

Audit of Paediatric Orthopaedic Surgical Admissions in A Tertiary Health Centre in Enugu, Nigeria.

Okenwa Wilfred O, Edeh Anthony J.

Department of surgery, ESUT Teaching Hospital Enugu Nigeria.

Corresponding Author: Okenwa Wilfred O

Abstract: Musculoskeletal pathologies in children are many, and they affect lives as well as overall development of children. These pathologies can be amenable to medical and surgical interventions and may be prevented. Assessing and documenting the musculoskeletal pathologies in children leading to admission in a tertiary hospital is the focus of this study. It is intended that this study and documentation will be useful in providing new information concerning the treatment approaches in order to promote the health of those affected and improve health services.

Medical records of children 16years and under that were admitted into the pediatricorthopedic ward of ESUT Teaching Hospital, Enugu were used for the study. Data related to age, sexof the children, diagnosis and etiology of the pathology were collected onto a spread sheet and subsequently analyzed.

A total of 321 children were admitted into the Pediatricorthopedic ward during the study period. 9(2.8%) patients signed against medical advice(SAMA) while 312(97.2%) received treatment. Trauma related pathology n-195(62.5%) was the commonest indication for admission. This was followed by pathologies of infective origin n-93(30.0%). More males than females were admitted in a ratio of 1:5:1.

Trauma is the leading cause of admission into the pediatricorthopedic ward and affects males more than females. Attention towards reduction of injuries will go a long way in promoting child care and survival. Enormous economic benefit could be derived from this effort as healthy children will growinto healthy productive adults.

Key words: Musculoskeletal pathology, PediatricOrthopedics, trauma, Tertiary Hospital.

Date of Submission: 20-04-2019

Date of acceptance: 04-05-2019

I. Introduction

Diseases of the musculoskeletal system fall into some distinct categories: orthopedics, traumatology and rheumatology, and there is frequent overlap between specialties.

Orthopedic derived from the Greeks is composed of two words ‘orthospais’ meaning ‘straight child’. Orthopedics today is concerned with disorders of bones, joints, muscles, tendons and nerves in children and adults. Pathologies or affectations of the musculoskeletal system have been reported to be a common cause of significant long term pain and physical disability to millions of people around the world and culminate in enormous economic and social impacts on individuals, society and the national health system.^{1,2,3} These musculoskeletal pathologies affect people across all ages and comprise a wide spectrum of conditions that include traumatic bone conditions, congenital andacquired bone diseases, arthritis, joint derangements, as well as soft tissue and nerve diseases. As common as musculoskeletal disorders are in both children and adults most of the available literature concerning these medical conditions tend to discuss the involvement of adults with relatively little attention being paid to musculoskeletal disorders or pathologies in children². It cannot be over emphasized, that identifying musculoskeletal pathologies in children early and treating such pathologies at the right time will be very necessary in ameliorating thechronic discomfort and or debilitating complications that may arise later in life. Indeed, musculoskeletal conditions, injuries, and deformities are known to deprive children of normal development⁴.

Though there is little specific epidemiological data in developing countries about the exact burden of musculoskeletal diseases, some authors believe that the disease burden is on the increase⁵.

In view of this anticipated increase in musculoskeletal disease burden and paucity of data in the developing world, thisstudy was embarked upon because majority of reports on musculoskeletal disorders available have been on adults. Children are not small adults but a distinct group with specific characteristics that require appropriate attention. Documentation of pediatricorthopedic surgical conditions will be invaluable in long term health careplan, development of pediatricorthopedic sub-specialty, as well as improveorthopedic health services for children. Evaluationof hospital admission data as it concerns children with musculoskeletal

pathologies will be a helpful tool in building the body of knowledge and data in this area and, eventually contributing to the clinical care of any child who needs orthopedic treatment.

II. Methods

The study was a hospital based retrospective audit of children with musculoskeletal pathologies that were admitted into the orthopedic surgery ward of the hospital. The medical records of the children 16 years and below that were admitted were retrieved and data related to the age, sex, diagnosis and the cause of the pathology extracted onto a spread sheet designed for the purpose. Theatre register, ward admission register and emergency room register were also used for data collection and validation.

The data was subsequently analyzed using simple statistical methods to determine percentages and mean. Outcome of the analysis were organized and presented as tables and charts. Study period covered July 2015 to June 2018

III. Result

Our study revealed admission of 321 patients out of which 9(2.8%) patients declined treatment and signed against medical advice (SAMA), while 312 (97.2%) stayed on the ward for medical treatment. Males' n-189 (60.6%) were in majority than females n-123 (39.4%) giving male, female ratio 1.5:1. The mean age of patients was 7.8 years \pm 1.3 years.

Table 1, show that the age group 9-12 years n-108(34.7%) had the highest admission rate. This was followed by the under 4 year's age group that recorded n-72(23.0%) while the 5-8 years and 13-16 years age groups had involvement of n-66(21.1%) patients each. Overall, more males n-189(60.6%) were involved than females with n-123(39.4%). Across the age groups, more males than females were admitted.

Table 2, musculoskeletal pathologies due to trauma n-195(62.5%) constituted the commonest indication for admission. Infective pathologies affecting the bones, joints and muscles gave rise to the second highest n-93(30.0%) reason for admission. Tumors n-3(0.9%) was the least indication for admission. The tumors all turned out to be osteogenic sarcoma after histological diagnosis.

Musculoskeletal pathologies due to trauma were caused by various mechanisms as depicted in **table 3**. Fall from height n-79(40.5%) was the commonest cause of trauma in children. That was followed by road traffic accident related injuries n-49(25.1%). Sports related injuries n-30(15.4%) and domestic violence n-25(12.8%) were the 3rd and 4th commonest causes of trauma respectively. More than three quarters of victims of domestic violence were females. Assault was the least mechanism of injury in our study affecting 12(6.1%) of the children admitted due to trauma.

Out of 189 patients admitted due to trauma, 139(73.5%) had fracture of one bone or another. The remaining 50(26.5%) had soft tissue injuries ranging from abrasion, lacerations, avulsion injuries, compartment syndrome, and joint dislocations.

Figure 1 shows that the femur n-34(24%) was the bone most fractured, and Radius n-30(22%) and Tibia n-26(19%) were the 2nd and 3rd most fractured bones. Majority of the fractures n-131(97.1%) were closed fractures while only n-4(2.9%) were open fractures. The tibia was involved in 3 of the open fractures and the radius was involved in a case. Cervical spine n-1(1%) was the least involved. The child dived into a shallow stream and landed on the river bed on his head leading to the cervical spine injury and resultant quadriplegia.

Table 4, shows that chronic osteomyelitis n-54(58.1%) constituted commonest indication for admission due to infective process. The humerus n-24(25.8%) was the bone most commonly affected by osteomyelitis, followed by the tibia n-21(22.6%). Further analyses showed that 61(65.6%) patients who had infective musculoskeletal pathology were referred by the pediatricians, 24(25.8%) by pediatric surgeons and 8(8.6%) were referred by the general practitioners from peripheral hospitals. Most of the patients had been receiving treatment for 7 days or more in the pediatrics medical unit before being referred to the orthopedic unit.

Most of the closed fractures n-131(97.0%) were managed conservatively by manipulation under anesthesia and plaster of Paris/fiber glass casting and by skin traction. The other 4(3.0%) needed

Surgical intervention after failed conservative management. The open fractures were debrided, manipulated and put in a cast with a window for dressing and cast completed after the wounds healed.

Cases of septic arthritis, chronic osteomyelitis and cellulitis /pyomyositis had surgical intervention to drain pus and remove dead bone and had antibiotics cover. Chronic osteomyelitis cases are still being followed up in the out patient clinic. Cases of developmental anomaly like genu valgus, and genu varus, had corrective osteotomy with plaster of Paris casting to maintain correction until healing took place. Compartment syndrome was managed mainly by limb elevation and strict monitoring but one case needed fasciotomy. The cases of osteogenic sarcoma had ablation of the limb and chemotherapy subsequently. They were later lost to follow up.

Table 1: Age distribution of patients

Age groups (yrs.)	Male	Female	Total
0-4	36(11.5%)	36(11.5%)	72(23.0%)
5-8	45(14.4%)	21(6.7%)	66(21.1%)
9-12	66(21.1%)	42(13.6%)	108(34.7%)
13-16	42(13.5%)	24(7.7%)	66(21.2%)
Total	189(60.6%)	123(32.4%)	312(100%)

Table 2: Distribution of Orthopaedic Pathologies

Pathology	Number	Percent
Trauma	195	62.5
Congenital Anomaly	9	2.8
Developmental Anomaly	6	1.9
Infection	93	30.0
Tumor	3	.9
Metabolic Bone Disease	6	1.9
Total	312	100.0

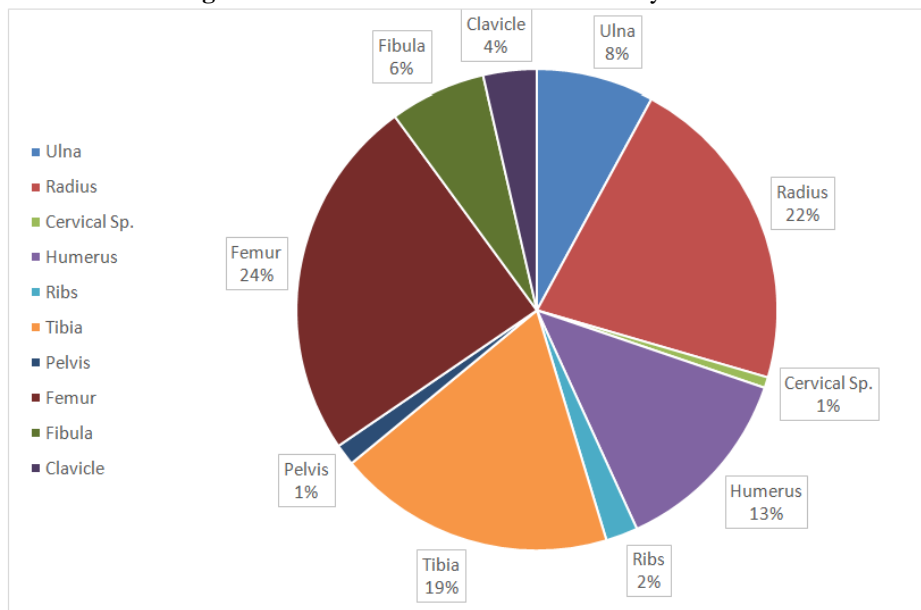
Table 3: Aetiology of Trauma in Children

Aetiology	Male	Female	Total
Fall from Height	47 (24.1%)	32 (16.4%)	79 (40.5%)
Assault	9 (4.6%)	3 (1.5%)	12 (6.1%)
Domestic violence	6 (3.1%)	19 (9.7%)	25 (12.8%)
RTA	26 (13.3%)	23 (11.8%)	49 (25.1%)
Sports	18 (9.2%)	12 (6.2%)	30 (15.4%)
Total	106 (54.3%)	89 (45.6%)	195 (99.9%)

Table 4: Distribution of infective pathologies

Pathology	Number	Percent
Cellulitis/Pyomyositis	24	25.8
Septic Arthritis		
Knee	6	6.4
Hip	9	9.7
Chronic Osteomyelitis		
Humerus	24	25.8
Tibia	21	22.6
Femur	9	9.7
Total	83	100.0

Figure 1: Distribution of Bones Fractured by Trauma.



IV. Discussion

Our study has been able to establish the spectrum of common musculoskeletal pathologies that affect children who present in one of the teaching hospitals in a developing country, Nigeria. The findings in this study give a reasonably good idea of the array of musculoskeletal pathologies to expect in a pediatric orthopedic service in our environment.

The two most common pathologies in our study were injuries and infective surgical conditions. That finding is similar to the study of Olasinde et al in Owo, Ondo State of Western Nigeria where injuries and surgical infections were the commonest diagnostic categories⁶. Makasa and Munthali working in Lusaka, Zambia found congenital and non-congenital abnormalities to be the two commonest musculoskeletal pathologies in their study⁷. That injuries ranked top in our study may be due to increase in the number of motor vehicles in our environment coupled with poor road safety culture which, together predispose people to vehicular accidents both as passengers and pedestrians. The finding of injuries as the top indication for admission in our study, further lends credence to previous findings that injuries are largely becoming a significant public health challenge in sub-Saharan Africa^{8,9}.

Infections of surgical importance ranked second most common diagnosis needing pediatric orthopedic surgery admission and chronic osteomyelitis was the most common cause of the infective pathologies. Bicker in his work in the Gambia found infection of surgical importance to be the third most common diagnosis in his series, and also reported chronic osteomyelitis as the commonest surgical infection¹⁰.

Analysis of cause of injury in our study revealed that fall from height was commonest followed by road traffic accidents. Louise Rennie et al¹¹ and Lyons RA et al¹² also found fall from height and road traffic accidents to be the top two most common mechanism of injury to children in their reports.

Children in their naivety and adventurous nature may climb on to heights without taking the necessary safety precautions, fall from the height and sustain injuries that may need orthopedic surgery intervention.

Nganga et al¹³ working in Nairobi, Kenya established that the femur and radius were the bones with the top two burden of fractures at 33% and 23% respectively. This shares similarity with the finding of our study where femoral fractures accounted for 24% of all fractures and the radius accounting for 22% of the fractures noted, making femur and radius the two top most fractured bones in our study. The tibia, is the bone most commonly involved in open fractures due to the subcutaneous position of the bone. It has less muscle cover that can cushion the effect of trauma and therefore easily get exposed as soon as there is breach in the overlying skin.

It was observed that most of the children who had surgical infections passed through the pediatric medical service and were managed for a couple of days before being referred to the orthopedic surgery unit. This apparent delay in referral may have created the time line for acute osteomyelitis to progress to chronic osteomyelitis which is difficult to eradicate. The importance of any suspected case of acute osteomyelitis to be referred for early orthopedic evaluation, should be emphasized so that acute osteomyelitis do not progress to chronic osteomyelitis. We advocate a very high index of suspicion and a multidisciplinary approach to management of suspected acute osteomyelitis in children to reduce referral interval and prevent progression of disease. It is better that the child is cleared of osteomyelitis after orthopedic surgery review than be diagnosed to have osteomyelitis due to unnecessary delay. Chronic osteomyelitis

V. Conclusion

This review has shown the spectrum of pediatric musculoskeletal pathologies requiring admission and orthopedic intervention in a typical tertiary health institution in South East Nigeria. The success of any health service research must be measured by whether the result(s) produced can be used to good effect to promote health and improve health services¹⁴. Knowledge gained from this study is expected to be useful in provision of improved pediatric orthopedic surgical care in our hospital. Injury prevention and control should be paramount in setting up any effective pediatric orthopedic surgical health service.

Acute osteomyelitis that presented early should not for any reason be allowed to progress to chronic osteomyelitis. Progression of acute osteomyelitis to chronic osteomyelitis is not just burdensome to the child but a clear case of failure of medical treatment. Therefore the watch word should be early presentation, early diagnosis and early intervention. Osteomyelitis is better prevented because cure is a difficult task.

References

- [1]. Wolf A.D, Pflieger B. Burden of major musculoskeletal condition. Bulletin of the world health organization. 2003; 81(9):646-56.
- [2]. Gunz A C, Canizares M, Mackay C, Badly EM Magnitude of impact and health care use for musculoskeletal disorders in the pediatric: A population based study. BMC musculoskeletal Disorder. 2012; 13:98.
- [3]. Brooks P M. The burden of musculoskeletal disease – a global perspective. In. Rheumatol. 2006; 25(6): 778-781. Doi: 10.1007/s10067-0240-3.
- [4]. Weinstein Stuart L. 2000-2010: The bone and joint decade. Journal of bone and joint surgery 2000; 82: 1; 1-3.
- [5]. Dormans JP, Fisher R C, Pill SG. Orthopedics in the developing world: present and future concerns. Journal of American Academy of Orthopedic surgeons. 2001. 9:5; 289-296.

Audit of Paediatric Orthopaedic Surgical Admissions in A Tertiary Health Centre in Enugu, Nigeria.

- [6]. Olasinde A, Oluwaadiya K, Akinkuolie A, Oginni I. Pediatric Surgical admission in Western Nigeria. The internet journal of pediatrics and Neonatology. 2004;5:2.
- [7]. Makasn E, Munthali J. Patterns of musculoskeletal disorders seen in Zambian children. Medical Journal of Zambia. 2009; 36: (4): 171 – 177.
- [8]. Adesunkami Ark, Oginni LM, Oyelami AO, Badru OS. Epidemiology of childhood injury. J. Trauma. 1998;4 :(3) : 506 – 12.
- [9]. Simmons D. Accident in Malawi. Arch. Dis. Child. 1985; 60 :(1) 64 - 66 .
- [10]. Bickerlers, sanno- Daunda B. Epidemiology of pediatric surgical admissions to a government referral hospital in the Gambia Bulletin of WHO 2000, 78: (11) 1330 – 1336.
- [11]. Louise Rennie, Charles M. Count Brown, Jacquelin MQ, MOK, Thomas F. Beahie. The Epidemiology of fractures in children injury 2007; 38 (8): 913 – 922.<http://doi.org/10.1016/j.injury.2007.01.036>
- [12]. Lyons RA, Delahunty AM et al. Incidence of childhood fractures in affluent and deprived areas: a population based study. Br. Med j. 2000; 320 (T228): 149 – 154.
- [13]. Ng'an'a E, Mustiso VM, Mwangi J. pattern of long bone fractures in a pediatric population at Kenyatta National Hospital. EADJ.2017; 11: 54 – 60.
- [14]. Salmond G.C. New Problems – New Strategies: World Health, Jan 1980: page 15.
- [15]. Fleetcroft J P. The Musculoskeletal System. Churchill Livingstone.1983.

Okenwa Wilfred O. “Audit of Paediatric Orthopaedic Surgical Admissions in A Tertiary Health Centre in Enugu, Nigeria.” IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 05, 2019, pp 72-76.