

## Analyzing the Rate of Lower Limb Bone Fractures and Repair among Men and Women in Three Tertiary Health Institutions of Akwa Ibom State, Nigeria

### ABSTRACT

**Background:** The objective of this study was to analyze lower limb fractures among male and female patients at three health institutions in Akwa Ibom State, Nigeria. Lower limb fractures are global public health concern, causing long-term disability and economic burden. Past research suggests that factors like bone density and lifestyle may influence fracture risk differently in men and women. However, there is a lack of region-specific studies in Akwa Ibom State.

**Methodology:** The study analyzed medical records from three major health institutions over a three-year period. Statistical analysis was used to identify gender-specific patterns in fracture occurrence and surgical interventions.

**Results:** The findings revealed differences in causes and surgical outcomes between male and female patients. The study also revealed variations in the success rates and failure rates of surgical interventions associated with the different causes of fractures, with falls, accidents, and gunshot injuries presenting different outcomes. Notably, fall-related fractures exhibited a 100% success rate in some instances, while accident-related fractures demonstrated varied success rates ranging from 72.27% to 94.4%. It was observed that in all the years, accident related cases were the main cause with a percentage ranging from 58.82% to 92.59%, followed by falls which had a percentage ranging from 3.23% to 29.82%, and then gunshot which had the least with a percentage ranging from 2.44% to 32.35%. Furthermore, the surgery failure rates for accident-related fractures varied, highlighting the complexities involved in managing fractures resulting from traumatic incidents.

**Conclusion:** Our findings can help healthcare practitioners and policymakers to develop targeted preventive measures and improve orthopedic care in Akwa Ibom State.

**Keywords:** Lower limb fractures, gender-specific patterns, surgical interventions, orthopedic care, Akwa Ibom State, Nigeria.

## 1. INTRODUCTION

Fractures of the lower limb bones, encompassing the femur, tibia, fibula, and associated structures, constitute a significant portion of orthopedic injuries globally. These fractures, which affect individuals of all ages, have substantial implications for mobility, quality of life, and healthcare resources [1]. Understanding the patterns, prevalence, and treatment outcomes of lower limb bone fractures is crucial for improving orthopedic care and public health interventions. This research seeks to delve into the rate of lower limb bone fractures and repair among men and women within three (3) tertiary health institutions of Akwa Ibom State. Despite the advancements in healthcare, fractures continue to pose a substantial burden on individuals and healthcare systems worldwide. However, there is a lack of comprehensive research specifically focusing on lower limb fractures in Akwa Ibom State. Limited knowledge about the rate of lower limb fractures among different population groups, particularly in tertiary health institutions, hampers the development of effective strategies to prevent and manage these injuries. Surgical intervention is often indicated for the optimal management of lower limb fractures, particularly in cases of displaced, intra-articular, or open fractures. The principles of fracture repair involve anatomical reduction, stable fixation, and early mobilization, all of which contribute to achieving favorable functional outcomes and minimizing the risk of long-term complications [2]. Surgical techniques, including open reduction and internal fixation (ORIF), intramedullary nailing, external fixation, and minimally invasive procedures, serve as cornerstones in the surgical armamentarium for addressing lower limb fractures [2].

Therefore, it is essential to undertake a comprehensive analysis of lower limb fracture in men and women in tertiary health institutions of Akwa Ibom State. This research holds significant importance in several domains. From a clinical standpoint, understanding the rate and characteristics of lower limb fracture among men and women will equip healthcare

professionals with valuable data to optimize patient care and improve treatment outcomes. Additionally, this study could contribute to the existing body of knowledge on fractures, particularly within the context of Akwa Ibom State, thereby promoting evidence-based practice and policy development. Furthermore, this research will shed light on the factors contributing to lower limb fractures, helping policymakers and public health officials design appropriate preventive strategies. By identifying the different patterns and causes of fractures, this study aims to contribute to the reduction of lower limb fractures in the study population, ultimately leading to improved public health outcomes.

## **2. METHODOLOGY**

### **2.1 Research Design**

The research design for this study is a cross-sectional observational study. By employing a cross-sectional design, data were collected at a single point in time, allowing for the analysis of the current rate of lower limb bone fractures and repairs among men and women in three tertiary health institutions of Akwa Ibom State.

### **2.2 Study Population and Sample Collection**

The study population consists of patients who have experienced lower limb bone fractures and received treatment or repair at three tertiary health institutions in Akwa Ibom State. The three selected institutions include University of Uyo teaching Hospital (UUTH), Immanuel Hospital, Eket, and Orthopedic Hospital, Ukana. To ensure a representative sample, the number of records selected from each institution was proportional to the size of the patient population at that institution. The sample size was determined using appropriate statistical methods to achieve a sufficient level of confidence.

## **2.3 Data Collection Procedures**

### **2.3.1 Selection Criteria**

The following selection criteria were applied to identify eligible participants for inclusion in the study:

1. All patients who have undergone lower limb bone fracture repairs at the selected institutions during a specified period (e.g., within the past three years) were included.
2. The study included both males and females, to examine the rate of lower limb bone fractures and repair across different demographic groups.

### **2.3.2 Variables**

The variables that were collected for analysis included demographic information (age, gender), type of lower limb bone fracture (e.g., tibia, fibula), cause of injury (e.g., fall, accident, gunshot), anatomical location of the fracture, treatment and repair methods employed as well as post-operative complications, if any.

### **2.3.3 Data Collection Tools**

Data were collected through a review of medical records, including patient demographics, clinical notes and surgical reports. A structured data collection form was used to systematically extract relevant information from the medical records.

### **2.3.4 Method of Data Collection**

The method of data collection involved the systematic review of medical records to extract the necessary information related to the study variables. This involved the meticulous extraction and documentation of relevant details from the medical records of the selected patients.

### 2.3.5 Method of Data Analysis

The collected data were analyzed using descriptive statistics to calculate the frequency, distribution and percentage of lower limb fractures among men and women using a statistical package, Subgroup analysis was conducted to identify any significant differences in fracture rates based on gender.

## 3. RESULTS

### 3.1 Rate, Causes and Prevalence of Lower Limb Bone Fractures among Patients in University of Uyo Teaching Hospital (UUTH).

**Table 1: Male, UUTH 2021**

**Age: 18 years and above**

Cause	No of patients	% cause	Surgery success	% Success	Surgery failure	% Failure
Fall	06. 00	19.35	04. 00	18.18	00.00	00. 00
Accident	19. 00	61.29	14. 00	63.64	3.00	100.00
Gunshot	06. 00	19.35	04. 00	18.18	00.00	00.00
<b>Total</b>	<b>31.00</b>	<b>99.99</b>	<b>22.00</b>	<b>100.00</b>	<b>03.00</b>	<b>100.00</b>

The table above data on male patients with lower limb bone fractures at the University of Uyo Teaching Hospital (UUTH) in the year 2021. The causes of fractures were attributed to falls, accidents, and gunshots. A total of 31 cases were recorded, with the highest percentage caused by accidents (61.29%), followed by falls and gunshot by (19.35%). Successful surgeries were reported in 22 cases, constituting 18.18% success for gunshot and fall injuries and 63.64% for accidents. Surgery failure was observed in 3 cases, all attributed to accidents.

**Table 2: Male, UUTH 2022**

**Age: 18 years and above**

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	08. 00	27.58	04. 00	18.18	02. 00	28.57
Accident	20. 00	68.97	17. 00	72.27	03. 00	42.86
Gunshot	01. 00	03.45	01. 00	04.55	02. 00	28.57
<b>Total</b>	<b>29.00</b>	<b>100.00</b>	<b>22.00</b>	<b>100.00</b>	<b>7.00</b>	<b>100.00</b>

The table above outlines the information on male patients with lower limb bone fractures at UUTH in 2022. The predominant causes of fractures were accidents (68.97%) and falls (27.58%). A total of 29 cases were recorded, with successful surgeries reported in 22 cases. Surgery failure occurred in 7 cases, with the highest percentage associated with accident (42.86%).

**Table 3: Male, UUTH 2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	05.00	17.24	03.00	14.29	00.00	00.00
Accident	22.00	75.86	16.00	76.19	06.00	100.00
Gunshot	02.00	06.89	02.00	09.52	00.00	00.00
<b>Total</b>	<b>29.00</b>	<b>99.99</b>	<b>21.00</b>	<b>100.00</b>	<b>6.00</b>	<b>100.00</b>

The table above details the data on male patients with lower limb bone fractures at UUTH in 2023. The primary causes of fractures were accidents (75.86%) and falls (17.24%). A total of 29 cases were recorded, with successful surgeries reported in 21 cases. Surgery failure occurred in 6 cases, all attributed to accidents.

**Table 4: Female, UUTH 2021**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	03.00	08.82	03.00	10.71	00.00	00.00
Accident	20.00	58.82	15.00	53.57	05.00	83.33
Gunshot	11.00	32.35	10.00	35.71	01.00	16.66
<b>Total</b>	<b>34.00</b>	<b>99.99</b>	<b>28.00</b>	<b>99.99</b>	<b>6.00</b>	<b>99.99</b>

The table above provides information on female patients with lower limb bone fractures at UUTH in 2021. The majority of fractures were caused by accidents (58.82%), followed by

gunshots (32.35%). A total of 34 cases were recorded, with successful surgeries reported in 28 cases. Surgery failure occurred in 6 cases, with the highest percentage associated with accidents (83.33%).

**Table 5: Female UUTH, 2022**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	10.00	24.39	10.00	26.32	00.00	00.00
Accident	30.00	73.17	27.00	71.05	03.00	100.00
Gunshot	01.00	02.44	01.00	02.63	00.00	00.00
<b>Total</b>	<b>41.00</b>	<b>100.00</b>	<b>38.00</b>	<b>100.00</b>	<b>3.00</b>	<b>100.00</b>

The table above outlines data on female patients with lower limb bone fractures at UUTH in 2022. Accidents were the leading cause of fractures (73.17%), followed by falls (24.39%). A total of 41 cases were recorded, with successful surgeries reported in 38 cases. Surgery failure occurred in 3 cases, with all failures associated with accidents.

**Table 6: Female, UUTH 2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	04.00	13.33	04.00	14.81	00.00	00.00
Accident	20.00	66.67	18.00	66.67	02.00	66.67
Gunshot	06.00	20.00	05.00	18.52	01.00	33.33
<b>Total</b>	<b>30.00</b>	<b>100.00</b>	<b>27.00</b>	<b>100.00</b>	<b>3.00</b>	<b>100.00</b>

The table above details the information on female patients with lower limb bone fractures at UUTH in 2023. The primary causes of fractures were accidents (66.67%) and falls (13.33%). A total of 30 cases were recorded, with successful surgeries reported in 27 cases. Surgery failure occurred in 3 cases, with failures associated with both accidents and gunshot injuries.

### 3.2 Rate, Causes and Prevalence of Bone Fractures among Patients in Immanuel Hospital, Eket

**Table 7: Male, Immanuel Hospital Eket 2021**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	17.00	29.82	09.00	25.71	08.00	61.54
Accident	40.00	70.18	26.00	74.29	05.00	38.46
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>57.00</b>	<b>100.00</b>	<b>35.00</b>	<b>100.00</b>	<b>13.00</b>	<b>100.00</b>

The table above outlines information about male patients with lower limb fractures at Immanuel Hospital, Eket, in the year 2021. The predominant cause of fractures was accidents, constituting 70.18% of the cases, followed by falls at 29.82%. There were no gunshot-related cases recorded. The success rate of surgeries for fall-related fractures were 25.71%, and accident-related

fractures were 74.29%. A total of 57 cases were recorded, with 35 successful surgeries and 13 surgery failures.

**Table 8: Male, Immanuel Hospital Eket 2022**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	07.00	14.89	06.00	14.63	05.00	83.33
Accident	40.00	85.11	35.00	85.37	01.00	16.67
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>47.00</b>	<b>100.00</b>	<b>41.00</b>	<b>100.00</b>	<b>6.00</b>	<b>100.00</b>

The table above presents information on male patients with lower limb bone fractures at Immanuel Hospital, Eket, in 2022. The leading cause of fractures remained accidents, accounting for 85.11% of cases, followed by falls at 14.89%. No gunshot-related cases were recorded. Surgery success rates varied, with 14.63% for fall-related fractures and 85.37% for accident-related fractures. A total of 47 cases were recorded, with 41 successful surgeries and 6 surgery failures.

**Table 9: Male, Immanuel Hospital Eket 2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	11.00	26.19	10.00	27.03	01.00	20.00
Accident	29.00	69.05	25.00	67.57	04.00	80.00
Gunshot	02.00	04.76	02.00	05.40	00.00	00.00
<b>Total</b>	<b>42.00</b>	<b>100.00</b>	<b>37.00</b>	<b>100.00</b>	<b>5.00</b>	<b>100.00</b>

The table above outlines data on male patients with lower limb bone fractures at Immanuel Hospital, Eket, in 2023. Accidents continued to be the primary cause of fractures, constituting

69.05% of cases, followed by falls at 26.19%. Gunshot-related cases accounted for 4.76%. Surgery success rates were 27.03% for fall-related fractures, 67.57% for accident-related fractures, and 5.40% for gunshot-related cases. A total of 42 cases were recorded, with 37 successful surgeries and 5 surgery failures.

**Table 10: Female, Immanuel Hospital Eket 2021**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	05.00	27.78	05.00	35.71	01.00	25.00
Accident	13.00	72.22	09.00	64.29	03.00	75.00
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>42.00</b>	<b>100.00</b>	<b>14.00</b>	<b>100.00</b>	<b>4.00</b>	<b>100.00</b>

The table above provides information on female patients with lower limb bone fractures at Immanuel Hospital, Eket in 2021. The majority of fractures were caused by accidents, which accounted for 72.22% of the cases while 27.78% accounted for fall. The success rate of surgeries for fall-related fractures was 35.71%, 64.29% for accident-related fractures, there was no gunshot related cases. A total of 42 cases were recorded, with 14 successful surgeries and 4 surgery failures.

**Table 11: Female, Immanuel Hospital Eket 2022**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	04.00	14.29	03.00	12.50	01.00	25.00
Accident	24.00	85.71	21.00	87.50	03.00	75.00
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>28.00</b>	<b>100.000</b>	<b>24.00</b>	<b>100.00</b>	<b>4.00</b>	<b>100.00</b>

The table above provides information on female patients with lower limb bone fractures at Immanuel Hospital, Eket in 2022. The majority of fractures were caused by accidents, constituting 85.71% of the cases. The success rate of surgeries for fall-related fractures was 12.5% and 87.5% for accident-related fractures. No gunshot-related fractures were recorded. A total of 28 cases were recorded, with 24 successful surgeries and 4 surgery failures.

**Table 12: Female, Immanuel Hospital Eket 2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	02.00	09.52	01.00	05.56	01.00	33.33
Accident	19.00	90.48	17.00	94.4	02.00	66.67
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>21.00</b>	<b>100.00</b>	<b>18.00</b>	<b>100.00</b>	<b>3.00</b>	<b>100.00</b>

The table above outlines information on female patients with lower limb bone fractures at Immanuel Hospital, Eket in 2023. The majority of fractures were caused by accidents, making up 90.48% of the cases. The success rate of surgeries for fall-related fractures was 5.56% and 94.4% for accident-related fractures respectively. There was no gunshot related cases. A total of 21 cases were recorded, with 18 successful surgeries and 3 surgery failures.

### 3.3 Causes and Prevalence Of Bone Fractures among Patients in Orthopedic Hospital, Ukana

**Table 13: Male, Orthopedic Hospital Ukana 2021**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	01.00	03.23	01.00	03.70	00.00	00.00
Accident	28.00	90.32	24.00	88.90	04.00	100.00
Gunshot	02.00	06.45	02.00	07.41	00.00	00.00
<b>Total</b>	<b>31.00</b>	<b>100.00</b>	<b>27.00</b>	<b>100.00</b>	<b>4.00</b>	<b>100.00</b>

The table above provides information on male patients with lower limb bone fractures at Orthopedic Hospital, Ukana in 2021. The majority of fractures were caused by accidents, representing 90.32% of the cases. The success rate of surgeries for fall-related fractures was 3.7%, 88.90% for accident-related fractures, and 7.41% for gunshot-related fractures respectively. A total of 31 cases were recorded, with 27 successful surgeries and 4 surgery failures.

**Table 14: Male, Orthopedic Hospital Ukana 2022**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	01.00	03.70	01.00	03.85	00.00	00.00
Accident	25.00	92.59	24.00	92.31	01.00	100.00
Gunshot	01.00	03.70	01.00	03.85	00.00	00.00
<b>Total</b>	<b>27.00</b>	<b>99.99</b>	<b>26.00</b>	<b>100.00</b>	<b>01.00</b>	<b>100.00</b>

The table above provides information on male patients with lower limb bone fractures at Orthopedic Hospital, Ukana in 2022. The majority of fractures were caused by accidents, accounting for 92.59% of the cases. The success rate of surgeries for fall-related fractures was

3.85%, 92.31% for accident-related fractures, and 3.98% for gunshot-related fractures respectively. A total of 27 cases were recorded, with 26 successful surgeries and 1 surgery failure.

**Table 15: Male, Orthopedic Hospital Ukana, 2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	01.00	04.35	01.00	04.35	00.00	00.00
Accident	21.00	91.30	21.00	91.30	00.00	00.00
Gunshot	01.00	04.35	01.00	04.35	00.00	00.00
<b>Total</b>	<b>23.00</b>	<b>100.00</b>	<b>23.00</b>	<b>100.00</b>	<b>00.00</b>	<b>00.00</b>

The table above provides information on male patients with lower limb bone fractures at Orthopedic Hospital Ukana in 2023. The majority of fractures were caused by accidents, accounting for 91.30% of the cases. The success rate of surgeries for both fall-related and gunshot-related fractures was 4.35% respectively, indicating a high success rate. A total of 23 cases were recorded, with 23 successful surgeries and 0 surgery failures.

**Table 16: Female, Orthopedic Hospital Ukana 2021**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	02.00	08.69	02.00	09.09	00.00	00.00
Accident	19.00	82.61	18.00	81.82	01.00	100.00
Gunshot	01.00	04.35	01.00	04.55	00.00	00.00
Abuse	01.00	04.35	01.00	04.55	00.00	00.00
<b>Total</b>	<b>23.00</b>	<b>100.00</b>	<b>22.00</b>	<b>100.00</b>	<b>01.00</b>	<b>100.00</b>

The table above provides information on female patients with lower limb bone fractures at Orthopedic Hospital, Ukana in 2021. The majority of fractures were caused by accidents, making

up 82.61% of the cases. The success rate of surgeries for fall-related fractures was 9.09%, 81.82% for accident-related fractures and 4.35% for gunshot-related and abuse-related fractures respectively. A total of 23 cases were recorded, with 22 successful surgeries and 1 surgery failure.

**Table17: Female, Orthopedic Hospital Ukana 2022**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	02.00	10.00	03.00	16.67	00.00	00.00
Accident	17.00	85.00	15.00	83.33	02.00	100.00
Gunshot	01.00	05.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>20.00</b>	<b>100.00</b>	<b>18.00</b>	<b>100.00</b>	<b>2.00</b>	<b>100.00</b>

The table above shows information on female patients with lower limb bone fractures at Orthopedic Hospital, Ukana in 2022. The majority of fractures were caused by accidents, constituting 85% of the cases. The success rate of surgeries for fall-related fractures was 16.67% and 83.33% for accident-related fractures. No gunshot-related fractures were recorded. A total of 20 cases were recorded, with 18 successful surgeries and 2 surgery failures.

**Table 18: Female, Orthopedic Hospital Ukana2023**

Age: 18 years and above

Cause	No of patients	% Cause	Surgery success	% Success	Surgery failure	% Failure
Fall	03.00	10.34	0.00	12.00	00.00	00.00
Accident	26.00	89.66	22.00	88.00	04.00	100.00
Gunshot	00.00	00.00	00.00	00.00	00.00	00.00
<b>Total</b>	<b>29.00</b>	<b>100.00</b>	<b>25.00</b>	<b>100.00</b>	<b>4.00</b>	<b>100.00</b>

The table aboveshowcases information on female patients with lower limb bone fractures at Orthopedic Hospital, Ukana in 2023. The majority of fractures were caused by accidents,

representing 89.66% of the cases. The success rate of surgeries for fall-related fractures was 12%, 88% for accident-related fractures, and no gunshot-related fractures were recorded. A total of 29 cases were recorded, with 25 successful surgeries and 4 surgery failures.

#### **4. DISCUSSION**

The information obtained from three distinct hospitals, namely University of Uyo Teaching Hospital (UUTH), Immanuel Hospital Eket, and Orthopedic Hospital Ukana, provides valuable insights into the prevalence of lower limb bone fractures among male and female patients over three consecutive years (2021-2023). Notably, in this study, the prevailing cause of lower limb fractures was accidents followed by falls and this result is similar to a study by Duarte *et al.*(2018) [3], who revealed that most common etiology of trauma was traffic accident (60.4% of patients), followed by violence (31.2%). The prevalence of fractures and their causes at various hospitals, including UUTH, Orthopedic Hospital Ukana, and Immanuel Hospital Eket, reveals a consistent pattern of accidents being the primary contributor. In 2021 at UUTH, accidents were the leading cause of fractures among males, accounting for 61.29% of cases. This trend continued into 2022 and 2023. Similarly, for females, accidents remained the primary cause, with a notable increase from 58.82% in 2021 to 73.17% in 2022. Fall-related fractures also stood out, especially among females. Orthopedic Hospital Ukana mirrored this trend, with accidents being the predominant cause of fractures in both males and females. Remarkably, the success rates for accident-related surgeries were consistently high, reaching 92.31% among males in 2022. Immanuel Hospital Eket, experienced a parallel situation, where accidents were the major cause of fractures for both gender over the three-year period. Despite the high success rates for accident-related surgeries, ranging from 74.29% to 94.4%, noteworthy instances of surgery failures, particularly associated with accidents, were recorded.

A study conducted by Smith *et al.* (2018) [4] examined the factors associated with fractures resulting from motor vehicle accidents. The researchers found that distracted driving, speeding, impaired vision, and inadequate seatbelt usage were significant risk factors for fractures. They concluded that addressing these factors through public awareness campaigns, stricter law enforcement, and improved road infrastructure could potentially reduce the occurrence of fractures due to accidents. Similarly, another study conducted by Jones *et al.* (2019)[5] explored the relationship between accidents and fractures in a population-based sample. The researchers identified several factors contributing to accidents, including fatigue, alcohol, drug use, and environmental hazards. They also noted that certain age groups, such as teenagers and older adults, were more vulnerable to accidents and subsequent fractures. The study highlighted the importance of targeted interventions and educational programs to address these risk factors and reduce the incidence of fractures due to accidents. Furthermore, the rise in accidents as a leading cause of fractures can also be attributed to the increasing number of vehicles on the road. With the rapid urbanization and growing population, there has been a tremendous increase in the volume of traffic, leading to a higher likelihood of collisions and subsequent fractures. This issue is particularly pronounced in developing countries where infrastructure may not be well-equipped to handle the surging number of vehicles. In addition to motor vehicle accidents, falls have been identified by our study as another significant cause of fractures, especially among females. A study conducted by Stevens *et al.* (2017) [6] investigated the causes of fall-related fractures in older adults. The researchers found that environmental hazards, such as uneven surfaces, slippery floors, and inadequate lighting, were common contributors to falls and subsequent fractures. The study emphasized the importance of environmental modifications,

such as installing handrails and improving lighting, to prevent falls and reduce fracture rates in this vulnerable population.

The rise in fall-related fractures among females can be attributed to several factors. Firstly, the prevalence of osteoporosis, a condition characterized by weakened bones, is higher in women due to hormonal changes during menopause and a lower peak bone mass compared to men. This places women at a higher risk of sustaining fractures, particularly from falls. Additionally, women tend to live longer than men, increasing their exposure to age-related factors that contribute to falls, such as muscle weakness, balance problems, and vision impairments [4]. Understanding the causes of injury is crucial for preventive measures. Studies have shown that motorcycle accidents particularly related to commercial motorcycle use (popularly known as "Okada"), are significant in causing lower limb fractures in Nigeria [7]. Additionally, inadequate road infrastructures, reckless driving and pedestrian related incidents contribute to the high incidence of lower limb fractures [8].

Accidents, particularly motor vehicle accidents and falls, have consistently been identified as the primary causes of fractures at these hospitals, with accidents taking the lead. These findings are supported by various studies and research indicating that factors such as distracted driving, impaired vision, environmental hazards, and age-related vulnerabilities contribute to the occurrence of accidents and subsequent fractures. Addressing these risk factors through public awareness campaigns, improved road infrastructure, and environmental modifications can help reduce the incidence of fractures due to accidents. Furthermore, targeted interventions can be implemented to address the specific needs of vulnerable populations, such as older adults and women, in order to prevent falls and reduce fracture rates. Surgical intervention is a crucial aspect of managing fractures, particularly those resulting from accidents and falls. A study conducted

by Brown *et al.* (2018) [9] analyzed the factors influencing surgery success rates for different types of fractures. The researchers highlighted the importance of prompt and appropriate surgical management in achieving favorable outcomes. They emphasized the need for personalized treatment plans tailored to the specific cause and nature of the fracture, as well as the patient's gender and age. In UUTH, the success rates of surgeries varied across causes and gender. Accidents consistently exhibited a higher success rate, ranging from 63.64% to 100%. Notably, accidents accounted for all surgery failures across the years. At Immanuel Hospital Eket, surgery success rates for accident-related fractures were consistently high, ranging from 85.37% to 94.4%. However, surgery failures were recorded, primarily associated with accidents. In Orthopedic Hospital Ukana, surgery success rates for accident-related fractures remained consistently high, ranging from 81.82% to 88.90%. Notably, fall-related fractures exhibited a 100% success rate across the years. The consistently lower success rates for surgeries related to accidents accounted for all surgery failures across the years, raise important considerations. One potential factor contributing to the lower success rates for accident-related surgeries may be the severity and complexity of injuries sustained in high-impact incidents such as motor vehicle accidents. Fractures resulting from accidents may involve multiple bones, severe soft tissue damage, and complex patterns, which can pose challenges for successful surgical repair and subsequent recovery.

In contrast, the consistently high success rates for surgeries related to accident-related fractures, ranging from 85.37% to 94.4%, despite the recorded surgery failures primarily associated with accidents, suggest that the surgical interventions for accident-related fractures, when successful, are generally effective in achieving positive outcomes. This aspect can be attributed to advancements in orthopedic surgical techniques, implant materials, and perioperative care, which

have improved the ability to stabilize and repair complex fractures resulting from accidents. However, the presence of surgery failures primarily associated with accidents indicates that a subset of injuries resulting from accidents may pose significant challenges and may require further investigation to identify opportunities for improvement in surgical outcomes [10]. Furthermore, the consistently high success rates for surgery related to accident-related fractures, ranging from 81.82% to 88.90%, underscore the importance of tailored and effective surgical interventions in managing these specific types of fractures. These findings emphasize the significance of comprehensive preoperative planning, meticulous surgical technique, and postoperative rehabilitation in achieving successful outcomes for accident-related fractures. The observed 100% success rate for surgery related to fall-related fractures across the years is a notable finding. This suggests that surgical interventions for fall-related fractures, when indicated, have been consistently effective in achieving favorable outcomes. This may be attributed to the relatively lower energy mechanisms involved in falls compared to accidents, resulting in fractures that are more amenable to successful surgical repair and rehabilitation.

The variations in the causes and outcomes of fractures based on gender at the University of Uyo Teaching Hospital (UUTH), Immanuel Hospital Eket, and Orthopedic Hospital Ukana, shed light on the complexities of orthopedic care and the unique challenges and trends observed in the management of fractures in males and females. To further understand these findings, it is essential to examine existing research and studies that investigate gender-based differences in the causes, treatments, and outcomes of fractures across various healthcare settings. Males and females demonstrate distinct differences in the causes and outcomes of fractures, as highlighted from the data in UUTH, Immanuel Hospital, Eket, and Orthopedic Hospital, Ukana. The prominence of accidents as the primary cause of fractures in both gender across these healthcare

institutions is consistent with broader research in the field of orthopedic trauma, which recognizes accidents, such as motor vehicle collisions, falls, and sports-related injuries, as leading causes of fractures in diverse populations.

At UUTH, the proportion of accidents as the primary cause was notably higher among females in 2021 (58.82%) and 2022 (73.17%). This disparity in the prevalence of accidents as a cause of fractures between males and females reflects the gender-specific risk factors and potential differences in exposure to high-impact traumatic events. Research conducted by Patel *et al.* (2019) [11] supports these findings, emphasizing the multi-faceted nature of gender-based disparities in traumatic injuries and the need for targeted interventions to address specific risk factors and improve injury prevention strategies for both males and females. Additionally, the consistently high surgery success rates for females at UUTH, along with relatively lower surgery failure rates compared to males, suggest that female patients may respond favorably to surgical interventions for fractures. This pattern aligns with a growing body of evidence that has identified gender-specific differences in fracture healing, response to orthopedic treatment modalities, and overall recovery trajectories following surgical management. A study by Smith *et al.* (2020) [12] explored the influence of gender on the outcomes of orthopedic surgeries, highlighting potential biological, biomechanical, and socio-economic factors that contribute to differential treatment responses and postoperative outcomes between males and females. Chan *et al.* (2022) [13] reported a relationship between upper and lower limb bone fractures and high-energy trauma such as road-traffic accidents, highlighting the role of accidents as a major cause of fractures.

In contrast, data obtained from Immanuel Hospital Eket revealed a higher surgery failure rate for females in 2021 (75%) compared to males (61.54%), despite generally high success rates for

both gender. This disparity underscores the need for further investigation into the factors contributing to differential surgical outcomes based on gender, including variations in anatomy, bone density, fracture characteristics, and potential discrepancies in postoperative care and rehabilitation adherence. The findings from Orthopedic Hospital Ukana, where similar patterns of causes and surgery outcomes were observed across gender, reinforce the idea that the gender-specific nuances in the etiology and management of fractures warrant careful consideration in clinical practice and healthcare policy development. Understanding the gender-specific epidemiology of fractures and optimizing gender-tailored treatment approaches hold significant implications for improving patient care and enhancing orthopedic outcomes across diverse healthcare settings.

## **5. Conclusion**

In conclusion, this study highlights the consistent prevalence of accidents as the primary cause of lower limb bone fractures. While surgery success rates were generally high, attention should be given to understanding and mitigating the factors contributing to surgery failures, especially in accident-related cases. These findings underscore the importance of continued research and improvement in orthopedic care to enhance patient outcomes.

## **CONSENT**

The study involved taking of medical records, informed consent was adequately obtained before the commencement of this study.

## **Ethical Approval:**

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

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