



Research Article

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# Epidemiology and Pattern of Clubfoot in Enugu, South-East Nigeria

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## Abstract

**Background:** clubfoot is a musculoskeletal birth defect of the foot and ankle that affects a lot of children in the world which can pose ambulatory and activity challenges to affected individual when not treated.

**Aim:** To evaluate the epidemiology and pattern of clubfoot at Enugu, Southeast Nigeria.

**Study Design:** A retrospective epidemiological study.

**Methodology:** Ninety-six case notes of patients managed for clubfoot between January 2014 and December 2017. Simple statistical methods like frequency, percentage and mean were used for data presentation and analysis.

**Results:** Idiopathic clubfoot had highest prevalence of 92%, secondary clubfoot 6% and positional clubfoot 2%. Male gender had occurrence rate of 56% and female 44%. Bilateral clubfoot has greater dominance with a prevalence rate of 75% and unilateral clubfoot 25%. 16% responded to plaster cast application without requiring tenotomy, while 84% did not respond to plaster cast application, but required tenotomy. 10% had relapses after correction, while 90% did not have relapses after correction.

**Conclusion:** Clubfoot is a major birth defect in the study area and is more prevalent in male children and in most cases is bilateral, with idiopathic clubfoot dominance.

**Keywords:** Clubfoot; Epidemiology; Pattern; Prevalence; Enugu; South-east; Nigeria

## Introduction

Clubfoot has been defined as a condition in which a newborn's foot or feet appear to be rotated internally at the ankle [1]. It is a condition affecting the position of foot and ankle joint in such a way that when untreated, it can lead to physical impairment and difficulty in ambulation and functions [2]. Clubfoot is a congenital condition (present at birth) that causes a baby's foot to turn inward or downward. It can be mild or severe and occur in one or both feet. In babies who have clubfoot, the tendons (Achilles tendons) that connect their leg muscles to their heels are too short. These tight tendons cause the foot to twist out of shape giving rise to

clubfoot [3]. Clubfoot is one of the leading birth defects to children, which they do not outgrow when neglected not attended to [4]. Clubfoot has been investigated in some African countries and other parts of the world with emphasis on etiology and treatment. Clubfoot presents with soleus muscle atrophy, equinus of the ankle, cavus and adductus of the forefoot, Varus of the heel which can be unilateral or bilateral [4]. In most cases, clubfoot is discovered after the baby is born by physical assessment or visual inspection of the foot or an X-ray of the foot to confirm the position of the bones that make up the foot arch. It can also be discovered in utero during an



ultrasound, after which nothing can be done to correct until the child is born [5].

Clubfoot can be classified as: positional; resulting from in utero mal positioning, idiopathic; which is when it has no known cause or cannot be linked to any medical cause, secondary; which is when another disease or condition exposed the individual to clubfoot [6]. Some investigations suggest that a good number of adults battle with challenges of untreated/neglected clubfoot in developing countries, especially in some rural places where people do not know that it can be treated [7].

However, some reports had it the etiology of clubfoot cannot be substantiated [4], while some reported habits like smoking and young maternal age (< 23 years old) to have an associated cause [4,8,9]. Some studies maintained that bilateral clubfoot is more prevalent than unilateral clubfoot and some has it that clubfoot has male preponderance than female [7]. It is also widely believed that most clubfoot is idiopathic and present at birth and could be treated with Ponseti method or surgery.

## Materials and Methods

**Study Area:** The study is a retrospective study conducted at National Orthopaedic Hospital Enugu, Southeast Nigeria. The hospital is the major government Orthopaedic hospital in south-east region of the country and the catchment areas are mostly Enugu, Abakiliki, Nsukka, Afikpo, Okigwe, owerri and Awaka.

**Sample Population:** A total of 96 clubfoot patients who visited the hospital between January 2014 and December 2017 (4year period) were studied.

**Method of Sample Collection:** After a due clearance and permission was sort for and obtained from the Chief Medical Director, National Orthopaedic Hospital Enugu, case note of patients who had presented with clubfoot were retrieved from the medical records unit. Relevant information needed for the study like age, gender, feet involved, position of the affected foot and joint were extracted. Patients' privacy was also maintained during the study

and folders returned to the medical records after exploring relevant information.

**Inclusion Exclusion Criteria:** All patients who presented with clubfoot and were treated at the hospital using Ponseti method or/ and tenotomy within the period under review were included.

**Statistical Analysis:** simple statistical tools like frequency, percentage and mean were used to analyze the data collected.

## Results (Tables 1-6)

Table 1 shows the pattern of clubfoot reviewed in the study, with idiopathic clubfoot having highest prevalence of 92%, followed by secondary clubfoot (6%) and positional clubfoot being the least (2%).

Table 2 shows gender prevalence of clubfoot, with male preponderance of 56% and female 42%.

Table 3 shows unilateral/bilateral distribution of clubfoot in the study area. Bilateral clubfoot dominated with a prevalence rate of 75% and unilateral clubfoot 25%.

Table 4 shows age distribution of patients. Majority of the clubfoot patients presented to the hospital at the age range of 29-42 weeks (21.9%), followed by 57-70 weeks (16.7%), 43-56 weeks (14.6%), 71-84 weeks (11.5%), 15-28 weeks (10.4), 85-98 weeks (9.3%), > 112 weeks (7.2%), 0-4weeks (4.2%) and 99- 112 weeks (4.2%).

Table 5 shows the type treatment that was used to manage the cases presented. 84% responded to Ponseti method without requiring tenotomy, while 16% did not respond to plaster cast application and required tenotomy before correction was achieved.

Table 6 shows the cases that had relapses after correction. 10% had relapses after correction, while 90% did not have relapses after correction. From the 10% that had relapses, 7% were managed conservatively, while 3% benefited from surgery (tenotomy). 9% of the relapse cases were bilateral clubfoot patients, while 1% was unilateral clubfoot patient.

**Table 1:** Nature of Clubfoot.

Nature of Clubfoot	Frequency	Percentage (%)
Positional	2	2
Idiopathic	88	92
Secondary	6	6
Total	96	100

**Table 2:** Gender Distribution of Clubfoot.

Gender	Frequency	Percentage (%)
Male	54	56
Female	42	44
Total	96	100

**Table 3:** Unilateral/Bilateral Distribution of Clubfoot.

	Frequency	Percentage (%)
Unilateral clubfoot	24	25
Bilateral clubfoot	72	75
Total	96	100

**Table 4:** Age distribution of patients at the time of presentation.

Age of patients (days)	Frequency	Percentage (%)
0-14	4	4.2
15-28	10	10.4
29-42	21	21.9
43-56	14	14.6
57-70	16	16.7
71-84	11	11.5
85-98	9	9.3
99-112	4	4.2
>112	7	7.2
Total	96	100

**Table 5:** Mode of Treatment.

Mode of Treatment	Frequency	Percentage (%)
Ponseti method	81	84
Tenotomy	15	16
Total	96	100

**Table 6:** Relapses after Treatment.

	Frequency	Percentage (%)
Relapse	10	10
Non-relapse	86	90
Total	96	100

## Discussion

Idiopathic clubfoot dominated in the study with an occurrence rate of 92%, followed by secondary clubfoot 6%. Positional clubfoot had 2% which could be because the mothers did not go for CTscan during pregnancy or were not informed of the positioning of their babies before delivery. Study carried by Moorthi RN et al. [10] in 2005 reported idiopathic clubfoot as having the highest prevalence [10,11].

The male gender had 56% occurrences and female 44%. Many research studies done on clubfoot prevalence also reported male gender dominance [6,11-15]. Bilateral clubfoot had 75% occurrences and unilateral 25%. Mkandawire also reported high prevalence rate of bilateral clubfoot in Malawi, Africa in 2004 [16]. The result also showed that most clubfoot patients present to the hospital between the ages of 29-56 weeks (1-2 months), with the peak at 29-42 weeks (1-1.5 months) and could be perceived as the age when the clubfoot becomes obvious to the parents. The least

number of patients was recorded at the age range of 0-14 weeks and 99-112 weeks. 84% of the cases were corrected with plaster casting, while 16% benefited from tenotomy because casting alone couldn't correct them. There were non-relapse in 90% of the cases and 10% had relapses. 84% of the clubfeet studied were effectively treated with Ponseti method, which accounts for its dominance and acceptability for clubfoot treatment in the area and all over. The relapses recorded after treating the patients with Ponseti method can be as a result of very short achilles tendon that needs elongation or non-compliance of parents/care giver with Ponseti procedures.

## Conclusion

Clubfoot is a major birth defect in the study area and is more prevalent in male children and also affected both feet (bilateral clubfoot) in majority of the cases. Idiopathic clubfoot was seen to have greater dominance than positional and secondary clubfoot. Bilateral clubfoot was seen to have greater relapse tendency and should be given a more serious attention during treatment to avoid

relapses. The study also supports other studies that have opined that Ponseti method is an effective method of treating clubfoot conservatively because 84% of the total cases studied were effectively treated with ponseti method, with only 16% of the cases requiring surgery/further treatments.

### Ethical Approval

Not applicable

### Conflict of Interest

All the authors do not have possible conflict of interest in the study.

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