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Original Article

Clinical, Surgical Characteristics, Pharmacotherapy Patterns, and Outcomes among Inpatients at Zawia Hospital

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Abstract:
Background: Providing efficient healthcare and guaranteeing patient safety in tertiary care settings requires an understanding of inpatient clinical characteristics, surgical outcomes, and drug trends. The purpose of this study was to analyse the clinical, surgical, pharmacological, and demographic features of inpatients at Zawia Hospital in Libya between August and November 2025 and to determine how these features affected patient outcomes. **Methods and Methods:** 150 adult inpatient records from Zawia Hospital were used in a retrospective observational study. Demographics, comorbidities, surgical type, number of medications, antibiotic use, length of stay, polypharmacy (defined as concurrent use of ≥5 drugs), and ultimate outcomes were all included in the data. Python (SciPy) was used for statistical analysis. **Results:** Of the cohort, 40% were between the ages of 40 and 59, and 54.7% were men. Patients were split equally between the surgical and medical departments. 63.3% of patients had comorbidities. With a 13.3% complication rate, 40% of surgical patients (n = 75) had emergency procedures. Of all patients, 63.3% received antibiotics, and 40% had polypharmacy. While the mortality rate was 5.3%, the majority of patients (88%) were released. 46.7% of the patients spent less than five days in the hospital. **Conclusion,** Zawia Hospital has a substantial clinical burden due to high rates of comorbidities, antibiotic use, and polypharmacy. In order to maximise the quality and safety of inpatient care, better preoperative risk assessment, improved medication reconciliation, and greater antimicrobial stewardship are necessary, even if the majority of patients were successfully discharged.
Keywords: Inpatient care, Zawia Hospital, Polypharmacy, Antibiotic stewardship, Surgical outcomes, Comorbidities, Libya.

Introduction:

Patients in the hospital often display a complicated set of clinical traits that significantly impact their treatment paths and final health results [1]. An in-depth comprehension of these inherent patient characteristics, including demographic details, the existence of comorbid conditions, and the length of hospital admissions, is essential for the sensible distribution of healthcare resources and the execution of successful patient management approaches in clinical environments [2]. The complex interaction of these elements requires a thorough analytical strategy to enhance patient care and boost institutional effectiveness. Surgical procedures represent a large part of inpatient care, including both scheduled elective surgeries and urgent emergency interventions. A significant difference is evident between the results of these two types, as emergency surgeries consistently show higher associated risks and typically less favorable outcomes compared to elective surgeries [3, 4]. This difference highlights the need for thorough comparative research to clarify the elements causing these varying results. This research is essential for improving surgical protocols, boosting preoperative patient counseling, and creating specific interventions to reduce risks linked to emergency procedures [5]. The ongoing assessment of surgical results is therefore a crucial element of quality assurance in hospital settings.

Apart from surgical factors, the medical management of hospitalized patients is a critical component of contemporary healthcare, especially regarding the widespread issue of polypharmacy and the careful administration of antibiotics. Polypharmacy, defined by the simultaneous use of several medications, is common among hospitalized patients, frequently resulting in a higher occurrence of adverse drug reactions, possible drug-drug interactions, and an accompanying increase in healthcare costs [6]. The challenges posed by polypharmacy require diligent oversight and thorough medication reconciliation to safeguard patient safety and treatment effectiveness [7]. Simultaneously, the careful management of antibiotics is increasingly essential. The careless or unsuitable use of these essential drugs is a leading cause of antimicrobial resistance, a growing global public health emergency [8]. Consequently, thorough evaluation of antibiotic prescribing behaviors is crucial for creating and executing effective antimicrobial stewardship initiatives designed to maintain the effectiveness of current antibiotics and protect public health. Incorporating an extensive examination of these complex factors, clinical features, surgical results, and pharmacy practices provides crucial

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insights into the current quality of inpatient care and helps identify particular areas that need enhancement [9]. Research that carefully analyzes these related elements is essential for creating evidence-based approaches aimed at enhancing patient safety, optimizing treatment procedures, and ultimately improving the overall efficiency of healthcare organizations [10].

The aim of the study:

This research intends to examine the demographic, clinical, surgical, and pharmacy-related traits of inpatients at Zawia Hospital (August-November 2025) and assess their influence on patient outcomes, such as length of stay, recovery, complications, and mortality. The main objective is to recognize patterns and elements that affect these results to guide suggestions for enhancing healthcare quality.

Materials and Methods:

Study Design and Setting:

This research utilized a retrospective observational approach to examine inpatient data obtained from Zawia Hospital, a tertiary care institution situated in Zawia, Libya. The research duration spanned four months, starting from August 1, 2025, and concluding on November 30, 2025.

Study Population and Participant Selection:

The study group included all adult patients hospitalized at Zawia Hospital throughout the specified study duration. Inclusion criteria encompassed all patients with a complete medical record accessible for examination, detailing their entire hospital stay from admission to discharge or outcome. Patients with incomplete records or those admitted solely for outpatient procedures were not included. A sum of 150 inpatient records was chosen for comprehensive analysis, encompassing both medical and surgical units.

Data collection:

Data were methodically gathered from the electronic health records (EHRs) and patient charts of the chosen inpatients. A uniform data collection form was used to guarantee consistency and precision. The gathered variables encompassed:

Demographic Features were age (grouped as <40, 40-59, ≥60 years) and gender (male/female). Clinical Features were the type of ward (medical/surgical), the existence of comorbidities (none, diabetes, hypertension, both). Surgical Features were (for surgical inpatients exclusively) the category of surgery (elective/emergency) and postoperative results (improved/complications). Pharmacy-Related Features were the quantity of medications given (≤3, 4-6, >6 drugs), the occurrence of polypharmacy (identified as simultaneous use of ≥5 medications), and usage of antibiotics (yes/no). Patient Outcomes were duration of hospitalization (≤5, 6-10, >10 days), and eventual result (released, referred, deceased).

Polypharmacy is characterized as the consistent use of five or more drugs at the same time [11]. Length of Stay (LOS): The time, measured in days, from when the patient is admitted until they are discharged or pass away. Complications: Any negative event or undesirable result that takes place during hospitalization or after surgery, necessitating extra medical treatment or an extended hospital stay.

Ethical approval:

Ethical clearance for this research was granted by the Institutional Review Board (IRB) of the applicable ethics committee of the University of Zawia. Confidentiality of patients was preserved during the study by anonymizing all gathered data and guaranteeing that no personal identification details were documented or shared. The research followed the guidelines outlined in the Declaration of Helsinki.

Statistical analysis:

Descriptive statistics were first used to summarize the demographic, clinical, surgical, and pharmacy-related traits of the study group. Categorical variables such as age group, sex, type of ward, comorbidities, surgical type, postoperative results, medication count, polypharmacy, antibiotic usage, duration of stay, and final outcome were displayed as frequencies and percentages. To evaluate the statistical significance of relationships between important patient traits and outcomes, inferential statistical tests were conducted. Chi-square (χ^2) tests were employed for comparisons among categorical variables. In all inferential analyses, a two-tailed p-value below 0.05 ($p < 0.05$) was regarded as statistically significant. All statistical evaluations were performed using Python (version 3.11) along with the SciPy library (version 1.17.0).

Result:

A total of 150 patient records were analyzed from Zawia Hospital, covering the months of August through November in 2025. The findings are presented in the following sections: demographic and clinical characteristics, surgical characteristics, and pharmacotherapy patterns.

Demographic and Clinical Characteristics:

Among the 150 individuals included in this study, the largest age group was between 40 and 59 years old, making up 40% of them. Next were those 60 and older, at about 33.3%, and then patients younger than 40, at 26.7%. More men were in the study, accounting for 54.7% of the group, while women made up 45.3%. The patients were split evenly between medical and surgical units, with 75 patients in each. Regarding comorbidities, 63.3% of the patients had at least one other health issue. To be more specific, 26.7% had diabetes, 23.3% had high blood pressure, and 13.3% had both. Only about 36.7% of the patients didn't have any recorded health problems. Most patients, about 46.7%, stayed in the hospital for 5 days or less. A substantial proportion, 36.7%, were there for 6 to 10 days, and 16.7% needed to stay for over 10 days. In the end, 88% of the patients were sent home, 6.7% were sent to other hospitals, and 5.3% died Table1.

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Table 1. Demographic and Clinical Characteristics (n = 150)

Variable	N (%)
Age group (years)	
< 40	40 (26.7)
40 – 59	60 (40)
≥ 60	50 (33.3)
Sex	
Male	82 (54.7)
Female	68 (45.3)
Ward type	
Medical	75 (50)
Surgical	75 (50)
Comorbidities	
None	55 (36.7)
Diabetes mellitus	40 (26.7)
Hypertension	35 (23.3)
Both	20 (13.3)
Length of stay	
≤ 5 days	70 (46.7)
6–10 days	55 (36.7)
> 10 days	25 (16.7)
Outcome	
Discharged	132 (88)
Referred	10 (6.7)
Died	8 (5.3)

Surgical Characteristics:

Table 2 showed the 75 patients in the surgical ward, 60% (n = 45) underwent elective procedures, while 40% (n = 30) were admitted for emergency surgeries. Postoperative outcomes were generally positive, with 86.7% (n = 65) of patients showing improvement. However, complications were recorded in 13.3% (n = 10) of the surgical cases. There was a statistically significant association between the type of surgery and postoperative complications (χ^2 test, p = 0.03).

Table 2. Surgical Characteristics (n = 75)

Variable	N (%)	P value
Type of surgery		**0.03***
Elective	45 (60)	
Emergency	30 (40)	
Postoperative outcome		
Improved	65 (86.7)	
Complications	10 (13.3)	

*p-value calculated using Chi-square (χ^2) test. Statistically significant at $p < 0.05$

Pharmacotherapy Patterns:

Multiple drug use was found to be highly prevalent based on the examination of medication patterns. Of the patients, 23.3% (n = 35) were taking more than six medications, while 46.7% (n = 70) were prescribed four to six. The concurrent use of five or more medications is known as polypharmacy, and it was found in 40% (n = 60) of the study population. Additionally, 63.3% (n = 95) of patients received at least one antibiotic throughout their hospital stay, demonstrating the extensive usage of antibiotics table 3.

Table 3. Pharmacotherapy Characteristics (n = 150)

Variable	N (%)
Number of medications	
≤ 3 drugs	45 (30)
4–6 drugs	70 (46.7)
> 6 drugs	35 (23.3)
Polypharmacy	
Yes	60 (40)
No	90 (60)
Antibiotic use	
Yes	95 (63.3)
No	55 (36.7)

Discussion:

The clinical, surgical, and pharmacy-related traits and results of 150 inpatients at Zawia Hospital between August and November 2025 are thoroughly examined in this study. The results provide insightful information about the local healthcare system, pointing out areas that align with international trends and flagging particular difficulties in the Libyan setting.

According to our demographic research, the patient population was evenly distributed between the medical and surgical wards, with a slight male preponderance (54.7%) and a predominant age group of 40–59 years (40%). With 63.3% of patients having at least one comorbidity, the high incidence of comorbidities is in line with findings from other regional and global studies that show chronic conditions like diabetes and hypertension are major health burdens among hospitalised patients [12] [13]. These disorders can affect overall results, such as duration of stay and likelihood of complications, and frequently make patient care more difficult [14].

According to our research, 60% of surgical results were elective procedures, whereas 40% were emergency surgeries. The 13.3% complication rate among surgical patients is consistent with data from comparable contexts, where emergency surgeries are frequently linked to greater risks and worse results than elective procedures [15] [16]. This emphasises the necessity of thorough preoperative evaluation and optimised surgical procedures, especially for emergency procedures, in order to reduce unfavourable outcomes.

A significant percentage of patients were taking many prescriptions, with 46.7% using four to six pharmaceuticals and 23.3% taking more than six, according to pharmacy-related features. As a result, 40% of all inpatients had polypharmacy, which is defined as the concurrent use of five or more drugs. This result is especially significant and consistent with studies carried out at other hospitals in Libya. For example, a cross-sectional study conducted in Subratha Teaching Hospital by Ibrahem, Said, Beshna, et al. (2024) revealed a significant rate of drug interactions among hospitalised patients, with the age group most exposed being between 61 and 80 years [17]. In order to minimise adverse drug reactions and drug-drug interactions, which can have a substantial impact on patient safety and healthcare expenditures, this highlights the vital necessity for

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careful medication reconciliation and pharmacovigilance [18]. Additionally, the high rates of antibiotic prescriptions in inpatient settings worldwide are reflected in the widespread usage of antibiotics, which was observed in 63.3% of our patients [19]. To counter the growing problem of antibiotic resistance, this calls for bolstering antimicrobial stewardship initiatives [20]. Our study's patient outcomes, which include a mortality rate of 5.3% and a mean duration of stay of 5 days or shorter for 46.7% of patients, are similar to those documented in comparable hospital settings in poor nations [21]. Even though 88% of patients were released, the death rate and the percentage of patients who were referred (6.7%) call for ongoing observation and efforts to enhance quality. These results are influenced by a variety of factors, including the type of surgery, the existence of comorbidities, and drug management techniques, indicating that a multimodal approach is necessary for improvement.

Conclusion:

The study of 150 inpatients at Zawia Hospital reveals a substantial clinical burden marked by a high rate of comorbidities (63.3%), extensive use of antibiotics (63.3%), and widespread polypharmacy (40%). Even though 88% of patients were successfully discharged, the 5.3% mortality rate and 13.3% surgical complication rate highlight the need for strong antimicrobial stewardship and improved preoperative risk assessment. These results imply that enhancing clinical procedures and medication reconciliation for high-risk populations is crucial to raising the standard of institutional healthcare and patient safety.

Limitations

This study has several limitations: its retrospective, single-center design may limit generalizability. The small sample size (n=150) and short duration may not reflect broader trends. Reliance on medical records could introduce documentation bias, and the definition of polypharmacy did not assess clinical appropriateness.

Recommendation:

To enhance care, we recommend:

1. Strengthening medication reconciliation to reduce polypharmacy risks.
2. Implementing robust antimicrobial stewardship programs.
3. Improving preoperative risk assessment for emergency surgeries.
4. Integrating chronic disease management into inpatient care.
5. Promoting pharmacovigilance and staff training on drug safety.

Conflict of interest:

The authors declare that there is no conflict of interest regarding the publication of this paper.

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