

## Anatomical Region and Outcome of Fractures in the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria

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### Abstract

**Background:** The knowledge of pattern of illness provides an insight to the health or otherwise of a society, useful for planning and allocation of resources. Fractures are common emergency surgical presentations in our practice, and patients are sometimes unable to pay for the cost of fracture care resulting in a dynamic traffic for alternative care. This study therefore aims at describing the anatomical region and outcome of fractures seen at the Surgery Department of the Rivers State Teaching Hospital, from 2016 to 2020.

**Materials and Methods:** A descriptive retrospective cross-sectional study was carried out in Port Harcourt, Nigeria, using admission and discharge registers to identify all patients with fractures at the Surgery Department of the Rivers State University Teaching Hospital, from 2016 to 2020. The collected data was entered into Excel Spreadsheet, and tabulated.

**Results:** A total of 223 patients had fractures involving different bones. The male to female ratio was 1.9: 1. The mean age of the patients was 40.53, and the age ranges 30 - 39 years (38), 40 - 49 years (44), and 50 - 59 years (33) were more involved in the fracture cases. There were more fractures of the tibia (17.3%) and fibula (16.0%) within the five-year period. Out of the total of 223 patients who had fractures, 159 (71.3%) were admitted to the wards, treated and discharged home. Twenty-five patients (11.2%) signed against medical advice. Thirty-four (15.2%) absconded from admission, while 5 (2.2%) died from complications of the fractures.

**Conclusion:** Fracture is a common surgical emergency in our practice with male preponderance. Most of the patients were treated and discharged. However, about a quarter of the patients left the hospital before treatment could be completed.

**Keywords:** *Fractures; Anatomical Region; Outcome; RSUTH; Port Harcourt; Nigeria*

## **1. Introduction**

Fracture occurrence and care has long been known in medical literature, dating back to the fifth century in Greece, and the earliest documented role of Hippocrates [1]. Evolution to modern fracture care, with the ever-dynamic discovery of new methods has also been chronicled in relevant accounts [2]. The knowledge of pattern of illness provides an insight to the health or otherwise of a society, useful for planning and allocation of resources. The same is also the case with fractures occurring in human society. Fractures occur following violent military and civilian activities, occupational and domestic accidents, and some illness-related weakness of the bones. Efforts by professional organizations, institutions and researchers are active in reducing morbidity and mortality associated with fracture occurrence [3-6]. The cost of care is significant, and in the Sub-Saharan Africa where insurance coverage is low, it is rather challenging for some of the patients to pay for the cost of proper fracture care [7,8].

A relationship seems to exist between fracture pattern and severity of injury or outcome. In other climes, high fracture frequency has been found to be associated with medieval males and females engaged in subsistence farming, compared with their city-dwelling craft workers [9]. In motor vehicle accidents, the pattern of injury has been reported to be affected by type of vehicle involved and the side of the vehicle affected in the collision [10]. Types of fractures sustained is also known to differ between drivers and passengers [11]. Apart from fractures from motor vehicle accidents, there are specific fracture patterns following sports injuries [12], ladder fall injuries [13], vehicle air-bag usage [14], pelvic fracture in geriatric patients [15], and maxillofacial injuries following domestic violence [16], to mention just a few.

In Nigeria, some studies highlighting pattern of fractures have also been done. A study published about 18 years ago in Ibadan Western Nigeria reported more fractures involving males and children, and the upper limb being more affected than the lower limb [17]. An earlier study among children in Eastern Nigeria had also corroborated higher prevalence of fractures among males, however femoral fracture was more common and the patients with lower limb fractures presented earlier than upper limb fractures [18]. A more recent study reported the radius and ulna as the most common long bones fractured among pediatric population in western Nigeria [19]. Among adult population in a south-eastern Nigerian study, tibial fracture was the most common [20]. Multiple fractures occurring more among males, with the tibia being more commonly involved, were reported from western Nigeria [21-23].

Fractures are common emergency surgical presentations in our practice. Patients are sometimes unable to pay for the cost of fracture care resulting in a dynamic traffic for alternative care, even when they know that the orthodox hospital care is a preferred choice. This study therefore aims at describing the anatomical region and outcome of fractures seen at the Surgery Department of the Rivers State Teaching Hospital, from 2016 to 2020.

## **2. Materials and Methods**

### **2.1 Research design**

A descriptive retrospective cross-sectional study was carried out.

### **2.2 Study area**

The study was carried out in Port Harcourt, at The Rivers State University Teaching Hospital (RSUTH). The RSUTH was formerly Braithwaite Memorial Specialist Hospital upgraded to a Teaching Hospital status by the Government of Chief Bar Nyesom Ezenwo Wike, Governor of Rivers State, in July 2018. RSUTH is located in Port Harcourt, the capital of Rivers State, South-South of the Federal Republic of Nigeria.

### **2.3 Study sites**

The study site / setting were the Surgical Operating Theatre and the wards of the Surgery Department of the Rivers State University Teaching Hospital, Port Harcourt.

### **2.4 Study population/participants**

Total population of patients with fractures seen at the Surgery Department of the Rivers State University Teaching Hospital within the study period was used for the study.

### **2.5 Sample size determination**

All patients identified in the registers with fractures were included in the study.

### **2.6 Sampling method**

All patients who had fracture whose data were found in the registers within the study period were recruited.

### **2.7 Study instrument**

The registers of the surgical operating theatre and the wards of the Surgery Department were used, and data entered into a proforma designed for the study.

### **2.8 Variables**

Data on demographics, total number of fracture cases per year, type of bone involved in fracture, and the outcome of ward admission (treated and discharged, signed against medical advice, absconded, died), were obtained.

### **2.9 Bias**

Data collection was limited to information in admissions and discharge registers of the male and female surgical/orthopaedic wards. Hence only a description of the bone involved in fracture could be given without describing the type of fracture. Also, patients with incomplete data were excluded.

### **2.10 Data analysis**

The collected data was entered into Excel Spreadsheet, and tabulated.

### 2.11 Validity/Reliability of instrument

The study data was scrutinized by all the authors for authenticity or otherwise before use.

### 3. Results

TABLE 1 shows the demographic data (age and sex distribution) of patients who had fractures at the Rivers State University Teaching Hospital. A total of 223 patients had fractures involving different bone types. There were 147 males and 76 females (1.9: 1). The mean age of the patients was 40.53, and the age ranges 30 - 39 years (38), 40 - 49 years (44), and 50 - 59 years (33) were more involved in the fracture cases. Hence patients within the ages 30 - 59 years made up 115 out of the 223 total population of cases (51.6%).

TABLE 1. Demographic data - age and sex distribution (n=223).

S/N	AGE RANGE (YEARS)	MALE	FEMALE	TOTAL
1	0 - 9	8	3	11
2	10 – 19	12	7	19
3	20 - 29	27	12	39
4	30 - 39	23	15	38
5	40 – 49	28	16	44
6	50 – 59	24	9	33
7	60 – 69	15	8	23
8	70 - 79	7	3	10
9	≥ 80	3	3	6
TOTAL		147	76	223
Mean Age: 40.53				

TABLE 2 indicates the bones involved in the fractures sustained by the patients. A total of 387 fractured bones were seen within the five-year period, out of which 257 (66.4%) occurred in males and 130 (33.6%) were in females. There were 67 tibial fractures (male = 44, female = 23) making up 17.3% of all fractures. The fibula fractures were 62 (male = 42, female = 20), being 16.0% of all fractures. There were 46 fractures of the radius (male = 27, female = 19), being 12%, and 39 ulna (male = 14, female = 19) fractures amounting to 10.2%. There were 29 (7.6%) humeral fractures (male = 19, female = 10), and 42 (11%) femoral fractures (male = 27, female = 15).

TABLE 3 shows outcome of surgical/orthopedic ward admitted patients for fracture care. Out of the total of 223 patients who had fractures, 159 (71.3%) were treated and discharged home. Twenty-five patients (11.2%) signed against medical advice and left the hospital. Thirty-four (15.2%) absconded from admission, while 5 (2.2%) died from complications of the fractures.

**TABLE 2. Bone involved in fracture.**

S/N	BONE INVOLVED IN FRACTURE	NUMBER											
		2016		2017		2018		2019		2020		TOTAL	
		M	F	M	F	M	F	M	F	M	F	M	F
1	Skull	-	1	-	-	-	-	-	-	-	-	-	1
2	Vertebral Spine	-	-	-	-	-	-	-	-	-	-	-	-
3	Ribs	1	-	2	-	-	-	-	-	-	-	3	-
4	Clavicle	2	-	1	-	-	-	1	-	1	-	5	-
5	Scapula	-	-	-	-	-	-	-	-	-	-	-	-
6	Humerus	3	1	3	2	3	1	6	3	4	3	19	10
7	Ulna	3	4	5	4	3	5	5	5	2	3	18	21
8	Radius	3	4	6	5	5	4	8	4	5	2	27	19
9	Carpals	2	3	2	-	1	2	5	-	4	-	14	5
10	Metacarpals	-	-	-	-	-	-	-	-	-	-	-	-
11	Phalanges (Upper Limb)	2	2	2	3	5	-	-	-	6	-	15	5
12	Pelvis	1	1	1	-	-	-	-	-	1	-	3	1
13	Femur	3	5	3	3	8	1	7	3	6	3	27	15
14	Patella	1	-	-	-	-	-	-	-	-	-	1	-
15	Tibia	3	5	5	3	11	6	13	5	12	4	44	23
16	Fibula	5	5	5	2	10	5	11	4	11	4	42	20
17	Tarsals	-	3	3	-	4	1	5	2	6	1	18	7
18	Metatarsal	-	-	1	-	-	-	-	-	-	-	1	-
19	Phalanges (Lower Limb)	1	1	2	-	-	-	2	-	16	1	21	2
TOTAL				39	22	50	26	62	26	74	21	257	130

TABLE 3. Outcome of patients admitted for fracture care.

S/N	OUTCOME	NUMBER					
		2016	2017	2018	2019	2020	TOTAL
1	Treated and Discharged	33	27	29	30	40	159 (71.3%)
2	Signed Against Medical Advice	3	2	5	8	7	25 (11.2%)
3	Absconded	9	9	4	5	7	34 (15.2%)
4	Died	2	1	1	1	-	5 (2.2%)
TOTAL		47	39	39	44	54	223 (100%)

TABLE 4 shows the number of fracture cases as seen in emergency room per year, and the number admitted to the orthopedic wards. There were 252 cases of admissions due to fractures, out of which 223 (88.5%) were stabilized and admitted to the wards. Five patients were referred, 7 patients were stabilized and discharged to out-patient clinic, and 3 deaths. There were missing data accounting for the discrepancy between admissions at the emergency department and the wards.

TABLE 4. Fracture admissions in emergency room and orthopedic wards.

S/N	ADMISSIONS	NUMBER					
		2016	2017	2018	2019	2020	TOTAL
1	Emergency Room Admissions	62	63	41	42	44	252
a	Absconded	-	-	-	-	-	-
b	Signed Against Medical Advice	-	-	-	-	-	-
c	Referred to a Bigger Centre	-	-	-	1	4	5 (2.0%)
d	Discharged to Out-Patient Clinic	5	-	1	-	1	7 (2.8%)
e	Died	-	-	2	1	-	3 (1.2%)
2	Admitted to Orthopedic Ward (Admissions)	47	39	39	44	20	223 (88.5%)

#### 4. Discussion

There were more males than females who sustained fracture in the study, and the male to female ratio was 1.9:1. This finding is in conformity with other Nigerian studies [17,18,21-23]. Fracture mean age of 40.53, implies involvement of the population with productive capacity in society, with the associated losses in revenue that could have been generated by those involved in the fracture during the long period of treatment. There were 387 fractured bones were found in 223 patients in five years. This

implies a significant occurrence of multiple fractures, with male preponderance. Similar finding has been reported in other parts of Nigeria [21-23].

Lower extremity fractures were commonest with the tibia being the most affected. Our study showed involvement of the tibia, fibula, radius, and ulna, in descending order of occurrence. The predominance of tibial fractures in our study is similar to the other report by Omoke & Ekumankama in Abakiliki [24], and other locations [25,26]. However, it differs from another studies where the radius was commoner [27], and the femur in some other reports [28-30]. Skull fracture in this report is very scanty. This is understandable as the patients get referred due to absence of neuro surgical specialty in our center. The same applies for vertebral spine fractures.

A situation where patients leave hospital without the knowledge and permission of the healthcare staff or facility is regarded as absconding [31]. The outcome of fracture care showed that most patients were successfully treated and discharged home. However, a sizable number of patients either signed against medical advice or absconded from the wards after treatment. Similar issue of patient absconding has been reported in other studies [32-34]. This is worrisome, and leaves one to wonder why? Situational and environmental factors have been reported to be likely explanations for absconding [35]. Experience in our practice shows that some patients are not able to pay the accumulated bill for the cost of fracture care. This reasoning is buttressed by the fact that most of the patients did not have insurance coverage for their treatment. A Ghanaian report among breast cancer patients with late presentation showed that patient absconding (defaulting) was traceable to the following factors - fear of medical treatment, preference for herbal treatment or prayer camps, and financial incapability [36]. In another study, middle age, male gender, absence of insurance coverage, inability to afford hospital expenditures and admission in emergency department were factors identified to be predictive of absconding [32].

However, the findings of our study show higher number of patients absconding from the wards than at the emergency department. In Nigeria, we observe that absconding seems to be reported more among patients with conditions that required long time in admission like fractures, breast cancer, burns, mental illness, etc [37-40].

Our ward absconding rate of 15.2% is higher than the 3.5% reported among psychiatric patients [40], 1.8% among patients with neurosurgical diseases [41], etc., although these are not the same category of patients. Majority of the patients with fracture seen at the emergency department were admitted to the wards after stabilization. There was no record of any patient with fracture absconding or signing against medical advice at the emergency department. The reasons for this observation could partly be incompleteness of data, or the fact that life-threatening conditions in which the patients found themselves may have limited the options of the patient at the time. Mortality from complications of fracture among ward-admitted patients was 2.2%, and 1.2% among patients at the accident and emergency department. In a 10-year mortality review among hospitalized patients, a researcher reported mortality of 24.7%, 64.4% and 93.8%, at 1, 5 and 10 years respectively for isolated fractures of the pubic rami [42].

In another study mortality of 4.5 and 13% at 30days and one year was observed among patient who had limb and pelvic fractures [43]. These studies, however, are different from ours in that our findings reflect the mortality observed among patients with all types of fracture, and not isolated fractures.

## **5. Generalizability**

Although there were missing data, to a reasonable extent, the outcome of this study could still be generalizable to Rivers State. Our reason is based on the facts that the tertiary health care center is a referral center for trauma that occurs in the local government areas; and the whole population of fractures over the 5-year study period was captured.

## **6. Limitations**

This study is limited in the content of pattern of fractures, as it is unable to provide more information on pattern other than the type of bones involved in the fractures. The study is also unable to give more information on outcome of fracture care other than as presented. Understandably, the reason for these observations is that the study instrument was the registers of admissions and discharge, and not the patients' medical records/folders. This study therefore highlights room for further study on the subject, with information obtained from patients' medical records.

## **7. Conclusion**

There were more males than females with fractures, and most of them were in their productive age. The tibia was the most commonly involved bone. Most of our patients were successfully treated and discharged, however, there was a high rate of absconding among our patients admitted into the wards with fractures.

## **8. Source of Funding**

The Study was privately sponsored by the researchers.

## **9. Acknowledgement**

We appreciate the efforts of our data collection assisting staff - Dr Chisom Christian Nwamadi, who painstakingly extracted needed data from the records of the hospital.

## **10. Ethical Statement**

The approval of the research ethics committee of the Rivers State University Teaching Hospital was obtained before the study was done.

## **11. Conflict of Interest**

None.

## **REFERENCES**

1. Clark WA. History of fracture treatment up to the sixteenth century. *JBJS*. 1937;19(1):47-63.
2. Kakria H. Evolution in fracture management. *Med J Armed Forces India*. 2005;61(4):311-2.
3. Eisman JA, Bogoch ER, Dell R, et al. Making the first fracture the last fracture: ASBMR task force report on secondary fracture prevention. *J Bone Miner Res*. 2012;27(10):2039-46.



4. Curry SJ, Krist AH, Owens DK, et al. Screening for osteoporosis to prevent fractures: US Preventive Services Task Force recommendation statement. *JAMA*. 2018;319(24):2521-31.
5. Ekman EF. The role of the orthopaedic surgeon in minimizing mortality and morbidity associated with fragility fractures. *J Am Acad Orthop Surg*. 2010;18(5):278-85.
6. Metsemakers W-J, Onsea J, Neutjens E, et al. Prevention of fracture-related infection: a multidisciplinary care package. *Int Orthop*. 2017;41(12):2457-69.
7. Ademuyiwa AO, Usang UE, Oluwadiya KS, et al. Pediatric trauma in sub-Saharan Africa: challenges in overcoming the scourge. *J Emerg Trauma Shock*. 2012;5(1):55-61.
8. Sina OJ, Ayodele I. Traditional bone-setters and fracture care in Ekiti State, Nigeria. *Altern Integr Med*. 2015;4(1):182.
9. Judd MA, Roberts CA. Fracture trauma in a medieval British farming village. *Am J Phys Anthropol*. 1999;109(2):229-43.
10. Acierno S, Kaufman R, Rivara FP, et al. Vehicle mismatch: injury patterns and severity. *Accid Anal Prev*. 2004;36(5):761-72.
11. Conroy C, Schwartz A, Hoyt DB, et al. Upper extremity fracture patterns following motor vehicle crashes differ for drivers and passengers. *Injury*. 2007;38(3):350-7.
12. Swenson DM, Henke NM, Collins CL, et al. Epidemiology of United States high school sports-related fractures, 2008-09 to 2010-11. *Am J Sports Med*. 2012;40(9):2078-84.
13. Partridge RA, Virk AS, Antosia RE. Causes and patterns of injury from ladder falls. *Acad Emerg Med*. 1998;5(1):31-4.
14. Mohamed A, Banerjee A. Patterns of injury associated with automobile airbag use. *Postgrad Medi J*. 1998;74(874):455-8.
15. Henry SM, Pollak AN, Jones AL, et al. Pelvic fracture in geriatric patients: a distinct clinical entity. *J Trauma Acute Care Surg*. 2002;53(1):15-20.
16. Le BT, Dierks EJ, Ueek BA, et al. Maxillofacial injuries associated with domestic violence. *J Oral Maxillofac Surg*. 2001;59(11):1277-83.
17. Ebong WW. The pattern of fractures and dislocations in Western Nigeria. *Injury*. 1978;9(3):221-4.
18. Archibong A, Onuba O. Fractures in children in south eastern Nigeria. *Cent Afr J Med*. 1996;42(12):340-3.
19. Adewole O, Kayode M, Shoga M, et al. Pattern and trauma mechanisms of paediatric long bone fractures in Lagos, Nigeria. *Niger J Orthop Trauma*. 2011;10(2):100-4.
20. Okoro I, Ohadugha C. The anatomic pattern of fractures and dislocations among accident victims in Owerri, Nigeria. *Niger J Surg Res*. 2006;8(1):54-6.
21. Enweluzo G, Giwa S, Obalum D. Pattern of extremity injuries in polytrauma in Lagos, Nigeria. *Niger Postgrad Med J*. 2008;15(1):6-9.
22. Babalola O, Salawu ON, Ahmed B, et al. Epidemiology of traumatic fractures in a tertiary health center in Nigeria. *J Orthop Traumatol Rehabil*. 2018;10(2):87-9.
23. Owoola A, Thanni L. Epidemiology and outcome of limb fractures in Nigeria: A hospital based study. *Niger J Orthop Trauma*. 2012;11(2):97-101.

24. Omoke NI, Ekumankama FO. Incidence and pattern of extremity fractures seen in accident and emergency department of a Nigerian teaching hospital. *Niger J Surg.* 2020;26(1):28-34.
25. Ravikanth R, Varghese P. Pattern and distribution of long bone fractures in victims of road traffic accidents in Bangalore city. *Indian J Forensic Med Toxicol.* 2017;11(1):229-33.
26. Elachi I, Yongu W, Kortor J, et al. Characteristics and Outcome of Paediatric Long Bone Fractures Managed in a University Teaching Hospital. *J BioMed Res Clin Pract.* 2018;1(2):124-8.
27. Awwad NY. Epidemiology of Fractures Among Patients Attending Azadi Teaching Hospital in Kirkuk City. *Thi-Qar J Med.* 2020;20(2):66-75.
28. Anibor E, Obaroefe M, Shagamu JE. A radiographic survey of bone fractures at Celian Clinic, Ughelli in Delta State, Nigeria. *GSC Adv Res Rev.* 2021;7(1):117-22.
29. Jabeen N, Ashraf IU, Hakak A, et al. Anatomical Prevalence of Fractures among Admitted Patients in a Tertiary Care Hospital: A Retrospective Study. *J Med Sci Clin Sci.* 2018;6(11):383-6.
30. Theophile NC, Pius F, Martin MN, et al. Epidemiology and aetiology of fractures treated in four hospitals in the South West Region of Cameroon: A 5 year review. *Afr J Med Surg.* 2020;7(11):1-7.
31. Falkowski J, Watts V, Falkowski W, et al. Patients leaving hospital without the knowledge or permission of staff-absconding. *Br J Psychiatry.* 1990;156(4):488-90.
32. Khammarnia M, Kassani A, Amiresmaili M, et al. Study of patients absconding behavior in a general hospital at southern region of Iran. *Int J Health Policy Manag.* 2015;4(3):137-41.
33. Wright SV. An investigation into the causes of absconding among black African breast cancer patients. *S Afr Med J.* 1997;87(11):1540-3.
34. Cheng S, Chung C, Leung Y, et al. Patient absconding behaviour in a public general hospital: retrospective study. *Hong Kong Med J.* 2002;8(2):87-91.
35. Meehan T, Morrison P, McDougall S. Absconding behaviour: an exploratory investigation in an acute inpatient unit. *Aust N Z J Psychiatry.* 1999;33(4):533-7.
36. Clegg-Lamprey J, Dakubo J, Attobra Y. During treatment in Ghana? A pilot study. *Ghana Med J.* 2009;43(3):127-31.
37. Mabogunje O, Khwaja M, Lawrie J. Childhood burns in Zaria, Nigeria. *Burns.* 1987;13(4):298-304.
38. Ayoade BA, Tade AO, Salami BA. Clinical features and pattern of presentation of breast diseases in surgical outpatient clinic of a suburban tertiary hospital in South-West Nigeria. *Niger J Surg.* 2012;18(1):13-6.
39. Ukwenya A, Yusufu L, Nmadu P, et al. Delayed treatment of symptomatic breast cancer: the experience from Kaduna, Nigeria. *S Afr J Surg.* 2008;46(4):106-10.
40. Raji SO. Factors associated with absconding behaviours amidst inpatients of a regional psychiatric hospital in Nigeria. *Niger Health J.* 2020;19(1):25-36.
41. Oyemolade TA, Balogun JA, Akinkunmi MA, et al. The burden of neurosurgical diseases in a rural southwestern Nigeria setting. *World Neurosurg.* 2020;140:e148-e52.
42. van Dijk W, Poeze M, Van Helden S, et al. Ten-year mortality among hospitalised patients with fractures of the pubic rami. *Injury.* 2010;41(4):411-4.
43. Deakin D, Boulton C, Moran C. Mortality and causes of death among patients with isolated limb and pelvic fractures. *Injury.* 2007;38(3):312-7.