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Orthopaedic Surgery Interventions in Ekiti, Southwestern Nigeria: An Analysis of Patient Sociodemographics and Comorbidities

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Abstract

Background: Orthopaedic surgical procedures account for a substantial part of the global surgical burden. This study evaluates the demographics, indications, types, and comorbidities in patients who underwent orthopaedic interventions at Ekiti State University Teaching Hospital, Ado-Ekiti, between January 2019 and December 2024. ***Materials and Methods:*** A retrospective observational study was conducted using data collected from the theatre registers and case notes at Ekiti State University Teaching Hospital, Ado Ekiti. A total of 450 entries were reviewed, with analyses focusing on 431 complete entries. Sociodemographic information, intervention data, and comorbidities were collected and categorized accordingly. Descriptive and inferential statistics were employed for the analysis. ***Results:*** Mean age of patients was 40.7 (22.6) years. Male patients constituted 59.2% of the cohort. The most common age group for surgery was 31-40 years (18.6%). The vast majority of interventions performed were elective (86.8%), with lower limb fractures being the leading indication (46.2%). Surgical procedures were predominantly open reduction and internal fixation (38.1%). No significant association between sex and type of surgery. Statistically significant differences in mean ages across comorbidities ($p < 0.001$). Higher likelihood of elective surgery among patients from lower socioeconomic statuses ($p < 0.05$). ***Conclusion:*** This study highlights critical trends in demographic and clinical characteristics among patients undergoing orthopaedic interventions. Significant association between comorbidities, socioeconomic status, and orthopaedic surgery interventions.

Keywords: ***Orthopaedic surgery; interventions; Sociodemographics; Comorbidities***

Introduction

Orthopaedic surgery is a critical field in medicine aimed at treating a variety of conditions affecting the musculoskeletal system, including bones, joints, ligaments, tendons, and nerves. Orthopaedic surgery have gained prominence globally, owing to the increasing incidence of trauma, degenerative diseases, and congenital disorders. Despite the global advancements in orthopaedic surgery, regional-specific data, particularly in developing countries such as Nigeria, remains sparse. This literature review aims to explore the existing body of knowledge concerning orthopaedic surgery interventions, particularly at the study centre, and assess the need for a systematic review of the pattern of interventions in this context. On the epidemiology and prevalence of orthopaedic conditions, orthopaedic disorders are prevalent worldwide, with a significant burden observed in developing nations. According to a study, trauma, largely due to road traffic accidents, and conditions such as osteoarthritis constitute a major portion of orthopaedic consultations in Nigeria [1]. A study indicates that musculoskeletal disorders account for a high percentage of disability-adjusted life years (DALYs) in Western Sub-Saharan Africa, emphasizing the urgent need for healthcare systems to address the rising incidence of high-energy trauma [2].

Sociodemographic factors play a crucial role in understanding the patterns of orthopaedic interventions. A report illustrated a higher incidence of orthopaedic conditions in males, particularly those aged 20-40 years, attributed mainly to increased exposure to high-risk activities and occupations [3]. Furthermore, urbanization and lifestyle changes have been suggested to influence the prevalence of degenerative musculoskeletal conditions [4,5]. Understanding the sociodemographic profiles of patients is critical for targeted interventions and preventive strategies.

Based on aetiopathologies and clinical presentation, various pathologies necessitate orthopaedic intervention, ranging from traumatic injuries to degenerative diseases. A study identified trauma as the leading indication for requiring surgical intervention, followed by degenerative diseases like osteoarthritis [6,7]. Meanwhile, congenital malformations, such as clubfoot, also present significant challenges in the paediatric population. [8]. The clinical presentation often varies based on the underlying condition and its

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severity, necessitating a thorough understanding for appropriate orthopaedic management.

Orthopaedic surgical procedures encompass a wide range of interventions, including but not limited to fracture fixation, joint replacement, and arthroscopic surgeries. Studies have shown that intramedullary nailing and plate fixation are among the most common surgical techniques employed for fractures in Nigeria [9,10]. Additionally, total hip and knee arthroplasties are becoming increasingly common as the population ages and the prevalence of degenerative diseases rises [11,12].

Research indicates that surgical outcomes are heavily dependent on the type of surgery performed, the surgeon's skill, and the patient's socio-economic status [13]. Post-operative complications such as infection and delayed union significantly affect recovery and long-term outcomes [14,15]. Furthermore, patient education and pre-operative counselling play vital roles in facilitating better surgical outcomes, as indicated by a retrospective review [16].

The existing literature on orthopaedic surgery in Nigeria underscores the critical need for localized research to inform healthcare practices and policy. Specifically, a comprehensive review of the pattern of orthopaedic interventions at Ekiti State University Teaching Hospital will contribute to the understanding of regional surgical practices and patient demographics. Addressing this gap will pave the way for improved patient management strategies and resource.

The primary research aim of this study is to explore the distribution and frequency of various orthopaedic interventions performed at Ekiti State University Teaching Hospital, Ado Ekiti. The research objectives were to analyze the types of musculoskeletal disorders in patients requiring surgical intervention. To assess the sociodemographic profiles of patients, including age, gender, and socio-economic status, and to identify trends and patterns in surgical interventions. Categorize the various orthopaedic procedures undertaken at the teaching hospital, including emergency and elective procedures.

Materials and Methods

This retrospective observational study was conducted to evaluate demographic characteristics, indications, and patterns of surgical interventions of patients undergoing orthopaedic care at Ekiti State University Teaching Hospital, Ado-Ekiti over 5 years. The research relied on data from the theatre registers and case notes, covering a total of 450 entries, of which 431 had complete information suitable for analysis. The investigation aimed to identify trends in patient demographics, types of intervention performed, and indications for intervention based on various factors, including age, sex, and comorbidities.

The study centre was a tertiary care hospital with specialists in orthopaedic surgeries. The hospital serves a diverse population from both urban and rural settings, providing a comprehensive range of surgical interventions.

The study population consisted of patients who underwent orthopaedic surgery interventions in the theatre from January 2019 to December 2024. A total of 431 patients were included in the analysis based on the completeness of their medical records. Patients with incomplete data were excluded from the study.

Data were extracted from the surgical theatre registers and patients' case notes, including demographic Information on age, sex, level of education, occupation, domicile, socioeconomic status, and alcohol consumption. Clinical Data on year of intervention, indication for intervention, type of intervention, and comorbidities. The information was categorized, as patients were grouped into age categories from 10 years and below to 71 years and above, with corresponding frequencies and percentages. This included sex distribution, education levels, occupations, and socioeconomic status. The types of comorbidities recorded included hypertension, diabetes mellitus, asthma, chronic kidney disease, ischemic heart disease, and the absence of comorbidities. Years were categorized from 2019 to 2024. Classifications included elective and emergency procedures. A range of clinical conditions were identified as reasons for surgical intervention. Different surgical procedures were categorized with their corresponding frequencies.

Descriptive and inferential statistics were employed to analyze the data. On the descriptive statistics, the frequency and percentage were calculated for all categorical variables, such as age distribution, sex, type of intervention, and indications for intervention. The mean and standard deviation were calculated for continuous variables such as age. On the inferential statistics Chi-square test was performed to assess the association between sex and the type of surgery performed. A p-value of <0.05 was considered statistically significant. One-way analysis of variance (ANOVA) was conducted to compare mean ages across different comorbidities. Statistical significance was established with a p-value of <0.05. Logistic regression was employed to determine the relationship between socioeconomic status and the timing of intervention. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to assess the strength of the associations.

Ethical approval was obtained from the Ekiti State University Teaching Hospital, Ado Ekiti Ethical Review Board, and all data were anonymized to ensure patient confidentiality. Informed consent was waived due to the retrospective nature of the study.

Results

There were 450 entries on the theatre register, and 431 (95.8%) had complete entries in the case note. The age range of patients ranged from 0.5 years to 99 years, with a mean age of 40.7 (22.6) years and a mode of 35 years. Males were 255 and females 176, with a male-to-female ratio of 1.5:1.

Figure 1 summarises the distribution of 431 patients by age groups. The largest cohort is aged 31-40 years (18.6%), followed by 21-30 years (14.2%) and 41-50 years (12.1%). The data shows that the healthcare intervention serves a diverse age distribution, with almost 9.5% being 10 years or below. This highlights the necessity for pediatric and geriatric care in surgical practices.

These profiles table 1 depicts the demographic characteristics of the patient population. The majority of patients are male (59.2%). The education level shows a significant number with secondary education (44.1%), suggesting an educated populace. Most patients come from urban settings (69.6%), and socioeconomic categorization indicates a significant number in the low (34.8%) and middle (53.4%) socioeconomic status. This diversity informs potential disparities in access to surgical treatments within different demographics.

The comorbidity provides insights into the health conditions prevalent among the patients. A substantial proportion of patients, 221(51.3%), reported no comorbidities, while hypertension, 90(20.9%), and diabetes mellitus, 55(12.8%), were the most common comorbid conditions. Other comorbidity among the patients were asthma, 30(7.0%), Ischaemic heat disease, 25(5.8), and chronic kidney disease, 10(2.3). This indicates that the surgical population is relatively healthy, although hypertension should be a focus for preoperative management.

The distribution of the number of orthopaedic surgery interventions showed that the year 2022 had the highest number,

118(27.4%), which may indicate a peak in orthopaedic surgery theatre service demands, possibly related to healthcare services resuming post-COVID-19 lockdowns. Notably, the number of orthopaedic surgery interventions performed in 2021 was lower (12.8%), reflecting potential disruptions in theatre services due to the pandemic. The number of interventions in other years were; in 2019, 74(17.2%); 2020, 59(13.7%); 2023, 85(19.7%); and 2024, 40(9.3%). The majority of the interventions were elective (86.8%). This underscores a focus on planned interventions where patients might have better postoperative outcomes due to the elective nature compared to emergency cases (13.2%).

Lower limb fractures were the most common indication for surgeries, 199(46.2%), indicating a frequent necessity for orthopedic interventions in this area. Limb gangrene, 67(15.5%), and bone or joint infections, 56(13.0%), also highlight critical areas of orthopedic care. This information is vital for resource allocation and planning surgical capacities. Other indications for interventions were; upper limb fractures, 40(9.3%); angular deformities, 17(8.9%); dislocations, 13 (3.0%); healed bone and soft tissue injuries, 10(2.3%); bone and joint tumours, 8(1.9%); implant failure, 8(1.9%); congenital anomalies, 6(1.4%); traumatic amputations, 4(0.9%); foreign body in the joint, 2(0.5%); and carpal tunnel syndrome, 1(0.2%).

The orthopaedic surgery interventions performed, figure 2, reveals that open reduction and internal fixation were the most common procedures (38.1%), and followed by amputation (17.2%) and open reduction and external fixation (14.2%). This distribution reflects the types of orthopaedic pathologies prevalent in the patient population and the surgical approach most needed.

Table 2, the Chi-square analysis shows no statistically significant relationship between sex and type of interventions. This suggests that the type of orthopaedic surgery procedure did not vary significantly based on the sex of the patient.

Table 3, Patients with chronic kidney disease have the highest mean age, 60.1 ± 15.2 years, whereas those with asthma are the youngest, 35.7 ± 11.4 years. One-way analysis of variance (ANOVA) showed a statistically significant difference in mean age across comorbidity categories, $F(4,426) = 8.42$, $p < 0.001$. This indicates that patients' ages varied significantly depending on the presence and type of comorbid condition. This necessitates tailored preoperative assessments and management strategies to the patient's age and existing health conditions.

In Table 4, the logistic regression results indicate significant odds ratios for the timing of interventions, particularly for low versus middle socioeconomic status (OR = 1.5, p = 0.02) and low versus high (OR = 1.75, p = 0.01). This finding suggests that socioeconomic factors significantly influence whether patients receive elective or emergency interventions and warrants consideration of socioeconomic barriers in healthcare delivery.

The arrangement and interpretation of the tables and figures are critical for demonstrating the sociodemographic and clinical indications for patients undergoing theatre procedures in this study. The findings suggest potential areas for further exploration, reliance on socioeconomic data in surgical timing and the management of patients with comorbidities. Such insights can contribute significantly to improving orthopaedic surgery care pathways and resource allocation in different demographic settings.

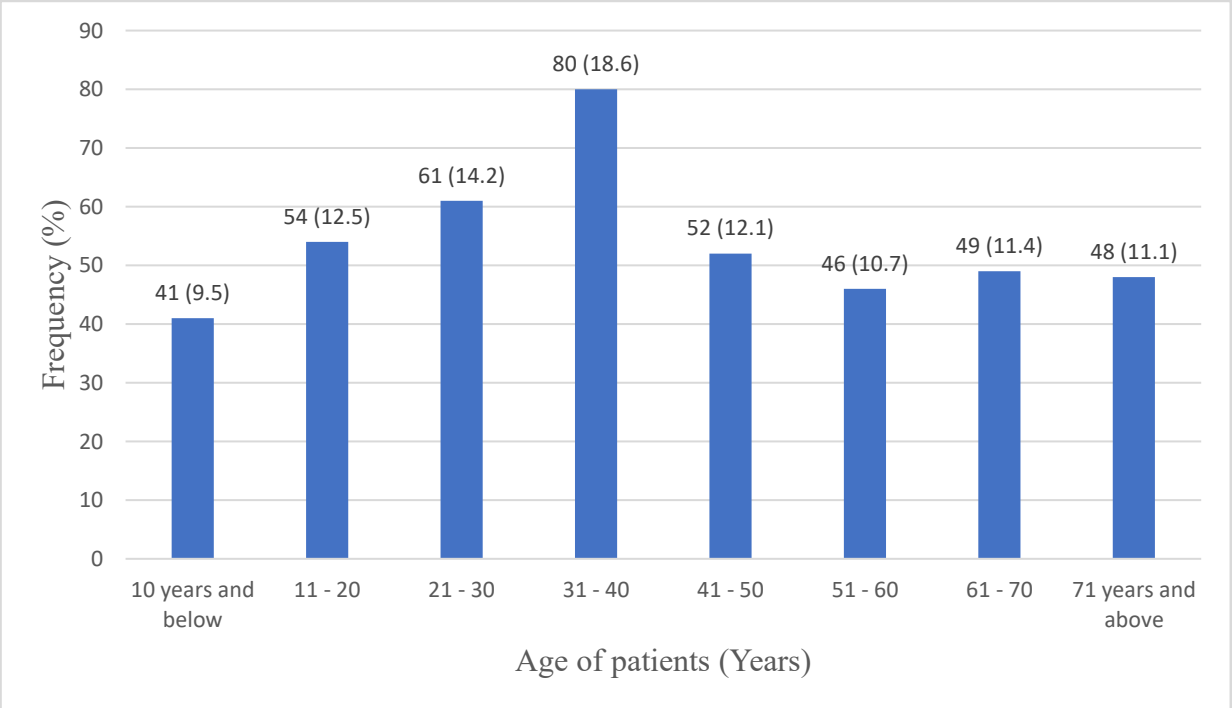

Fig. 1: Frequency distribution of age groups of patients

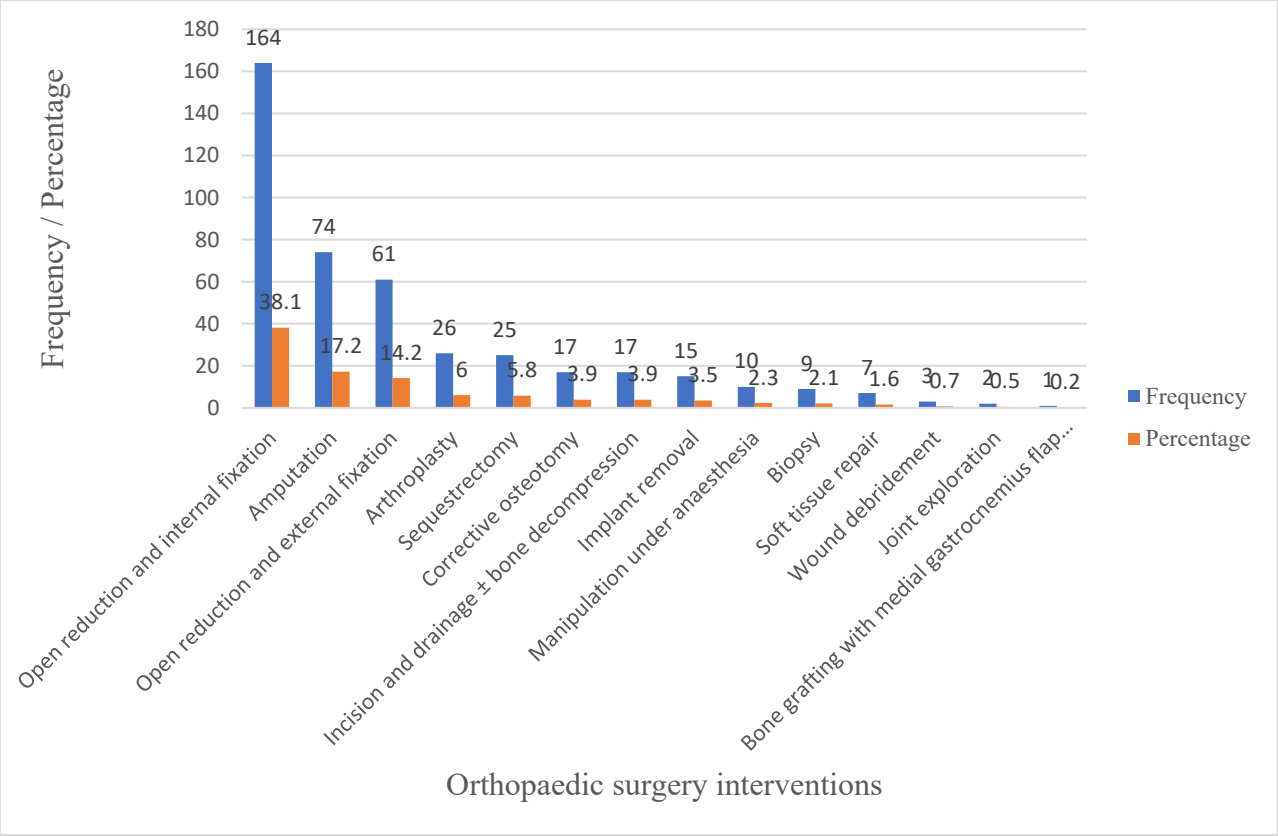

Figure 2: Orthopaedic surgery interventions

Table 1: Sociodemographic Profiles of patients

Variable Category	Frequency (%)
Sex	
Male	255(59.2)
Female	176(40.8)
Education Level	
No Formal Education	30(7.0)
Primary	120(27.8)
Secondary	190(44.1)
Tertiary	91(21.1)
Occupation	
Unemployed	50(11.6)
Student	70(16.2)
Skilled Worker	120 (27.8)
Professional	80(18.6)
Other	111(25.7)
Domicile	
Urban	300(69.6)
Rural	131(30.4)
Socioeconomic Status	
Low	150(34.8)
Middle	230(53.4)
High	51(11.8)
Alcohol Consumption	
Yes	120(27.8)
No	311(72.2)

Table 2: Chi-Square analysis of sex and type of orthopaedic surgery interventions

Type of interventions	Male	Female	Total
Open reduction & internal fixation	98	66	164
Amputation	42	32	74
Other Surgeries	115	78	193
Total	**255**	**176**	**431**

$\chi^2 = 0.215$; df = 2; p-value = 0.898

Table 3: ANOVA Analysis of Age across Comorbidities

Comorbidity	Mean Age ± SD (Years)	Number
Hypertension	48.5 ± 20.3	90
Diabetes Mellitus	52.9 ± 19.5	55
Asthma	35.7 ± 11.4	30
Chronic Kidney Disease	60.1 ± 15.2	10
None	38.4 ± 21.3	221
Total		**431**

F (4,426) = 8.24, p < 0.001

Table 4: Logistic Regression Analysis of Socioeconomic Status and Timing of Interventions

Variables	Odds Ratio (OR)	95% CI	*p*-value
Low vs. Middle	1.5	1.1 - 2.1	0.02
Low vs. High	1.75	1.2 - 2.5	0.01
Middle vs. High	1.2	0.9 - 1.6	0.32

Discussion

The demographic profile of the study population shows that the highest proportion of patients undergoing intervention were within the 31-40-year age group (18.6%). This indicates that adults form the majority of the surgical cohort, a trend consistent with orthopedic practice, where individuals in this age range are more frequently affected by trauma-related injuries and early degenerative conditions [17-19]. Notably, 9.5% of the patients were aged 10 years and below, demonstrating that pediatric orthopedic cases remain clinically relevant, although fewer compared to adult presentations. The mean age of 40.7 ± 22.6 years offers additional insight into the types of health challenges and surgical needs typically encountered in a middle-aged population. Such demographic patterns are essential for guiding healthcare planning, ensuring appropriate resource allocation, and developing operational strategies tailored to the needs of different age groups.

The distribution of interventions over the study period shows a marked peak in 2022 (27.4%), which may reflect a rebound in surgical activity following the disruptions caused by the COVID-19 pandemic in 2020 and 2021 [20]. The gradual increase in the number of procedures from 2019 through 2022 supports this interpretation, indicating a recovery phase during which healthcare systems worked to address accumulated backlogs and rising demand for elective interventions. These trends illustrate the adaptability of the surgical workforce and infrastructure in responding to fluctuating service needs. Comparing intervention rates across these years provides valuable insights for shaping healthcare policy, optimizing resource allocation, and improving system resilience in the face of future disruptions.

The majority of surgical interventions were elective (86.8%), underscoring the renewed capacity for scheduling non-emergency procedures as healthcare systems continue to stabilize in the post-pandemic period. This high proportion may also reflect a backlog of patients who had deferred care, thereby increasing the volume of planned procedures [21]. Elective interventions generally allow for better preoperative planning, optimized resource allocation, and reduced strain on healthcare services compared to emergency cases. Nonetheless, the 13.2% of emergency interventions remains clinically significant, highlighting the persistent burden of acute conditions that require immediate surgical management.

Lower limb fractures were the leading indication for surgical intervention (46.2%), followed by limb gangrene (15.5%) and bone and joint infections (13.0%). This distribution underscores the predominance and clinical severity of traumatic injuries within the patient population, which may be linked to increased physical activity levels, occupational hazards, or high-risk environments [22]. The range of presenting indications further highlights the need for robust injury prevention programs, improved workplace safety measures, and enhanced access to timely emergency medical care.

Significant surgical interventions in the study population primarily included open reduction and internal fixation (38.1%) and amputations (17.2%). This distribution reflects the severity of traumatic injuries and the clinical need for definitive surgical correction. Open reduction and internal fixation remain standard orthopaedic procedures due to their effectiveness in restoring anatomical alignment and ensuring stable fixation of fractured bones [23,24]. Conversely, the notable prevalence of amputations underscores persistent challenges related to high-energy trauma, delayed presentation, and potentially inadequate management of some medical conditions. These findings highlight the need for strengthened preventive strategies, early intervention systems, and improved trauma care pathways.

The patient population was predominantly male (59.2%), indicating a higher likelihood of surgical intervention among men, which may be attributed to their greater involvement in high-risk activities, increased occupational hazards, and higher exposure to trauma-related incidents [17,25,26]. Educational attainment among the study population varied, with a substantial proportion having completed secondary education (44.1%). Socioeconomic analysis showed that most patients belonged to low- to middle-income groups, consistent with broader evidence that financial capacity influences healthcare-seeking behaviour and access to surgical services. 27 Additionally, the predominance of urban residents (69.6%) highlights a notable urban–rural disparity, which may impact access to healthcare facilities, availability of specialized services, and overall resource distribution.

More than half of the patients (51.3%) had no comorbidities; however, hypertension (20.9%) and diabetes mellitus (12.8%) were the most prevalent among those with chronic conditions. The high prevalence of these chronic diseases is clinically important, as both hypertension and diabetes are well-known to increase perioperative risks, delay wound healing, and adversely affect surgical outcomes [28,29]. Understanding the distribution of these comorbidities is therefore essential for effective risk stratification and optimizing surgical care pathways.

The chi-square analysis revealed no statistically significant association between sex and the type of surgery intervention. However, males underwent a higher number of open reduction and internal fixation procedures compared to females (98 males vs. 66 females), which may reflect behavioral differences, occupational exposures, or sex-specific injury patterns. These insights can support the development of targeted preventive and health education

interventions aimed at high-risk demographic groups to reduce the likelihood of injuries requiring surgical management.

The ANOVA analysis demonstrates that the mean age of patients with comorbidities was significantly higher than that of patients without comorbid conditions. This relationship highlights the impact of advancing age and deteriorating health status on the types of surgical interventions required and their associated outcomes [30]. These findings underscore the importance of proactive screening and optimized comorbidity management among older adults.

Finally, logistic regression analysis indicated that patients from lower socioeconomic classes were more likely to undergo elective interventions compared to those in higher socioeconomic groups. This may reflect disparities in healthcare-seeking behaviour, delayed presentation, and differences in financial preparedness for surgery [31]. Understanding these socioeconomic dynamics is essential for promoting equitable access to surgical care and enhancing outcomes across diverse economic strata.

Conclusion

Our analysis has highlighted key demographic and clinical characteristics of patients undergoing orthopaedic interventions. The patterns observed in age distribution, timing of interventions, and clinical indications reflect the multifactorial interaction between demographic attributes, underlying comorbidities, and socioeconomic factors. These findings underscore the need for strengthened preventive strategies, targeted health policies, and strategic resource allocation tailored to high-risk demographic groups. Such focused approaches have the potential to improve surgical outcomes, reduce perioperative complications, and enhance overall patient satisfaction.

Recommendations

Considering the high incidence of lower limb fractures, targeted prevention strategies should be devised, especially in urban areas where physical activity levels may contribute to higher injury rates. Addressing disparities in socioeconomic status and access to elective surgeries is essential. Policymakers must ensure that vulnerable populations receive prompt surgical care. Implementing routine screening and management of common comorbid conditions among surgical candidates can help reduce complication risks and enhance outcomes. Initiatives focusing on the different injury patterns and healthcare needs of male and female patients can improve the effectiveness of targeted interventions.

Limitations

The study's retrospective design is subject to information bias due to incomplete or inconsistent record keeping. Its single-center nature may limit generalizability to other regions or institutions. Additionally, postoperative outcomes and long-term follow-up were not assessed, limiting the ability to evaluate the effectiveness of surgical interventions. Future multicenter and prospective studies incorporating postoperative assessment are recommended.

Declarations

Conflict of interest

We have no conflict of interest to declare.

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