# The Mode of Presentation and Treatment of Acute Osteomyelitis in Children in a New Nigerian Teaching Hospital

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## ABSTRACT

**Objective:** Complications seen in the out-patient clinic like chronic osteomyelitis, pathological fractures and limb length discrepancies especially in a 5year old girl with 5cm shorten right lower limb as a complication of untreated acute osteomyelitis stimulated this study. Objective is to find mode of presentation and treatment, reasons why a treatable and probably curable disease could lead devastating outcome and to make suggestions for prevention of such occurrence.

**Methods:** A five and half year retrospective study at a Nigerian teaching hospital. Medical records of paediatric aged group below 16 who were treated for acute osteomyelitis were retrieved. Extracted were: biodata, presenting complaints, interval between onset of symptoms and presentation, duration of parenteral antibiotic and oral antibiotic, results of blood and aspirate culture. The data were entered into a Microsoft Excel worksheet, exported and analyzed with SPSS.

**Results:** There were forty-eight documented cases of paediatric acute osteomyelitis during the study period but only 29 medical records were retrievable, 14 males and 15 females. Of the 22 patients in which interval between onset and presentation was documented, only 1 (4.5%) presented within 48 hours while 13(59.2%) presented after 7 days. Duration of intravenous antibiotics was documented in 19 patients out of which 10 (52.6%) had intravenous antibiotic between 2-4 days. Only 4 (13.8 %) of the 29 patients reported for follow-up.

**Conclusion:** The study revealed these following modes of presentations and treatment: late presentations of most of the patients, inadequate duration of intravenous and oral antibiotic and there was inadequate follow-up.

**Keywords**: Acute, Osteomyelitis, presentation, treatment

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## INTRODUCTION

Acute haematogenous osteomyelitis is a bacterial infection of bone, which occurs and diagnosed within two weeks of onset of symptoms most frequently in children (1, 2).

In children, osteomyelitis is usually acute and hematogenous, the metaphysis of long bones being the most common location (3). The organisms are deposited in the metaphysis which has a relatively slow flow, this allow the organisms to migrate out of the vessel walls (4). The metaphyseal region has few reticuloendothelial cells for phagocytosis this allows the circulating organisms to start the infection in the metaphysis (4). The diagnosis of acute haematogenous osteomyelitis is primarily clinical but laboratory and radiological investigations supplement the clinical findings (5).

A delay in the diagnosis of acute and subacute haematogenous in osteomyelitis in children can lead to potentially devastating morbidity (6). The severity and complications of the paediatric acute osteomyelitis seen at our orthopaedic out-patient clinic stimulated this retrospective study. Observed complications in the out-patient included chronic osteomyelitis, pathological fractures and significant limb length discrepancies. One of the complications was a 5 year old girl with 5 cm shorten right lower limb due to shortening of the right femur secondary to untreated acute osteomyelitis that became chronic osteomyelitis. This was the major stimulating reason why this retrospective study was done to find out mode of presentation and treatment of acute osteomyelitis in children in our local environment. Also to find out the possible reasons why a treatable and probably curable disease could lead to these devastating outcomes and to make recommendations for prevention of such occurrences.

## METHOD

This is a retrospective study at the Ekiti State University teaching Hospital Ado Ekiti between January 2011 to July 2016. Ekiti State University Teaching hospital is a new teaching hospital established in 2008, located in Ado- Ekiti, South-Western Nigeria. It is a tertiary referral center that cater for the medical needs of Ekiti state and it neighboring states. We retrieved the medical records of paediatric patients aged group below 16 years of age who were treated for acute osteomyelitis in the teaching hospital. We extracted the biodata, presenting complaints, interval between onset of symptoms and presentation at the hospital, treatment including visit to traditional bone setter, duration of parenteral antibiotic, pattern of temperature when the parental antibiotic was converted to oral, duration of oral antibiotic, results of blood and aspirate culture, and presence of co-morbidity.The data were entered into a Microsoft Excel worksheet, exported and analyzed with SPSS.

## RESULT

There were forty-eight documented cases of paediatric acute osteomyelitis during the study period but only 29 medical records were retrieved and studied.

There were 14 males and 15 females whose the ages ranged between 6 days and14 years. Three patients were treated by Traditional Bone Setter (TBS) before presentation , one of which actually spent 5 days at the center before presentation, duration for the other two not stated. Six of patients had severe septicemia, 4 of which presentation to the hospital was delayed (more than 7 days after onset of presentations)

Surgical decompression of subperiosteal/extraperiosteal abscess with cortical drilling was done for 15 patients, between 10 and 200 mls of pus were drained from patients.

Only 12 results of culture of aspirates were retrieved, and 9 (75%) yielded *Staphylococcus aureus*, one (8.3%) yielded *Proteus vulgaris* while two (16.6%) yielded no growth. Only 4 (3.8 %) of the 29 patients reported for out-patient clinic visits after discharge from the hospital.

## DISCUSSION

Forty–eight cases of paediatric acute osteomyelitis were identified but only 29 medical records could be located, showing that about 40% of the medical records could not be located. This shows poor record keeping that makes data collection and analysis difficult, making true reflection and incidence of disease difficult to be accurately documented.

The Male: Female ratio of the 29 studied patients were 14:15 showing almost equal male: female in this study compare with Bueno *etal* and Saavedra-Lazano *etal* that reported 52% and 62% male propondance (7, 8). The percentage of patients with acute osteomyelitis that were 10 years or below was 75.9 (Table 1) and the youngest patient was a 6 day old neonate with septicemia. This case of neonatal osteomyelitis is similar to case reported by Odetunde etal and Ernat etal who reported acute osetomyleitis in neonate that were 10 and 15 days old (9,10). Very high index of suspicion is required to make this diagnosis in this age group because there may not be any obvious constitutional symptoms like fever, our patient's temperature was normal throughout the presentation.

In this study, the major complaints at presentation were as follow: swelling (69%), fever (58.6%), pain at the site of infection (51.7%) as shown in Table 2, whereas Bueno *et al* reported

pain (94%), functional impairment (90%) and was (72%) fever (7 ). Saavedra-Lozano *et al* in their study reported localized pain (84%), fever (67%), and swelling (62%) as the major clinical complaints (8). Functional impairment/inability to use the limb was just mere 3.4% in our study and therefore should not be expected to be a major complaint in patients with acute osteomyelitis in our locality. In our environment acute osteomyelitis should be one of the major differentials in a child with localized swelling of the limb and fever.

Twenty-two patients (59.2%) of the studied 29 patients, presented for treatment after one week of onset of complaints as shown in Table 3. Noticeably three patients were taken to Traditional Bone Setter (TBS) before presenting in the hospital, one of which actually spent 5 days at the center before presentation in the Emergency Room. Scott *et al* studied 116 patients and found that patients who present early in the course of their disease may have no findings other than local tenderness and an elevated sedimentation rate and sixty-four of the patients were treated non-operatively (11). Only one (4.5%) of our patients presented within 48 hours thereby increases the chances of acute presentations progressing on to chronic osteomyelitis .

This delayed presentation, which is due to initial treatment at home, non-specialist hospitals and pre- hospital-visit to centers like TBS might have contributed to the almost invariable progression of acute osteomyelitis to chronic osteomyelitis and other severe complications of acute osteomyelitis in our environment. Seven of our studied patients were severely septicemic and they all presented late, the septicemia could be another contributory factor to the poor outcome and complications of acute osteomyelitis in our environment. Positively we noted that four out of the six patients that presented within 4 days of onset of symptoms were registered with National Health Insurance Scheme (NHIS). The fact the health insurance scheme covers the payment for services render to this group of patients might be the

reason for this early presentation. There will be a need to study and know if NHIS patients presents early to the hospital compared to non NHIS patients.

There were almost equal frequency of femur and tibia involvement in our study (as shown in Table 4) in contrast to other authors that have reported less common occurrence of acute osteomyelitis of femur in their studies ( 6,7,8).

We observed that 52.6% of the patients (n=19) with documentation of duration of intravenous antibiotic had the intravenous medication for a period between 1-4 days –Table 5. The study also shown in Table 6 that the duration of oral antibiotic was very short and less than the recommended duration of oral antibiotic administration. Scott *et al* in their study reported that the average antibiotic treatment time was 2 weeks by intravenous (i.v) administration followed by additional outpatient oral therapy for periods of up to 4 weeks (11). This treatment regimen applied specifically to acute osteomyelitis led to no known treatment failures (11)

The short duration of antibiotic both parenterally and orally could the contributory factors to the unfavourable outcome of the treatment of acute osteomyelitis in our environment. It is important to know that change for intravenous to oral antibiotic should only be commenced after vital signs especially the temperature become normal.

Another noticeable factor that could be contributory to the complications presentation at the out –patient clinic was the poor follow-up of all patients, only 4 (13.8 %) of the 29 patients reported for out-patient clinic visits after discharge from the hospital. Poverty was manifested in different ways, five patients left against medical advice (LAMA) because they could not afford medical bill, record shown also that some admitted patients were not able to pay for laboratory

tests especially microscopy culture and sensitivity and of samples. *Staphylococcus aureus* was the commonest cause of acute osteomyelitis as previously documented by other authors (5.6, 8).

## CONCLUSION

The study revealed these following modes of presentations and treatment: there were late presentations of most of the patients for medical care, some visited traditional bone setter for cure, antibiotic administration was inadequate as shown by short intravenous and oral antibiotic duration and there was inadequate follow-up of patients. Poverty manifested by refusal of admission because they could not afford hospital bill and inability to pay for laboratory investigations. These could be influencing factors that determine the fate of acute osteomyelitis is our environment

To minimize these complications, parents should be educated on early presentation, there should be fund set aside for poor patients, adequate period of intravenous and oral antibiotic should not be less than 6 weeks and good follow-up of patients with acute osteomyelitis should be done.

## AUTHORS' NOTE

J D Ogunlusi conceived the paper, supervised the data collection and analysis and also wrote the manuscript and approved the final manuscript. P K Brigs actively participated in data collection. M B Yusuf, S O Popoola and K S Oluwadiya were involved in the critical review of the manuscript and interpretation of the data results.

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Table 1: Age distribution (n=29)

| **Age Range (years)** | **Frequency (%)** |
|---|---|
| 0 – 5 | 12 (41.4) |
| 6 – 10 | 10 (34.5) |
| 11 – 15 | 7 (24.1) |
| Total | 29 (100) |

Table 2: Presenting Complaints (n=29)

| **Symptoms** | **Number** | **Percentage** |
|---|---|---|
| Swelling | 20 | 69.0 |
| Fever | 17 | 58.6 |
| Pain at the site of infection | 15 | 51.7 |
| Limping | 2 | 7.0 |
| Yellowness of the eyes | 2 | 7.0 |
| Breathlessness | 1 | 3.4 |
| Inability to use the limb | 1 | 3.4 |

Table 3: Interval between Onset and Presentation in the Hospital (n= 22)

| Days | Frequency (%) |
|---|---|
| 0 – 2 | 1 (4.5)* |
| 3 – 4 | 6 (27.3) |
| 5 – 6 | 2 (9.0) |
| 7 – 8 | 4(18.2) |
| 9 – 10 | -(0) |
| 11 – 12 | -(0) |
| 13 – 14 | 9 (41.0) |
| Total | 22 (100) |

*1 patient (4.5%) presented within 48 hours

Table 4: Showing sites of infections in documented twenty-nine patients (n=29)

| Sites | Number (%) |
|---|---|
| Femur | 13 (40.6) |
| Tibia | 14 (43.8) |
| Humerus | 2 (6.3) |
| Calcaneus | 2 (6.3) |
| Tarsal bones | 1 (3) |

There were 32 sites with three HbSS patients having bifocal infection sites

Table 5: Duration of intravenous antibiotics in documented nineteen patients (n=19)

| **Days** | **Numbers** |
|---|---|
| 2 | 1* |
| 3 | 2* |
| 4 | 7* |
| 5 | 0 |
| 6 | 1 |
| 7 | 4 |
| 8 | 2 |
| 12 | 1 |
| 25 | 1 |

*52.6% of the n 19 had intravenous antibiotic between 2-4 days

Table 6: Table 6: Duration of oral antibiotic stated in 9 patients

| Week(s) | Frequency |
|---|---|
| 1 | 3 |
| 2 | 2 |
| 3 | 1 |
| 4 | 2 |
| 5 | 1 |