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A radiographic survey of bone fractures at Celian Clinic, Ughelli in Delta State, Nigeria

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Abstract

Background: Fracture is a commonly associated medical condition with osteological structures. It is caused as a result of high stress or impact forces acting on bone. This study is aimed at evaluating the types and prevalence of bone fractures in Celian Clinic, Ughelli in Delta State, Nigeria.

Materials and Methods: This survey is a one-year retrospective study which comprised 256 patients (160 males and 96 females) managed at Celian Clinic. Ethical Consent was obtained from the Research and Ethics Committee of Human Anatomy and Cell Biology Department, Delta State University, Abraka. Data were sourced from the Orthopaedic Department and patient's information such as age, sex, cause and bones fractured. Data were analysed and chi-square test used in evaluating relationship between variables.

Results: Findings showed males (62.5%) having a higher prevalence of facture than females (37.5%). It was also observed femur (19.9%) was the most prevalent bone fractured which was followed by tibia/fibula (16.0%). Findings also indicated individuals within the ages of 21-40years (37.9%) was the most affected followed by age group of 41-60years (29.3%). Results also showed road traffic accidents (62.5%) were the most predominant causes which was followed by fracture with unknown aetiology (19.9%) with the least causative factor being assault (2.0%). Significant association with a p-value of 0.004 was observed in a test of association between age and class of bone fracture.

Conclusion: In conclusion it was observed that bone fractures had a higher predisposition to the male gender (62.5%) than the female (37.5%) with its commonest etiological factor being road traffic accident (62.5%).

Keywords: Bone; Cause of fracture; Types of fracture; Radiograph

1. Introduction

The Human body is comprised eleven systems one of which is skeletal system which include osteological structures such as the femur, patella, skull, mandible and many others [1]. This system is commonly affected by a medical condition known as fracture which is referred to as a condition developed as a result of discontinuity in the structural integrity of any osteological structure [2]. It could either be partial or complete, it could also be regarded medically as any disruption in a bony structure ranging from fragmentation of a bony structure to a small hairline disruption of its structural constituent [2].

Studies on this medical condition have shown various classifications one of which is its invasion of the skin surfaces on development which are the simple (fracture of the bone without skin invasion) and compound (fracture of the bone with skin invasion) fractures. According to Nordqvist, they are several types of fractures, they include; Avulsion fracture

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(resulting from muscular or ligament pull), Pathological fracture (developed from weakening of the bones structure by underling medical condition), Greenstick fracture (associated with children due to their soft and elastic bones. It is characterized with a distinct feature of incomplete discontinuity of the bone with only one side been fractured), Hairline fracture (simply a partial fracture on a bony structure. This is the least detected fracture type with routine x-rays), Longitudinal fracture (characterised with occurring along the entire length of the bony structure), Oblique fracture (simply a discontinuity of a bony structure diagonally to its long axis), Spiral fracture (characterised with bony structure been twisted), Stress fracture (developed due to repeated stress and strain of the bony structure comply the femur), Transverse fracture (simply a transverse discontinuity of a bony structure), Impacted fracture (fragment of a fracture colliding with one another), Comminuted fracture (associated with osteological structure been fragmented into more than two fragments), Compression fracture (high compressional forces acting on a bony structure)[3].

Results from studies conducted have revealed the human bones can withstand a significant level of impact forces but when such forces become above normal, such bones undergo fracture [4-6]. It has also been observed that medical conditions such as osteoporosis, osteopenia, and bone cancer are also etiological factors for this medical condition [7]. Researches have shown the incidence of bone fracture has an association with age with results showing age have a direct implication on one's susceptibility to fracture with its occurrence commonly in childhood, adolescence and lastly older age [4-6,8-10]. Other studies have observed gender been a risk factor of this medical condition with females having a higher predilection to this condition than male, with menopause only in females playing a role in the development of fracture [7].

Instruments alongside equipment over the years have been designed for identification and treatment of bone fracture, such equipment include; X-ray, Computed Tomography scan, Magnetic resonance imaging for identifying and diagnosing this medical condition [11-12]. A traction is an example of such instruments employed for the treatment of one's bone when fractured, it is surgically implanted with the purpose of holding bone fragments together in place [12]. The paucity of information on this medical condition amongst orthopaedic patients of Celian Clinic, Ughelli has promoted this study with the focus of evaluating the prevalence, types and causes of bone fracture among the patients.

2. Material and methods

Study Design and Sampling Technique: A retrospective study design with a study period of one year (March, 2017-February, 2018) was employed for this study and purposive sampling was used to sample collection.

Sample Size: Study sample comprise 256 patients (160 males and 96 females).

Ethical Statement: Ethical Clearance for the study was approved by Human Anatomy Department, Committee of Research and Ethics, Faculty of Basic Medical Sciences, Delta State University, Abraka.

Data Collection and Statistical Analysis: Data was obtained from the medical records of the Orthopaedic Department of Celian Clinic, Ughelli and records of patients such as age, sex, cause and type of bone fracture retrieved were retrieved. Statistical Package of Social Sciences version 23 was used in analysing the data collected with the results presented in tables and chi-square test used in evaluating relationship between variables

3. Results and discussion

Table 1 Gender Distribution of the Studied Population

Gender	Frequency (%)
Male	160 (62.5)
Female	96 (37.5)
Total	256 (100.0)

Table 2 Age Distribution of the Studied Population

Age (years)	Frequency (%)
0-20	49 (19.1)
21-40	97 (37.9)
41-60	75 (29.3)
61-80	35 (13.7)
Total	256 (100.0)

Table 3 Fractured Bones Distribution in the Studied Population

Bones	Frequency (%)
Clavicle	15 (5.9)
Humerus	31(12.1)
Radius	13 (5.1)
Ulnar	4 (1.6)
Radio/ulna	17 (6.6)
Femur	51 (19.9)
Tibia	34 (13.3)
Fibula	7 (2.7)
Tibio/fibula	41 (16.0)
Patella	1 (0.4)
Spine	2(0.8)
Skull	12 (4.7)
Foot	6 (2.3)
Pelvis	4 (1.6)
Ribs	8 (3.1)
Phalanges	5 (2.0)
Mandible	5 (2.0)
Total	256 (100.0)

Table 4 Distribution of the Aetiology of Fractures Observed

Etiology	Frequency (%)
Road Traffic Accidents	160 (62.5)
Gunshot	12 (4.7)
Fall	20 (7.8)
Unidentified	51 (19.9)
Assault	5 (2.0)
Disease	8 (3.1)
Total	256 (100.0)

Table 5 Test of Association between Age group and Types of Fracture

Age (years)	Types of Fracture		Chi-square	Df	P-value
	Simple	Compound			
0-20	40(15.6)	9(3.5)	3.722	3	0.293
21-40	70(27.3)	27(10.5)			
41-60	55(21.5)	20(7.8)			
61-80	22(8.6)	13(5.1)			
Total	187(73.0)	69(27.0)			

Table 6 Test of Association between Age group and Classes of Fracture

Classes of Fracture	Age (years)				Chi-square	Df	P-value
	0-20	21-40	41-60	61-80			
Transverse	15(5.9)	24(9.4)	20(7.8)	10(3.9)	33.230	15	0.004
Malunited	2(0.8)	2(0.8)	6(2.3)	1(0.4)			
Oblique	7(2.7)	10(3.9)	13(5.1)	2(0.8)			
Comminuted	20(7.8)	39(15.2)	34(13.3)	19(7.4)			
Pathological	3(1.2)	2(0.8)	1(0.4)	2(0.8)			
Unspecified	2(0.8)	20(8.0)	1(0.4)	1(0.4)			
Total	49(19.1)	97(37.9)	75(29.3)	35(13.7)			

Observation from Table 1 showed bone fracture having a higher incidence level among male patients 160 (62.5%) than female patients 96 (37.5%).

From Table 2, it was observed that the age distribution of bone fracture depicted patients within the ages of 21-40years having the highest prevalence level of 97 (37.9%) which was followed by those within the ages of 41-60 years with a prevalence of 75 (29.3%), 0-20years accounting for 49 (19.1%) with the least affected age been those within the ages of 61-80 years 35 (13.7%).

Results from Table 3 indicated that among affected bones with fracture the most prevalent was the femur with a frequency of 51 (19.9%) which was followed by the tibio-fibular bone with a frequency of 41 (16.0%), tibia 34 (13.3%), humerus 31(12.1%) with the least affected been the patella with a frequency of 1 (0.4%).

On evaluation of Table 4, it was observed that the road traffic accidents accounted for 160 (62.5%) of all observed etiological factors which was followed by unidentified etiology with a frequency of 51 (19.9%), fall 20 (7.8%), gunshot 12 (4.7%), disease 8 (3.1%), with the least observed causative factor been assault with an incidence level of 5 (2.0%)

Table 5 depicts no significant association between age group and types of fracture with a p-value of 0.293.

Results from Table 6 indicate a significant association between age and classes of fracture with a p-value of 0.004.

The world health Organisation have estimated the incidence level of fracture from falls and road traffic accidents to range about 1000-2600 people per 100,000 per year in developing countries [13]. It also accounted for 9% of disease burden in Africa and globally responsible for 9.6% of deaths, with its age predilection been those within the ages of 5-45 years [14].

Results from this study, on observation were similar to those in studies conducted by Igho et al., and Mabueze et al., which depicted the commonest osteological structure affected by this medical condition as the femur [15, 16]. Disparity with regards to these findings were observed from results of studies conducted by Adoga and Ozilo which reported the skull been the most affected, Admasie; Igho et al., and Tyebkham, which depicted the humerus as the most predisposed osteological structure to fracture [17,10,15,18].

This study result is in agreement with findings reported by Igho et al., Taiwo et al., Kadkhodaie; Khanbhai and Lutomia, which observed the male gender had a higher predilection to this medical condition than the females [15, 19, 8, 6]. These results could be the high predominance of males involved in manual activities (construction, driving of vehicles, motorcycle riding etc.) which often result in road traffic accidents [6].

From this study, it was also observed that results were in synchrony with those of Igho et al.; Taiwo et al., Kadkhodaie; Khanbhai and Lutomia, which showed individuals within the 3rd and 4th decade of their life having a high predisposition to fracture [15, 19, 8, 6]. Evaluation from this study showed similarity with studies conducted by Okoro and Ohaduga; Mubashir et al., which depicted road traffic accident as the most predominant cause of fracture which was believed to be caused by the fact that there is ever increasing poor roads, unabiding road safety law users as well as increase means of road transport [20, 21]. Also, from this study similar observation with regards the association of pattern of fracture with its types was depicted in a study conducted by Kaewpornsawan et al., which also showed age and types of fracture having a significant association with p=0.021[9].

Investigations from this study also indicates agreement with a study conducted by Mabuweze et al., which showed age having no significant association with classes of fracture with a p-value of 0.051 observed, but these findings were in disagreement with studies conducted by Taiwo et al., Kadkhodaie which depicted age and classes of fracture having a significant association of 0.025, 0.005 respectively [5, 15, 19]

4. Conclusion

In conclusion it was observed that bone fractures had a higher predisposition to the male gender (62.5%) than the female (37.5%) with its commonest etiological factor been road traffic accident (62.5%). It was also drawn from the study that those with the ages of 21-40 years (37.5%) were commonly affected with the femur (19.9%) been the commonest bony structure affected.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors declare no conflict of interest.

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