A FOUR YEAR RADIOGRAPHIC REVIEW OF BONE FRACTURES AT THE ABRAKA GENERAL HOSPITAL, DELTA STATE IN NIGERIA.

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Abstract

This intellectual exercise was intended to evaluate bone fractures seen at the Abraka General Hospital in Delta State, Nigeria. This appraisal is a four-year retrospective inquiry which encompassed 244 patients (121 males and 123 females) cared for at the General Hospital in Abraka from January 1st 2017 to December 31st 2020. Ethical accord was gained from the Research/Ethical Board of Anatomy Department, Delta State University, Abraka. Data were copied from the register in the radiology unit and patients' data such as age, gender, bones fractured and etiology of fracture were noted. Analysis of statistics entailed the use of chi-square test for valuing association between variables. The females (50.4%) were more than the males (49.6%). The femur was frequently fractured (25.0%), and was closely followed by the radius (21.7%). Those persons within the age set of 21-30years (27.0%) were mostly affected, as well as those aged 31- 40years (25.0%). Trauma (38.9%) was the leading cause of fracture which was followed by falls (35.2.9%) with the seldom causative issue being road traffic accident (25.8%). Considerable relationship with a p-value of .001 was observed in a test of association between age and bone fractured as well as causation. In conclusion it was observed that the 21-30years age bracket had a higher tendency to bone fractures and the commonest etiological stimulus is trauma.

Keywords: *Radiographic, review, bone, fracture.*

Introduction

Fracture is stated as a malady characterized by a break in the structural integrity of an osteological structure. It may well be partial or complete, and it may likewise be considered medically as a break in a bone such as fragmentation of a bony structure or a slight hairline disruption of its structural component.[1]

Human bones can bear substantial levels of impact forces, nonetheless once the forces turn out to be beyond usual, the bones break. [1-4] Disorders like bone cancer, osteoporosis and osteopenia are causes of bone fractures.[5] Different inquiries determined that the occurrence of bone fracture has an association with age. Researchers resolved that age has an unswerving inference on vulnerability to fracture with fracture occurrence common in childhood, adolescence and old age.[2-4,6-8] Gender poses as a risk factor of fracture with females displaying a higher tendency to fracture than males due to the manifestation of menopause.[5]

Equipment for diagnosis of bone fractures include; x-ray machine, computed tomography scanner and magnetic resonance imaging machine.[9-10] A traction is an instrument used for the treatment of fractured bone, with a unique design such that bone fragments are held together in place.[10]

The rareness of published data on bone fractures among patients seen at the General Hospital in Abraka, Nigeria is the reason for this inquiry. Findings from this scrutiny will interest the orthopeadic surgeons, radiologists and epidemiologists

Materials and Methods

A retrospective research scheme through a duration of four years (January 1st, 2017- December 31st, 2020) was involved in this scrutiny and purposive selection of the sample was done. Study sample comprised 244 patients (221 males and 223 females). Ethical authorization was permitted by the Research/Ethics Committee in Anatomy Department, Delta State University, Abraka. Data was gotten from the case files and medical registers

of the radiology unit in the General Hospital, Abraka. Specifics of patients such as age, gender, bone fractured and causation of bone fracture were retrieved and jotted down. Statistical Package of the Social Sciences version 23 was utilized in data analysis. Results were arranged in tables and chi-square was applied in assessing association between age and the bone fractured as well as causation.

Results

Individuals in the age gap of 21-30years (27.0%) were often affected by bone fractures as displayed in figure 1. The females were more commonly affected by bone fractures compared to the males as exposed in figure 2. Regarding the occupation of the considered populace, majority (51.2%) were students as disclosed in figure 3. Concerning the ethnic clusters among the scrutinized masses, majority (52%) were Urhobos (figure 4).

With reference to the bones fractured, the femur (25.0%) was often fractured as revealed in table 1. Enquiry of side of fracture disclosed that the left side is frequently affected with 122 (50%) cases as seen in table 2. As regards the cause of fracture, maximum number of cases (95 [38.9%]) were due to trauma as illustrated in table 3.

Chi-square test of association concerning age and the bone fractured exposed a remarkable relationship (p=.001) as shown in table 4. A notable association (p=.001) was observed with chi-square test of association between age and cause of fracture as shown in table 5. Table 6 displayed an insignificant result with chi-square test of association between gender and bone fractured (p= .808). Table 7 disclosed an inconsequential relationship (p= .092) following chi-square test of association between gender and cause of fracture. Table 8 indicated chi-square test of association between cause of fracture and bone fractured with a significant relationship (p=.001) logged. Chi-square test of association between occupation and cause of fracture disclosed a remarkable relationship (p=.004) as seen in table 10.

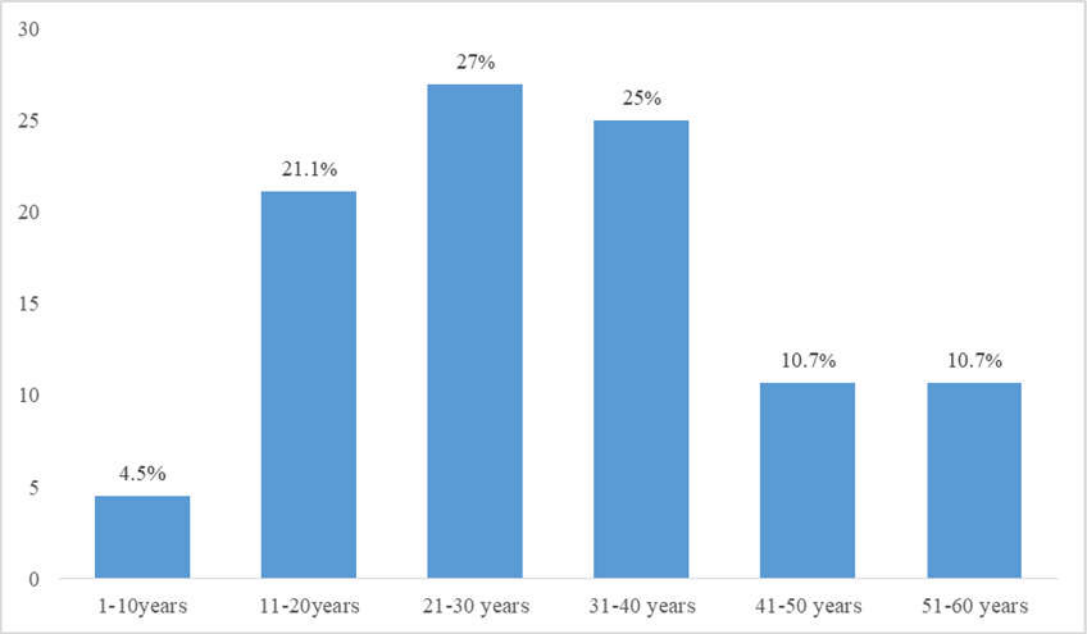

Figure 1: Age distribution in the considered population.

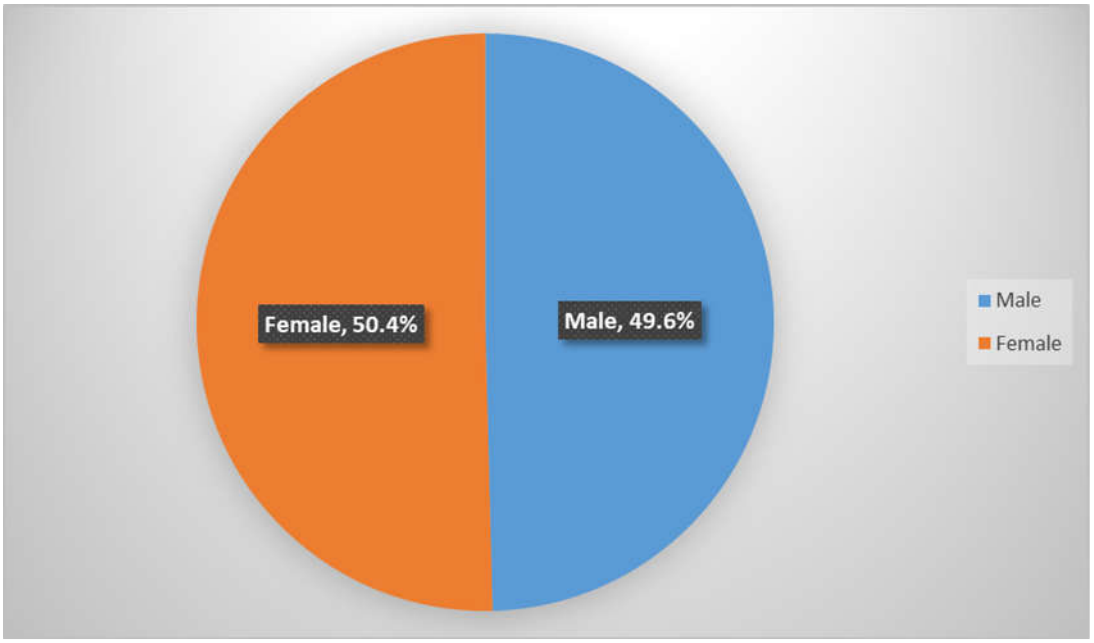

Figure 2: Gender distribution in the sampled population.

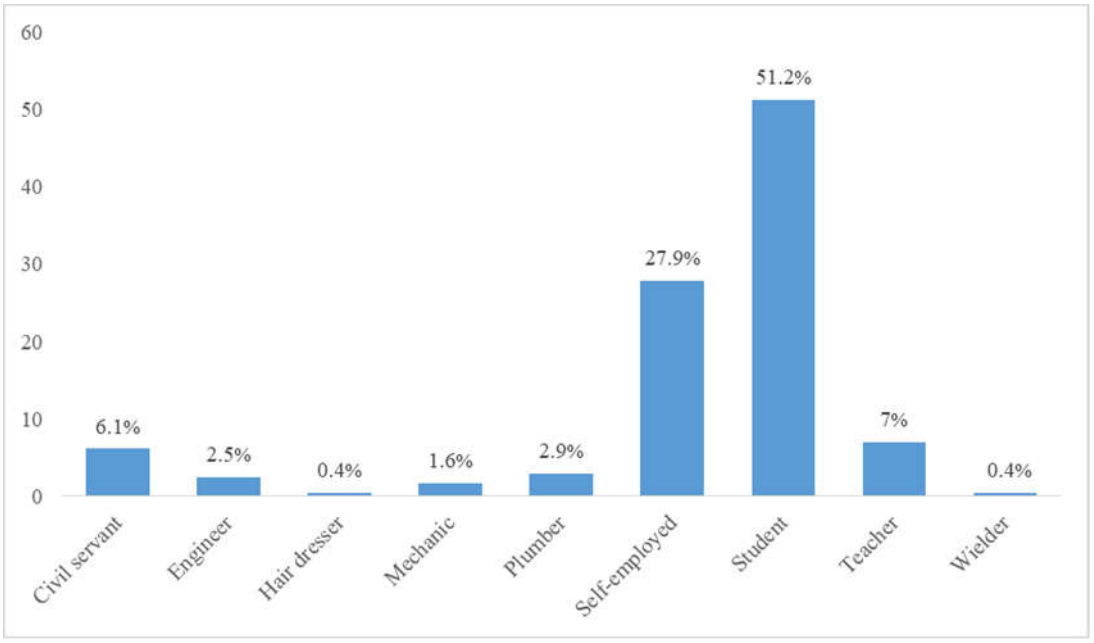

Figure 3: Distribution of occupation in the reviewed population.

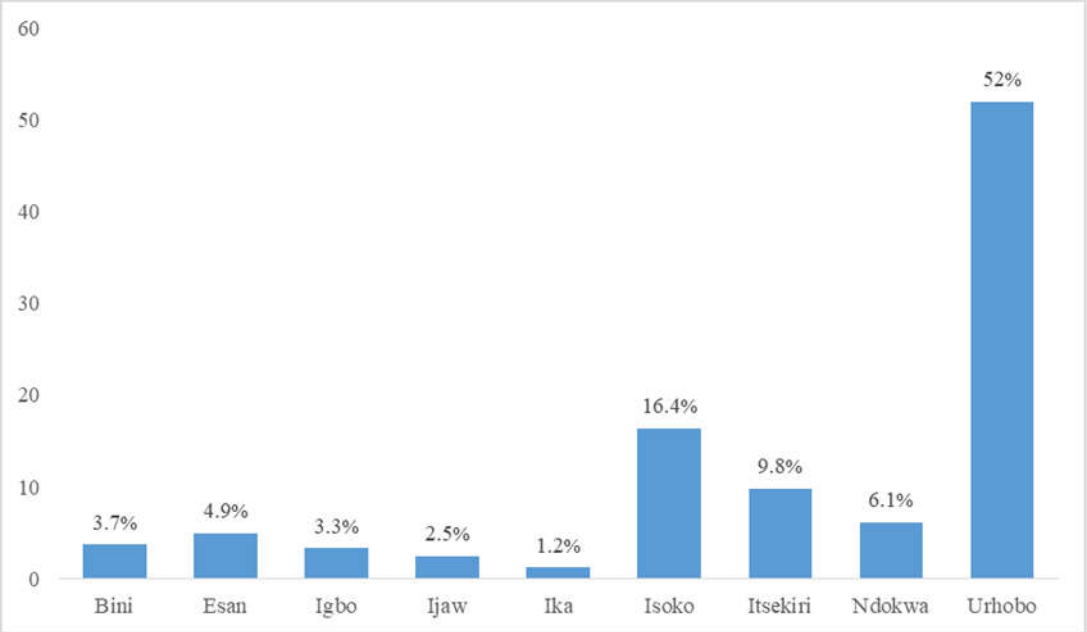

Figure 4: Distribution of ethnic groups in the studied sample.

Table 1: Distribution of bones fractured among the evaluated populace.

Bones fractured	Frequency (%)
Femur	61 (25.0)
Fibula	9 (3.7)
Hip bone	11 (4.5)
Humerus	30 (12.3)
Patella	2 (0.8)
Phalanges	7 (2.9)
Radius	53 (21.7)
Ribs	28 (11.5)
Ribs and humerus	10 (4.1)
Scaphoid	6 (2.5)
Skull	5 (2.0)
Tibia	9 (3.7)
Ulna	13 (5.3)
Total	244 (100.0)

Table 2: Distribution of side of fracture among the studied populace.

Side of fracture	Frequency (%)
Left	122 (50.0)
Right	101 (41.4)
Right and left	21 (8.6)
Total	215 (100.0)

Table 3: Distribution of cause of fracture among the assessed subjects.

Causes of fracture	Frequency (%)
Fall	86 (35.2)
Road traffic accident	63 (25.8)
Trauma	95 (38.9)
Total	244 (100.0)

Table 4: Chi-square test of association between age and bone fractured

Bones fractured	1-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	Chi-square	df	p-value
Femur	11 (4.5)	12 (4.9)	9 (3.7)	24 (9.8)	-	5 (2.0)	405.269	60	**.001**
Fibula	-	-	9 (3.7)	-	-	-			
Hip bone	-	-	-	6 (2.5)	2 (0.8)	3 (1.2)			
Humerus	-	23 (9.4)	-	-	-	7 (2.9)			
Patella	-	-	-	-	2 (0.8)	-			
Phalanges	-	-	-	7 (2.9)	-	-			
Radius	-	-	21 (8.6)	24 (9.8)	8 (3.3)	-			
Ribs	-	19 (7.8)	1 (0.4)	-	8 (3.3)	-			
Ribs and humerus	-	-	10 (4.1)	-	-	-			
Scaphoid	-	-	-	-	1 (0.4)	5 (2.0)			
Skull	-	-	-	-	5 (2.0)	-			
Tibia	-	-	7 (2.9)	-	-	2 (0.8)			
Ulna	-	-	9 (3.7)	-	-	4 (1.6)			
Total	11 (4.5)	54 (22.1)	66 (27.0)	61 (25.0)	26 (10.7)	26 (10.7)			

Table 5: Chi-square test of association between age and cause of fracture

Age group (years)	Fall	Road traffic accident	Trauma	Chi-square	df	p-value
1-10	1 (0.4)	1 (0.4)	9 (3.7)	137.112	10	**.001**
11-20	24 (9.8)	-	30 (12.3)			
21-30	36 (14.8)	30 (12.3)	-			
31-40	18 (7.4)	10 (4.1)	33 (13.5)			
41-50	-	3 (1.2)	23 (9.4)			
51-60	7 (2.9)	19 (7.8)	-			
Total	86 (35.2)	63 (25.8)	95 (38.9)			

Table 6: Chi-square test of association between gender and bone fractured

Bones fractured	Male	Female	Chi-square	df	p-value
Femur	29 (11.9)	32 (13.1)	7.707	12	.808
Fibula	3 (1.2)	6 (2.5)			
Hip bone	4 (1.6)	7 (2.9)			
Humerus	13 (5.3)	17 (7.0)			
Patella	1 (0.4)	1 (0.4)			
Phalanges	4 (1.6)	3 (1.2)			
Radius	32 (13.1)	21 (8.6)			
Ribs	13 (5.3)	15 (6.1)			
Ribs and humerus	7 (2.9)	3 (1.2)			
Scaphoid	2 (0.8)	4 (1.6)			
Skull	2 (0.8)	3 (1.2)			
Tibia	5 (2.0)	4 (1.6)			
Ulna	6 (2.5)	7 (2.9)			
Total	121 (49.6)	123 (50.4)			

Table 7: Chi-square test of association between gender and cause of fracture

Gender	Fall	Road traffic accident	Trauma	Chi-square	df	p-value
Male	36 (14.8)	33 (13.5)	40 (16.4)	4.774	2	.092
Female	50 (20.5)	30 (12.3)	55 (22.5)			
Total	86 (35.2)	63 (25.8	95 (38.9)			

Table 8: Chi-square test of association between cause of fracture and bone fractured

Bones fractured	Fall	Road traffic accident	Trauma	Chi-square	df	p-value
Femur	8 (3.3)	23 (9.4)	30 (12.3)	159.289	24	.001
Fibula	-	9 (3.7)	-			
Hip bone	6 (2.5)	5 (2.0)	-			
Humerus	5 (2.0)	7 (2.9)	18 (7.4)			
Patella	-	-	2 (0.8)			
Phalanges	5 (2.0)	2 (0.8)	-			
Radius	21 (8.6)	-	32 (13.1)			
Ribs	20 (8.2)	-	8 (3.3)			
Ribs and humerus	-	10 (4.1)	-			
Scaphoid	5 (2.0)	-	1 (0.4)			
Skull	-	1(0.4)	4 (1.6)			
Tibia	5 (2.0)	4 (1.6)	-			
Ulna	11 (4.5)	2 (0.8)	-			
Total	86 (35.2)	63 (25.8	95 (38.9)			

Table 9: Association between occupation and bone fractured

Bones fractured	Civil Servant	Engineer	Hair dresser	Mechanic	Plumber	Self-employed	Student	Teacher	Welder	Chi-square	df	p-value
Femur	3 (1.2)	-	1 (0.4)	-	1 (0.4)	13 (5.3)	40 (16.4)	3 (1.2)	-			
Fibula	-	-	-	-	1 (0.4)	2 (0.8)	5 (2.0)	1 (0.4)	-	84.181	96	0.800
Hip bone	1 (0.4)	-	-	-	-	4 (1.6)	5 (2.0)	1 (0.4)	-			
Humerus	1 (0.4)	-	-	-	-	7 (2.9)	21 (8.6)	1 (0.4)	-			
Patella	-	-	-	-	-	1 (0.4)	1 (0.4)	-	-			
Phalanges	-	-	-	-	-	2 (0.8)	4 (1.6)	1 (0.4)	-			
Radius	3 (1.2)	3 (1.2)	-	3 (1.2)	3 (1.2)	20 (8.2)	16 (6.6)	4 (1.6)	1 (0.4)			
Ribs	2 (0.8)	2 (0.8)	-	1 (0.4)	1 (0.4)	8 (3.3)	14 (5.7)	-	-			
Ribs and humerus	2 (0.8)	-	-	-	-	1 (0.4)	7 (2.9)	-	-			
Scaphoid	1 (0.4)	-	-	-	-	2 (0.8)	1 (0.4)	2 (0.8)	-			
Skull	-	1 (0.4)	-	-	-	1 (0.4)	3 (1.2)	-	-			
Tibia	-	-	-	-	-	2 (0.8)	4 (1.6)	3 (1.2)	-			
Ulna	2 (0.8)	-	-	-	1 (0.4)	5 (2.0)	4 (0.8)	1 (0.4)	-			
Total	15 (6.1)	6 (2.5)	1 (0.4)	4 (0.8)	7 (2.9)	68 (27.9	125 (51.2)	17 (7.0)	1 (0.4)			

Table 10: Chi-square test of association between occupation and cause of fracture

Occupation	**Fall**	**Road traffic accident**	**Trauma**	**Chi-square**	**df**	**p-value**
Civil servant	6 (2.5)	7 (2.9)	2 (0.8)	34.618	16	.004
Engineer	-	-	6 (2.5)			
Hair dresser	-	-	1 (0.4)			
Mechanic	4 (1.6)	-	-			
Plumber	5 (2.0)	1 (0.4)	1(0.4)			
Self-employed	21 (8.6)	22 (9.0)	25 (10.2)			
Student	41 (16.8)	29 (11.9)	55 (22.5)			
Teacher	9 (3.7)	4 (1.6)	4 (1.6)			
Wielder	-	-	1(0.4)			
Total	86 (35.2)	63 (25.8	95 (38.9)			

Discussion

The outcome of this inquiry highlighted that the femur is the most frequently fractured bone and this upshot was comparable to that recorded by Anibor *et al*., Igho *et al*., and Mabueze *et al*.[13, 14, 15] Inconsistency exist between this scrutiny and that of Adoga and Ozilo since they stated that the skull is often fractured.[16] Admasie *et al*., and Tyebkham, showed that the humerus is the most likely bone to fracture. [8, 17]

Discoveries from this inquisition divulged that females were more often affected by bone fractures when compared to males. This enquiry is not in agreement with that of Khanbhai and Lutomia, Kadkhodaie, Igho *et al*., and Taiwo *et al*., as they noted that the male gender had a higher predisposition to bone fracture than the female.[4, 6, 14, 18] The thinking is that males carry out manual labour (construction, driving of vehicles, motorcycle riding etc.) and are thus predisposed to road traffic accidents.[4]

This inquest noted that the 21-30years age set was more susceptible to bone fracture. This synchronized with the conclusions of Khanbhai and Lutomia, Kadkhodaie, Igho *et al*., and Taiwo *et al*., who disclosed that individuals within the 3rd and 4th decade have huge susceptibility to fracture.[4, 6, 14, 18] This assessment did not display similarity with reviews done by Okoro and Ohaduga, Mubashir *et al*., who portrayed road traffic accident as the leading cause of fracture due to poor roads, defiant road users and traffic congestion.[19, 20]

Furthermore, from this evaluation the association concerning age and the bone fractured exposed a remarkable relationship (p=.001). Kaewpornsawan *et al*., also indicated that age and types of fracture have a significant association with p=.021.[7] Mabuweze *et al*., concluded that age has a trivial association with classes of fracture with a p-value of .051.[3] Kadkhodaie and Taiwo *et al*., exemplified age and class of fracture in significant association with p values of .025 and .005 correspondingly.[6, 18]

The inquiries appraised above had similarities and dissimilarities which may be due to environment, legislature, age, occupation and methodology. The limitation faced in this scrutiny is the self-declared age and occupation claimed by each subject as no birth record was viewed.

Conclusion

Bone fractures affect the female gender more often than the male and the most prevalent cause is trauma. The age range of 21-30 years is more predisposed to bone fracture and the femur is frequently fractured.

References

1. Duckworth T, Blundel C. M Lecture notes on Orthopaedics and Fractures. (3rd ed.). Blackwell Science, Oxford. 2010; 25-48.

2. Okoro IO, Obadugha CO. The pattern of fractures and Dislocations among Accident Victims in Owerri, Nigeria. *Nigeria Journal of Surgical Resources*. 2006; 8(1-2): 54-6.

3. Mabuweze CC, Chukwu COO, Omoke NI, Oyakhilome OP, Ozo C. Road Traffic Injuries seen in a Nigerian Teaching Hospital. *Journal of International Orthopaedics*. 2011; 11(17): 2.

4. Khanbhai M, Lutomia MBL. Motorcycle Accident injuries seen at Kakamega Provincial Hospital in Kenya. *East and Central Africa Journal of Surgery*. 2012; 17(1): 43-6.

5. Kunkler CE. Fractures in Maher AB, Salmond SW, Pellino TA. (Eds) Orthopaedic Nursing. Third edition Saunders, Philadelphia PA. 2002; 609-49.

6. Kadkhodaie MH. Three-year review of facial fractures at a teaching hospital in Northern Iran. *Journal of Oral and Maxillofacial Surgery*. 2006; 44(3): 229-331.

7. Kaewpornsawan K, Sukvanich P, Tujinda H, Eamsobhanna P. Prevalence and patterns of fractures in children. *Journal of Medical Association*. 2014; 97(9): 116-20.

8. Admasie D, Tekle YY, Wahisho BL. Radiological and Clinical Details of Major Adult Limb Fractures in a Teaching Hospital, Aall, Ethiopia. *East and Central Africa Journal*. 2009; 14(1): 88-7.

9. Olaitan OL. Fractures: Pattern of incidence! Causative factors and treatment at Olives Hospital, Ibadan, Nigeria. Health and Fitness. *International Journal of Research*. 2003; 4(1-2): 8-20.

10. Victoria A. Diagnosis and treatment of bone fractures. Better Health Channel.

11. Mock C, Cherian MN. The global burden of musculoskeletal injuries: Challenges and solutions. *Clin Orthop Relat Res*. 2008; 466: 2306-16

12. Beveridge M, Howard A. The burden of orthopaedic diseases in developing countries. *J Bone Joint Surg*. 2008; 86: 1819-22

13. Anibor E, Obaroefe M, Shagamu JE. A radiographic survey of bone fractures at Celian Clinic, Ughelli in Delta State, Nigeria. *GSC Advanced Research and Reviews*. 2021; 07(01): 117–22.

14. Igho EO, Isaac AO, Eronimoh OO. Road Traffic Accidents and Bone Fractures in Ughelli, Nigeria. *Journal of Dental and Medical Sciences*. 2015; 14(4): 21-5.

15. Mabuweze CC, Chukwu COO, Omoke NI, Oyakhilome OP, Ozo C. Road Traffic Injuries seen in a Nigerian Teaching Hospital. *Journal of International Orthopaedics*. 2011; 11: 17(2).

16. Adoga AA, Oziolo KN. The Epidemiology and type of injuries seen at the Accident and Emergency unit of Nigerian Referral Centre. *Journal of Emergency and Trauma Shock*. 2014; 7(2): 77-82.

17. Tyebkham G. Declaration of Helsinkin. The Ethical comerstone of Human Clinical Research. *India Journal of Dermatology, Venereology and Leprology*. 2003; 69: 245-7.

18. Taiwo, AO, Soyele OO, Godwin, Ibinkule AA. Facial fracture Management in Northwest Nigeria. *Journal of Surgical Technology Case*. 2013; 5(2): 65-71.

19. Okoro IO, Obadugha CO. The pattern of fractures and Dislocations among Accident Victims in Owerri, Nigeria. *Nigeria Journal of Surgical Resources*. 2006; 8(1-2): 54-6.

20. Mubashir A, Tahir MT, Syed AA, Waseem AM, Nasra B. Non-fata Limb injuries in motorbike accidents. *Journal of the College of Physicians and Surgeons Pakistan*. 2008; 18(10): 635-8.