

**FACTORS ASSOCIATED WITH CLUBFOOT BRACING
AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS
ATTENDING AIC CURE INTERNATIONAL HOSPITAL
IN KIJABE, KENYA**

WINFRED NDINDA MUINDE

**MASTER OF SCIENCE
(Public Health)**

**JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY**

2021

**Factors Associated with Clubfoot Bracing among Mothers of Children
Under Five Years Attending AIC Cure International Hospital in
Kijabe, Kenya**

Winfred Ndinda Muinde

**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Public Health of the
Jomo Kenyatta University of Agriculture and Technology**

2021

DECLARATION

This thesis is my original work and has not been presented for the award of a degree in any other university.

Signature:.....Date:.....

Winfred Ndinda Muinde

This thesis has been submitted for examination with the approval of the following as university supervisors

Signature:.....Date:.....

Prof. Gideon Mutie Kikuvi, PhD
JKUAT, Kenya

Signature:.....Date:.....

Dr. Joseph Mutai, PhD
KEMRI, Kenya

DEDICATION

I dedicate this work to all children with clubfoot and their caretakers, my mother who is my greatest source of inspiration and my late father.

AKNOWLEDGEMENT

My deepest gratitude goes to the Almighty God for giving me the strength, grace and resources to accomplish this work.

I would like to express my very great appreciation to my supervisors, Professor Gideon Mutie Kikuvi and Dr. Joseph Mutai. Completion of this work would not have been possible without their guidance, support and encouragement.

I would like to acknowledge Jomo Kenyatta University of Agriculture and Technology for providing me with resources and technical support to facilitate writing of this thesis.

I would also like to extend my thanks to the management of Cure International Children's Hospital for granting me the opportunity to use their facility as my study site, and to all the staff in the facility for the support accorded during the study period.

Finally, I am thankful to my mother, sisters, brother and friends for believing in me and for their encouragement all through.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF APPENDICES	xii
ABBREVIATIONS AND ACRONYMS	xiii
DEFINITION OF OPERATIONAL TERMS	xiv
ABSTRACT	xvi
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background Information	1
1.2 Statement of the Problem	2
1.3 Justification	4
1.4 Research questions	4
1.5 Objectives	5

1.5.1 General objective	5
1.5.2 Specific objectives	5
CHAPTER TWO	6
LITERATURE REVIEW.....	6
2.1 Overview of the clubfoot.....	6
2.2 Proportion of Non-Compliance to Bracing	7
2.3 Knowledge and Attitude on Bracing	9
2.4 Social factors associated with non-compliance to bracing.....	12
2.4.1 Social practices	12
2.4.2 Maternal practices.....	14
2.4.3 Social economic factors	16
2.4.4 Practices of health providers.....	17
2.5 Conceptual Frame work	20
CHAPTER THREE	21
MATERIALS AND METHODS	21
3.1 Study design	21
3.2 Study site	21
3.3 Study population.....	22

3.4 Selection criteria.....	22
3.4.1 Inclusion criteria	22
3.4.2. Exclusion criteria	23
3.5 Sample size determination.....	23
3.6 Sampling Procedure	24
3.7 Variables.....	24
3.7.1 Independent Variables	24
3.7.2 Dependent variable	25
3.8 Data Collection, Management, Analysis and Presentation	25
3.8.1 Data collection	25
3.8.2. Data Management	26
3.9 Data Analysis	26
3.9.1 Univariate Analysis.....	26
3.9.2 Bivariate analysis	26
3.9.3 FGD Analysis	26
3.10 Data Presentation.....	27
3.11 Ethical Consideration	27
CHAPTER FOUR.....	28

FINDINGS	28
4.1 Response Rate	28
4.2 Characteristics of the respondents	28
4.2.1 Socio-Demographic Characteristics of the Study Respondents	28
4.2.2 Socio-Economic Characteristics of the Respondents	29
4.3 Characteristics of the Child	30
4.4 Health of Child during Delivery	31
4.5 Specific Health Conditions.....	32
4.6 Compliance to Bracing among the Respondents.....	33
4.6.1 Proportion of Compliance to Bracing.....	33
4.6.2 Socio-Demographic Factors Associated with Clubfoot Bracing.....	34
4.6.3 Socio-Economic Factors Associated with Clubfoot Bracing	35
4.6.4 Child Demographic Characteristics Associated with Clubfoot Bracing	37
4.7 Knowledge and Attitude of Respondents on Bracing	38
4.7.1 Level of Knowledge.....	38
4.7.2 Respondents Knowledge on Bracing.....	38
4.7.3 Attitude of Respondents towards Bracing and Non-Compliance to Bracing .	39
4.7.4 Attitude of Respondents on Health Providers.....	40

4.7.5 Support Offered by Health Providers	41
4.7.5 Support Offered by the Spouse.....	41
4.7.6 Support Offered by Relatives	42
CHAPTER FIVE.....	44
DISCUSSION, CONCLUSION AND RECOMMEDATION.....	44
5.1 Discussion	44
5.1.1 Proportion of non- compliance to bracing	44
5.1.2 Knowledge and Attitude on Bracing	45
5.1.3 Social Factors Associated with Non-Compliance to Bracing.....	46
5.2 Conclusion.....	48
5.3 Recommendations	48
REFERENCES.....	50
APPENDICES	55

LIST OF TABLES

Table 4. 1: Socio-Demographic Characteristics of Respondents.....	29
Table 4. 2: Socio-Economic Characteristics of the Respondents.....	30
Table 4.3: Characteristics of the Child.....	31
Table 4.4: Specific Health Conditions of the Child	32
Table 4.6: Socio-Economic Factors Associated with Clubfoot Bracing.....	36
Table 4.7: Child Demographic Factors associated with clubfoot Bracing.....	37
Table 4.8: Respondents Knowledge on Bracing	39
Table 4.9: Attitude of Respondents towards Bracing	39
Table 4.10: Attitude of Respondents on Health Providers.....	40
Table 4.11: Support Offered by Health Providers.....	41
Table 4.12: Support Offered by the Spouse	42
Table 4.13: Support Offered by the Relative	42

LIST OF FIGURES

Figure 2.1: Conceptual framework	20
Figure 3.1: Map of Study Area	22
Figure 4. 1: Health of Child During Delivery	32
Figure 4.2: Proportion of Compliance to Bracing.....	33
Figure 4.3: Level of Knowledge	38

LIST OF APPENDICES

Appendix I: Questionnaire Informed Consent.....	55
Appendix II: Kiswahili Translation: Fomu Ya Kibali Ya dodoso	60
Appendix III: Questionnaire.....	66
Appendix IV: Focus Group Discussion Informed Consent	73
Appendix V: Fomu Ya Kibali Ya Kushiriki Katika Majadiliano Ya Kikundi	78
Appendix VI: Focus Group Discussion Guide 1	84
Appendix VII: Focus Group Discussion Guide 2.....	86

ABBREVIATIONS AND ACRONYMS

AIC	African Inland Church
CTEV	Congenital Talipes Equinovarus
DALYs	Disability-adjusted life years
ENT	Ear, Nose and Throat
ERC	Ethical Review Committee
FAB	Foot Abduction Brace
FGD	Focused Group Discussion
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
KNH	Kenyatta National Hospital
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
UON	University of Nairobi
USA	United States of America
WHO	World Health Organization

DEFINITION OF OPERATIONAL TERMS

Bilateral	Affecting both feet
Brace-	A device that prevents the legs from moving back to incorrect position
Bracing	Putting on a foot abduction brace designed to prevent club foot deformity from relapsing.
Compliance	Positioning the foot well in the brace and failure to brace for 23 hours in a day for young babies and night-time bracing of 12-14 hours per day for walking children up to the age of 5 years.
Club foot	Also called Congenital Talipes Equinovarus (CTEV) is a congenital deformity involving one foot or both where the affected foot appears to have been rotated internally at the ankle.
Foot Abduction Brace	A type of brace worn at the feet used in correction of club foot, which prevents the legs from moving back to incorrect position
Non-compliance	Not positioning the foot well in the brace and failure to brace for 23 hours in a day for young babies and night-time bracing of 12-14 hours per day for walking children up to the age of 5 years.
Relapse	Club foot presenting itself again after it had initially been corrected.

Tenotomy

Surgical cutting of a tendon, in this case the Achilles tendon.

Unilateral

Affecting one foot

ABSTRACT

Disability has emerged as a major public health problem worldwide. Physical disabilities are common in nations with disparate levels of socioeconomic development, among them clubfoot. Clubfoot presents early in neonatal life and if not treated becomes more disabling with age. Prevalence of clubfoot has been established to be 1.1 per 1000 births in the United States. In Africa, the prevalence has been established to be 1.2 per 1000 births in Uganda and 3.4 in 1000 births in Nigeria. The study sought to determine factors associated with non-compliance to bracing in clubfoot management among children under five years in AIC Cure International Children's Hospital, Kijabe, Kenya. The study adopted a cross-sectional descriptive design. It was carried out at AIC Cure International Children's Hospital, Kijabe, Kenya between April and August 2018. The study used a sample size of 174 participants. Ethical approval was sought from KNH/UON Ethical Review Committee before data collection. A semi-structured pre-tested questionnaire was used to collect data. Four focused group discussions were conducted among mothers of children with different characteristics. Quantitative data was entered for analysis using SPSS version 23.0. Chi square and Fisher's exact tests were performed to determine association between dependent and independent variables. Presentation was done through frequencies, percentages, tables and charts. Data from FGDs was analyzed using a three-stage thematic approach. Verbatim and textual summaries was used to present qualitative data where applicable. The proportion of non-compliance to bracing was 16.8%, and the cases of non-compliance to bracing were mostly reported in mothers of male children (23.1%), and mostly among mothers of children aged between 7-9 months of age (25.0%). Majority of those who did not comply to bracing (36.8%) had secondary education and below. Inability to meet transport costs, gender of the child and level of knowledge had significant association with bracing with a p-value of 0.006, 0.001 and 0.026 respectively. The study concluded that 83.2% of mothers complied to bracing which is a very positive finding. However, 16.8% of children with club foot are at a risk of getting a permanent disability because their mothers did not comply to bracing, which calls for an intervention since this is a public health risk. Also, 37.2% of the mothers did not exhibit knowledge on bracing which poses a disability risk to their children. The study recommends sensitization of communities/households through community health volunteers and empowerment of local facilities to be able to manage conditions like clubfoot in order to avoid relapse or even permanent disability due to non-compliance. There is also need for health education and promotion on clubfoot bracing and compliance.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Clubfoot (also called talipes equinovarus) is a general term used to describe a range of unusual positions of the foot usually present at birth (congenital). It is a common birth defect and is usually an isolated problem for an otherwise healthy newborn (Kawashima and Uhthoff, 2010). Globally, 150,000 – 200,000 babies with clubfoot are born each year. More commonly, it affects boys than girls and up to 50% cases are bilateral (Bedford, 2009). Various studies have established the prevalence of clubfoot to be 1.1 per 1000 births. Among them is a multistate study carried out in the United States by Parker *et al.*, (2009) and a study carried out in Peru in South America by Melissa *et al.*, (2014). In Africa, the prevalence is slightly higher with a study carried out in Nigeria showing a prevalence of 3.4 in 1000 births (Ukoha *et al.*, 2011) and a study carried out in Uganda showing a prevalence of 1.2 per 1000 births (McElroy *et al.*, 2015). There are no documented studies in Kenya on prevalence of club foot.

Clubfoot is characterized by abnormal bone formation in the foot. Sometimes the feet of an infant appear abnormal at birth because of the intrauterine position of the fetus prior to birth. If there is no anatomic abnormality of the bone, this is not true clubfoot, and the problem can usually be corrected by applying special braces or casts to straighten the foot. True clubfoot is usually obvious at birth because a clubfoot has a typical appearance of pointing downward and being twisted inwards. Since the condition starts in the first trimester of pregnancy, the abnormality is quite well established at birth, and the foot is often very rigid. Uncorrected clubfoot in an adult cause only part of the foot, usually the outer edge, the heel, or the toes, to touch the ground. For a person with clubfoot, walking becomes difficult or impossible (Robertson and Corbett, 2013).

Clubfoot presents early in neonatal life and if not treated becomes more disabling with age. Neglected or inadequately corrected clubfoot causes physical impairments that result in decreased ambulation and inability to perform basic tasks such as carrying water, collecting food and going to school. This leads to dependency for activities of daily living with significant economic impact on the family. In addition, the structural differences in children with clubfoot are associated with social stigma, which has a psychological effect on the child (Ukoha *et al.*, 2011).

The Ponseti method has become the gold standard in isolated clubfoot care. It is done in two phases: the casting phase, which gradually moves the foot to the correct position and the bracing phase, which makes sure it stays there. Casting usually starts when a baby is a week or two old. The baby will wear a series of 5 to 7 casts over a few weeks or months. When the foot is in its final, correct position, the baby is fitted with a brace. The Ponseti clubfoot foot abduction brace keeps the corrected foot growing like it should. If the brace isn't worn as directed, a corrected clubfoot will return to its original position which is referred to as a relapse.

However, for good outcomes it requires rigid adherence to the intervention which consists of specific serial manipulations, casting and tenotomy of the achilles tendon, followed by abduction bracing of the affected foot or feet until the child is 4 to 5 years old. Health care professionals must not deviate from the protocol and parents and caregivers are required to give the long-term commitment in order to achieve a successful outcome (Miller *et al.*, (2016).

1.2 Statement of the Problem

Non-compliance in health matters including bracing during clubfoot management continues to be a public health concern not only to the concerned individuals that is the child, mother and relatives but also to governments due to the consequences that arise. According to Morcuende (2009), the challenge of the Ponseti method begins when casting ends. Many Ponseti treatment programs have found bracing as the most difficult

phase of treatment for parents to comply to. Lack of bracing leads to relapse of clubfoot. A study by Staheli (2009) found that relapses due to lack of compliance to the bracing are a common occurrence among children with clubfoot up to the age of 5 years at this rate: 1st year 90%, second year 70-80%, third year 30-40%, 4th year is 10-15%, subsequent years are about 6%. Melissa *et al.*, (2014) found out that non-adherence to bracing can affect 34% to 61% of children and results in 5- to 17-fold higher odds of relapse.

Club foot can lead to lifelong disability. The person affected may not be able to wear shoes, may experience pain when walking, may have low self-esteem, may not be able to perform basic tasks such as carrying water, collecting food and going to school. These factors may affect the health of an individual, with health having being defined by WHO as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. As a consequence, public health will carry an unnecessary burden in poor health, which can be avoided by compliance to bracing. This further adds to financial burden to the family and the government at large.

Failure to comply to bracing can be attributed to many factors like beliefs and stigma including community / family pressure to consult traditional healers and/or to discontinue treatment, lack of confidence in treatment, lack of understanding about treatment and the full protocol, believe that treatment is finished after casting, baby cries with cast or braces, lack of money for transport or treatment costs, long distance to clinic, lack of support by fathers/families, other responsibilities e.g. other children care, work, poor communication from and relationships with health workers, cultural practices e.g. nomadic tribes, military families who move regularly, impatience, poor appointment tracking and follow-up after missed appointments, incorrect prescription of braces: foot not yet corrected, shoe does not fit well or lack of clear instructions on braces: importance, how to fit, wearing protocol.

1.3 Justification

The findings on factors associated with clubfoot bracing will bring out more information and knowledge to the caregivers of children with club foot so that any corrective measures can be taken to ensure compliance to bracing. AIC Cure International Childrens' Hospital coordinates club foot management across all the 47 counties of Kenya. These findings will lead to more information on bracing in club foot, which will further be shared across all the counties. The Ministry of Health will also use these findings to make decisions on strategies of improving compliance to bracing. Further, health professionals managing clubfoot at the various health facilities across the country will have added information and knowledge, which will make them more precise in addressing the factors that will be derived from the study. Mothers of children with clubfoot will be informed on how they can rise above the factors which can lead to non-compliance, and hence the children with clubfoot can be properly managed and be out of the risk of developing a permanent disability.

1.4 Research questions

1. What is the proportion of non-compliance to bracing among mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya?
2. What is the knowledge and attitude on bracing of mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya?
3. What are the social factors associated with non-compliance to bracing among mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya?

1.5 Objectives

1.5.1 General objective

To determine factors associated with non-compliance to bracing in clubfoot among mothers of children under five years in AIC Cure International Children's Hospital, Kijabe, Kenya.

1.5.2 Specific objectives

1. To determine the proportion of non-compliance to bracing among mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya.
2. To determine the knowledge and attitude on bracing of mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya.
3. To determine the social factors associated with non-compliance to bracing among mothers of children under five years with clubfoot in AIC Cure International Children's Hospital, Kijabe, Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of the clubfoot

According to the founder of Ponseti method, clubfoot more commonly affects boys than girls with a male to female ratio of 2:1. Boo and Ong (2014) confirmed this in a study recently carried out in Malaysia where by the ratio of male to female was 2.5:1. The etiology of clubfoot remains unknown and is controversial, and numerous theories on causative factors are proposed. These include nerve lesion, muscle imbalance, muscular abnormality, vascular defect or neuromuscular defect (Wynne, 2012). However, according to Bedford (2009), in some cases, clubfoot is just the result of the position of the baby while it is developing in the mother's womb (postural clubfoot), but more often clubfoot is caused by a combination of genetic and environmental factors that is not well understood. Although long held proposals of intra-uterine compression as a causative factor is unsubstantiated, Wynne (2012) still claims feeling remains that mechanical pressure may be of some significance. Kawashima and Uthoff (2010) claim interruption in the development of a normal foot during the ninth week of gestation might be responsible for the deformity. This hypothesis of a regional growth disturbance is supported by two observations. First, a disproportionate amount of type I fibres in the posterior and medial muscle groups which suggests the presence of a neural abnormality as muscle fibre types are neurally determined. Second, tendon sheaths of toe flexors and posterior tibial tendon have signs of cellular hypoplasia with smaller cell and cytoplasmic volume (Garg and Porter, 2012)

In a study by Cartlidge (2011) reported ethnic differences in CTEV occurrence with the lowest (0.6%) incidence among the Chinese population, the highest (6.8%) in the Polynesian region and a cumulative incidence of approximately one per 1000 live births among Caucasians. Further, the study cited that studies on ethnic groups, populations, and families suggest a genetic component as one causative factor of congenital clubfoot.

However, the mode of inheritance does not follow a classic pattern and both genetic and environmental factors are probably involved: the presence of a genetically determined connective tissue defect and a transient deforming force is supposed to allow the mobile foot to be pushed into equinovarus position at a vulnerable time of its development (Boehm and Sinclair, 2007).

According to Engell (2008), twin studies are useful for determining whether the cause of a disorder is genetic or not. As monozygotic twins have identical genes, dizygotic twins share 50% of the genes, and all twins share the antenatal environment, it is possible to assess the effect of genetic factors on congenital disorders. Increased rates of doubly affected monozygotic twins, compared with dizygotic twins (concordance), would indicate a genetic etiology for a disorder. This finding, confirmed by Parker *et al.* (2009) suggests if a monozygotic twin is born with a clubfoot, the risk for the second to have the disorder is estimated to be one in three, strongly indicating a partly genetic etiology. The risk of having clubfoot in first-degree relative to a person with idiopathic clubfoot is higher than in the normal population. Wynne (2012) reported that a sibling of a child with idiopathic clubfoot has a 2% to 4% risk of having a clubfoot.

2.2 Proportion of Non-Compliance to Bracing

Mathias *et al.*, (2010) define compliance as the patient/caregiver's willingness to adhere to treatment requirement as proposed by the health care provider. He terms it as a contractual relationship between the health care provider and patient or parent/caregiver which includes following instructions, accepting restrictions and adhering to appointments.

According to McElroy, et al, (2015) found that an overall non-compliance to bracing was 17% with 25.5% among being caregivers with male child and 28.9% with a 7-9 months child. Poor adherence to casting and bracing among parents/caregivers of children with clubfoot is a major dilemma experienced by service providers in delivery of health care services. Therapeutic efficacy in any treatment depends on the compliance

of patients or parents/caregiver to the prescribed treatment procedure (Zionts and Dietz, 2010).

A study by Nogueira *et al.*, (2013) found that 28.9% of parents/guardians of children below five years with clubfoot didn't comply to bracing. Further, the study found that non-compliance to treatment regime causes reduction in medical benefit since the main objective of management is not achieved. Poor compliance increases complications, health care costs as well as reducing the quality of life of the patient. A patient or parents/caregivers who are non-compliant with clubfoot management rules have more chances of developing a recurrence of the deformity (Lu *et al.*, 2010).

Bedford (2009); Akintayo *et al.*, (2012) and Melissa *et al.*, (2014) found that 12.4%, 13.7% and 18.9% of patient or parents/caregivers were non-compliance to bracing. The studies asserted that the respondents were aware that compliance to clubfoot management procedures is imperative for attaining positive outcomes. McElroy *et al.*, (2015) found that without diligent follow-up of the treatment regime, recurrence ensues in approximately 80% of cases. This is contrary to 6% recurrence cases in compliant cases. Ukoha *et al.*, (2011) further point out that missed appointments not only disrupt the child's continuity of care, but also disrupt the relationship between the parent/caregiver and the service provider leading to frustration on the service providers. The authors further sustain that this frustration may affect communication with the parent/caregiver and may decrease empathy for the parent/caregiver in future interactions. Furthermore, the authors emphasize that parents/caregivers who miss appointments deprive themselves of professional services, disrupt parent/caregiver and service provider relationships, reduce opportunity for other patients to receive timely care by taking appointments away from those who may need it and indirectly contribute to rising health care costs.

According to Jawadi, (2010), non-compliance to the clubfoot bracing leads to poor results and relapses. They reported that of the 26 patients that participated in the study on clubfoot, only a minority of parents/caregivers of children with clubfoot attended the

clinic for more than three sessions for treatment. In their study, none of the participants attended the clinic satisfactorily to either be discharged after complete recovery or for surgery to be deliberated after inadequate management with non-surgical intervention (McElroy *et al.*, 2015). The study shows a huge challenge of compliance of patients/caregivers of children with clubfoot to treatment regime in developing countries especially in Africa. Non-compliance to treatment regime compromises the effectiveness of intervention and also accelerates development of more deformity that may be difficult to correct, these complications can result into disability (Ukoha *et al.*, 2011).

2.3 Knowledge and Attitude on Bracing

Historically, clubfoot has been treated with extensive and invasive surgeries. However, since the 1990s, the Ponseti method of treatment has repeatedly been proven to effectively treat clubfoot with only minimally invasive surgery (Morkuende, 2009). This method was invented by Dr. Ignacio Ponseti in 1940's hence the name ponseti. The ponseti method is ideally suited for the developing world in that it is inexpensive, non-surgical and trained paramedical personnel can complete the casting component. The method is usually done in two phases: serial casting or tenotomy phase and bracing phase. Serial casting or tenotomy corrects the deformity while bracing helps the foot/feet to stay in the corrected position for some time to avoid relapse that leads to recurrence of the clubfoot, and ensure successful outcome (Zionts and Dietz, 2010). It is very important that mothers/caregivers of children with clubfoot have an understanding of this method of treatment, especially bracing where they are expected to play the biggest role.

Casting corrects most cases of the clubfoot, but clubfoot tends to relapse without proper care after the casting. A child therefore needs to wear a brace, commonly referred to as Foot Abduction Brace (FAB) that will prevent the leg from moving back to the incorrect position while the foot grows and develops. The parents/caregivers of these children must therefore be ready and willing to brace the children appropriately and correctly. Their eagerness to brace their children without being reminded or pushed contributes to

success of the treatment. Children must wear the brace locking their feet in place 23 hours a day for the first three months. After three months, the time required begins to drop incrementally until age 4 or 5 when the gene that causes club feet is no longer active (Morcuende, 2009).

Rates of success with the Ponseti method have been reported to be as high as 95% however, relapse rates are also high and present a significant problem in treatment. Relapses occur in 14-41% of patients, with some patients experiencing multiple relapses or treatment failure. The single factor most frequently associated with relapse is inadequate use of an abduction brace following the casting phase of treatment (Bedford, 2009).

Parents/caregivers have a major role treating the child with clubfoot. Their responsibility includes regular attendance at clinic and long-term brace application. According to Göksan *et al.* (2014) patient and family adherence to brace use is a common problem, as non-adherence is directly related to relapse. However, there are many factors that may contribute to parents and caregivers not adhering to the Ponseti treatment protocol. Parents/caregivers may fail to attend or discontinue with the treatment appointments due to lack of understanding of the treatment procedure or not knowing how the treatment works (McElroy *et al.*, 2015). When a parent/caregiver gets the knowledge about management and how these management leads to better health, they are likely to pursue care and comply with the recommended treatment procedure (Lu *et al.*, 2010). Akintayo *et al.*, (2012), Melissa *et al.*, (2014) and Parker *et al.*, (2009) assert that increase in health information among patients and parents/caregivers about their illness enable them to make informed choices concerning their health needs.

Non-adherence is one of the key reasons for failure of clubfoot treatment. This non-adherence can relate to health care practitioners not strictly following the Ponseti regime of interventions, but more commonly refers to poor adherence by parents/caregivers which is often as a result of the many barriers faced by parents/caregivers (Miller *et al.*, (2016)

There is very little published literature on parents/caregivers knowledge on clubfoot. A study by Mohammad *et al.*, (2016) identified knowledge gap in patients/caregivers as a major barrier to the Ponseti method in China. This gap made it difficult for parents/caregivers to understand each step of the treatment, leading to non-compliance. Some parents/caregivers discontinue treatment after casting because they did not understand why they should continue with brace. Similarly, secondary illness that affected the children (e.g., a cold) caused some parents/caregivers to temporarily discontinue the use of the brace. Other parents/caregivers were worried about their children's comfort during treatment and the difficulty of holding their children with braces (Ukoha *et al.*, 2011).

The knowledge gap was compounded by the healthcare believes in China. Patients often went to larger hospitals to seek treatment because they believed that they would receive better quality of care. In similar studies, Ayman *et al.*, (2015) and Nogueira *et al.*, (2013) found that in Saudi Arabia and Uganda there were families that did not understand Ponseti method and chose different methods for clubfoot treatment or no treatment at all. Information on one's illness may be a motivating factor to adhere to the treatment regime. When people take a step to learn about their condition, they will make an effort to control it (Iftikhar *et al.*, 2014). Therefore, knowledge may play a role in the compliance with rehabilitation interventions which could be achieved through education on health to the parents/caregivers at the talipes clinics.

According to Iftikhar *et al.*, (2014), the daily bracing schedule can come with some frustrations. A baby might cry at first when the shoes and brace are put on, while an older, more active child might complain about wearing the brace to bed.

It's therefore natural for parents to consider skipping it sometimes, or to think that 3 years with a brace is long enough, even if the orthopedic surgeon recommends 5. It requires a lot of positivity from the mother to be able to stick to putting on the brace amidst the frustrations. Some mothers give up and discontinue the bracing. Brief periods of not wearing the brace can cause problems. Besides making it harder for a

child to get used to the brace as part of everyday life, skipping days can allow the foot (or feet) to very subtly move out of the corrected position. With this, the brace won't fit as it should, making it uncomfortable for a child to wear. This will definitely lead to relapse club foot.

2.4 Social factors associated with non-compliance to bracing

2.4.1 Social practices

Kawashima and Uthoff (2010) and Morcuende (2009) found no significant relationship of relapse with age at presentation, previous unsuccessful treatment, complexity or intrinsic severity of the deformity, number of casts required for correction, ethnicity or family history of clubfoot. Kawashima and Uthoff (2010) and Avilucea *et al.*, (2009) however, have reported some relationship of cultural factors coupled with the distance from the site of care and caretakers ' tolerance to increased incidence of relapse, recurrence, partial compliance and non-compliance. In an interview with parents, the cultural factors and the distance to travel was the second highest reason for inconsistent use of FAB and non-compliance (Iftikhar *et al.*, 2014). The cultural factors were more apparent among parents from higher societies. They discontinued FAB while attending festivals and parties, often did not re-apply FAB on that night, some discontinued on religious holidays and with this relaxation, the child avoided to wear FAB again.

A rare and unique cultural barrier to the Ponseti method was explained by a physician in Ho Chi Minh City. There was a belief that what others saw as a deformity, the family, with the affected child, saw as a “gift” or talent. By removing the deformity, the child would no longer be gifted and special. In Vietnamese culture, the grandparents have great weight in decision-making, and parents show respect by following their wishes. In this specific tradition, the child with clubfeet was the first-born male of the eldest son of the grandfather. As such, the child was seen as the sole carrier of the grandfather's bloodline, and any danger – tenotomy included – leading to the death of the child would effectively end the bloodline (Wu *et al.*, 2012).

Study done in New Mexico (Avilucea *et al.*, 2009) observed that, the Native American families who lived a distance from Albuquerque were more likely to follow native traditions, speak their native language in the home, and utilize native healers in addition to modern medicine. While families of all ethnicities frequently reported, when their child had a recurrence of deformity, that they did not perceive the abduction orthotics as an important component for ongoing success in the treatment of their child, interviews with some of the rural Native American families in this study parents revealed there often exists a notion of shared responsibility within an interdependent family system which can result in many family members sharing childcare. A strong connection existed with traditional spiritual and natural healing practices, and the family may have consulted with a medicine man or native healer. This was also evident in Nigeria with Morcuende (2009) reporting that culture and religious practices were crucial factors in Nigerians' health-seeking behaviors. A few of the parents recounted attributing their baby's malformation to God's will, punishment from God, or to witchcraft. Ponseti providers commented that these mindsets and beliefs resulted in poor health-seeking behaviors among parents because they would conclude that western medicine could not confront spiritual matters. Thus, some would turn to faith healers, herbalists and bonesetters (Morcuende, 2009).

Large family size was another cultural factor that influenced parental health-seeking behaviors. Physicians reported that age of presentation to Ponseti clinics and the compliance of parents to treatment protocols and follow-up appointments were influenced by the number of children present in their households or the number of children desired by the parents. Nigeria Demographic and Health Survey (2008) established that 42.9% of men and 39.8% of women who already had three children planned to have another child sometimes in the future. According to this survey, the mean ideal number of children desired by Nigerian men was 7.2 and 6.1 by women. Ponseti practitioners responded that if parents desired more children, they were likely to postpone treatment of the diagnosed child or default during treatment because of their plans (Morcuende, 2009).

Most of the African culture considers clubfoot a physical disability (Wynne, 2012). A study conducted in Malawi on clubfoot by Bedford (2009) found that people use derogatory term referring to clubfoot. The author explained that the terms used to describe disability were oppressive and had negative connotations. Clubfoot is often stigmatised by its description as “cripple”. Such generic labels were said to bring associations of abnormality that has the potential to negatively influence all aspects of social interactions and treatment seeking behavior of the parents/caretakers for their children (Bedford, 2009).

Majority of patients/caretakers of children with clubfoot experience a range of negative behavior or negative attitudes as a direct result of clubfoot (Staheli, 2009). This may lead to the parents/caretakers hiding their children and failing to attend treatment appointment. Similarly, parents/caretakers of children with clubfoot face divorce, reprisals and exclusion that may force them to relocate to areas that are inaccessible to health facilities hence compromise adherence to treatment (Naomi, 2012). Additionally, some of the cultures consider clubfoot as a curse or punishment for wrong doing hence no support is offered to these children and their family. These elements tend to affect the consistency with treatment and may lead to non-compliance or neglect clubfoot.

A study conducted by Broardman and Morcuende (2010) in Chile and Peru found that some parents/caretakers rejected the use of abduction brace because of the social stigma associated with children in orthotics braces. A similar study by Lu *et al.*, (2010), found that the family of the patient with clubfoot felt ashamed and embarrassed about having “bad genes”. They did not want to publicize their “bad genes” by seeking treatment for their children at the health facilities. This was a clear indication of how social stigma negatively affected the treatment and adherence to clubfoot.

2.4.2 Maternal practices

Educational level of parents could be a contributing factor to the recurrence of clubfoot deformity after correction according to Mohammad *et al.*, (2016) who reported that low

maternal educational level led to non-compliance to bracing which generally led to recurrence of clubfoot. However, in a study by Ayman *et al.*, (2015) in Saudi Arabia, no significant correlation was found between brace use and parents' monthly income or their level of education. Nogueira *et al.*, (2013) observed that physicians cited a lack of education as a major cause of non-compliance because very little time was spent explaining the bracing process and its importance to parents. Additionally, few physicians (34%) had any kind of written information available for parents regarding the brace. Although some physicians attributed this to low literacy and comprehension levels among parents, there is still a place for written materials in order to solidify information provided orally during the patient consultation. A study done in China by Lu *et al.*, (2010) recorded that many caretakers of clubfoot patients have not even completed middle school, especially in rural areas. This educational gap is believed by those interviewed to make it difficult for caretakers to understand each step of the treatment, leading to non-compliance. For example, some caretakers discontinue treatment after casting because they do not understand the purpose of the brace. They see the results of casting and believe that the patient is cured. Secondary illness for example a cold causes other caretaker to temporarily discontinue use of the brace, which may then be forgotten. Three out of eight sets of parents from a focus group were worried about their children's comfort during treatment and difficulty holding their child with a brace. Since its inception, the Ponseti method has proven to be effective in the treatment of idiopathic clubfoot in greater than 95% of cases. Iftikhar *et al.*, (2014) reiterated that compliance with the post-correction abduction bracing protocol is critical to avoid clubfoot recurrence.

Ayman *et al.*, (2015) further reported that unilateral clubfoot was a significant risk factor for non-compliant parents compared to bilateral clubfeet and that Parents with 3 or more children had more non-compliance (66.7%) compared to those with less than 3 children. In addition, according to the study, all non-compliant parents reported that their babies cried during the application of the brace in contrast to 25% of the complaint parents. Majority of non-compliant parents (94.4%) reported being “fed up” with using the brace.

2.4.3 Social economic factors

Socio-economic factors have been shown to be a major hindrance to access to health care services in most resource-poor settings. In a study conducted in Karachi, Pakistan, the major reason for poor and non-compliance was low income, unaffordability of time and cost for regular follow-up. 16.67% of the parents who participated in the study had inconsistent use of braces due to delay in re-procurement of Foot Abduction Braces once the child had outgrown the shoe (Iftikhar *et al.*, 2014). However, when a couple of dozen pairs of all shoe sizes were arranged and provided free/partially free of cost, as charity or donations, this significantly improved compliance and encouraged parents to continue the treatment. Another study carried out in Mbarara Regional Hospital and Mulago Hospitals in Uganda also found a significant association between compliance and transport costs to the facilities, distance travelled and family support (Kazibwe and Struthers, 2009). Other challenges highlighted in the study include the need to improve the communication skills between clinicians offering treatment to children with clubfoot and their parents.

In countries where the majority of the population lives in poverty, most families are severely limited in their capacity to fund their own health care. CURE Clubfoot Kenya (CCK) program has observed in various programs high dropout rates for those who have started the treatment process but lack funds for continuing casting (Victor and Dan, 2013). Experience indicates that even in countries where clubfoot clinics are being operated at governmental facilities most patients are expected to pay for the treatment and/or the supplies and that in many cases neither the hospitals nor the patients can afford to fund clubfoot treatment (Gupta *et al.*, 2008).

The intervention to correct early relapse is easier than to correct late relapse. Hence, continued care with FAB and regular follow-up after achieving initial correction becomes mandatory. This is, however, a bit difficult for the parents to comply strictly with Ponseti's protocol for FAB to be used for 3-4 years of age on account of expenses

and time that is required as well as the psychosocial impact, such as the stigma of prolonged use of orthosis, which have an impact on compliance (Verma *et al.*, 2012).

In a study done in Brazil physicians reported that parents went without the brace due to the delay or expense of acquiring it. Additionally, multiple braces must be purchased as the child outgrows each brace, adding to the financial burden of the brace. Up to two pairs of orthotic shoes may be required in the first year of bracing, followed by one new pair of shoes for each following year (Zionts and Dietz, 2010). As a result, families may have to purchase up to five pairs of orthotic shoes, which is a considerable cost for low-income families. Previous studies have consistently identified costs as one of the most significant barriers to bracing adherence in developing countries making it a difficulty worth addressing (Pirani *et al.*, 2009).

2.4.4 Practices of health providers

For most medical conditions, correct diagnosis and effective medical treatment are essential to a patient's survival and quality of life. A significant barrier to effective medical treatment, however, is the patient's failure to follow the recommendations of his or her physician or other healthcare provider. Patient non-adherence (also referred to as non-compliance) can take many forms; the advice given to patients by their healthcare professionals to cure or control disease is too often misunderstood, carried out incorrectly, forgotten, or even completely ignored. Non-compliance carries a huge economic burden. Yearly expenditures for the consequences of non-compliance have been estimated to be in the hundreds of billions of US dollars (Leslie *et al.*, 2012). Patients must therefore be given the opportunity to tell the story of their unique illness experiences. Knowing the patient as a person allows the health professional to understand elements that are crucial to the patient's adherence: beliefs, attitudes, subjective norms, cultural context, social supports, and emotional health challenges, particularly depression. Physician–patient partnerships are essential when choosing amongst various therapeutic options to maximize compliance. Mutual collaboration

fosters greater patient satisfaction, reduces the risks of non-compliance, and improves patients' healthcare outcomes (Boardman *et al.*, 2011).

According to Branch (2012), the interpersonal dynamics of the physician–patient relationship play an important role in determining a variety of patient outcomes including patient adherence to their treatment recommendations. Patients who feel that their physicians communicate well with them and actively encourage them to be involved in their own care tend to be more motivated to adhere. Additionally, when physicians and patients agree on how to involve patients in their care, adherence is improved. Cohesive partnerships and effective interpersonal communication make it possible for patients and physicians to work together to help patients follow mutually agreed-upon recommendations. Successful communication between physicians and patients promotes greater patient satisfaction with medical care, which in turn fosters higher levels of adherence (Boehm and Sinclair, 2007).

Patients' trust in their physicians is essential to their emotional disclosure and is therefore a crucial component of the patient–physician relationship. Patients must believe that their physician is someone who can understand their unique experience of being a patient, and someone who can provide them with reliable and honest advice. Trusting relationships between physicians and patients can greatly affect patient outcomes. For example, it has been shown that physicians who promote trust in the therapeutic relationship, who have effective communication and “bedside manner”, and who express compassion for their patients succeed in fostering cooperation and patient compliance with a variety of preventive and treatment recommendations. Compliance rates have been found to be nearly three times higher in primary care relationships characterized by very high levels of trust coupled with physicians' knowledge of the patient as a whole person. In fact, patients' trust in their physician has been found to far exceed many other variables when it comes to promoting patients' satisfaction with their care (Jahng *et al.*, 2010).

Further, studies have found that both patient satisfaction and patient adherence are enhanced by patients' involvement and participation in their care. The behavior of physicians and patients tends to be reciprocal when they strive toward partnership. Patients who want to be more involved tend to ask more questions and display more confidence, and physicians who are willing to sustain collaborative relationships with their patients tend to act in ways that prompt their patients to be involved and active (Leslie *et al.*, 2012).

Scarcity of resources and inappropriate distribution of health care professionals between rural and urban regions add to problems of rehabilitation in developing countries. This has resulted in many patients in poor rural settings going without treatment or having to travel long journeys to urban areas for treatment. Patient compliance with treatment procedures is important for the therapeutic regimen to be effective. Without compliance, the therapeutic goals cannot be achieved, resulting in poor patient outcomes (Kawashima and Uthoff, 2010).

Research on adherence to paediatric treatment regimens has received attention in recent years as sub optimal adherence to medical and other therapeutic regimens can have personal, social and clinical implications for the child as an adult (Melissa *et al.*, 2014). Lack of information regarding reasons for adherence to the regimen makes it difficult for health providers and health planners to determine the impact of treatments on health status or weigh the cost/benefit ratio for prescribing costly treatments to the patients (Zionts and Dietz, 2010). It is important to determine the compliance of patients to clubfoot correction treatment in order to identify and target factors that may positively or negatively influence parents/caregiver's compliance.

2.5 Conceptual Frame work

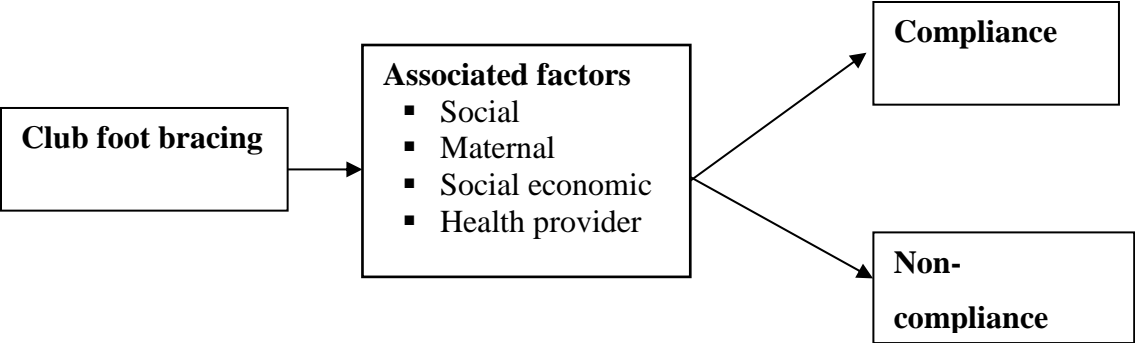


Figure 2.1: Conceptual framework

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study design

This was a cross-sectional descriptive study which utilized both qualitative and quantitative techniques. Kothari (2004) states that cross-sectional surveys contain multiple wealth of details, totality and variation which allow the author to understand fully how and where intervention may have worked collectively with correlated general effects. The descriptive cross-sectional survey designs validate emerging constructs and proposition in the data set; guiding the study of various units within the identified case by underlining the mechanism by which an incident is brought to being (Kothari, 2004). Mugenda and Mugenda (2012) described descriptive design, as method of data collection that attempts to collect data from members of a population, in order to determine the current status of that population with respect to one or more variables. This design establishes conditions as they are on the ground and is capable of obtaining information of large samples of the population. Descriptive design can also provide information about attitudes that are otherwise difficult to measure using observational techniques.

3.2 Study site

The study was carried out in AIC Cure International Children's Hospital in Kijabe, adjacent to Kijabe Mission Hospital, Kenya. This is a mission hospital sponsored by Africa Inland Church. It is located about 60 km north of Nairobi, in Lari Sub- County, Kiambu County. It is one of the leading specialty hospitals in East Africa and one of the largest international providers of surgical and rehabilitation services for children in developing countries. It is a 30 bed, pediatric orthopaedic hospital devoted to serving the physically disabled children of Kenya as well as training new Kenya Orthopedic surgeons. It provides Orthopedic, Plastic and ENT surgery to children aged 18 and

below. The Hospital originally opened in 1998 as AIC Bethany Crippled Children's Centre of Kenya. The hospital name was changed in early 2006 to AIC Cure International Children's Hospital to better reflect the partnership between Africa Inland Church and Cure International and the scope of its services.



Figure 3.1: Map of Study Area

3.3 Study population

These were mothers of children aged one month to five years with clubfoot attending AIC Cure International hospital. According to the hospital records there are approximately 320 mothers of children under five years with clubfoot per month.

3.4 Selection criteria

3.4.1 Inclusion criteria

Mothers of children under five years with clubfoot that consented to the study

3.4.2. Exclusion criteria

- Mothers of children under five years with clubfoot that did not consent to the study.
- Mothers of seriously sick children under five years with clubfoot.
- Sick mothers of children under five years with clubfoot.
- Guardians who were not the biological mothers of children under five years with clubfoot.

3.5 Sample size determination

Fisher *et al.*, (1998) method was used.

$$n = \frac{z^2 p \cdot q}{d^2}$$

Where;

n = required minimum sample size

Z= 1.96 (confidence level at 95%)

p = proportion in the target population that is estimated to have particular characteristics.

A value of 50% was used

d = 0.05 (Level of precision at 5%)

q = 1-p

$$n = \frac{(1.96)^2 (0.5) (1 - 0.5)}{0.05^2}$$

n = 385 participants

Since the study area has a population of less than 10,000 persons, the second formula was used to calculate the sample size (Fisher *et al.*, 1998).

Where nf = sample size, if population is less than 10000

N = total number of mothers in the study area.

$$nf = \frac{385}{1 + \left(\frac{385}{320}\right)}$$

the minimum sample size was 174

3.6 Sampling Procedure

All mothers attending the clinic and who fitted the inclusion criteria were selected until the required sample size was reached. They were selected during a weekly clinic, where by an average of 20 mothers fitted the criteria. The sample size was attained in a period of 3 months. This approach was chosen because there was no consistency or standard numbers of mothers attending the weekly clinic. The respondents were presented with the questionnaires at the exit point. A mother was only allowed to answer the questionnaire once for the entire period of the study.

Purposive sampling was used to select participants of FGDs. This ensured that mothers who participated in answering the questionnaires did not participate in the FGDs. Mothers who fitted the inclusion criteria were interviewed to ensure that they had not answered the questionnaire and only mothers who had not were involved in the FGD.

3.7 Variables

3.7.1 Independent Variables

- Social demographic characteristics: Age, Marital Status, Highest Education level, Monthly Income, Religious Affiliation

- Knowledge and attitude of mothers towards bracing
- Social factors

3.7.2 Dependent variable

Compliance to bracing

3.8 Data Collection, Management, Analysis and Presentation

3.8.1 Data collection

Data was collected by the Principal researcher and research assistants using semi structured questionnaires (Appendix I). The questions were designed in English and assistance in translation to swahili was done. The questionnaire addressed issues such as social demographic characteristics, knowledge and attitude of mothers and social factors leading to non-compliance to bracing. The questionnaire was administered at the exit point, after the participant has been attended to by the health care provider. A Linkert scale in cooperated in the questionnaire was used to measure knowledge and attitude.

Four FGDs were organized and conducted to have an in-depth understanding of the factors. The number of groups was dictated by saturation point. Two groups of 9 and 10 comprised of first-time mothers while the other two groups of 10 and 11 participants were made up of mothers who had previously given birth. The FGDs were conducted during clinic days when the number of mothers was sufficient to constitute a group discussion. An FGD guide was developed to address issues such as knowledge and attitude of mothers and social factors associated with non-compliance to bracing (Appendix II). The principal researcher took participants through the purpose of the study, what it sought to accomplish and the significance of the study and moderated discussions assisted by one research assistant who tape recorded the discussions and took backup notes. The hospital offered a conducive room to have the discussions.

3.8.2. Data Management

Data from questionnaire was double entered into a computer database designed using MS-Access application. Regular file back-up was done to avoid any loss or tampering. The data retrieved was stored safely on daily basis to avoid unauthorized access. Back up files were stored in flash/hard discs. Data cleaning and validation was performed in order to achieve a clean dataset that was exported into a Statistical Package format (using SPSS version 23.0) ready for analysis. Recorded data from the FGD was transcribed and stored in flash/hard discs.

3.9 Data Analysis

3.9.1 Univariate Analysis

Means, median, range and standard deviation were calculated for continuous variables e.g., age of the respondents. Frequencies and percentages were calculated for categorical variables e.g., Marital status, religious affiliation, highest level of education, gender of child and monthly income. Bar graphs and tables were used to display the data.

3.9.2 Bivariate analysis

This was performed to determine association between dependent and independent variables. The categorical variables were analyzed using Chi square test or Fischer's exact test. $P < 0.05$ was considered significant.

3.9.3 FGD Analysis

Transcribed data was translated into English (where applicable) and manually coded and subjected to verbatim and a three-stage thematic approach based on the responses from participants and study objectives. In the first stage, data was transcribed and re-read to generate answers to open ended questions. In the second stage, it was sorted in specific

themes which were then coded to match specific relevant research questions in the third stage.

3.10 Data Presentation

After analysis, presentation of the data was done through frequencies, percentages, tables and charts. Verbatim and textual summaries were also used to present qualitative data where applicable.

3.11 Ethical Consideration

The proposal to conduct this study was submitted to Kenyatta National Hospital/University of Nairobi Ethical Review Committee for ethical approval and it was granted. Permission to access the facility and patients was sought from AIC Cure International Children's Hospital. Informed consent was sought from the participants before they could be allowed to participate in the study (Appendix III and IV). All information was treated with utmost confidentiality. Mothers of children under five years with clubfoot who did not consent to the study were excluded. Mothers of seriously sick children under five years with clubfoot were excluded. Sick mothers of children under five years with clubfoot were excluded.

CHAPTER FOUR

FINDINGS

4.1 Response Rate

The sample population had 174 respondents of which 173 returned filled questionnaires. Therefore, the response rate was 99 percent.

4.2 Characteristics of the respondents

4.2.1 Socio-Demographic Characteristics of the Study Respondents

The participants' age ranged from 18 years to 64 years, the mode was 30 years, median 30 years and the mean age was 30.52 ± 2.54 . At least 134(77.5%) were less than 35 years, of which 55(31.8%) were between 30-34 years, 33(19.1%) were between 18-24 years and 4(2.3%) were between 50-64 years

Regarding marital status, approximately 82% were in marital union with 21(21.1%) being single at the time of the study, 165(95.4%) were Christians and almost three-quarter of respondents 138(79.8%) had more than one child and of which 63(36.4%) had 3-5 children and 6(3.5%) had more than 5 children (table 4.1)

Table 4. 1: Socio-Demographic Characteristics of Respondents

Characteristics	Frequency	Percent
Age (in complete years)		
18-24 years	33	19.1%
25-29 years	46	26.6%
30-34 years	55	31.8%
35-39 years	24	13.9%
40-44 years	4	2.3%
45-49 years	7	4.0%
50-64 years	4	2.3%
Marital status		
Single	21	12.1%
Married	141	81.5%
Divorced/separated	11	6.4%
Religious affiliation		
Christian	165	95.4%
Muslim	8	4.6%
Parity		
1-2 children	104	60.1%
3-5 children	63	36.4%
More than 5 children	6	3.5%
Highest level of education		
Primary education and below	41	23.7%
Secondary education	78	45.1%
Tertiary education	54	31.2%

4.2.2 Socio-Economic Characteristics of the Respondents

Approximately 28% of respondents had no income generating activity of which 71(41.0%) were self-employed and 35(20.2%) were salaried employees. The results further show that 110(63.6%) had monthly income of less than Ksh 10000 (table 4.2)

Table 4. 2: Socio-Economic Characteristics of the Respondents

Characteristics	Frequency	Percent
Employment status		
Student	3	1.7%
Unemployed	45	26.0%
Employed	35	20.2%
Self-employed	71	41.0%
Farmer	18	10.4%
Retired	1	0.6%
Monthly income		
No income	48	27.7%
Up to Ksh 9999	62	35.8%
Ksh 10000-19999	36	20.8%
Ksh 20000-29999	7	4.0%
Ksh 30000-39999	6	3.5%
Ksh 40000-49999	4	2.3%
Ksh 50000 and above	10	5.8%

4.3 Characteristics of the Child

The table showed that 115 (66.5%) were between 1-5 years of age and almost 63% of children in the study were males. Amongst all respondents interviewed, 35 (20.2%) had a relapse while 135 (79.8%) were first time patients with clubfoot. 99 children (57.2%) had bilateral clubfoot (table 4.3).

Table 4.3: Characteristics of the Child

Characteristics	Frequency	Percent
Age		
1-6 months	30	17.3%
7-9 months	28	16.2%
1-2 years	75	43.4%
2-5 years	40	23.1%
Sex		
Male	108	62.4%
Female	65	37.6%
Limb with clubfoot		
Right	42	24.3%
Left	32	18.5%
Both	99	57.2%
Nature of clubfoot		
First time	138	79.8%
Relapse	35	20.2%
Birth order of child with clubfoot		
First born	75	43.4%
Second and third born	75	43.4%
Fourth born and above	23	13.3%

4.4 Health of Child during Delivery

In this study, 154(89.0%) had clubfoot only and apart from club foot, 19(11.0%) had other medical conditions (figure 4.1)

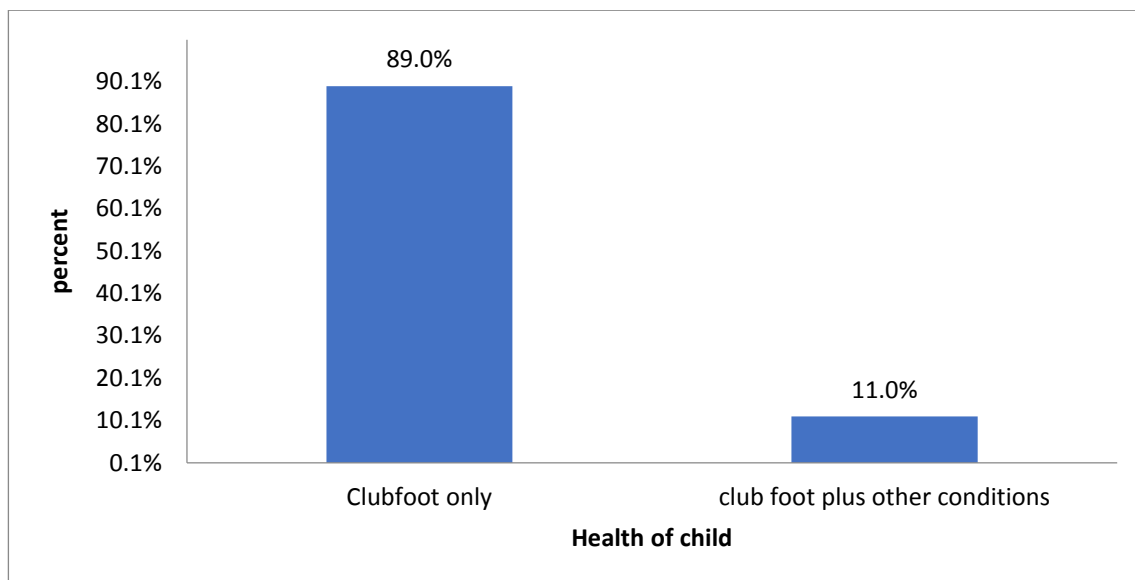


Figure 4. 1: Health of Child During Delivery

4.5 Specific Health Conditions

Among the children with other medical conditions, 12(63.2%) had chest problem and 6(31.6%) had cerebral palsy (table 4.4)

Table 4.4: Specific Health Conditions of the Child

*Specific health conditions	Frequency	Percent
Chest problem	12	63.2%
Spina bifida	8	42.1%
Hydrocephalus	5	26.3%
Cerebral palsy	6	31.6%

*multiple response

Majority of the respondents (n=15) did not agree with the believe that clubfoot is a curse by a relative or a supernatural power. Rather, they understood that this is a medical condition which could be managed. Most mothers were of the view that club foot was a

disease just like any other. *“Club foot ni ugonjwa tu kama malaria na unaweza tibiwa ukifuata maagizo ya daktari (Translation: Club foot is a disease just like Malaria and it can be managed if you follow doctor’s advice)”*. (Group 2).

In a different group, majority of the mothers were in agreement with their sentiments; *“There are other parents with some traditional and superstitious thoughts about clubfoot, it is not a big deal, our children are almost getting well. They walk almost properly”* (Group 3)

4.6 Compliance to Bracing among the Respondents

4.6.1 Proportion of Compliance to Bracing

Figure 4.2 shows that 29(16.8%) of respondents didn’t comply to the bracing

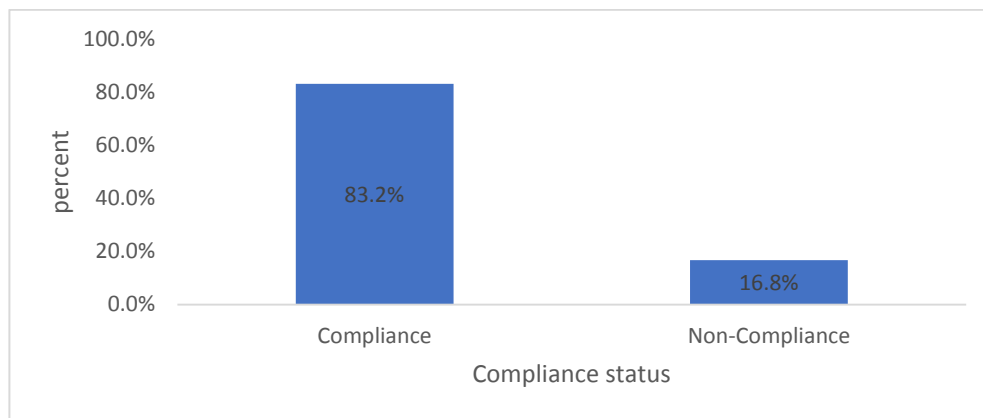


Figure 4.2: Proportion of Compliance to Bracing

Majority of the respondents (83.2%) complied to bracing. This indicated that they applied the brace correctly and for the correct hours as required. During the FGDs, majority of the mothers exhibited knowledge on how and when to brace; *“Initially the braces are applied for 23 hours’ day and night with a one-hour break during which the child is bathed and the manipulation done. This takes place for a period of three months.”* (Group 1).

Mothers in a different group exhibited the same understanding; “At the moment we are having the braces for 23 hours with one-hour rest.” (Group 4).

4.6.2 Socio-Demographic Factors Associated with Clubfoot Bracing

The cases of non-compliance to bracing were higher among caretaker between 25-29 years (23.9%) and 18-24 years (21.2%) however, there was no significant association ($p=0.346$) between age and non-compliance to bracing. Additionally, 20.5% of caretaker with secondary level of education didn't comply to bracing as well as 11.1% of caretakers with tertiary education, however, there was no significant association ($p=0.053$) between level of education and non-compliance to bracing (table 4.5).

Table 4. 5: Socio-Demographic Factors Associated with Clubfoot Bracing

	Compliance	Non-compliance	Chi square	p-value
Age			6.736	0.346
18-24 years	26(78.8%)	7(21.2%)		
25-29 years	35(76.1%)	11(23.9%)		
30-34 years	47(85.5%)	8(14.5%)		
35-39 years	22(91.7%)	2(8.3%)		
40-44 years	4(100.0%)	0(0.0%)		
45-49 years	7(100.0%)	0(0.0%)	df 6	
50-64 years	4(100.0%)	0(0.0%)		
Marital status			3.513	0.319
Married	121(85.8%)	20(14.2%)		
Divorced/separated	9(81.8%)	2(18.2%)		
Single	14(70.0%)	6(30.0%)	df 2	
Number of Children			1.588	0.452
1-2 Children	88(60.7%)	16(57.1%)		
3-5 children	51(35.2%)	12(42.9%)	df 2	
More than 5 children	6(4.1%)	0(0.0%)		
Religious affiliation			0.480	0.488
Christian	139(84.2%)	26(15.8%)		
Muslim	6(75.0%)	2(25.0%)	df 1	
Highest level of education			7.681	0.053
Primary and without formal education	35(85.4%)	6(16.3%)		
Secondary	62(79.5%)	16(20.5%)	df 2	
Tertiary	48(88.9%)	6(11.1%)		

4.6.3 Socio-Economic Factors Associated with Clubfoot Bracing

The table below shows that 25.0% of mothers who travelled more than 100km to health facility didn't comply to bracing. 29.5% of mothers who indicated that transport charges were a challenge to them didn't comply to bracing. Affordability of transport costs (p=0.006) was significantly associated with club foot bracing (table 4.6)

Table 4.6: Socio-Economic Factors Associated with Clubfoot Bracing

Factors	Compliance	Non-compliance	Chi square	p-value
Occupation			2.653	0.753
Unemployed	37(82.2%)	8(17.8%)		
Student	3(100.0%)	0(0.0%)		
Employed	27(77.1%)	8(22.9%)	df 5	
Farmer	15(83.3%)	3(16.7%)		
Self Employed	62(87.3%)	9(12.7%)		
Retired	1(100.0%)	0(0.0%)		
Monthly income			6.400	0.269
No income	40(83.3%)	8(16.7%)		
Up to Ksh 9999	6(66.7%)	3(33.3%)		
Ksh 10000-19999	27(75.0%)	9(25.0%)		
Ksh 20000-29999	5(71.4%)	2(28.6%)	df 6	
Ksh 30000-39999	4(66.7%)	2(33.3%)		
Ksh 40000-49999	3(75.0%)	1(25.0%)		
Ksh 50000 and above	7(70.0%)	3(30.0%)		
Transport fare			7.635	0.006
Affordable	113(88.3%)	15(11.7%)	df 1	
Not affordable	31(70.5%)	13(29.5%)		

During the FGDs, some mothers explained that they covered long distances from home to the health facility in pursuit of their children’s treatment;

“...okay coming to this place all the way from where we come from is not easy, it’s far and it takes time and money” (Group 1).

In a different group, some mothers said that they used more than Ksh 1,000 to travel to and from AIC Cure’ *“It’s a challenge for us to afford that. Ksh 1000 does not come easily. It is not easy to raise Ksh 1000 per week for treatment” (Group 3).*

Asked whether they viewed clubfoot as a burden, majority thought it was a condition just like any other and they had got used to it;

“It’s a challenge we agree, not really a burden, but when we see our children improving, we feel good” (Group 4).

4.6.4 Child Demographic Characteristics Associated with Clubfoot Bracing

The cases of non-compliance to bracing were mostly reported in male children 25(23.1%), however there was significant association with child’s sex (p=0.001) (table 4.7)

Table 4.7: Child Demographic Factors associated with clubfoot Bracing

Factors	Compliance	Non-compliance	Chi square	p-value
Sex			10.274	0.001
Male	83(76.9%)	25(23.1%)	df 1	
Female	62(95.4%)	3(4.6%)		
Age			2.100	0.552
1-6 months	25(83.3%)	5(16.7%)	df 3	
7 - 9 months	21(75.0%)	7(25.0%)		
1 - 2 years	65(86.7%)	10(13.3%)		
2 - 5 years	34(85.0%)	6(15.0%)		
Leg with club foot			4.312	0.116
Right	38(90.5%)	4(9.5%)	df 2	
Left	29(90.6%)	3(9.4%)		
Both	78(78.8%)	21(21.2%)		
Born with club foot			0.791	0.374
Yes	141(83.4%)	28(16.6%)	df 1	
No	4(100.0%)	0(0.0%)		

4.7 Knowledge and Attitude of Respondents on Bracing

4.7.1 Level of Knowledge

More than half of the respondents 109(62.8%) were knowledgeable on bracing while 64(37.2%) were not knowledgeable as shown in figure 4.3.

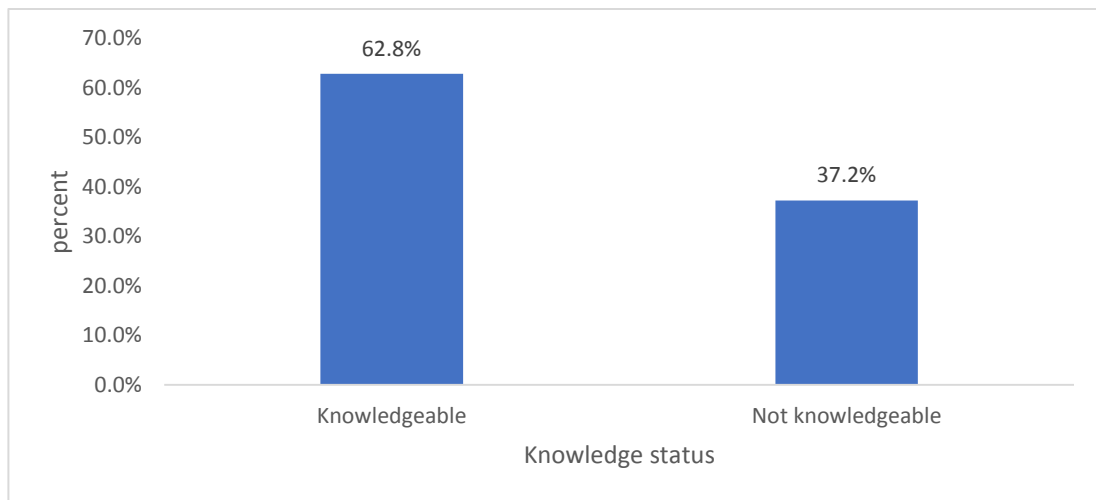


Figure 4.3: Level of Knowledge

4.7.2 Respondents Knowledge on Bracing

Table 4.8 shows that respondents who were not knowledgeable on bracing were more likely to fail to comply with bracing, however the variable is significantly associated with non-compliance to bracing

Table 4.8: Respondents Knowledge on Bracing

Factors	Compliance	Non-compliance	Chi square	p-value
Level of Knowledge			8.632	0.026
Knowledgeable	96(88.1%)	13(11.9%)	df 1	
Not knowledgeable	49(76.6%)	15(23.4%)		

4.7.3 Attitude of Respondents towards Bracing and Non-Compliance to Bracing

Positive and negative attitude were regarded as eager to learn more on bracing and applying brace without being pushed or reminded and not bothered much about bracing and have to be pushed or reminded to brace their children respectively.

Table 4.9 shows that negative attitude of respondents towards bracing was more likely to lead to non-compliance, however, attitude was not significantly associated with non-compliance. The attitude was determined by the respondent's responses during the quantitative data. 92.3% of the responses indicated that it was important to brace and they were determined to apply the braces without being pushed until when advised otherwise by a health professional, while the remaining 74.4% explained that bracing was tiresome and even uncomfortable for their children. Among the 42.1%, some said they at times forgot to put on the brace until when reminded by their spouse or another relative.

Table 4.9: Attitude of Respondents towards Bracing

Factors	Compliance	Non-compliance	Chi square	p-value
Attitude status			1.241	0.302
Positive attitude	84(92.3%)	7(7.7%)	df 1	
Negative attitude	61(74.4%)	21(25.6%)		

4.7.4 Attitude of Respondents on Health Providers

Most of respondents 148(85.5%) and 146(84.4%) said they got needed information from health professionals and that the Health Professionals were friendly, respectively. However, the variable was not significantly associated with non-compliance (table 4.10).

Table 4.10: Attitude of Respondents on Health Providers

Attitude	Compliance	Non-compliance	chi square	p-value
Enough information			0.001	0.978
Yes	124(83.8%)	24(16.2%)	df 1	
No	21(84.0%)	4(16.0%)		
Friendliness of Health Providers			0.044	0.833
Yes	122(83.6%)	24(16.4%)	df 1	
No	23(85.2%)	4(14.8%)		
Health Providers demonstration of bracing			0.197	0.657
Yes	142(83.5%)	28(16.5%)	df 1	
No	1(100.0%)	0(0.0%)		

During the FGDs, mothers explained that health professionals adequately supported them by explaining how they ought to brace their children. This was highlighted by responses such as: “After 3 months, *Daktari* reminds us to always put the shoes in the day and the braces at night. So, during day time no braces, you put the normal shoes.” (Group 2).

“After the three months’ day and night of brace wear, we should stop using the braces during the day and use only during the night. We use normal shoes during the day. The way the doctors are friendly and concerned make us follow their instructions as given.” (Group 3).

4.7.5 Support Offered by Health Providers

Majority of the mothers 157(90.7%) received professional support of which 26(92.9%) failed to comply with bracing. Health professional support was not associated with non-compliance to bracing (table 4.11)

Table 4.11: Support Offered by Health Providers

Support	Compliance	Non-compliance	chi square	p-value
Health Professionals patience in treatment			0.519	0.471
Yes	127(83.0%)	26(17.0%)	df 1	
No	17(89.5%)	2(10.5%)		
Health Providers support in treatment			0.049	0.826
Yes	131(83.4%)	26(16.6%)	df 1	
No	12(85.7%)	2(14.3%)		

4.7.5 Support Offered by the Spouse

Slightly more than three-quarter 114(87.7%) of respondents received support from their partner mostly financial support 106(93.0%). This support was not significantly associated with non-compliance to bracing (table 4.12)

Table 4.12: Support Offered by the Spouse

	Compliance	Non-compliance	Chi-square	p-value
Support from spouse			0.186	0.666
Yes	114(85.1%)	20(14.9%)	df 1	
No	16(88.9%)	2(11.1%)		
Spouse accompany mother to clinic			0.035	0.851
Yes	97(85.8%)	16(14.2%)	df 1	
No	33(84.6%)	6(15.4%)		

4.7.6 Support Offered by Relatives

Most of respondents 144(83.2%) receives support from relatives of which 124(85.5%) complied with bracing and 20(71.4%) failed to comply with bracing, however there was no significant association (table 4.13)

Table 4.13: Support Offered by the Relative

	Compliance	Non-compliance	chi square	p-value
Relative's support			3.339	0.068
Yes	124(86.1%)	20(13.9%)	df 1	
No	21(72.4%)	8(27.6%)		
Expose child to relatives or friends			1.167	0.280
Yes	126(84.6%)	23(15.4%)	df 1	
No	15(75.0%)	5(25.0%)		

Most of the mothers did not have a problem in carrying their braced children in public even when uncovered. Some mothers contradicted some believe that mothers are ashamed of exposing the braces in public by saying “...but the children are ours, will

they treat them if we don't? there is no reason for us to be embarrassed of exposing the braces. That is medicine just like any other!" (Group 4). "We hear there are some mothers who are afraid to undress their children in public, like now you see it's hot and most of us have put only t-shirts to our children and the braces can be seen by everyone. Why should we be embarrassed?" (Group 2).

Mothers who had other children apart from the one with club foot reported that at times it was tricky to give full attention to this one child because other children also needed to be attended to; *"at times we have also to attend to other children and we find ourselves skipping clinic days, especially when there are school meetings for the other children or when the other children are not feeling well. We cannot leave the rest unattended to when they are sick" (Group 3).* In group 4, mothers were of similar opinion; *"the other children also need us and we cannot neglect them, otherwise they will think we don't love them like these ones."*

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussion

5.1.1 Proportion of non- compliance to bracing

In this study, 16.8% of the respondents did not comply to bracing. This concurs with Dobbs et al (2014) study that reported a 183 (17%) of children with clubfoot risk recurrence due to poor compliance of parents to braces after correction by the Ponseti method. Gelfer et al (2015) also found 17.6% of parents had poor compliance to bracing, although the finding did not find a significant relationship between the rate of recurrence and the compliance of brace wearing. These findings are lower than McElroy *et al.*, (2017) study which found 28.8% of parents had poor compliance to bracing. However, majority of the respondents (83.2%) complied to bracing. This large percentage of compliance can be attributed to the fact that majority of the respondents (76.3%) had secondary and tertiary education, which could make their understanding of the club foot easy to grasp and also make it easy to comprehend the consequences of non-compliance to bracing. Although level of education had no significant association with non-compliance, it is also worth noting that on the flip of the coin cases of non-compliance were highest among those with secondary education and below, at 36.8%. This could be due to their inability to grasp their understanding of the condition in comparison to the tertiary education respondents. These findings concur with a study by Mohammed *et al.*, (2016) which indicated that low maternal educational level led to non-compliance to bracing, and further leading to recurrence of the clubfoot. They also concurred with Branch (2012) who found out that parental education below high school level carried a tenfold increased risk of non-compliance. Similarly, Ayman *et al.*, (2015) found no significant correlation between compliance and parent's level of education.

5.1.2 Knowledge and Attitude on Bracing

This study found that majority of the participants (62.8%) were knowledgeable on bracing with 85.5% receiving enough information on bracing from healthcare provider. This indicates that the health professionals are effective in their service delivery and have a huge impact on compliance to bracing by the respondents. More than three quarters of the respondents (84.4%) said that the health providers were friendly. This is a very positive finding indicating the good relationship between the health professionals and the mothers of children with club foot. Good relationship between a health professional and a client/patient is the number one contributing factor to treatment compliance. These findings concur with the results of Bedford, (2009) which showed that more than 97% of parents had knowledge of bracing. They however differ with findings of a study conducted among the community in Mwanza, Tanzania in 2014 which showed that 38.5% of urban and 44.3% of rural residents had no knowledge about bracing, while 5.3% of urban and 11% of rural respondents knew clubfoot as a permanent deformity (Ayman, *et al.*, 2015). In this study, majority of respondents 160 (78.8%) said the hole is the good indicator for a well fitted braces, this was not statistically significant in this study. This is consistent with Ukoha et al., (2011) study carried out in Nigeria which found 81% of parents were aware of an indicator of well fitted braces.

The study found out that more than half the respondents (52.6%) had a positive attitude towards bracing. This was arrived through their responses; that it was important to brace correctly, they were determined to apply the braces without being pushed or reminded until when advised otherwise by the health professionals. The rest however felt that bracing was tiresome, was uncomfortable to their children and they explained that most of the time they had to be pushed or reminded to brace their children by either their spouses or relatives. Although attitude was not significantly associated with non-compliance to bracing, findings show that negative attitude of respondents towards bracing was more likely to lead non-compliance with 75% of those who did not comply

being those with negative attitude. This can be attributed to having superstitious beliefs on club foot and hence thinking that it is not curable and as a result not complying to medical advice, removal of the brace once the child cries, feeling ashamed of the disease and hence not bracing the child when people are around etc.

Majority of the mothers felt that health professionals were helpful in demonstration of how to apply the braces, were patient in offering treatment and that generally they were supportive in their treatment at 98.3%, 88.4% and 90.8% respectively. However, all these factors had no significant association with compliance. This is consistent to a study by Branch (2012), interpersonal dynamics of physician-patient relationship play a very important role in determining a variety of patient outcomes including compliance to treatment,

5.1.3 Social Factors Associated with Non-Compliance to Bracing

In this study 65.3% of both parents accompanied the children to the clinic always. The rate of compliance was 85.8% among mothers who were accompanied by the spouses. This highlights the importance of both parents' involvement in compliance to a treatment regime. It further stresses on the need to have healthy relationship between parents which is critical for compliance to treatment. However, these findings differ with findings of a study by Akintayo *et al.*, (2012) which found out that during the first clinic 82.3% of children had both parents and thereafter the mother was the only parent available. However, the company by spouse was not found to have any significance association with non-compliance to bracing.

In this study, monthly income had no significant association with non-compliance to clubfoot. This contrasts with findings of a study conducted in Karachi, Pakistan which found out that the major reason for poor and non-compliance was low income, unaffordability of time and cost for regular follow-up (Iftikhar *et al.*, 2014). It also contrasts with Zion and Dietz (2010) findings that identified costs of braces as one of the most significant barriers to non-compliance and especially in low-income earners. Lack

of significance association of monthly income and non-compliance in this study can be attributed to free services for all clubfoot management procedures including the FABs.

In this study, inability to meet transport costs were significantly associated with non-compliance to bracing. This is in agreement to studies done by Kawashima and Uthoff (2010) and Avilucea *et al.*, (2009) which observed that transport challenge by caretakers health facilities increased non-compliance to bracing. Non-compliance can be attributed to skipping of clinic attendance due transport challenges hence missing health professionals' advice and review, which is critical in management. It can also be attributed to failure to replace FABs which have outgrown children if one fails to go for review due to distance challenges, results to either bracing the child with outgrown FABs which are not effective, or not bracing the child at all.

Majority of those who did not comply to bracing (57.2%) had children with bilateral clubfeet. This differs with a study by Ayman *et., al* (2015) findings that unilateral clubfoot was a risk factor for non-compliance in parents as opposed to bilateral clubfeet.

Majority of the respondents (86%) indicated that they had no problem in exposing their braced children in public to relatives or friends. This could be attributed to the fact that majority of them (83%) got enough support from relatives and hence giving them the confidence to brace and expose their braced children in public. They feel embraced by their own. This differs with Staheli (2009) who found out that parents/caretakers of children with clubfoot hide them and fail to attend to treatment appointments because they experience a range of negative behaviour or negative attitudes as a direct result of clubfoot. The findings also differ with a study carried out by Naomi (2012) in Kenya which indicated that due to some cultures which consider clubfoot as a curse or punishment for wrong doing, no support is offered to children with clubfoot and their family, which was seen to affect consistency with treatment leading to non-compliance or neglect of clubfoot.

5.2 Conclusion

Failure to comply to bracing is a public health concern whose consequences will continue to pose serious public health challenges to both the children with club foot and the mothers if not appropriately addressed. Disability and low esteem as a result of the clubfoot may lead to mental health related issues and inability to perform basic tasks. The consequences will also in turn exert a lot of pressure to the existing health system.

Maternal Knowledge and attitude are highly associated with compliance to bracing as this leads to a better understanding and approach towards appropriate maternal care towards children with clubfoot.

Inability to meet transport costs to health facilities remains a key issue associated with maternal compliance to bracing. Mothers/caregivers are likely to miss reviews due to this challenge. This challenge if not addressed will continue to contribute to increase in the number of children with disability posing physical and emotional pain to both children with clubfoot and their mothers/caregivers. Further, this is a public health risk which will as well lead to government economic burden.

5.3 Recommendations

Based on the findings, this study recommends -

1. The need by the Ministry of Health in collaboration with county governments to advance and embrace feasible community health strategies to aid continued sensitization of communities/households to comply to bracing through community health volunteers.
2. The Ministry of Health should develop and roll out empowerment framework and policy to empower selected facilities at the county level to be able to manage clubfoot and its conditions. This is because inability to meet transport costs to referral facilities was significantly associated with compliance to bracing.

3. The Ministry of Health should develop a working partnership with county governments to allocate sufficient resources and develop relevant strategies of forming support groups for mothers of children with clubfoot. This will help demystify that clubfoot is a curse and enable mothers interact and learn from each other on how to manage the condition. This will not only facilitate tracing and follow up by health care workers but also facilitate mothers to the referral facilities.
4. Multisectoral approach involving the Ministry of Health, county health teams and other stakeholders should be used to provide detailed and feasible health education and promotion on clubfoot bracing and importance of parent compliance.
5. Training of clubfoot to be incorporated in curricula of Medical Training Colleges/Institutions by the relevant professions to train well equipped personnel with knowledge and skills to adequately handle and manage cases of club foot right from level 2.
6. Further research and studies, particularly with prospective design, to be undertaken to have more in-depth knowledge on institutional determinants of bracing among mothers/caregivers of children with clubfoot.

REFERENCES

- Akintayo O.A., Adegbehingbe O., Cook T. and Morcuende J.A. (2012) Initial Program Evaluation of the Ponseti Method in Nigeria. *The Iowa Orthopaedic Journal.*;32, 141-149.
- Avilucea F.R., Szalay E.A., Bosch P.P., Sweet K.R. and Schwend RM. (2009) Effect of cultural factors on outcome of Ponseti treatment of clubfoot in rural America. *Journal Bone Joint Surgery America*; 91, 530-40
- Ayman H.,Jawadi., Essam M., Al-Abbasi. and Hani A.Tamim. (2015) Factors predicting brace noncompliance among idiopathic clubfoot patients treated with the Ponseti method. *Taibah University Journal for Medical Science, Volume 10, Issue 4*
- Bedford, K. (2009) Perceptions of and treatment-seeking behaviour for Congenital Talipes Equinovarus (Clubfoot) Deformity in Malawi, University of Oxford, 51–53 Banbury Road, Oxford OX2 6PE, UK
- Boardman A., Jaywardena A, Oprescu F., Cook T. and Morcuende J.A. (2011) The Ponseti method in Latin America: Initial impact and barriers to its diffusion and implementation. *Iowa Orthopaedic Journal*; 31, 30–35.
- Boehm, S. and Sinclair, M. (2007) Foot abduction brace in the Ponseti method for idiopathic clubfoot deformity; torsional deformities and compliance *Journal Pediatric Orthopaedic*, 27, 712–716
- Boo N.Y. and Ong L. (2014) Congenital Talipes in Malaysian Neonates: Incidence, pattern and associated factors. *Singapore Medical Journal*; 31, 539–542.
- Branch W.T. (2012) The ethics of caring and medical education; *Medical journal* 75, 127–132.

- Broardman, A. and Morcuende, J. (2010) “Initial Impact and Barriers of the Ponseti Method in Latin America. Department of Orthopaedic Surgery and Rehabilitation, Carver College of Medicine, University of Iowa.
- Carlidge I. (2011) Observations on the epidemiology of club foot in Polynesian and Caucasian populations. *Medical Genetics*; 21(4), 290-2.
- Engell V. (2008) Club foot: a twin study. *Bone Joint Surgery*; 88(3), 374-6.
- Fishers et al (1998)
- Garg S. and Porter K. (2012) Improved bracing compliance in children with clubfeet using a dynamic orthosis. *Journal of Child Orthopaedics*; 3, 271-6.
- Göksan, SB., Bilgili, F., Eren. I., Bursalı, A., and Koc, E. (2014) Factors Affecting Adherence with Foot Abduction Orthosis Following Ponseti Method. *Acta Orthopaedica et Traumatologica Turcica*. 49(6), 620-6.
- Gupta A., Singh S., Patel P., Patel J. and Varshney M.K. (2008) Evaluation of the utility of the Ponseti method of correction of clubfoot deformity in a developing nation. *International Orthopaedics*.;32, 75-9.
- Iftikhar Memon., Anisuddin Bhatti., Parvez Ali., Kashif Mahmood. and Saeed Minhas .M. (2014) Difficulties in maintenance of clubfoot abduction brace and solutions - maintenance of clubfoot abduction brace, locks and keys Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan
- Jahng K.H., Martin L.R. and Golin C.E. (2010) Preferences for medical collaboration: patient-physician congruence and patient outcomes. *Patient Education Counselling*; 57, 308–14.
- Jawadi, A., (2010) Clubfoot management by the Ponseti technique in Saudi patients, *Saudi Medical Journal*, 31 (1), 179–182

- Kawashima T. and Uhthoff H.K. (2010) Development of the foot in prenatal life in relation to idiopathic club foot. *Pediatric Orthopaedic*; 10(2),:232-7.
- Kazibwe H. and Struthers P. (2009) Barriers experienced by parents of children with clubfoot deformity. *Tropical Doctor* 39(1), 15-8 .
- Leslie R Martin., Summer L Williams., Kelly B Haskard., and Robin DiMatteo M. (2012) The challenge of patient adherence. *Health Psychology Review Journal*, 6(1), 74-91
- Lu, N., Zhao, L., Du, Q., Liu, Y., Oprescu, F. I. and Morcuende, J. A. (2010) From cutting to casting: impact and initial barriers to the ponseti method of clubfoot treatment in china. *The Iowa Orthopaedic Journal*, 30, 1–6.
- Mathias, R.G., Lule, J.K., Waiswa, G., Naddumba,. E.K., and Pirani, S. (2010) Incidence of clubfoot in Uganda. *Journal of Public Health* 101(4), 341-344
- McElroy T., Konde-Lule J., Neema S., Gitta S. (2015) The Uganda Sustainable Clubfoot Care Project. ‘Understanding the barriers to clubfoot treatment adherence in Uganda: A rapid ethnographic study’. *Disability & Rehabilitation*; 29, 845-55.
- Melissa P., Thomas C., Julio S., Augustin P. and Morcuende J. (2014) Descriptive Epidemiology of Clubfoot in Peru: A Clinic-Based Study. *The Iowa Orthopaedic Journal*. 2013; 33, 167–171.
- Miller NH., Carry PM., Mark BJ., Engelman GH., Georgopoulos G., Graham S., and Dobbs MB. (2016) Does strict adherence to the ponseti method improve isolated clubfoot treatment outcomes? A two-institution review. *Clinical Orthopaedics and Related Research*®;474(1), 237-43

- Mohammad R., Azarpira J., Mohammad J., Amir V. and Keivan R. (2016) Factors associated with recurrence of clubfoot treated by the Ponseti method. *World Journal of Clinical Cases*. 2016; 4(10), 318–322.
- Morcuende J. (2009) Congenital idiopathic clubfoot: prevention of late deformity and disability by conservative treatment with the Ponseti technique. *Pediatric*. 35(2), 128,132–30,6.
- Naomi W.K. (2012) Perceptions regarding medical management of clubfoot in Kenya. *International Journal of Physical Medicine and Rehabilitation*, 2015, 3, 309
- Nigeria Demographic and Health Survey (2008) ICF Macro, Maryland USA 2009 p1, 3, 106, 114.
- Nogueira, M. P., Fox, M., Miller, K., and Morcuende, J. (2013). The Ponseti Method of Treatment for Clubfoot in Brazil: Barriers to Bracing Compliance. *The Iowa Orthopaedic Journal*, 33, 161–166.
- Parker S., Mai C., Strickland M., Olney R., Rickard R., Marengo L., Wang Y., Hashmi S. and Meyer. (2009) Multistate study of the epidemiology of clubfoot. *Birth Defects Research Part A - Clinical and Molecular Teratology*, 85(11), 897-904.
- Pirani S., Maddumba E., Mathias R., Kone-Lule J., Penny J., Beyeza T., Mbonye B., Amone J. and Franceschi F. (2009) Towards effective Ponseti clubfoot care: the Uganda sustainable clubfoot care project. *Clinical Orthopaedic*.;467, 1154–1163.
- Robertson W. and Corbett D. (2013) Congenital clubfoot. Month of conception. *Clinical Orthopaedic*; 331, 14-8.
- Staheli, L. (2009) Ponseti Management (3rd edition.). www.global-help.org.
- Ukoha U., Egwu O., Okafor I., Ogugua P., Udemezue O., Olisah R. and Anyabolu A. (2011) Incidence of congenital talipes equinovarus among children in southeast

Nigeria. *International Journal of Biological and Medical Research*. 2011; 2(3), 712-715

Verma, A., Mehtani, A., Sural, S., Maini, L., Gautam, V.K. and Basran, S.S., (2012) Management of idiopathic clubfoot in toddlers by Ponseti's method. *Journal Pediatric Orthopaedics*; 21, 79-84.

Victor, K. Wu. and Dan Poenaru (2013) Burden of Surgically Correctable Disabilities Among Children in the Dadaab Refugee Camp *World Journal of Surgery* (2013) 37, 1536–1543

Wu, V., Nguyen, M., Nhi, H. M., Thanh, D. V., Oprescu, F., Cook, T., and Morcuende, J. A. (2012) Evaluation of the Progress and Challenges facing the Ponseti Method Program in Vietnam. *The Iowa Orthopaedic Journal*, 32, 125–134.

Wynne Davies R. (2012) Family Studies and the Cause of Congenital Club Foot. Talipes Equinovarus, Talipes Calcaneo-Valgus and Metatarsus Varus. *Bone Joint Surgery*; 46, 445-63.

Zionts, L.E. and Dietz, F.R. (2010) Bracing following correction of idiopathic clubfoot using the Ponseti method. *Journal American Academic Orthopaedic Surgery*; 18(8), 486-93.

APPENDICES

Appendix I: Questionnaire Informed Consent

Participant's code Date

Study title:

Factors associated with non-compliance to bracing in club foot among mothers of children under five years old in AIC Cure International Children's Hospital, Kijabe, Kenya.

Institution and Investigator:

Researcher	Institution	Contact
Winfred Ndinda	Jomo Kenyatta University of Agriculture and Technology	+254723950053

Introduction

Clubfoot presents early in neonatal life and if not treated becomes more disabling with age. Neglected or inadequately corrected clubfoot can have a dramatic effect on the quality of life of the child. It causes physical impairments that result in decreased ambulation and inability to perform basic tasks such as carrying water, collecting food and going to school.

There are concerns about non-compliance to bracing from various studies and even the founder of the Ponseti method admitting that bracing is a challenge. Findings of this study will help bring out the factors associated with non-compliance to bracing which can then be addressed by the various stakeholders.

Non-compliance to bracing during club foot management leads to relapse. This can have a dramatic effect on the quality of life of the child. It causes physical impairments

that result in decreased ambulation and inability to perform basic tasks such as carrying water, collecting food and going to school. This leads to dependency for activities of daily living with significant economic impact on the family. In addition, the structural differences in children with clubfoot are associated with social stigma, which has a psychological effect on the child. On the family, it carries the burden of providing for the disabled and is financially poorer. On society, ill health is the leading cause and consequence of poverty in developing nations.

Further, relapse is frustrating both for parents and clinicians. It also results in considerable waste of parents' and service providers' resources, but most important it can lead to permanent disability of the affected children. This research aims at establishing factors associated with non-compliance to bracing.

Being in the study is your choice.

This consent form gives you information about the study, the risks and benefits, and the process that will be explained to you. Once you understand the study, and if you agree to take part, you will be asked to sign your name or make your mark on this form. You will be given a copy to take home.

Before you learn about the study, it is important that you know the following:

- Your participation in this study is entirely voluntary
- You may decide to withdraw from the study at any time, without facing any consequences

Purpose of the study:

To determine *factors* associated with non-compliance to bracing in club foot among mothers of children less than five years old in AIC Cure International Children's Hospital, Kijabe, Kenya.

If you choose not to participate or to leave the study:

You have the choice to not participate in this research study. If you choose not to participate in this study, you may do so freely without consequences against you.

Risks and/or discomforts:

I do not anticipate any risks or discomforts to you during this study.

Benefits to you:

You may not get direct benefit from the information you provide for this study. However, the results will be used to assist in formulating policies that may initiate strategies on the matter being studied.

Costs to you:

There is no cost to you for participating in this study apart from your precious time.

Your records will be private:

Every effort will be made to keep the information you provide confidential. You will be only identified by a code and personal information from the questionnaire will not be released without your written permission. The information in the questionnaire cannot be identified as belonging to you. You will not be personally identified in any publication about this study. Your records may be reviewed by KNH/UON Ethical Review Committee.

Injury because of participating in this study:

It is unlikely that any form of injury could happen to you or your child as a result of being in this study. It is important that you tell the researchers if you feel that you have been irritated or damaged because of taking part in this study.

Problems and questions:

You will be given a copy of this form to take with you. If you have any questions or concerns about your rights as a research participant, please contact:

The Principal;

College of Health Sciences

Jomo Kenyatta University of Agriculture and Technology

P.O. Box 62200-00200; Nairobi

Tel:254-67-52711/52181-4

Fax: 254-67-52161

director@itromid.jkuat.ac.ke

Your rights as a study participant:

This research has been approved and reviewed by KNH/UON Ethical Review Committee. This committee has reviewed this study in order to help protect participants. If you have any questions about your right as research participant you may contact:

The secretary, KNH/UON Ethical Review Committee,

P.O Box 19676- 00202, Nairobi. Tel. (254-020) 2726300-9 Ext 44355

Email: uonknh_erc@uonbi.ac.ke Website: www.erc.uonbi.ac.ke

Your statement of consent and signature:

If you have read the informed consent, or have had it read and explained to you, and you understand the information and voluntarily agree to join this study, please carefully read the statements below and think about your choice before signing your name:

- I have been given the chance to ask any questions I may have and I am content with the answers to all my questions.
- I know that any information I give will be kept confidential and that I may leave this study at any time.
- If I leave or refuse to be in the study, I understand that there will be no repercussions.
- The name, phone number and address of whom to contact in case of an emergency has been told to me and has also been given to me in writing.
- I agree to take part in this study as a volunteer, and will be given a copy of this informed consent form to keep.

.....

Participant's code

.....

Participant's signature and date

.....

Researcher's name

.....

Researcher's signature and date

Appendix II: Kiswahili Translation: Fomu Ya Kibali Ya dodoso

Nambari ya mshiriki Tarehe

Anwani ya Utafiti:

Mambo yanayohusishwa na kutofunga viatu kwenye kiguu miongoni mwa mama wa watoto chini ya umri wa miaka mitano katika Hospitali ya AIC Cure International Children's, Kijabe, Kenya.

Taasisi na Mpelelezi:

Mtafiti	Taasisi	Nambari ya simu
Winfred Ndinda	Jomo Kenyatta University of Agriculture and Technology	+254723950053

Utangulizi

Kiguu uonekana mapema katika maisha ya mtoto na kisipotibiwa kinalemaza zaidi kadiri mtoto anavyokua. Kiguu kikipuuzwa au kisiporekebishwa kinaweza kuwa na athari kubwa juu ya ubora wa maisha ya mtoto. Kinasababisha kuharibika kwa kimwili na pia husababisha kupungua kwa uwezo na kukosa uwezo wa kufanya kazi za msingi kama vile kubeba maji, kukusanya chakula na kwenda shule.

Kuna wasiwasi juu ya kutofunga viatu kwenye kiguu kutokana na masomo mbalimbali na hata mwanzilishi wa njia ya Ponseti kukubali kuwa kufunga viatu ni changamoto. Matokeo ya utafiti huu yatasaidi kuleta nje mambo yanayohusishwa na kutofunga viatu ambayo yanaweza kushughulikiwa na wadau mbalimbali.

Kutofunga viatu kwa kiguu inavofaa kunasababisha mguu kupata kiguu tena. Hii inaweza kuwa na athari kubwa juu ya ubora wa maisha ya mtoto. Unasababisha kuharibika kwa kimwili ambayo husababisha kupungua kwa uwezo na kukosa uwezo wa kufanya kazi za msingi kama vile kubeba maji, kukusanya chakula na kwenda shule. Hali hii inasababisha kutegemea watu wengine katika shughuli za maisha za kila siku na athari kubwa ya kiuchumi kwenye familia. Pia, tofauti za miundo kwa watoto wenye mguu wa klabu zinahusishwa na unyanyapaa wa kijamii, ambao una athari za kisaikolojia kwa mtoto. Familia nayo hubeba mzigo wa kushughulikia walemavu na hali hii hufanya familia kuwa maskini zaidi. Kwa jamii, afya mbaya ni sababu inayoongoza na matokeo ya umasikini katika mataifa yanayoendelea.

Zaidi ya hayo, kurudia kwa kiguu huvunja wazazi na madaktari/wataalamu moyo. Pia husababisha uharibifu mkubwa wa rasilimali za wazazi na wahudumu, lakini muhimu zaidi inaweza kusababisha ulemavu wa kudumu kwa watoto walioathirika. Utafiti huu unalenga kutadhmini mambo yanayohusika na kutofunga viatu kwa watoto wenye kiguu.

Kuhusika katika utafiti huu ni uchaguzi wako.

Fomu hii ya kibali inakupa habari kuhusu utafiti, hatari na faida, na mchakato utakaoelezea. Mara unapoelewa utafiti huu, na ikiwa unakubali kushiriki, utaombwa kusaini jina lako au kufanya alama yako kwenye fomu hii. Utapewa nakala ya kuchukua nyumbani.

- Kabla ya kujifunza kuhusu utafiti huu, ni muhimu kuwajua yafuatayo:
- Kushiriki kwako katika utafiti huu ni kikamilifu kwa hiari
- Unaweza kuamua kujiondoa kwenye utafiti wakati wowote, bila kukabiliana na matokeo yoyote

Kusudi la utafiti:

Ili kuamua mambo yanayohusiana na kukosa kufunga viatu kwenye kiguu miongoni mwa mama wa watoto chini ya miaka mitano katika Hospitali ya AIC Cure International Children's, Kijabe, Kenya.

Jukumu lako katika utafiti:

Nitawapa maswali ya kujibu kuhusu kiguu na ufungaji wa viatu kwenye mguu huo.

Ikiwa unachagua kushiriki au kuacha utafiti:

Una chaguo la kutoshiriki katika utafiti huu. Ikiwa unachagua kutoshiriki katika utafiti huu, unaweza kufanya hivyo kwa uhuru bila madhara dhidi yako.

Hatari na / au kuharibu:

Sitarajii hatari yoyote au uharibifu wowote wakati wa utafiti huu.

Faida kwako:

Huwezi kupata faida yoyote ya moja kwa moja kutokana na maelezo unayoyotoa kwa ajili ya utafiti huu. Hata hivyo, matokeo yatatumika kusaidia katika kuunda sera ambazo zinaweza kuanzisha mikakati juu ya suala linaloangaziwa.

Gharama kwako:

Hakuna gharama kwako kushiriki katika somo hili mbali na wakati wako wa thamani.

Rekodi zako zitawekwa kwa siri:

Kila jitihada zitafanywa ili kuweka maelezo unayoyotoa kwa siri. Utatambuliwa tu kwa kificho na maelezo ya kibinafsi kutoka kwenye maswali hayatatolewa bila idhini yako iliyoandikwa. Maelezo katika swali la maswali hayawezi kutambuliwa kama yako. Huwezi kutambuliwa binafsi katika chapisho lolote kuhusu utafiti huu. Rekodi zako zinaweza kupitiwa na Kamati ya Ukaguzi wa Maadili ya KNH / UON.

Madhara kutokana na kushiriki katika utafiti huu:

Haiwezekani kwamba aina yoyote ya madhara inaweza kutokea kwako kutokana na kushiriki katika utafiti huu. Ni muhimu kuwaambia wanaohusika na utafiti huu ikiwa unajisikia kuwa umekasirika au kuharibiwa kwa sababu ya kushiriki katika utafiti huu.

Matatizo na maswali:

Utapewa nakala ya fomu hii kuchukua nawe. Ikiwa una maswali yoyote au wasiwasi kuhusu haki zako kama mshiriki wa utafiti, tafadhali wasiliana na:

Mkuu;

Chuo cha Sayansi za Afya

Chuo Kikuu cha Jomo Kenyatta cha Kilimo na Teknolojia

Sanduku La Posta 62200-00200; Nairobi, Nambari ya Simu: 254-67-52711 / 52181-4

Faksi: 254-67-52161

Anwani ya barua pepe: director@itromid.jkuat.ac.ke

Haki zako kama mshiriki:

Utafiti huu umeidhinishwa na Kamati ya Ukaguzi wa Maadili ya KNH / UON. Kamati hii imechunguza utafiti huu ili kusaidia kulinda washiriki. Ikiwa una maswali yoyote kuhusu haki yako kama mshiriki wa utafiti unaweza kuwasiliana na:

Katibu,

KNH/UON Kamati ya Ukaguzi wa Maadili,

Sanduku La Posta 19676- 00202, Nairobi, Nambari ya Simu. (254-020) 2726300-9 Ext 44355

Anwani ya barua pepe: uonknh_erc@uonbi.ac.ke Tovuti: www.erc.uonbi.ac.ke

Taarifa yako ya kibali na saini:

Ikiwa umesoma kibali kinachofahamika, au umesomewa na kuelezewa, na unaelewa habari na kwa hiari unakubali kujiunga na utafiti huu, tafadhali soma kwa makini maneno yaliyomo hapa na ufikirie uamuzi wako kabla ya kusaini jina lako:

- Nimepewa fursa ya kuuliza maswali yoyote niliyo nayo na nimeridhika na majibu ya maswali yangu yote.
- Najua kwamba habari yoyote nitakayopeana itahifadhiwa kwa siri na ninaweza kuacha kuwa mshiriki kwa wakati wowote.
- Ikiwa ninatoka au kukataa kuwa katika utafiti, ninaelewa kuwa hakutakuwa na matokeo yoyote.
- Nimeambiwa Jina, nambari ya simu na anwani ya nani wa kuwasiliana naye ikiwa ni dharura na pia nimepewa kwa maandishi.

- Nakubali kushiriki katika utafiti huu kwa kujitolea, na nitapewa nakala ya fomu hii ya kibali ni jiwekee.

.....

.....

Nambari ya mshiriki

Saini ya mshiriki na tarehe

.....

.....

Jina la mtafiti

Saini ya mtafiti na tarehe

Appendix III: Questionnaire

Participant's code **Date**

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. How old are you in (complete years)?
 - a. 18-24 years
 - b. 25-29 years
 - c. 30-34 years
 - d. 35-39 years
 - e. 40-44 years
 - f. 45-49 years
 - g. 50-64 years

2. What is your marital status?
 - (i) Married
 - (ii) Divorced
 - (iii) Separated
 - (iv) Single

3. What is your religious affiliation?
 - (i) Christian
 - (ii) Muslim
 - (iii) Hindu
 - (iv) Other (Specify).....

4. What is your highest level of education?

- (i) No formal education
- (ii) Primary School
- (iii) Secondary School
- (iv) Tertiary

5. What is your employment status?

- a) Student
- b) Unemployed
- c) Employed
- d) Self-employed
- e) Others (Specify.....)

6. What is your approximate monthly income?

- a. No income
- b. Up to Ksh 9999
- c. Ksh 10000-19999
- d. Ksh 20000-29999
- e. Ksh 30000-39999
- f. Ksh 40000-49999
- g. Ksh 50000 and above

7. How old is your child?

- (i) Less than 1 month
- (ii) 1-6 months

(iii) 7 - 9 months

(iv) 1 - 2 years

(v) 2 - 5 years

8. What is the gender of your/the child?

(i) Male

(ii) Female

9. Is this your first child?

(i) Yes

(ii) No

10. If no to question 9 above, how many children do you have in total?

.....

SECTION B: HEALTH CONDITION OF THE CHILD

11. Which leg of your child has club foot?

(i) Right

(ii) Left

(iii) Both

12. Was the child born with the club foot?

(i) Yes

(ii) No

13. Was the child born with any other health condition (s)?

(i) Yes

(ii) No

14. If you answered yes in question 13 above, please specify which condition (s)

.....

SECTION C: KNOWLEDGE AND ATTITUDE OF MOTHERS TOWARDS BRACING

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
15.	<i>Bracing is done for</i> a) 1- 10 hours a day					
	b) 12 hours a day					
	b) 23 hours a day					
	c) 24 hours a day					
16.	<i>Bracing is done for the following reasons</i> a) Prevention of club foot					
	b) Correction of clubfoot					
	c) Maintaining correction of clubfoot					

	d) Aligning of the foot					
	e)Others.....					
17.	<i>When a baby cries after correct bracing;</i> a) Remove the brace					
	b) Don't remove the brace					
18.	<i>Which part of the foot indicates proper fitting of the brace;</i> a) Toes					
	b) Ankle joint					
	c) Heel					
19.	<i>Bracing should be done up to what age?</i> a) 3 months					
	b) 3 months– 1 year					
	c) 3 years					

	d) 5 years					
--	------------	--	--	--	--	--

NB: Answering 4/5 of the questions above (15-19) correctly will be termed as knowledgeable.

20. Do you comply with bracing all the time?

- a) Yes
- b) No

21. Do you get enough information on bracing from the health care professionals?

- a) Yes
- b) No

22. Are the health care professionals friendly and useful when attending your child?

- a) Yes
- b) No

SECTION D: SOCIAL ECONOMIC FACTORS AND SOCIETAL PRACTICES

23. What is the approximate distance of your home from this facility?

- a) Less than 50 km
- b) 50-100 km
- c) More than 100 km

24. How would you rate the transport to this hospital for follow-ups, whether by private or public means?

- a) Affordable
- b) Not affordable

25. If married, divorced/separated, does your spouse support you in taking care of your baby especially bracing care?

- a) Yes
- b) No

26. If married, divorced/separated, does your spouse accompany you to take your child to the hospital?

- a) Yes
- b) No

27. Do your relatives support you in bracing care of your baby at home?

- a) Yes
- b) No

28. Do you expose your child's feet to your relatives or friends with FABs on?

- a) Yes
- b) No

Appendix IV: Focus Group Discussion Informed Consent

Participant's code Date

Study title:

Factors associated with non-compliance to bracing in club foot among mothers of children under five years old in AIC Cure International Children's Hospital, Kijabe, Kenya.

Institution and Investigator:

Researcher	Institution	Contact
Winfred Ndinda	Jomo Kenyatta University of Agriculture and Technology	+254723950053

Introduction

Clubfoot presents early in neonatal life and if not treated becomes more disabling with age. Neglected or inadequately corrected clubfoot can have a dramatic effect on the quality of life of the child. It causes physical impairments that result in decreased ambulation and inability to perform basic tasks such as carrying water, collecting food and going to school.

There are concerns about non-compliance to bracing from various studies and even the founder of the Ponseti method admitting that bracing is a challenge. Findings of this study will help bring out the factors associated with non-compliance to bracing which can then be addressed by the various stakeholders.

Non-compliance to bracing during club foot management leads to relapse. This can have a dramatic effect on the quality of life of the child. It causes physical impairments that result in decreased ambulation and inability to perform basic tasks such as carrying water, collecting food and going to school. This leads to dependency for activities of

daily living with significant economic impact on the family. In addition, the structural differences in children with clubfoot are associated with social stigma, which has a psychological effect on the child. On the family, it carries the burden of providing for the disabled and is financially poorer. On society, ill health is the leading cause and consequence of poverty in developing nations.

Further, relapse is frustrating both for parents and clinicians. It also results in considerable waste of parents' and service providers' resources, but most important it can lead to permanent disability of the affected children. This research aims at establishing factors associated with non-compliance to bracing.

Being in the study is your choice.

This consent form gives you information about the study, the risks and benefits, and the process that will be explained to you. Once you understand the study, and if you agree to take part, you will be asked to sign your name or make your mark on this form. You will be given a copy to take home.

Before you learn about the study, it is important that you know the following:

- Your participation in this study is entirely voluntary
- You may decide to withdraw from the study at any time, without facing any consequences

Purpose of the study:

To determine *factors* associated with non-compliance to bracing in club foot among mothers of children less than five years old in AIC Cure International Children's Hospital, Kijabe, Kenya.

If you choose not to participate or to leave the study:

You have the choice to not participate in this research study. If you choose not to participate in this study, you may do so freely without consequences against you.

Risks and/or discomforts:

I do not anticipate any risks or discomforts to you during this study.

Benefits to you:

You may not get direct benefit from the information you provide for this study. However, the results will be used to assist in formulating policies that may initiate strategies on the matter being studied.

Costs to you:

There is no cost to you for participating in this study apart from your precious time.

Your records will be private:

Every effort will be made to keep the information you provide confidential. You will be only identified by a code and personal information from the questionnaire will not be released without your written permission. The information in the questionnaire cannot be identified as belonging to you. You will not be personally identified in any publication about this study. Your records may be reviewed by KNH/UON Ethical Review Committee.

Injury because of participating in this study:

It is unlikely that any form of injury could happen to you or your child as a result of being in this study. It is important that you tell the researchers if you feel that you have been irritated or damaged because of taking part in this study.

Problems and questions:

You will be given a copy of this form to take with you. If you have any questions or concerns about your rights as a research participant, please contact:

The Principal;

College of Health Sciences

Jomo Kenyatta University of Agriculture and Technology

P.O. Box 62200-00200; Nairobi

Tel:254-67-52711/52181-4

Fax: 254-67-52161

director@itromid.jkuat.ac.ke

Your rights as a study participant:

This research has been approved and reviewed by KNH/UON Ethical Review Committee. This committee has reviewed this study in order to help protect participants. If you have any questions about your right as research participant you may contact:

The secretary, KNH/UON Ethical Review Committee,

P.O Box 19676- 00202, Nairobi. Tel. (254-020) 2726300-9 Ext 44355

Email: uonknh_erc@uonbi.ac.ke Website: www.erc.uonbi.ac.ke

Your statement of consent and signature:

If you have read the informed consent, or have had it read and explained to you, and you understand the information and voluntarily agree to join this study, please carefully read the statements below and think about your choice before signing your name:

- I have been given the chance to ask any questions I may have and I am content with the answers to all my questions.
- I know that any information I give will be kept confidential and that I may leave this study at any time.
- If I leave or refuse to be in the study, I understand that there will be no repercussions.
- The name , phone number and address of whom to contact in case of an emergency has been told to me and has also been given to me in writing.
- I agree to take part in this study as a volunteer, and will be given a copy of this informed consent form to keep.

.....

Participant's code

.....

Researcher's name

.....

Participant's signature and date

.....

Researcher's signature and date

Appendix V: Fomu Ya Kibali Ya Kushiriki Katika Majadiliano Ya Kikundi

Kiswahili Translation: Fomu Ya Kibali Ya Kushiriki Katika Majadiliano Ya Kikundi

Nambari ya mshiriki **Tarehe**

Anwani ya Utafiti:

Mambo yanayohusishwa na kutofunga viatu kwenye kiguu miongoni mwa mama wa watoto chini ya umri wa miaka mitano katika Hospitali ya AIC Cure International Children's, Kijabe, Kenya.

Taasisi na Mpelelezi:

Mtafiti	Taasisi	Nambari ya simu
Winfred Ndinda	Jomo Kenyatta University of Agriculture and Technology	+254723950053

Utangulizi

Kiguu uonekana mapema katika maisha ya mtoto na kisipotibiwa kinalemaza zaidi kadiri mtoto anavyokua. Kiguu kikipuuzwa au kisiporekebishwa kinaweza kuwa na athari kubwa juu ya ubora wa maisha ya mtoto. Kinasababisha kuharibika kwa kimwili na pia husababisha kupungua kwa uwezo na kukosa uwezo wa kufanya kazi za msingi kama vile kubeba maji, kukusanya chakula na kwenda shule.

Kuna wasiwasi juu ya kutofunga viatu kwenye kiguu kutokana na masomo mbalimbali na hata mwanzilishi wa njia ya Ponseti kukubali kuwa kufunga viatu ni changamoto.

Matokeo ya utafiti huu yatasaidi kuleta nje mambo yanayohusishwa na kutofunga viatu ambayo yanaweza kushughulikiwa na wadau mbalimbali.

Kutofunga viatu kwa kiguu inavofaa kunasababisha mguu kupata kiguu tena. Hii inaweza kuwa na athari kubwa juu ya ubora wa maisha ya mtoto. Unasababisha kuharibika kwa kimwili ambayo husababisha kupungua kwa uwezo na kukosa uwezo wa kufanya kazi za msingi kama vile kubeba maji, kukusanya chakula na kwenda shule. Hali hii inasababisha kutegemea watu wengine katika shughuli za maisha za kila siku na athari kubwa ya kiuchumi kwenye familia. Pia, tofauti za miundo kwa watoto wenye mguu wa klabu zinahusishwa na unyanyapaa wa kijamii, ambao una athari za kisaikolojia kwa mtoto. Familia nayo hubeba mzigo wa kushughulikia walemavu na hali hii hufanya familia kuwa maskini zaidi. Kwa jamii, afya mbaya ni sababu inayoongoza na matokeo ya umasikini katika mataifa yanayoendelea.

Zaidi ya hayo, kurudia kwa kiguu huvunja wazazi na madaktari/wataalamu moyo. Pia husababisha uharibifu mkubwa wa rasilimali za wazazi na wahudumu, lakini muhimu zaidi inaweza kusababisha ulemavu wa kudumu kwa watoto walioathirika. Utafiti huu unalenga kutadhmini mambo yanayohusika na kutofunga viatu kwa watoto wenye kiguu.

Kuhusika katika utafiti huu ni uchaguzi wako.

Fomu hii ya kibali inakupa habari kuhusu utafiti, hatari na faida, na mchakato utakaoelezea. Mara unapoelewa utafiti huu, na ikiwa unakubali kushiriki, utaombwa kusaini jina lako au kufanya alama yako kwenye fomu hii. Utapewa nakala ya kuchukua nyumbani.

Kabla ya kujifunza kuhusu utafiti huu, ni muhimu kuwajua yafuatayo:

- Kushiriki kwako katika utafiti huu ni kikamilifu kwa hiari

- Unaweza kuamua kujiondoa kwenye utafiti wakati wowote, bila kukabiliana na matokeo yoyote

Kusudi la utafiti:

Ili kuamua mambo yanayohusiana na kukosa kufunga viatu kwenye kwenye kiguu miongoni mwa mama wa watoto chini ya miaka mitano katika Hospitali ya AIC Cure International Children's, Kijabe, Kenya.

Jukumu lako katika utafiti:

Nitawapa maswali ya kujibu kuhusu kiguu na ufungaji wa viatu kwenye mguu huo.

Ikiwa unachagua kushiriki au kuacha utafiti:

Una chaguo la kutoshiriki katika utafiti huu. Ikiwa unachagua kutoshiriki katika utafiti huu, unaweza kufanya hivyo kwa uhuru bila madhara dhidi yako.

Hatari na / au kuharibu:

Sitarajii hatari yoyote au uharibifu wowote wakati wa utafiti huu.

Faida kwako:

Huwezi kupata faida yoyote ya moja kwa moja kutokana na maelezo unayoyatoa kwa ajili ya utafiti huu. Hata hivyo, matokeo yatatumika kusaidia katika kuunda sera ambazo zinaweza kuanzisha mikakati juu ya suala linaloangaziwa.

Gharama kwako:

Hakuna gharama kwako kushiriki katika somo hili mbali na wakati wako wa thamani.

Rekodi zako zitawekwa kwa siri:

Kila jitihada zitafanywa ili kuweka maelezo unayoyotoa kwa siri. Utatambuliwa tu kwa kificho na maelezo ya kibinafsi kutoka kwenye maswali hayatatolewa bila idhini yako iliyoandikwa. Maelezo katika swali la maswali hayawezi kutambuliwa kama yako. Huwezi kutambuliwa binafsi katika chapisho lolote kuhusu utafiti huu. Rekodi zako zinaweza kupitiwa na Kamati ya Ukaguzi wa Maadili ya KNH / UON.

Madhara kutokana na kushiriki katika utafiti huu:

Haiwezekani kwamba aina yoyote ya madhara inaweza kutokea kwako kutokana na kushiriki katika utafiti huu. Ni muhimu kuwaambia wanaohusika na utafiti huu ikiwa unajisikia kuwa umekasirika au kuharibiwa kwa sababu ya kushiriki katika utafiti huu.

Matatizo na maswali:

Utapewa nakala ya fomu hii kuchukua nawe. Ikiwa una maswali yoyote au wasiwasi kuhusu haki zako kama mshiriki wa utafiti, tafadhali wasiliana na:

Mkuu;

Chuo cha Sayansi za Afya

Chuo Kikuu cha Jomo Kenyatta cha Kilimo na Teknolojia

Sanduku La Posta 62200-00200; Nairobi, Nambari ya Simu: 254-67-52711 / 52181-4

Faksi: 254-67-52161

Anwani ya barua pepe: director@itromid.jkuat.ac.ke

Haki zako kama mshiriki:

Utafiti huu umeidhinishwa na Kamati ya Ukaguzi wa Maadili ya KNH / UON. Kamati hii imechunguza utafiti huu ili kusaidia kulinda washiriki. Ikiwa una maswali yoyote kuhusu haki yako kama mshiriki wa utafiti unaweza kuwasiliana na:

Katibu,

KNH/UON Kamati ya Ukaguzi wa Maadili,

Sanduku La Posta 19676- 00202, Nairobi, Nambari ya Simu. (254-020) 2726300-9 Ext 44355

Anwani ya barua pepe: uonknh_erc@uonbi.ac.ke Tovuti: www.erc.uonbi.ac.ke

Taarifa yako ya kibali na saini:

Ikiwa umesoma kibali kinachofahamika, au umesomewa na kuelezewa, na unaelewa habari na kwa hiari unakubali kujiunga na utafiti huu, tafadhali soma kwa makini maneno yaliyomo hapa na ufikirie uamuzi wako kabla ya kusaini jina lako:

- Nimepewa fursa ya kuuliza maswali yoyote niliyo nayo na nimeridhika na majibu ya maswali yangu yote.
- Najua kwamba habari yoyote nitakayopeana itahifadhiwa kwa siri na ninaweza kuacha kuwa mshiriki kwa wakati wowote.
- Ikiwa ninatoka au kukataa kuwa katika utafiti, ninaelewa kuwa hakutakuwa na matokeo yoyote.
- Nimeambiwa Jina, nambari ya simu na anwani ya nani wa kuwasiliana naye ikiwa ni dharura na pia nimepewa kwa maandishi.
- Nakubali kushiriki katika utafiti huu kwa kujitolea, na nitapewa nakala ya fomu hii ya kibali nijiwekee.

.....
Nambari ya mshiriki

.....
Saini ya mshiriki na tarehe

.....
Jina la mtafiti

.....
Saini ya mtafiti na tarehe

Appendix VI: Focus Group Discussion Guide 1

Researcher Introduction

The researcher will welcome all the participants, introduce herself and the note taker (research assistant), and give the Sign-In Sheet with a few quick demographic questions (age, gender, profession, number of children, area of residence) around to the group.

Group members will be asked to introduce themselves using their preferred one name.

Questions for group 1 & 2 (First time mothers)

1. What is your understanding of clubfoot?
2. At what point or when did you know that your child has clubfoot?
3. What is the importance of bracing in clubfoot?
4. This being your first child how is the experience of bringing up a child with clubfoot and having to brace him/her often?
5. What is your experience of bracing?
6. What do you think of bracing/carrying your baby with braces in public?
7. What would you term as the role of your family and society in management of your child's clubfoot?

Probe: a) How does the society; relatives, neighbors, friends and even strangers react when they see your baby with braces.

b) Does your baby get any unwarranted attention when seem with braces?

8. How would you term your adherence to bracing as advised by the health professionals?

Probe: a) What are some of the factors that make you not adhere to bracing as advised?

Appendix VII: Focus Group Discussion Guide 2

Focus Group Discussion Guide

Researcher Introduction

The researcher will welcome all the participants, introduce herself and the note taker (research assistant), and give the Sign-In Sheet with a few quick demographic questions (age, gender, profession, number of children, area of residence) around to the group.

Group members will be asked to introduce themselves using their preferred one name.

Questions for group 3 & 4 (Mothers who have other children apart from the one with club foot)

1. What is your understanding of clubfoot?
2. At what point or when did you know that your child has clubfoot?
3. What is the importance of bracing in clubfoot?
4. How is the experience of bringing up a child with clubfoot and having to brace him/her often unlike the other children?
5. Do you compare your child with club foot with others in terms of growth and development?
6. Do you have a dislike for your child because his/her feet/foot are not normal like the other children?
7. Do your other children have a challenge in relating with this particular child?
8. Does your child have any difficulty in fitting in within your family/relating with the other children?
9. What is your experience of bracing?
10. What do you think of bracing/carrying your baby with braces in public?

11. What would you term as the role of your family and society in management of your child's clubfoot?

Probe: a) How does the society; relatives, neighbors, friends and even strangers react when they see your baby with braces.

12. Does your baby get any unwarranted attention when seem with braces?

13. How would you term your adherence to bracing as advised by the health professionals?

Probe: a) What are some of the factors that make you not adhere to bracing as advised?