

# Prevalence And Management Protocol Of Clubfoot In Selected Hospitals In Four Regions In Tanzania

**John Oduor Ondiege**

MSc Candidate in Health Systems Management, Kenya  
Methodist University, Kenya, BSc Prosthetist and Orthotist,  
Tumaini University, Tanzania

**Winfred Mbula Nzioka**

MSc Candidate in Health Systems Management, Kenya  
Methodist University, Kenya, BA in Psychology, Egerton  
University, Kenya, Diploma in Nursing (KRCHN), Kenya

**Dr. Dennis Nyongesa Wamalwa, PhD**

Lecturer / Consultant; Ph.D., Department of Peace and  
Conflict Studies, Masinde Muliro University of Science and  
Technology, Kenya, MA Counselling Studies, The  
University of Manchester UK

*Abstract: Congenital Talipes Equino-varus (CTEV) for instance clubfoot, is a common congenital deformity of the feet present at birth. It affects both males and females. It can be unilateral or bilateral. The aetiology of Congenital Talipes Equino-Varus (CTEV) is largely idiopathic but also may be syndromic or acquired. It may be secondary to conditions like arthrogyrosis multiplex, osteogenesis imperfect, spina bifida which has neurological components and may be accompanied by scoliosis. In the last decade, the management has greatly been conservative. The study endeavoured to note the prevalence, after management protocol costs and to determine what data kept to inform planners in forward planning of management of this condition. The study adopted the retrospective hospital based cross sectional study design which involved going through the data in the five different hospitals to see if there is good and meaningful precise data. It was also geographical sampling for the purpose of regional balance. The findings revelled that the management protocol has not been consistent coupled with lack of proper data in unsupported hospitals compared to those with donor support. It was concluded that consistent data about patient demographics and clinical findings needed to be kept as part of hospital records as such information could be referenced to improve patient care and lobby instruments for donor support in Low- and Middle-income Countries.*

**Keywords: Congenital Talipes Equino-varus, prevalence, clubfoot, management**

## I. INTRODUCTION

The National Bureau of Statistics in Tanzania did a survey on the prevalence of disability in 2008 where the results were as follows in both Tanzania mainland and island: 7.8 percent of the population had some form of activity limitation. Prevalence is higher on the Mainland (7.8 percent) compared to Zanzibar (5.9 percent) and is also higher in rural areas (8.3 percent) than in urban areas (6.3 percent). There were no significant differences in disability prevalence among males and females. Prevalence among males was 7.7 percent compared to 7.8 percent for females. (NBS, 2008)

In order to empower these people with disabilities, the society must understand how to live and help these people, this will help to reduce dependency among them. This will increase the wide range of independency which will help them to earn a living and manage their own life in their societies or communities where they live. The independence is explained in P&O program guide (ISPO, 2006).

It is not only their disabilities which prevent them to achieve their full potential in the society or community but the disempowering, misunderstanding of the society is what often prevent them from fully participating in activities of daily living. Clubfoot is among these disabling conditions if not

managed early. Though the National Bureau of Statistics talks of high-level data available, detailed data about disability by condition is not available in Tanzania.

The thesis author has a position as the chief orthopedic technologist in Kenyatta National Hospital, Kenya and has an interest in management of CTEV. In East Africa, a significant presentation of CTEV in orthopedic clinics is seen. The author coordinated meetings with colleagues in East Africa during scientific forums and a common talk about management of CTEV came up. The author observed that CTEV when untreated leads to a significant burden of disability in Kenya and therefore selected this for study in Tanzania to learn more about the management of CTEV.

## II. LITERATURE REVIEW

### CONGENITAL TALIPES EQUINOVARUS AETIOLOGY

Congenital Talipes Equinovarus (CTEV) is commonly known as Club Foot Deformity, and is a heterogeneous deformity of the lower limbs acquired during pregnancy between the 14<sup>th</sup> and 18<sup>th</sup> week of foetal development (Ponseti, 1972)



Figure 1: Picture of Child with Clubfoot in Kijabe Hospital Kenya (2011)

It is a congenital deformity, characterized by rotation of the forefoot (adduction and supination), heel varus, equinus of the ankle and medial deviation of the feet forefoot adduction (Cook et al., 2008).

There are two types of CTEV, syndromic and idiopathic:

Syndromic CTEV occurs simultaneously to some neurological disorders such as athrigriposis or spina bifida (Pavone et al., 2012; Coke et al., 2008).

However, the most commonly seen type of CTEV is idiopathic where the deformity occurs in isolation due to lack of concrete epidemiological data, it is difficult to pinpoint the main causes of CTEV (Cooke et al., 2008; Abbas et al., 2008), however, researchers believe that during the foetal development, some factors adversely affect the development of muscles on the medial and posterior aspects of the lower limbs, causing them to become shorter than what is deemed normal (Penn, 2005; Morcuende, 2006). Its exact aetiology

remains speculative; however, some scientists believe that CTEV is caused by extrinsic pressure on the foetus in the uterus.



Figure 2: Child with syndromic clubfoot in Kijabe Kenya (2011)

Raised intra uterine pressure is believed to force the lower limbs of the foetus against the wall of the uterus causing the malformation. Dobbs et al, 2009.

## III. STATEMENT OF THE PROBLEM

Congenital Talipes Equino-Varus is estimated as the second most disabling condition if not treated. It has become very prevalent and management protocol is not well-understood.

The condition has increased burden in different communities where management of Congenital Talipes-Equino-varus (CTEV) has not reached hence increase in poverty level.

Therefore, there is a need to understand the prevalence and management protocol of clubfoot and determine the use of a common protocol in the management of clubfoot to avoid the consequences that come with untreated clubfoot see figure 4.



Figure 3: Picture of untreated club foot (Picture taken in Kijabe hospital Kenya in (2009)

PONSETI TECHNIQUE

V. RESULTS



Figure 4: Tenotomy Done in Minor in Theatre in Zanzibar (2014). J.O. Ondiege at the center in green leading the team

A large body of contemporary literature related to CTEV references conservative methods of treatment being the 'gold standard'. Historically, conservative methods were not always preferred. Invasive surgical methods were favored to correct the deformity using complex open release techniques to achieve correction and foot alignment (Cooke et al., 2008). However, over time the management strategies transitioned from surgical to non-operative techniques, as surgical methods were thought to pose high risk of secondary complications and risk of relapse (Yapp et al., 2012, Abbas et al., 2008).

IV. METHODOLOGY

CROSS SECTIONAL STUDY

This study adopted a cross sectional research design in the selected 5 hospitals in 4 regions in Tanzania i.e. Selian hospital in Arusha Northern region. Bugando in Lake region. Mbeya in Southern region. CCBRT and Mnazi Mmoja in coastal zone. by checking the records of clubfoot cases for the last 5 years. The hospitals were selected because they had previous history of Ponseti management and that they are consultant hospitals which deal with many referrals. The study population was all CTEV cases registered in the past 5 years (2010-2014), with most cases aged 2 years and below. Purposive sampling was used with bio data that included name, age, sex, physical address, phone number, side of the foot affected whether left or right or bilateral, whether new case or old case.

A check list was used to register data on all CTEV cases and their management protocol for the last five years. Both manual records and the data base records were used as tools of data collection. Data collected was sorted and analyzed through SPSS software. The bar graphs and charts were deduced. The tables also derived from this analysis and comparisons of different demographic patterns 'were inferred.

Ethical clearance was obtained from Faculty of Rehabilitation Medicine-KCMU College and presented to the directors of the said hospitals for permission to conduct the study.

A total of 3,806 children treated for Congenital Talipes-Equino-varus (CTEV) (clubfoot) from five hospitals. The distribution of children with CTEV according to hospital records is shown in Figure 1.

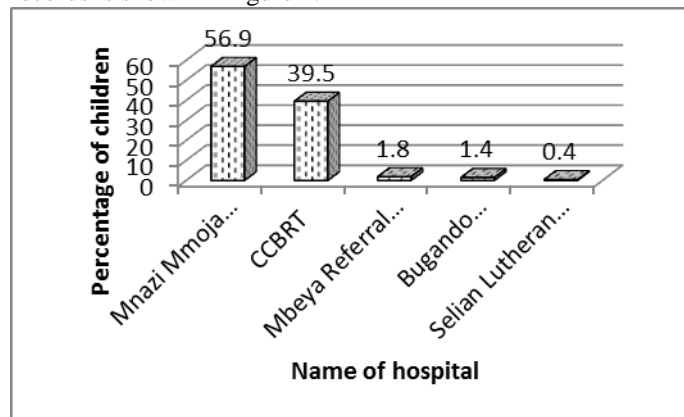


Figure 1: Distribution of children treated for clubfoot according to hospital records

Overall, records for sex were available for 3806 (99.9%) patients. Of these, male children with CTEV constituted the majority (53.1%). The female to male ratio was 1:1.1. Age of children treated for CTEV varied from 9 days to 60 months (5 years) with mean ( $\pm$ SD) of 10.7 ( $\pm$ 8.7) months. Majority of children were in the age group of more than 1 to 12 months (81.3%, n=3095) followed by 13-24 months (12.8%, n=486). Only 41 (1.1%) were in the age group of less than a month (Figure 2)

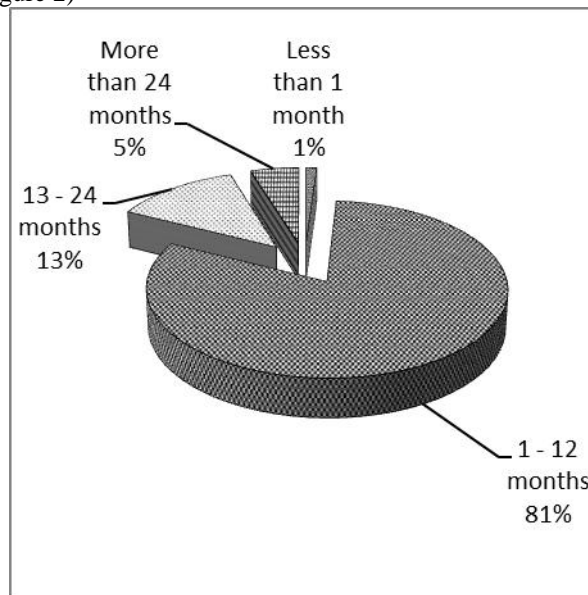


Figure 2: Distribution of children treated for clubfoot according age and sex distribution

The mean ( $\pm$ SD) age of 1996 male children was 10.4 ( $\pm$ 8.8) months while that of 1777 female children with CTEV was 11.0 ( $\pm$ 8.6) months. The mean age difference between male and female children treated for CTEV was statistically significant ( $p=0.026$ ).

Figure 3 shows the sex-age distribution of children treated for CTEV. There was preponderance of male over female children treated for CTEV in all age groups but significantly



in the age group of less than 1 month (75.6% vs. 24.4%) and 13-24 months (63.3% vs. 46.7%). The difference in the sex-age distribution was statistically significant ( $p=0.033$ ).

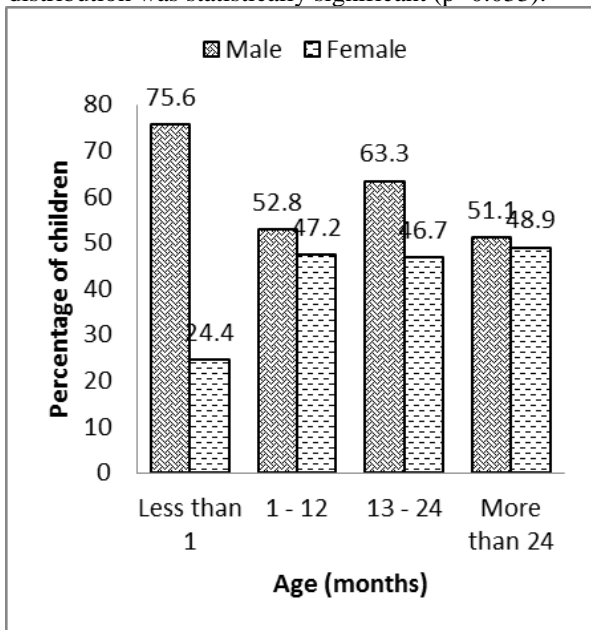


Figure 3: Age and sex distribution of children treated for clubfoot

Figure 4 shows the distribution of age of children undergoing CTEV treatment according to hospital. A high proportion of children at Mnazi Mmoja, CCBRT, Mbeya Referral and Bugando Referral hospitals were treated at the age of between 1 and 12 months while all the children at Selian Lutheran Hospital were treated for CTEV at the age of less than one month.

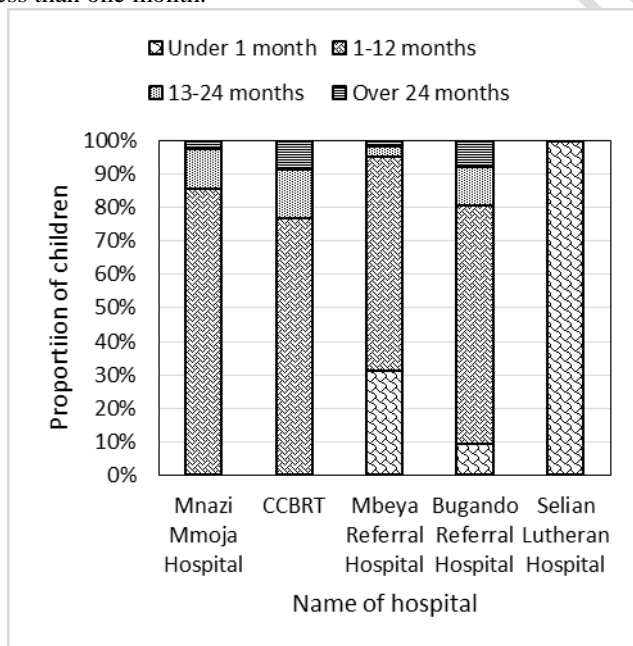


Figure 4: Age distribution of children treated for clubfoot according to treating hospital

Figure 5 shows the distribution of children treated for CTEV according to sex and treating hospital. Except at Mnazi Mmoja Hospital in Zanzibar (47.5% male vs. 52.5% female), male children constituted the majority, the difference being more pronounced at Mbeya Referral hospital (79.1% male vs.

20.9% female) followed by Selian Lutheran Hospital (73.3% male vs. 26.7% female) and then by Bugando Referral Hospital (67.3% male vs. 32.7% female). The difference in the sex distribution according to hospital was significant ( $p<0.001$ ).

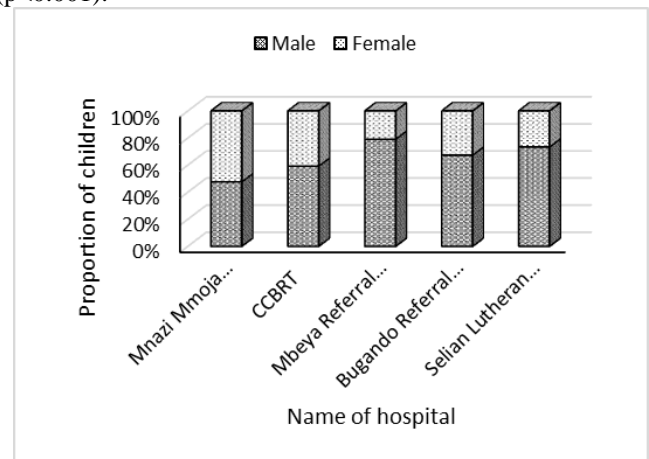


Figure 5: Sex distribution of children treated for clubfoot according to treating hospital

#### AFFECTED FOOT

Data on the foot affected was available for 3794 (99.7%) children with 12 (0.3%) having no record on the foot affected. Of the 3794 children, the distribution of unilateral and bilateral ailments was almost the same (49.8% unilateral vs. 50.2% bilateral).

#### DISTRIBUTION ACCORDING TO HOSPITAL

Except for Selian Lutheran Hospital, Bugando Referral Hospital and Mnazi Mmoja Hospital at which there was preponderance of bilateral (>50%) compared to unilateral CTEV, in the remaining hospitals, children with unilateral CTEV predominated. There was no significant difference in the distribution of unilateral and bilateral CTEV ( $p=0.103$ ) (Figure 6).

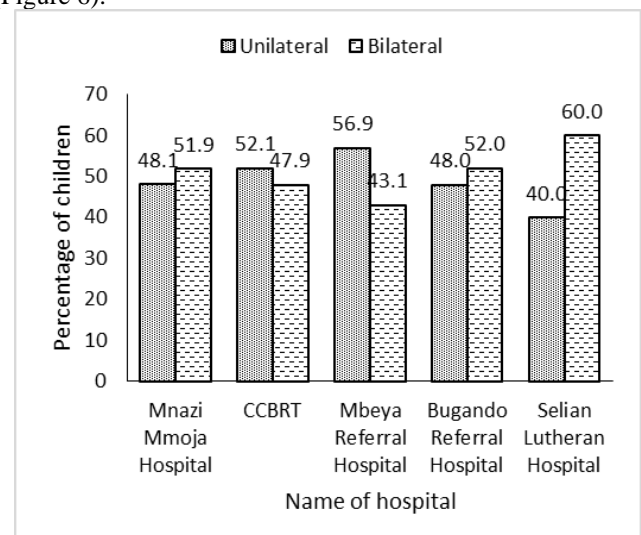


Figure 6: Distribution of affected foot of children treated for clubfoot according to treating hospital

DISTRIBUTION ACCORDING TO SEX

No significant difference between unilateral and bilateral CTEV was observed according to sex (Figure 7).

TREATMENT MODALITY

Out of 3806 CTEV children, 3797 (99.8%) had records on treatment modality. Of these, majority (98.4%, n=3736) were treated by Ponseti method, 37 (1.0%) by both Ponseti method and surgery while 24 (0.6%) by surgery alone (Figure 8).

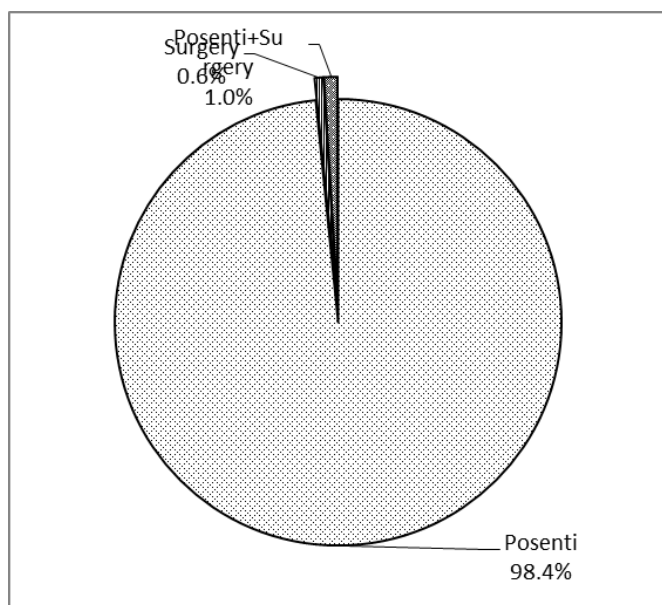


Figure 8: Distribution of treatment modalities

Table 1 show that about all the CTEV patients (98-100%) were treated using Ponseti method except for Bugando Referral hospital at which only 52% were treated by this method while the remaining 48% were treated by surgical method. Both surgical and Ponseti treatment methods were employed at CCBRT (2.0%) and Mnazi Mmoja Hospital (0.3%).

Both methods were employed more for children older than 12 month (9.7%) and for children less than 1 or more than 24 months, surgical intervention was common than for other age groups.

Variable	Total	Treatment modality		
		Ponseti No. (%)	Surgery No. (%)	Both No. (%)
Hospital:				
MnaziMmoja				
Hospital	2197	2160 (99.7)	0 (0.0)	7 (0.3)
CCBRT	1505	1475 (98.0)	0 (0.0)	30 (2.0)
MbeyaReferral				
Hospital	60	60 (100.0)	0 (0.0)	0 (0.0)
BugandoReferral				
Hospital	50	26 (52.0)	24 (48.0)	0 (0.0)
SelianLutheran				
Hospital	15	15 (100.0)	0 (0.0)	0 (0.0)
Sex:				
Male	2012	1976 (98.2)	16 (0.8)	20 (1.0)
Female	1782	1757 (98.6)	8 (0.4)	17 (1.0)
Age (months):				
Less than 1	38	37 (97.4)	1 (2.6)	0 (0.0)
1 – 12	3089	3065 (99.2)	16 (0.5)	8 (0.3)
13 – 24	486	465 (95.7)	3 (0.6)	18 (3.7)
More than 24	184	169 (91.8)	4 (2.2)	11 (6.0)

Affected foot:				
Unilateral	1886	1858 (98.4)	10 (0.5)	20 (1.1)
				16
Bilateral	1900	1870 (98.4)	14 (0.7)	.8)

Table 1: Treatment modality according to hospital, sex, age and affected foot

VI. DISCUSSION

From the findings, most hospitals lost previous data or did not have them at all. The clear records in most hospitals cannot date back to five years which was a study limitation.

The hospitals that had all the records were CCBRT and Mnazi Mmoja hospitals. This is because the two hospitals had sponsorship and were the only known hospitals for the treatment of (CTEV) Clubfoot nationally. In the most literature published by Scholars like more so in the Club foot initiative worldwide, it has been assumed that the ratio of males to females is 2; 1. But the findings in this study have not confirmed that. It is almost the same. It is 1:1.1.

Though the findings in other hospitals the ratio almost gave the same world known ratio but when all combined, the ratio changed. This was so because Mnazi Mmoja hospital which had the highest data has a percentage of female slightly higher than male. In CCBRT the ratio was slightly opposite. The male were slightly higher than the female. In the rest of the hospitals that is Selian, Bugando, and Mbeya, the ratio was 2; 1 (i.e. male to female).

The treatment pattern in all the treating hospitals showed that between 1-12 months were the most in all the 5 hospitals. However, the advocacy that is taking root in Tanzania of educating all midwives on early identification is showing some fruits.

In this pattern of treatment, there was preponderance of male to female. According to various literatures (Haft *et al* 2007), the pattern of treatment is relatively the same. The outcome of the treatment has also remained the same once Ponseti method is applied. As is seen generally in this study, the management protocol is mainly the Ponseti method.

V. CONCLUSION AND RECCOMENDATIONS

The results have clearly shown need of systematically kept records and that the prevalence is there and need to lobby for supporting organization is inevitable. The results have also shown that the most preferred method is Ponseti and that treating hospitals should adopt a common bio data entry and treatment protocol. Another study to confirm the ratio of male to female in Tanzania with systematically recorded bio data is necessary. This study has brought out need for support in the management of CTEV cases to ease the burden the communities are facing financially.

The researcher recommends the need for having a common protocol in the management of these cases and to have a National committee to oversee the management of the cases. This will control the use of uniform protocol and the quality of treatment given will also be checked.

To have all midwives trained on identification of clubfoot for appropriate referral for early intervention.

The need for all treating hospitals to have a standardized way of recording all the clubfoot cases will help as a backup data base for the whole nation by developing a more compressive bio data recording tool to be used in all the treating hospitals.

Similarly, all treating hospitals should think of lobbying to get sponsorship as seen from the results, supported hospitals were doing better and had very few drop out cases compared to where the parents had to foot bills on their own.

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