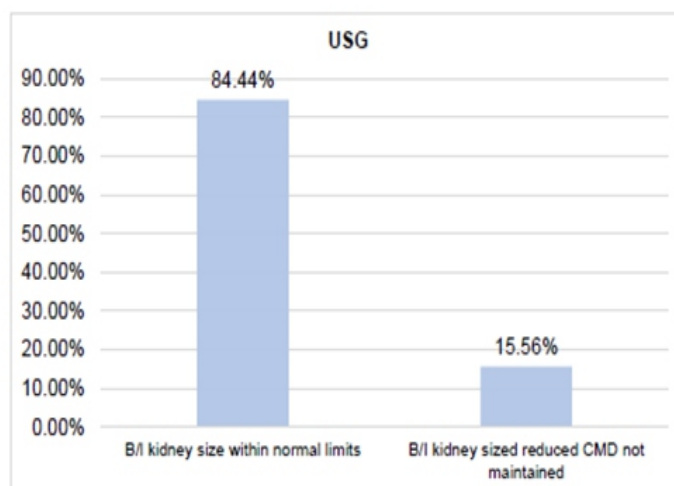


Figure 14: Ultrasound sonography (USG) of patients with hypertension in elderly age group

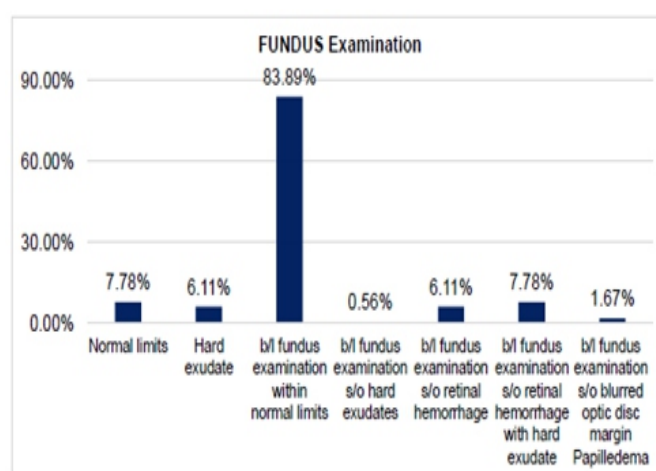


Figure 15: Fundus examination of patients with hypertension in elderly age group

DISCUSSION

Hypertension is a major contributor to morbidity and mortality in the elderly, arising from age-related physiological changes such as increased arterial stiffness, endothelial dysfunction, and reduced baroreflex sensitivity, compounded by lifestyle factors and comorbidities [12]. Age-related increases in blood pressure are often accompanied by vascular and renal changes, neurohormonal alterations, and cumulative exposure to risk factors such as obesity, physical inactivity, and unhealthy diets. The present cross-sectional study of 180 elderly hypertensive patients provides a comprehensive insight into the socio-demographic, clinical, and biochemical profile of this population, reflecting both global trends and region-specific characteristics shaped by health infrastructure, socioeconomic status, and cultural practices.

The majority of patients (65%) were aged 60–70 years, with 27.22% aged 71–80 years and 7.78% above 80 years. This aligns with findings from Wu et al. (2023) and the Longitudinal Ageing Study in India (LASI, 2021), which report the highest prevalence of hypertension in the early elderly population [13]. Female patients slightly predominated (55%), consistent with

postmenopausal hormonal changes such as estrogen withdrawal, increased central adiposity, and reduced vascular compliance, as reported by Oliveros et al. (2020), Yadav et al. (2008), and the National Family Health Survey-5 [14]. Notably, some regional studies, such as Ghosh et al. (2022), reported higher prevalence among males, indicating that gender differences may be influenced by lifestyle, cultural, and healthcare access factors [15].

Educational and socioeconomic factors emerged as significant determinants of hypertension burden. Most patients (73.89%) had primary or secondary education, with only 7.78% attaining graduation-level education. Low educational attainment is linked to poor disease awareness, treatment adherence, and healthcare utilization [16–18]. Similarly, 70.56% of patients belonged to lower socioeconomic classes, reflecting barriers to healthcare access, unhealthy dietary habits, and increased occupational stress [19–21]. These findings underscore the social gradient in hypertension prevalence and management, emphasizing the need for community-based health education and low-cost screening programs targeting socioeconomically disadvantaged elderly populations.

Lifestyle and occupational factors further influenced hypertension risk. Housewives (47.78%) and farmers (40%) formed the largest occupational groups, consistent with rural demographic profiles [22]. Unhealthy behaviors such as alcohol consumption (26.67%), smoking (20%), and physical inactivity (55.56%) were prevalent, exacerbating cardiovascular risk [23–25]. Overweight (38.33%) and obesity (13.33%) were common, reinforcing the role of weight management as a modifiable intervention in elderly hypertension [25].

Clinically, hypertension often manifested with nonspecific symptoms such as headache (27.22%), palpitations (20%), and dizziness (17.78%), highlighting the silent and insidious nature of the disease. Comorbid conditions were common, including diabetes mellitus (31.67%), ischemic heart disease (20%), and chronic kidney disease (15.56%) [26], reflecting the clustering of cardiometabolic risks in the elderly. End-organ involvement was evident, with left ventricular hypertrophy (30%), left axis deviation (38.89%), ischemic ECG changes (20%) [27], renal impairment (serum creatinine >1.1 mg/dL in 43.33%) and hypertensive retinopathy in a subset of patients [28–30]. The majority presented with Grade 2 hypertension (41.11%), indicating delayed diagnosis and suboptimal control, while isolated systolic hypertension was less common (4.44%), potentially due to underdiagnosis or accelerated progression to combined systolic-diastolic hypertension [30].

Comparison with previous studies demonstrated similar trends in age distribution, gender patterns, socioeconomic status, comorbidities, and complication prevalence, supporting the external validity of these findings. The study underscores that elderly hypertension is shaped by an interplay of biological, social, and lifestyle factors, with significant implications for health outcomes.

In summary, elderly hypertensive patients represent a medically vulnerable group characterized by a high burden of comorbidities, modifiable risk factors, and socio-economic disadvantages. Effective management requires early detection, regular screening, patient education, lifestyle interventions, and a multidisciplinary approach addressing both clinical and social determinants of health. Public health strategies must prioritize community-based interventions, targeted health literacy programs, and resource-sensitive management protocols to reduce complications and improve outcomes in this growing geriatric population.

CONCLUSION

This study highlights the multifactorial nature of hypertension in the elderly, influenced by age, female predominance, low socioeconomic status, and limited education. Modifiable lifestyle factors—physical inactivity, obesity, smoking, and alcohol use—contribute to poor blood pressure control. Nonspecific symptoms often mask disease, while comorbidities such as chronic kidney disease, ischemic heart disease, and diabetes

demonstrate its multisystemic impact. End-organ damage was evident even in minimally symptomatic patients. These findings underscore the need for early detection, lifestyle interventions, patient education, and integrated geriatric hypertension care, particularly in resource-limited settings.

ABBREVIATIONS

CBC: Complete Blood Count

RFT: Renal Function Test

LFT: Liver Function Test

ECG: Electrocardiogram

USG: Ultrasonography

LIMITATIONS & FUTURE PERSPECTIVES

The study was limited by its single-centre design, relatively small sample size, and short duration, which may restrict generalizability. Future research could focus on multicenter studies with larger cohorts to validate findings, evaluate long-term outcomes, and explore innovative diagnostic and management strategies for appendicular perforation, improving patient prognosis and reducing complications.

CLINICAL SIGNIFICANCE

Timely detection and management of acute appendicitis are crucial to prevent perforation, reducing morbidity and mortality. The study identifies high-risk groups, such as males and individuals at age extremes, highlighting the need for targeted preventive strategies and clinical vigilance. Delayed presentation significantly increases perforation risk, underscoring the importance of early healthcare access and awareness campaigns. Postoperative complications, including surgical site infections and prolonged ileus, emphasize the need for thorough preoperative risk assessment and tailored postoperative care. Recognizing the distal third of the appendix as the most common perforation site aids surgeons in effective intraoperative planning and management.

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of International

Journal of Medical & Health Research Editors (IJMHR) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

FUNDING

None

ETHICAL APPROVAL & CONSENT TO PARTICIPATE

All necessary consent & approval was obtained by authors.

CONSENT FOR PUBLICATION

All necessary consent for publication was obtained by authors.

DATA AVAILABILITY

All data generated and analyzed are included within this research article. The datasets utilized and/or analyzed in this study can be obtained from the corresponding author upon a reasonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in the writing or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

PUBLISHER'S NOTE

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