

Research Article

Prevalence of Lower Limb Fractures among Adult Patients at Mama Lucy Kibaki Hospital

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Abstract: The study aimed at determining the prevalence of lower limb fractures among adult patients at Mama Lucy Kibaki Hospital. The study adopted a cohort analysis and matched case-control study. It was conducted at Mama Lucy Kibaki Hospital, Nairobi. The study population was drawn from 80 respondents who presented with lower limb fractures. Categorical data was presented in the form of frequency tables, graphs and charts. In view of the study findings, it was concluded that: there is a high prevalence of lower limb fractures among adults compared to upper limb fractures; the fracture pattern had the most common occurrence; high energy trauma was the major cause of lower limb fractures and tibia/fibula shaft was the commonly involved fractured bone. The study recommends that the hospital administration should adequately prepare for fractures that involve the lower limb given that the mostly occur in the study area; hospitals should ensure that their facilities are well equipped with surgical equipment and instruments. Further, the clinicians should be well trained and to handle the oblique fracture and tibia/fibula shaft fractures of the lower limb since it accounted for the majority of cases observed.

Keywords: Adult patients, Prevalence of lower limb, fractured bone.

Introduction

The global burden of injury is increasing [1], with low-and middle-income nations bearing a disproportionate share of the cost. They are responsible for around 90% of all injury-related deaths. Injuries would most likely be the fourth leading cause of death by 2030 [2]. According to the Global Burden of Disease (GBD), road traffic accidents will move to sixth position as a leading cause of mortality by 2020, and will continue to rise unless extra road safety measures are implemented.

Lower limb fractures are frequent in today's world, particularly in urban areas and developing countries [3]. It is critical to understand the fracture process, which is primarily induced by trauma. The trauma patient may heal completely and the injured limb(s) may return to normal function, depending on the patient's access to medical care. If the individual does not seek appropriate medical attention, the affected limb(s)' function may be permanently altered [4]. Long-term fracture problems, such as restricted range of motion, may make it impossible to restore to normal function.

Tibial diaphysal fractures are among the most common long bone fracture encountered by most orthopedic surgeons [5]. The TDF are often difficult to manage especially in resource constrained settings [6]. In developing world, non-operative treatment of tibial fractures has been, and in some centers, is still the mainstay mode of treatment. Al Ahsaa, Saudi Arabia, [7] found that 50.81 percent of the participants had a 10-year risk of major osteoporotic fracture; 23.48 percent had a high risk, and 25.71 percent had a moderate risk. Furthermore, 26.27 percent of those polled were at high risk of hip fracture. The research found that the study concluded that more than a third of the surveyed

population had osteoporosis, which was associated with many sociodemographic and clinical characteristics.

Corticosteroids, antipsychotics, antidepressants, and hypnotic/sedative users have a higher risk of fracture, however the population attributable risks for each of these drug classes within fracture and age specific strata is only 3% or less [8]. According to the study, the relative risk of lower limb fractures associated with a diagnosis of dementia is 2.3 percent, while other medical diagnoses have a relative risk of less than 2%. It is also explained that, among the risk variables, road traffic accidents are linked to the largest relative risk of lower limb fractures, despite accounting for only 3.1 percent or less of the population.

According to Lindsay et al. [9], fractures were found in only a few of our subjects, yet the frequency could be higher because many fractures may have gone unreported. According to estimates, around two-thirds of fractures are asymptomatic and detected as an X-ray result. Two of the three patients had major fractures, and two of them had osteopenia.

A study conducted in Nigeria with the goal of determining the risk factors, pattern, and frequency of bone fractures in Nigerians with hyperthyroidism [10]. Fractures may be common in hyperthyroidism in this age range, according to the study. Thyroid disorders should be checked in patients who have fractures. Low BMI, weight loss, and vitamin D deficiency, in addition to lower bone mineral density, are all risk factors for fractures in hyperthyroidism.

A study by Ale [11] reveal that 45 percent of hyperthyroid individuals had osteoporosis. Hyperthyroidism is a recognized risk factor for secondary osteoporosis, as well as an increased fracture risk, according to this study. Fractures must be addressed in conjunction with the thyrotoxic state in order to improve quality of life and to lessen the physical handicap associated with the disease's burden and financial repercussions. Patients with spontaneous or minor fractures should be tested for thyroid problems or vice versa, according to the study.

Eliza et al. [12] in a study on the lower limbs heterometry correction in patients with osteoporosis and increased risk of falls demonstrated a statistically significant link between clinical limb shortening expressed in millimeters and the region of the weight imbalance during the stabilometric examination. In addition, the majority of patients with clinical heterometry have a weight imbalance on the longer limb, and after heterometry correction, patients had a statistically significant drop in weight.

A study in Cameroon which centered on prevalence and pattern of lower extremity injuries due to road traffic crashes, revealed that the bulk of those killed in car accidents were in their third and fourth decades of life [13]. Pedestrians and passengers on motorcycles were the most vulnerable road users, with bike-car collisions and bike-pedestrian collisions being the most common mechanisms by which crash victims were injured. Commercial motorcycles and taxis were the road users most involved in road traffic collisions. Legs, thighs, and knees were among the body parts implicated in the accidents. Fractures, lacerations, and bruises were the most common patterns of lower extremity injuries, according to the study.

Study Procedure

Patients who presented to the hospital with road traffic injuries were approached. Those who met the inclusion criteria were counselled on the aim and importance of the study. Those who granted consent were then examined and the data recorded on the data collection form. The data collection form had two main sections: the first section for the demographic variables and the second section for the crash and injury characteristics. It went on for 3 months. Patients who arrived in a critical state were examined later in the ward when they were much improved and stable.

Materials and Methods

Study design, study area and setting

The study adopted a cohort analysis and matched case-control study. It was conducted at Mama Lucy Kibaki Hospital, Nairobi since the area has a high prevalence of accidents with public service vehicles, tricycles and motorbikes being the most preferred means of transport.

Study Population

The population of this study is adult patients at MLKH with fractures. The orthopaedic department has an outpatient clinic which operates every Monday and Tuesday. Of interest to this study were those presenting to the facility with fractures of the lower limb. Areas of recruitment were the radiology department, the orthopaedic wards, and the orthopaedic outpatient clinic.

Selection criteria

Inclusion criteria: Adult patients presenting with lower limb fractures that have been confirmed either clinically or by radiological method; Patients with cognitive ability to understand questions; Adult patients with lower limb fractures who give written information consent.

Exclusion criteria: Patients who decline to have radiographs of fractures to be taken/those who don't require radiographic evaluation; Patients who decline to give written information consent; Patients who are hemodynamically unstable; Patient's below the cutoff age (18 years).

Recruitment and Sampling Technique

All patients who were seen over the study period were registered, listed and assigned consecutive numbers. Those who met the eligibility criteria underwent non-probability consecutive sampling. Then they were recruited and consented.

Data collection, management and analysis

The data collected included: injury characteristics, Type of crash: motor-bike or car; Position of the victim: pedestrian, bike rider or passenger, car driver or passenger and Body the part injured and nature of the injury.

Findings

The Prevalence of Lower Limb Fractures among Adult Patients

Question one wanted to find out the prevalence of lower limb fractures among adults. The total number of adult patients who presented with fractures during the study period was sought from the orthopedic patients register. The results were computed as shown below.

Prevalence= Total number of Adult Patients with Lower Limb Fractures/ Total number of Adult Patients who presented with fractures $\times 100\%$

Total number of Adult Patients with Lower Limb Fractures = 80

Total number of Adult Patients who presented with fractures = 143

$=80/143 \times 100 = 55.94\%$

The prevalence of lower limb fractures in this study was 55.94%.

Trauma Details

The study sort to find out the anatomical site of the fractures in lower limb in adults. The findings were illustrated in figure 1.

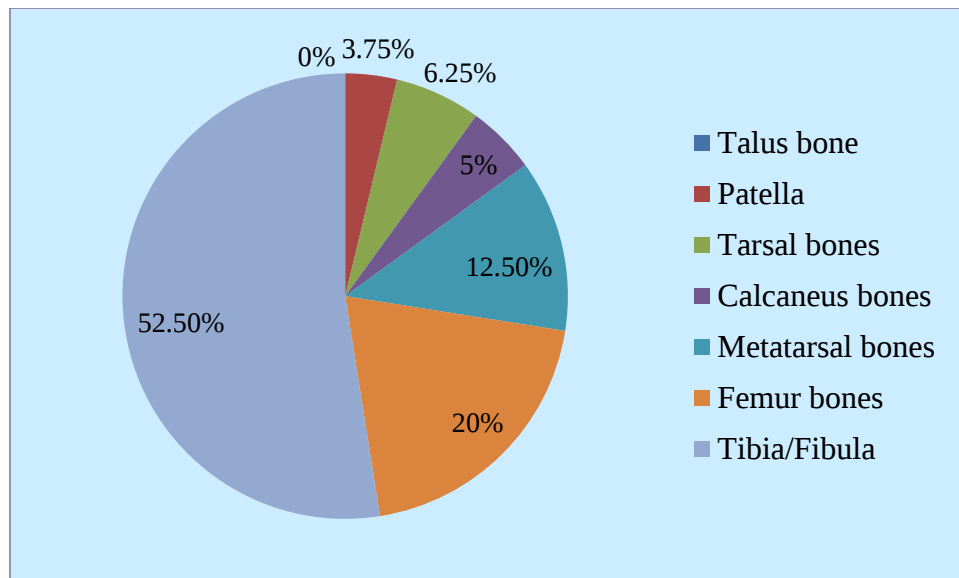


Figure 1. Distribution by Anatomical Site of the Fracture

More than half of the participants had a fracture involving the Tibia/Fibula 42(52.50%). Those who presented with involvements of the femur and metatarsal bones contributed 16(20%) and 10(12.50%) respectively. Those with calcaneus and tarsal bones involvement each contributed 4(5.00%) and 5(6.25%). However, few had the involvement of the patella 3(3.75%) and none presented with fracture of the talus bone. Among the study participants, some acquired associated injuries in addition to the lower limb fracture. The details are as illustrated in table 1 below.

Table 1. Associated Injuries

Injury (n=80)	N (%)
Head	8(38.10%)
Abdomen	7(33.33%)
Other (Upper Limb)	6(28.57%)

Assessment of the patients for associated injuries revealed that there were (38.10%) participants with an associated head injury, upper limb at (33.33%), and abdomen at (28.57%).

Fracture Pattern

Fracture patterns observed among the study subjects were as follows.

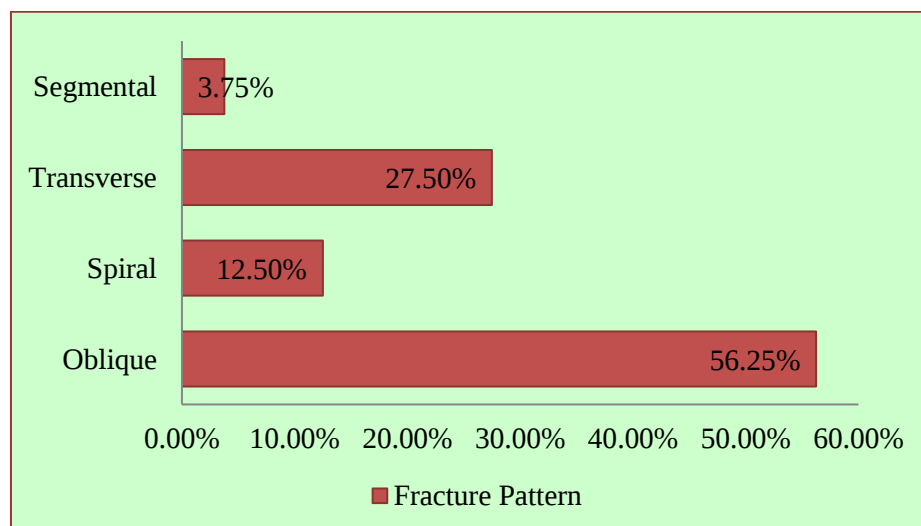


Figure 2. Fracture Pattern

Figure 2, it was observed that majority of the fractures 45(56.25%) were oblique, with 22(27.50%) being transverse. 10(12.50%) and 3(3.75%) were spiral and segmental respectively. This was an indication that many of the lower limb fractures in adults were oblique.

Type of Fracture

The study determined whether the acquired fracture was either open or closed (compound). The findings are as illustrated on figure 3 and figure 4.

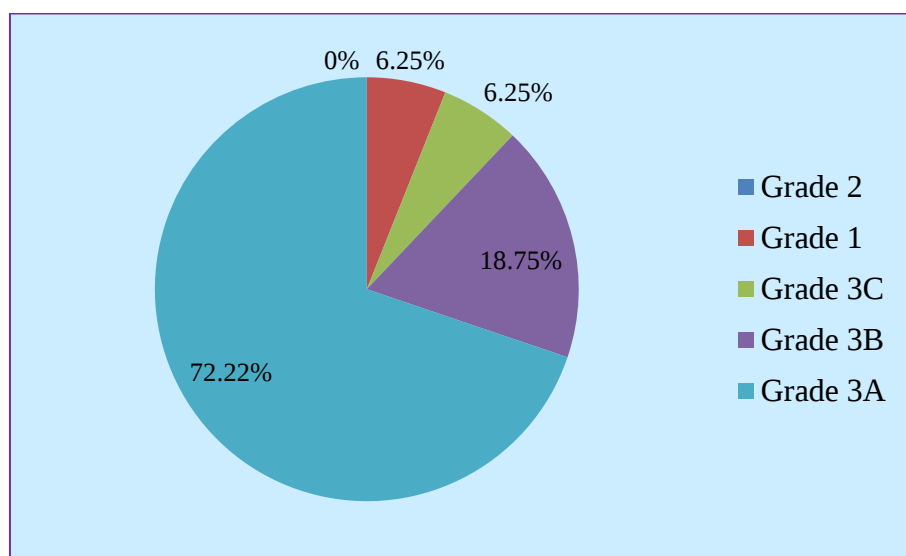


Figure 3. Gustilo Anderson classes among open fractures types

A total of 18(22.5%) patients resented with open fractures. Majority of the open fractures were Gustilo Anderson Grade 3A at 13(72.22%), followed by Grade 3B at 3(18.75%). Grade 1 and 3C both accounted for 6.25% each. There were no occurrences of Grade 2.

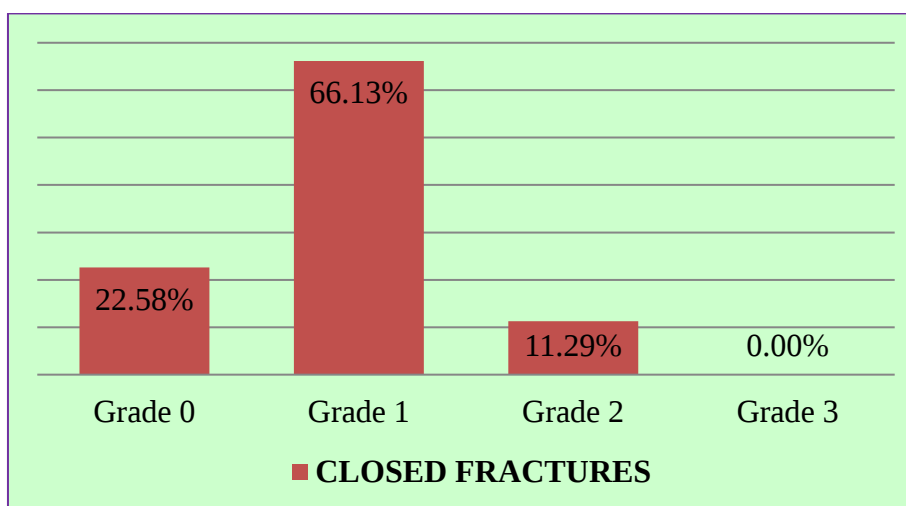


Figure 4. Tscherne Class among the closed fractures with soft tissue injury

A total of 62(77.50%) patients presented with closed fractures. Tscherne classification among those with closed fractures showed that more than a quarter, 41(66.13%), of those who had closed fractures with soft tissue injury were in Grade 1. Grade 0 comprised 14(22.58%). Grade 2 comprised 7(11.29%). There were no occurrences of Grade 3.

Risk Factors

Objective three of the study aimed at finding out the risk factors of the lower limb fractures among adult patients. The findings are as illustrated in table 2.

Table 2. Associated Risk Factors

Variable	Sample size	Percentage (%)
Degree of Injury	80	
High Energy		54 (67.50%)
Low Energy		26 (32.50%)
Risk Factors	80	
RTAs		26 (32.50%)
Fall		34 (42.50%)
Direct blows/assault		20 (25.00%)
Sports		0 (0.00%)
Gunshot		0 (0.00%)

About two thirds of the participants, 54 (67.50 %) sustained high energy injury. The specific injuries show that over half of the participants 34 (42.50%) sustained injuries due to falls. Those who sustained injuries due to RTAs comprised 26 (32.50%). Twenty (25.00%) had injuries as a result of direct blows or assaults. There were no gunshot or sports injuries. More details on specific mechanisms of injuries were sort and are illustrated as below.

Table 3. RTA related risk factors

RTA		N	N %
RTA risk factors	Motorcycle		19(73.07%)
	Car	26	6 (23.07%)
	Bicycle		1 (3.85%)
Car	Driver	6	1 (16.67%)
	Passenger		2 (33.33%)
	Pedestrian		3 (50%)
Motorcycle	Cyclist	15	15(78.95%)
	Pedestrian	0	0 (0%)
	Pillion	4	4 (21.05%)
Bicycle	Cyclist	1	1 (100%)

About one third of the RTA related fractures injuries involved cars 6(25.00%). A higher portion of RTA related injuries, 19(73.07%), involved motorcycles. Of those that involved cars, drivers comprised 1(16.67%), passengers comprised 2(33.33%), and pedestrians comprised 3 (50%).Of the fracture injuries involving motorcycles, cyclists comprised 15(78.95%). Pillions comprised 4 (21.05%). There was only one bicycle cyclist who presented with lower limb injury.

Table 4. Lower Limb Fracture due to fall, and direct blows or assault

Variable			N	n (%)
Fall	Nature of fall	Down a gradient	34	16 (47.06%)
		Simple		18 (52.94%)
Direct blow/Assault	Incidence	Hit by heavy falling object	20	14 (70.00%)
		Occupational injury		6 (30.00%)
	Nature	Accidental		16 (80.00%)
		Incidental		4 (20.00%)
	Object	Blunt		13 (65.00%)
		Sharp		7 (35.00%)

The study found that majority of the respondents who had a fall, the fall was either a simple fall which accounted for 52.94%, while fall down a gradient accounted for 47.06%. Participants who had injuries due to direct blows/assault was as a result of either a hit by a falling object which accounted for 70.00%, and occupational injury 6 (30.00%).

Accidental injuries accounted for 16 (80.00%), whereas incidental injuries accounted for 4 (20.00%). The causative objects were mostly blunt 65.00%, whereas sharp objects accounted for 35.00%.

Recommendations

The hospital administration should adequately prepare for fractures that involve the lower limb since evidence shows that there is a high prevalence of the lower limb in the area. They should ensure the facility has an adequate number of specialists to manage these fractures.

Conflicts of interest

There is no conflict of interest of any kind.

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