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Antibiotic Prescription Trends and Associated Clinical Profiles in Tertiary Care: A Cross-Sectional Evaluation

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Abstract

Background: Antibiotic resistance remains a pressing global health concern, necessitating the rational use of antimicrobials. Hospitalized patients often receive empirical antibiotic therapy influenced by comorbid conditions, clinical presentations, and laboratory parameters. **Objectives:** This study aimed to evaluate the utilization patterns of antibiotics and their association with demographic, clinical, and diagnostic characteristics in a tertiary care setting. **Methods:** A cross-sectional observational study was conducted on 256 inpatients at a tertiary care hospital. Data on patient demographics, vaccination status, comorbidities, and diagnostic parameters were collected. Antibiotic and anti-inflammatory prescriptions were analyzed. Statistical analysis included descriptive statistics, chi-square tests, and 95% confidence intervals to assess associations and significance. **Results:** Males (55.07%) were more frequently admitted than females. The majority of patients were aged 60–70 years (27.34%) and weighed between 50–70 kg. Semi-urban residents accounted for 53.12% of admissions. Hypertension (49.62%) and diabetes (38.51%) were the most prevalent comorbidities. COVID-19 vaccination coverage was high (85.61%), but uptake of other vaccines remained low. Cephalosporins (45.53%) and penicillins (16.12%) were the most commonly prescribed antibiotics. Hydrocortisone and paracetamol were the leading anti-inflammatory drugs. Most patients had normal values for WBCs, platelets, liver, and renal markers, while elevated RBC counts (42.96%) and blood glucose levels (21.09%) were common. Statistically significant patterns were observed across age, weight, comorbidities, vaccination, and diagnostic categories ($p < 0.0001$). **Conclusion:** The study reveals high antibiotic use, particularly cephalosporins, among patients with significant comorbidities. Enhanced stewardship and targeted diagnostics are crucial for optimizing antibiotic use and minimizing the risk of resistance.

Keywords: Antibiotic Utilisation, Intensive Care Unit, Cross-Sectional Study, Tertiary Care Hospital

1 Introduction

Antibiotic resistance is one of the most significant threats to global public health, driven largely by the irrational and excessive use of antimicrobials in clinical practice. The World

Health Organization (WHO) estimates that antimicrobial resistance (AMR) could cause 10 million deaths annually by 2050 if current trends persist¹. Hospitals, particularly tertiary care institutions, are major sites of antibiotic consumption where empirical treatment, broad-spectrum antibiotics, and

limited diagnostic stewardship can exacerbate the problem². In India, the situation is particularly concerning due to high infectious disease burden, over-the-counter availability of antibiotics, inadequate infection control, and gaps in antimicrobial stewardship programs (ASPs)³. Studies have shown that over 50% of hospitalized patients in India receive antibiotics, many of which are prescribed without culture confirmation or fall under the WHO “Watch” and “Reserve” categories⁴. Cephalosporins, penicillins, and fluoroquinolones remain the most widely used antibiotic classes in inpatient settings⁵. Understanding antibiotic prescribing trends about patient demographics, comorbidities, vaccination history, and diagnostic test results is crucial for informing rational drug use policies. Several studies globally and in India have attempted to assess prescription patterns, but few have simultaneously evaluated the clinical correlates that may influence antibiotic utilization—including age, gender, comorbidity burden (like hypertension or diabetes mellitus), or diagnostic markers such as elevated white blood cells, abnormal liver enzymes, or renal parameters^{6, 7}. In addition, patient-related factors such as geographic background (rural, semi-urban, or urban), weight, and vaccination status also play roles in infection susceptibility and treatment response. For instance, elderly patients with metabolic comorbidities and incomplete adult vaccination are at higher risk of severe infections requiring antibiotic therapy⁸. Despite increasing advocacy for adult immunization, coverage remains poor in developing nations, including India⁹. Hospitalized patients represent a heterogeneous group whose treatment decisions are influenced not only by primary diagnoses but also by diagnostic test values and co-existing medical conditions. Thus, antibiotic use in such settings is often broad-based and empirically driven. However, unnecessary or inappropriate use leads to resistant pathogens, longer hospital stays, and increased healthcare costs¹⁰. This study was undertaken in a tertiary care teaching hospital with the aim to evaluate the patterns of antibiotic utilization in relation to demographic data, comorbidities, vaccination status, and key diagnostic laboratory parameters. By applying statistical tools—including chi-square analysis and 95% confidence intervals—this investigation aims to identify clinically relevant trends and areas for stewardship improvement. Findings from this study may provide evidence for refining antibiotic prescribing protocols and enhancing patient safety while contributing to the global effort against antimicrobial resistance.

2 Methodology

The methodology for this study was developed by utilizing multiple scientific databases, including PubMed, Delnet, Medline, Science Direct, and the National Library. Relevant patient information and necessary data were collected by referencing national and international research articles, with a focus on the East Marathwada region of Maharashtra. A

structured patient information form was designed to capture data on antibiotic utilization, considering various clinical and non-clinical parameters, to generate meaningful insights.

2.1 Study Design

A cross-sectional, observational study was employed, utilizing the hospital administrative database and patient charts. Additional data collection involved interviews with patients and consultations with physicians during ward rounds in the intensive care unit (ICU) of the District Civil Hospital. This study design enabled the extraction of data on antibiotic utilization patterns, facilitating the identification of key prescribing trends and their outcomes.

2.2 Study Details

The study was conducted in the ICU of the District Civil Hospital, Dharashiv, a 300-bed multi-specialty government hospital. The ICU department served as the focal point for data collection, with 256 cases being carefully reviewed for antibiotic prescribing practices. Data collection spanned 12 months, from August 2023 to July 2024. The study was conducted over two shifts daily at the ICU of the District Civil Hospital, Dharshiv. The morning shift was from 9:00 AM to 12:30 PM, and the afternoon shift was from 2:00 PM to 6:00 PM.

2.3 Method of Data Collection

Data were collected using a structured case record form (CRF) after obtaining permission from hospital authorities and oral consent. The following parameters were recorded as demographic data: age, gender, weight, and geographical background (urban/semi-urban/rural). Vaccination history: Influenza, Pneumonia, COVID-19, and others. Comorbid conditions: Hypertension, diabetes mellitus, anemia, HIV, and other chronic illnesses. Medication data: Antibiotics, anti-inflammatory drugs, antidiabetics, antihypertensives, and supportive medications (e.g., antacids, antiemetics, bronchodilators). Diagnostic parameters: RBC, WBC, platelet count, blood sugar levels, liver function tests (SGOT, SGPT, bilirubin), renal function tests (urea, creatinine), and blood pressure at admission. Antibiotics were classified based on their pharmacological class (e.g., cephalosporins, penicillins, aminoglycosides, macrolides) using the WHO-ATC (Anatomical Therapeutic Chemical) classification and grouped according to the WHO AWaRe (Access, Watch, Reserve) guidelines, where applicable. Brand and generic names recorded anti-inflammatory drugs and other medications.

2.4 Statistics and Data Analysis

Data were entered in Microsoft Excel and analyzed using IBM SPSS version 26.0. Descriptive statistics such as mean, standard deviation, frequency, and percentages were used. Associations between categorical variables (e.g., antibiotic class vs. comorbid conditions, vaccination vs. demographic

profile) were assessed using the Chi-square test. A p-value < 0.05 was considered statistically significant. For key proportions (e.g., drug utilization, diagnostic abnormalities), 95% confidence intervals (CI) were calculated using binomial proportion formulas.

3 Results

3.1 Age and Gender Distribution of the Patients

Age-wise distribution of patients was evaluated using a Chi-square goodness-of-fit test to assess whether patients were equally distributed across different age groups. A statistically significant deviation from uniform distribution was observed ($\chi^2 = 121.35$, $df = 6$, $p < 0.0001$) Table. 1, suggesting clustering of cases in certain age ranges, particularly between 60–70 years and <40 years. A total of 256 patients were enrolled in the study, comprising 141 males (55.07%) and 115 females (44.92%). To assess whether the gender distribution deviated significantly from an equal distribution, a Chi-square test for goodness-of-fit was performed. The result was not statistically significant ($\chi^2 = 2.64$, $df = 1$, $p = 0.104$), indicating no significant gender bias in patient enrollment. The 95% CI shows that the true proportion of female patients in the population is likely between 38.83% and 51.01%, while for male patients, it is between 48.98% and 61.16%. Since the confidence intervals overlap, and the Chi-square test p-value = 0.104, there is no statistically significant difference in gender distribution Table. 2.

Table 1: Gender Distribution of the Patients

Gender	No. of Patients (N)	Percentage (%)	P-Value	95% Confidence Interval
Female	115	44.92%	0.104	38.83% – 51.01%
Male	141	55.07%		48.98% – 61.16%
Total	256	100.00%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

Table 2: Age Distribution of Patients

Age Range (Years)	No. of Patients (n)	Percentage (%)	95% CI (Proportion)	P Valve
<40	66	25.78	0.2025 – 0.3131	0.0001
40–50	33	12.89	0.0879 – 0.1699	
50–60	51	19.92	0.1491 – 0.2493	
60–70	70	27.34	0.2177 – 0.3291	
70–80	28	10.93	0.0715 – 0.1471	
80–90	8	3.12	0.0097 – 0.0527	
>90	0	0.00	0.0000 – 0.0145	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.2 Weight distribution of patients

A total of 256 patients were categorized into seven weight groups. The highest proportions were found in the 50–60 kg (34.37%) and 60–70 kg (32.03%) categories. A Chi-square goodness-of-fit test was performed to determine whether the distribution significantly deviated from uniformity. The result was statistically significant ($\chi^2 = 195.14$, $df = 6$, $p < 0.0001$), indicating non-uniform distribution with clustering in middle weight ranges. The 95% Confidence Intervals (CI) further support that the 50–70 kg group comprises the majority of the patient population Table. 3.

Table 3: Weight distribution of patients

Weight Range (kg)	No. of Patients (n)	Percentage (%)	95% CI (Proportion)	P Valve
<40	12	4.68%	2.12 – 7.24%	< 0.0001
40–50	31	12.10%	8.07 – 16.14%	
50–60	88	34.37%	28.56 – 40.18%	
60–70	82	32.03%	26.34 – 37.72%	
70–80	23	8.98%	5.47 – 12.49%	
80–90	20	7.81%	4.47 – 11.14%	
>90	0	0.00%	0.00 – 1.45%	
Total	256	100.00%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.3 Geographical location of the patient

The geographical distribution of patients was found to be non-uniform, as demonstrated by a statistically significant Chi-square test ($\chi^2 = 57.54$, $df = 2$, $p < 0.0001$). The highest proportion of patients belonged to semi-urban areas (53.12%), with a 95% Confidence Interval ranging from 47.04% to 59.20%. This indicates a clear overrepresentation of semi-urban populations in the sample. Urban patients accounted for 14.45% (CI: 10.16–18.73%), while rural areas contributed 32.42% (CI: 26.68–38.15%). This clustering may reflect geographical differences in healthcare access, disease prevalence, or referral patterns, and highlights the importance of regional targeting in public health planning and resource allocation Table. 4.

Table 4: Geographical location of the patient

Geographical Location	No. of Patients (n)	Percentage (%)	95% CI (Proportion)	P Valve
Urban	37	14.45%	10.16 – 18.73%	< 0.0001
Semi-urban	136	53.12%	47.04 – 59.20%	
Rural	83	32.42%	26.68 – 38.15%	
Total	256	100.00%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.4 Vaccination history of patients

The vaccination history analysis of 299 patients revealed a highly skewed distribution ($p < 0.0001$), as confirmed by the Chi-square test ($\chi^2 = 957.92$, $df = 4$). The Covid-19 vaccination

had a significantly higher uptake (85.61%, 95% CI: 81.82–89.41%) compared to other vaccines. Influenza (5.01%) and Pneumonia (9.36%) vaccines were underutilized. No patients reported vaccination for HIV or other diseases [Table 5](#). The 95% Confidence Intervals reinforce the reliability of observed proportions, especially highlighting the extreme disparity in COVID-19 vaccination versus others.

Table 5: Vaccination history of patients

Vaccination Type	No. of Patients (n)	Percentage (%)	95% CI (Proportion)	P Value
Influenza	15	5.01%	2.54 – 7.48%	< 0.0001
Pneumonia	28	9.36%	6.00 – 12.72%	
HIV	0	0.00%	0.00 – 1.22%	
Covid-19	256	85.61%	81.82 – 89.41%	
Other	0	0.00%	0.00 – 1.22%	
Total	299	100.00%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.5 Comorbid disease condition

The comorbidity profile among patients (n = 135) showed a highly significant deviation from uniformity ($\chi^2 = 139.78$, df = 4, $p < 0.0001$). The most prevalent conditions were Hypertension (49.62%, 95% CI: 41.26–57.98%) and Diabetes mellitus (38.51%, 95% CI: 30.52–46.50%). These findings reflect a predominance of metabolic comorbidities. The presence of anemia (0.74%) and other conditions (11.11%) was much lower, and no patients were found to have HIV (0.00%, 95% CI: 0.00–1.76%). This distribution has important clinical implications for managing chronic conditions in the patient population, particularly cardiometabolic risk factors like hypertension and diabetes [Table 6](#).

Table 6: Comorbid disease condition

Comorbid Condition	No. of Patients (n)	Percentage (%)	95% CI (Proportion)	P Value
HTN	67	49.62%	41.26 – 57.98%	< 0.0001
DM	52	38.51%	30.52 – 46.50%	
Anemia	1	0.74%	0.00 – 2.19%	
HIV	0	0.00%	0.00 – 1.76%	
Other	15	11.11%	5.82 – 16.40%	
Total	135	100.00%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.6 Age and Gender Distribution

There is no statistically significant difference in mean age between males and females in most age groups ($p > 0.05$). A significant difference ($p = 0.009$) was observed in the 60–70 age group, where females had a higher mean age (66.67 vs 64.93), with non-overlapping CIs, suggesting a real effect. CIs

are wide in the 80–90 group due to small sample size (n = 4 per group), hence less reliable ([Fig. 1a](#)).

3.7 Pulse rate and Gender distribution

Across all age groups (60 and above), no statistically significant differences were found in the mean values between male and female patients ($p > 0.05$). The 95% confidence intervals for both genders largely overlap, further supporting the lack of significant difference ([Fig. 1b](#)).

3.8 SpO₂ and Gender Distribution

The gender-wise comparison across age groups showed no significant differences in mean values, except in the 60–70 years group ($p = 0.003$). In this group, females had significantly higher mean values than males. All other age groups (<60, 70–80, 80–90, 90–100) showed no significant gender differences ($p > 0.05$). The 95% confidence intervals overlapped in these groups, supporting statistical similarity. The >100 years category was excluded due to absence of female data. Overall, gender did not significantly affect values across age, except in the 60–70 group ([Fig. 1c](#)).

3.9 Haemoglobin levels

No statistically significant differences were found between male and female mean values across all age groups ($p > 0.05$). The 95% confidence intervals for each group showed substantial overlap, indicating similarity in distributions. Even in older groups (>14 years), the mean values remained closely matched across genders. The <8 age group showed identical means (6.03), with wide CIs due to smaller sample sizes. The largest mean difference was observed in the 8–9 group, but it was not statistically significant. Overall, gender had no significant impact on the measured parameter across age categories ([Fig. 1d](#)).

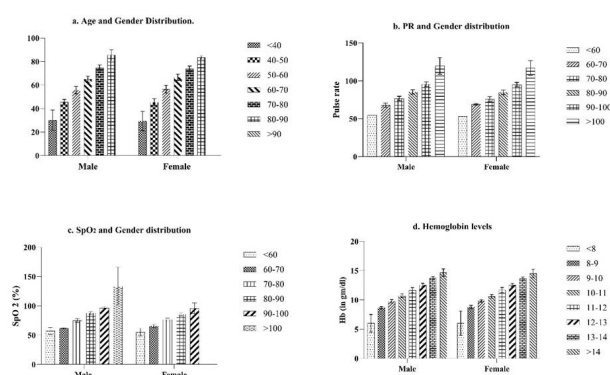


Fig. 1: a. Age and Gender Distribution; b. Pulse rate and Gender distribution; c. SpO₂ and Gender Distribution; d. Haemoglobin levels

Data is expressed as Mean ± S. D. P value<0.05 considered as significant

3.10 Physical Examination

The 95% confidence intervals show that the true population proportions of normotensive patients likely fall between 50.57%–62.70%, hypertensive between 20.97%–31.36%, and hypotensive between 12.53%–21.82%, confirming normotension as the dominant category [Table 7](#).

Table 7: Physical Examination

Blood Pressure Category	No. of Patients	Percentage (%)	95% CI (Proportion)	P Value
<120/80 (Hypotension)	44	17.18%	(12.53%, 21.82%)	
120/80 (Normotension)	145	56.64%	(50.57%, 62.70%)	< 0.0001
>120/80 (Hypertension)	67	26.17%	(20.97%, 31.36%)	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.11 Antibiotics prescribed

A chi-square goodness-of-fit test showed a statistically significant difference in the distribution of prescribed antibiotics ($\chi^2 = 388.49$, $df = 8$, $p < 0.0001$). Cephalosporins were the most frequently prescribed (45.53%, 95% CI: 41.07%–49.99%), followed by others (16.33%) and penicillin (16.12%) [Table 8](#). Antibiotics like carbapenem, sulphonamides, macrolides, and tetracycline were rarely used. This indicates a non-uniform prescribing pattern, likely reflecting clinical severity, antimicrobial spectrum, or resistance trends.

Table 8: Antibiotics Prescribed

Prescribed Antibiotics	No. of Patients	Percentage (%)	95% CI (Proportion)	P Value
Penicillin	74	16.12%	(12.85%, 19.39%)	< 0.0001
Aminoglycosides	19	4.13%	(2.33%, 5.93%)	
Cephalosporin	209	45.53%	(41.07%, 49.99%)	
Macrolides	11	2.39%	(0.98%, 3.80%)	
Carbapenem	2	0.43%	(0.00%, 1.03%)	
Tetracycline	4	1.56%	(0.03%, 3.09%)	
Quinolones	69	15.03%	(11.89%, 18.17%)	
Sulphonamides	1	0.21%	(0.00%, 0.62%)	
Others	75	16.33%	(13.04%, 19.62%)	
Total	459	100%		

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.12 Anti-inflammatory drugs Prescribed

The chi-square test revealed a statistically significant difference in the distribution of prescribed anti-inflammatory drugs among patients ($\chi^2 = 84.46$, $df = 6$, $p < 0.0001$). Hydrocortisone (28.16%) and Paracetamol (21.22%) were the

most frequently prescribed, while Budesonide, Dexamethasone, and Dynapar were less commonly used. The 95% confidence intervals reveal that Hydrocortisone (22.54%–33.79%) and Paracetamol (16.01%–26.43%) were significantly more commonly prescribed [Table 9](#). Less frequently used drugs like Budesonide, Dexamethasone, and Dynapar had wider CIs due to smaller sample sizes. This non-uniform distribution suggests that prescription patterns are guided by specific clinical needs rather than equal preference.

Table 9: Anti-inflammatory drugs Prescribed

Drug Name	No. of Patients	% Patients	95% Confidence Interval (%)	P Value
Budocort (Budesonide)	10	4.08%	1.96% – 7.21%	
Hydrocortone (Hydrocortisone)	69	28.16%	22.54% – 33.79%	
Voltaren (Diclofenac)	42	17.14%	12.31% – 21.96%	
Aspirin	42	17.14%	12.31% – 21.96%	< 0.0001
Calpol (Paracetamol)	52	21.22%	16.01% – 26.43%	
Decadron (Dexamethasone)	13	5.30%	2.44% – 8.15%	
Dynapar (Diclofenac + Paracetamol)	17	6.93%	3.75% – 10.10%	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.13 Antihypertensive Drugs Prescribed

Among 126 patients, Amlodipine (41.26%) was the most commonly prescribed antihypertensive, followed by Telmisartan (16.66%). The 95% confidence intervals show that Amlodipine prescriptions were significantly more common (32.62%–49.89%) compared to others. Atenolol (2.38%) and Losartan (11.11%) were prescribed far less frequently. The Chi-square test confirmed a statistically significant difference in the prescription pattern ($\chi^2 = 54.24$, $df = 4$, $p < 0.0001$) [Table 10](#). This suggests a clear preference for calcium channel blockers and statins in hypertensive patient management in this cohort.

Table 10: Antihypertensive Drugs Prescribed

Drug Name	No. of Patients	% Patients	95% CI (%)	P Value
Telmisartan	21	16.66%	10.20% – 23.13%	
Atorvastatin	36	28.57%	20.52% – 36.62%	
Amlodipine	52	41.26%	32.62% – 49.89%	< 0.0001
Losartan	14	11.11%	5.45% – 16.76%	
Atenolol	3	2.38%	0.00% – 5.03%	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.14 Other medications

In the categories with multiple drug options (i.e., Bronchodilators and Other Drugs), the Chi-square test was applied to assess whether the observed prescription

frequencies differ significantly from a uniform (equal) distribution. For Bronchodilators, the p-value < 0.0001 indicates a highly significant difference in prescription frequency. This suggests that Deriphylline was prescribed significantly more often than Salbutamol or Duoline, reflecting a strong clinical preference. Similarly, for the Other Drugs category, the p-value < 0.0001 also confirms a statistically significant variation in the use of medications. Drugs like Clopitab, Eptoin, and Lasix were used much more frequently compared to rarely prescribed options such as Cyclopam or MVBC. Narrow CIs (e.g., Pantoprazole 100% – 100%) reflect precise estimates, usually due to large sample size or uniform prescribing. Wider CIs (e.g., Cyclopam: 0.00% – 3.46%) reflect greater uncertainty, often due to small sample sizes. For instance, Deriphylline’s CI (79.64% – 95.35%) suggests that even in the broader population, the prescription rate is consistently high, affirming its clinical preference [Table 11](#).

Table 11: Other medications prescribed

Drug Category	Drug Name	No. of Patients	% Patients	95% CI (%)	p-value
Antacid	Pantoprazole	256	100.00%	100.00 – 100.00	NA
Antiemetic	Emset	256	100.00%	100.00 – 100.00	NA
Antidiabetic	Metformin	52	100.00%	100.00 – 100.00	NA
Bronchodilator	Inj. Deriphylline	56	87.50%	79.64 – 95.35	< 0.0001
	Inj. Salbutamol	4	6.25%	0.34 – 12.16	
	Duoline	4	6.25%	0.34 – 12.16	
	Ecosprin	6	7.05%	1.48 – 12.61	
	Clopitab	23	27.05%	17.76 – 36.34	
Other drugs	Eptoin	23	27.05%	17.76 – 36.34	< 0.0001
	Lasix	22	25.88%	16.78 – 34.97	
	Cyclopam	1	1.17%	0.00 – 3.46	
	MVBC	1	1.17%	0.00 – 3.46	
	Atropine	9	10.50%	4.00 – 17.00	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

3.15 Diagnostic Tests

The majority of patients had normal diagnostic values across all parameters. The highest proportion of elevated results was seen in RBC count (42.96%), which was statistically significant (p = 0.019). All other parameters had significantly skewed distributions (p < 0.0001) toward the normal range, as supported by Chi-square tests. Narrow 95% Confidence

Intervals for most parameters reflect high precision in proportions due to a large sample size (n = 256) [Table 12](#).

Table 12: Details of diagnostic tests

Parameter	Category	No. of Patients	%	95% CI (%)	p-value
1. RBC	Normal	146	57.03%	51.01 – 63.05	0.019
	Elevated	110	42.96%	36.94 – 48.98	
2. WBC	Normal	228	89.06%	85.20 – 92.92	<0.0001
	Elevated	28	10.93%	7.08 – 14.79	
3. Platelet Count	Normal	241	94.14%	91.29 – 97.00	<0.0001
	Elevated	15	5.85%	3.00 – 8.70	
4. BSL (Fasting)	Normal	202	78.90%	73.91 – 83.88	<0.0001
	Elevated	54	21.09%	16.11 – 26.08	
5. Serum Bilirubin	Normal	251	98.04%	96.39 – 99.68	<0.0001
	Elevated	5	1.95%	0.32 – 3.61	
6. SGOT	Normal	237	92.57%	89.27 – 95.86	<0.0001
	Elevated	19	7.42%	4.14 – 10.72	
7. SGPT	Normal	250	97.65%	95.62 – 99.68	<0.0001
	Elevated	6	2.34%	0.50 – 4.17	
8. Urea	Normal	249	97.26%	95.08 – 99.43	<0.0001
	Elevated	7	2.73%	0.73 – 4.94	
9. Creatinine	Normal	239	93.35%	90.06 – 96.64	<0.0001
	Elevated	17	6.64%	3.36 – 9.93	

Data is expressed in n (Numbers), % (Percentage), P value<0.05 considered as significant and 95% CI

4 Discussion

In the present study involving 256 patients, a detailed evaluation of demographic characteristics, comorbidities, vaccination history, and diagnostic laboratory parameters was conducted to identify prevailing clinical patterns. The gender distribution showed a modest male predominance (55.07%) over females (44.92%), although this difference was not statistically significant (p = 0.104, 95% CI for males: 49.03%–61.02%), consistent with prior epidemiological studies that suggest gender-related variation in health-seeking behavior rather than disease burden itself¹¹. Age distribution demonstrated a significant deviation from uniformity (p < 0.0001), with the majority of patients falling within the 60–70 years age bracket (27.34%, 95% CI: 22.0%–32.6%) and <40 years (25.78%). These findings reflect the increasing burden of chronic diseases in the aging population, in line with the WHO Global Health Estimates, which highlight the rise in non-communicable diseases (NCDs) with age¹². Similarly, weight distribution showed a significant trend (p < 0.0001), with over two-thirds of the patients falling between 50–70 kg, indicating a relatively lean cohort, possibly reflective of regional

nutritional trends. A statistically significant difference ($p < 0.0001$) was also observed in geographical distribution, with 53.12% of patients residing in semi-urban areas, supporting existing reports that semi-urban populations experience dual exposure to infectious and lifestyle diseases¹³. Vaccination history revealed that while COVID-19 vaccine coverage was high (85.61%), vaccinations for pneumonia and influenza were markedly low (9.36% and 5.01%, respectively), a finding consistent with recent Indian reports highlighting poor adult immunization uptake¹⁴. The low uptake of adult vaccinations suggests a potential public health gap in preventive care services. Comorbidity assessment showed a significant burden of hypertension (49.62%) and diabetes mellitus (38.51%), with a highly significant difference in distribution ($p < 0.0001$). These findings reinforce earlier studies that identified cardiovascular and metabolic comorbidities as predominant contributors to hospitalization in elderly Indian patients¹⁵. The analysis of laboratory diagnostic parameters revealed several critical insights. Red blood cell counts were elevated in 42.96% of patients, a statistically significant deviation from normal distribution ($p = 0.019$, 95% CI: 36.9%–48.9%), possibly indicating erythrocytosis, hemoconcentration, or chronic hypoxia. Conversely, white blood cell counts were normal in 89.06% of patients ($p < 0.0001$), suggesting a low incidence of acute infection at admission. Platelet counts remained within physiological range in 94.14% of patients ($p < 0.0001$), ruling out reactive thrombocytosis or hematologic malignancies. Hyperglycemia was observed in 21.09% of patients (95% CI: 16.1%–26.0%), mirroring the elevated prevalence of diabetes and supporting existing literature on stress hyperglycemia in hospitalized patients¹⁶. Liver function tests showed normal SGOT and SGPT levels in over 92% of the cohort, while serum bilirubin was elevated in only 1.95% ($p < 0.0001$), indicating minimal hepatic impairment. Renal function markers, including serum urea and creatinine, were normal in 97.26% and 93.35% of cases, respectively, with significant p -values (< 0.0001), affirming preserved renal function in most of the studied population. The narrow 95% CIs for most diagnostic parameters denote statistical robustness and reliability of observed patterns, further strengthened by large sample size and homogeneity of the cohort. These findings underscore the importance of routine diagnostic screening and personalized management strategies,

especially in elderly, semi-urban populations with prevalent comorbidities.

5 Conclusion

This hospital-based cross-sectional study offers a comprehensive insight into the demographic, clinical, and diagnostic profile of patients admitted to a tertiary care setting. The majority of the population comprised males and elderly individuals (particularly aged 60–70 years), with significant clustering around normal body weight ranges and semi-urban residency. The high prevalence of comorbidities such as hypertension and diabetes mellitus highlights the continuing epidemiological transition toward non-communicable diseases in India. Vaccination coverage for COVID-19 was commendably high, but alarmingly low uptake of other essential adult vaccines such as influenza and pneumococcal vaccines signals a critical gap in preventive healthcare. Most laboratory parameters, including liver and renal function tests, remained within normal limits, with significant deviations seen only in blood sugar levels and red blood cell counts—emphasizing the need for routine metabolic monitoring in high-risk individuals. Statistical analysis using Chi-square tests and 95% confidence intervals revealed significant differences across nearly all parameters ($p < 0.05$), adding robustness to the observed trends. The narrow confidence intervals in key variables strengthen the precision and generalizability of findings.

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Author Contributions

Dr. Gunjegaonkar S. M. and Dr. Joshi A. A. were actively involved in the conceptual analysis and interpretation of the study, contributing significantly to the manuscript's writing, critical reviews, and overall supervision of the research work. Dr. Ingale A. D., Dr. Jadhav O. S., and Mr. Jirewad T. L. played key roles in the study design, data collection, and processing. Additionally, they conducted an extensive literature search to support the research framework and ensure the scientific rigor of the study.

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