CLUBFOOT FREE KERALA

"None shall be disabled due to ClubFoot"

Department Of Health And Family Welfare
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Contents

List of Abbreviations

CTEV	Congenital Talipes Equinovarus
IMR	Infant Mortality Rate
FAB	Foot Abduction Brace
LMIC	Low-and Middle-Income Countries
NGO	Non-Governmental Organisation
RBSK	Rashtriya Bal Swasthya Karyakram
MLSP	Mid-level Service Providers
WHO	World Health Organisation
UNICEF	United Nations Children's Fund
GO	Government Order

Smt. Veena George
Minister for Health,
Woman and Child Development
Government of Kerala

MESSAGE

VEENA GEORGE
MINISTER FOR HEALTH
WOMAN AND CHILD DEVELOPMENT
GOVERNMENT OF KERALA

Date 16.06.2025

Message

It gives me immense pleasure to present the progress of the Clubfoot Free Kerala Programme, a pioneering initiative launched by the Government of Kerala in partnership with CURE India, WHO, and UNICEF. Clubfoot, a congenital deformity affecting thousands of newborns across the globe, once imposed physical, emotional, and economic burdens on families.

Today, thanks to timely intervention and effective public health strategies, Kerala stands at the forefront of addressing this challenge with compassion, commitment, and clinical excellence.

Since the inception of this programme, we have strived to ensure that no child in Kerala is left behind due to a treatable condition like clubfoot. Through early screening under RBSK at delivery points, free treatment using the gold-standard Ponseti technique, and continuous follow-up care through 36 public health facilities, we are able to successfully treating over 4,400 children. This remarkable feat is not just a health sector milestone but a powerful testament to our unwavering commitment to inclusive and equitable child health care.

The stories of children who once struggled to walk but now run and play with confidence are deeply moving and stand as real-life testimonials to the effectiveness of this programme. I am especially proud of the tireless efforts of our health professionals, ASHAs, Anganwadi workers, and our development partners who have helped carry this vision forward to even the remotest parts of the state.

Yet, challenges remain particularly in ensuring community awareness, treatment compliance, and addressing geographical disparities in access. Going forward, we will intensify our outreach, scale up training, and strengthen follow-up mechanisms so that every eligible child receives timely and quality care.

Together, let us reaffirm our resolve to ensure that "None shall be disabled due to clubfoot." I take this opportunity to congratulate all who have followed up the program conceptualization, implementation and execution. I wish all the success to the program.

Veena George

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Foreword

Congenital Talipes Equinovarus, commonly known as Clubfoot, remains one of the most prevalent congenital musculoskeletal deformities, with life-altering implications for children if left untreated. The quality of life of a child with club foot and suffering of family members are profound, which goes unnoticed. Fortunately, with early identification and intervention using the globally recognized Ponseti method, this condition is entirely correctable, offering children the opportunity to live full and active lives. This is non evasive method and results are very excellent.

Dr Santhosh Director, CURE INDIA met one day and introduced their work of correcting Clubfoot by non-evasive 'Ponseti technique' and requested to take up the initiative in Kerala in an organized matter by providing all the technical support through partnership with the department of Health and Family Welfare. Soon after detailed discussions were conducted with Dr Babu George Director CDC and Dr Sreehari State Nodal officer Child Health NHM. After detailed discussions involving RBSK team and Child Development Centre team a program of Clubfoot correction was conceptualized in the year 2021. Even though the country and the world were reeling under Covid pandemic, the Department continued its focus on various health issues including the child health and a niche project to correct congenital anomaly Clubfoot was taken. All the services were provided free of cost to all the patients.

In alignment with Kerala's commitment to equitable and inclusive healthcare, the Clubfoot Free Kerala Programme was launched by Hon Chief Minister Shri Pinarayi Vijayan and Hon Health & Family Welfare and Woman and Child Development Minister Smt Veena George with the vision that no child in our state should suffer lifelong disability due to an otherwise treatable condition. Through strategic collaboration with CURE India and the support of UNICEF and WHO, this programme has successfully expanded access to early screening, diagnosis, and free treatment across 36 government health facilities.

In order to take state wide initiative RBSK team along with CURE India have done capacity building of doctors and paramedics. The specific modelling of Club Foot Clinics was done in the selected hospital to provide services. The field workers were made aware of the program and through them community engagement was done. These efforts were supplemented with

generating awareness among people to encourage them to avail services free of cost if the child is having club foot.

This document serves as a comprehensive reflection of our efforts to institutionalize Clubfoot care in the public health system. It outlines the clinical protocols, care pathways, training initiatives, and outreach activities that have collectively contributed to transforming the lives of over 4000 children and their families. The testimonies and outcomes presented reaffirm the transformative power of early intervention, family-centred counselling, and dedicated health system strengthening. It is noteworthy to mention here that after taking this program in Kerala other states also taken the similar initiative in partnership with CURE INDIA.

I commend the entire team of doctors, RBSK staff, frontline workers, and programme coordinators whose relentless dedication has made this progress possible. I appreciate the committed work done by Dr Sreehari to establish the program systems and later Dr Rahul who ensured sustained efforts. I also extend my appreciation to our partner organizations CURE INDIA who's technical, material and field-level support continues to be invaluable. I deeply appreciate Dr Revu, Dr Soumya Dev and Dr Antony for their assistance to the documentation of Club Foot.

As we move forward, let us reaffirm our commitment to scaling up these interventions, improving community awareness, and sustaining high-quality care until we achieve a Kerala where no child is left behind due to Clubfoot.

Dr Rajan Khobragade IAS
Addl Chief Secretary
Health & Family Welfare and
AYUSH Department
Govt of Kerala

Executive summary

Clubfoot, or Congenital Talipes Equinovarus (CTEV), is a congenital deformity that severely affects mobility and quality of life if untreated. Early detection and timely treatment using the Ponseti method—a cost-effective, non-invasive, and globally recognized gold standard—can fully correct the deformity and prevent lifelong disability.

Recognizing this, the Government of Kerala, in partnership with CURE India, launched the Clubfoot Free Kerala Programme in 2021. The initiative places strong emphasis on early detection and referral. Newborns are screened at delivery points under the Rashtriya Bal Swasthya Karyakram (RBSK), and those identified with clubfoot are immediately referred to designated clinics for treatment. To ensure accessibility, treatment is provided free of cost at thirty-six government health facilities across the state, including medical colleges.

A major strength of the programme is its focus on capacity building. Training has been provided to orthopaedic doctors, nurses, ASHAs, and Anganwadi workers, which has significantly improved the capacity for diagnosis, treatment, and community-level awareness. By 2024, over 231 ASHAs and more than 900 Anganwadi workers had been trained, equipping them to identify cases early, counsel families, and encourage adherence to treatment. Alongside this, awareness campaigns and counselling services have been introduced to support families, reduce stigma, and improve compliance with treatment protocols.

Since its inception, the programme has achieved notable progress, with more than 4,400 children benefitting from treatment. The highest enrolments were reported in Thiruvananthapuram and Kozhikode, and structured follow-up systems using the Shalabham portal have supported adherence to the Foot Abduction Brace (FAB) and long-term monitoring. Despite these successes, challenges remain, particularly in ensuring compliance with bracing protocols, raising awareness among private sector delivery points, and addressing accessibility barriers in certain regions. The program has made significant progress, and continued efforts are needed going forward. By addressing challenges and maintaining high quality care, Kerala can achieve its goal of a Clubfoot-free state.

Chapter 1
Introduction

Club Foot, or Congenital Talipes Equinovarus (CTEV), is a congenital deformity affecting the foot of new-born babies. Characterized by an inward and downward twisting of the foot, Club Foot can significantly impact a child's physical development and overall quality of life (Anand & Sala, 2008). It is a significant public health issue, especially in low- and middle-income countries (LMICs). It is estimated that approximately 200,000 babies are born with Club Foot each year, with a significant proportion of cases occurring in LMICs. Without proper treatment, children with clubfoot face lifelong disabilities and social exclusion. Early intervention in children with clubfoot, particularly through the Ponseti method, significantly reduces disability-adjusted life years (DALYs). A study focusing on sub-Saharan Africa found that successful treatment with the Ponseti method averts an average of 7.42 DALYs per patient. This method is not only effective but also cost-efficient, with an average treatment cost of approximately ₹13,911 per patient, resulting in a cost-effectiveness ratio of around ₹1,871 per DALY averted. These findings underscore the substantial benefits of early clubfoot intervention in improving children's quality of life and reducing long-term disability. Globally, this condition affects approximately 1.18 out of every 1,000 live births , with India's incidence slightly higher at 1.19 per 1000 live births (Smythe et al., 2017, 2023). While precise data for Kerala is limited, a study in Northern Kerala revealed a prevalence of 0.24 per 1000 births region "(S & DCouth, 2018).

Every year, around 1000 to 2000 children are born with Club Foot in Kerala. Beyond the physical implications, Club Foot can impose a substantial emotional and financial burden on affected children and their families. The condition can hinder mobility, limiting a child's ability to play, learn, and interact with peers. For families, the costs of treatment, both financial and emotional, can be overwhelming ——-"'(Gelfer et al., 2022).

Fortunately, early detection and treatment can effectively correct Club Foot. The Ponseti Method, a non-invasive, low cost and highly effective approach, has proven highly successful in addressing this deformity (López-Carrero et al., 2023). Recognizing the significance of timely intervention, the Kerala government has made commendable strides in combating Club Foot. By establishing Club Foot detection and treatment services in government medical colleges and expanding these

efforts to 36 public healthcare facilities, the state has laid a strong foundation for a Club Foot-free Kerala.

This document outlines the Kerala government's comprehensive strategy to tackle Club Foot, emphasizing early diagnosis and effective treatment. By working collaboratively, we can ensure that every child in Kerala has the opportunity to live a life free from the limitations imposed by Club Foot.

Aetiology of Club Foot

The precise cause of Club Foot remains unknown despite extensive research. However, several factors are believed to contribute to its development (Barrie & Varacallo, 2024):

- **Genetic Predisposition:** There's a strong familial link to Club Foot, suggesting a genetic component. Studies have identified several gene variants—particularly those involved in musculoskeletal development—that are associated with an increased risk of the condition. Children with a family history of clubfoot are at notably higher risk, reinforcing factors in its etiology.
- **Environmental Factors:** While less understood, environmental factors during pregnancy might also play a role. Some research points to potential associations with maternal smoking, drug use, or certain medications.
- **Intrauterine Positioning:** Although not a direct cause, the baby's position in the uterus can sometimes contribute to foot deformities. The mechanical constraints may act as **aggravating factors**, especially in genetically predisposed individuals.
- **Multifactorial Origin:** It's increasingly recognized that Club Foot is likely a complex interplay of genetic and environmental factors.

Primary components of Club Foot

Clubfoot, or *Congenital Talipes Equinovarus (CTEV)*, is a complex congenital deformity involves abnormal development of the foot's bones, muscles, tendons, and ligaments. The affected foot would have the following components are often described using the acronym **CAVE:**

- **C - Cavus :** The foot's arch is abnormally high.

- A - **Adductus:** The forefoot is turned inward (forefoot adduction).
- V - **Varus:** The heel is turned inward.
- E - **Equinus:** The ankle is fixed in a pointed-down position.

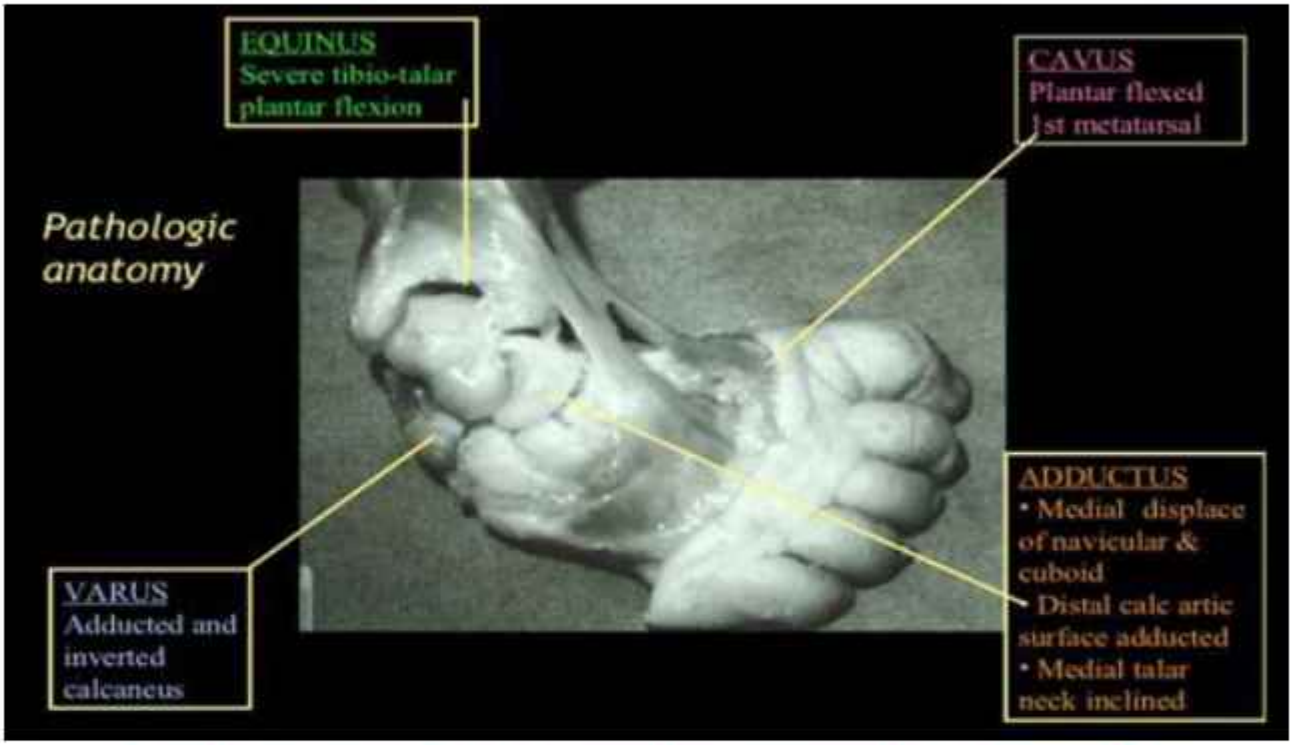

Figure 1: Components of Club Foot (Adapted from presentation by Dr. Shanavas E K)

These deformities result from an imbalance in the forces acting on the foot, with the muscles, tendons, and ligaments on the inside of the foot being shorter and tighter than those on the outside .

Early Detection and Diagnosis of Club Foot

Early detection is crucial for successful Club Foot treatment. The sooner the condition is identified, the higher the chances of a full recovery without complications. Ideally treatment should start in the first week after birth.

Prenatal Detection

Ultrasound: Advancements in prenatal care have made it possible to detect Club Foot as early as the second trimester of pregnancy through ultrasound examinations. This early diagnosis allows parents and healthcare providers to prepare for the baby's arrival and initiate treatment promptly.

Postnatal Diagnosis

Visual Inspection: In most cases, Club Foot is evident at birth. Healthcare providers can readily identify the condition by visually examining the newborn's feet.

Physical Examination: A thorough physical examination helps determine the severity of the deformity. The healthcare provider will assess the foot's position, flexibility, and any associated abnormalities.

Key signs of Club Foot:

- Foot turned inward and downward (equinovarus position)
- Foot appears smaller and stiffer than the unaffected foot
- Ankle is stiff and difficult to move
- Deep medial crease along the foot
- Small or underdeveloped calf muscle (unilateral cases may show asymmetry)

While X-rays are not typically necessary for diagnosis in newborns, they may be used in older children to assess bone development and treatment progress.

The Pirani Scoring System

The Pirani Scoring System is a valuable tool used in the assessment and management of Club Foot. This simple, reliable method helps determine the severity of the deformity and monitor progress during treatment. The system evaluates six specific clinical signs of contracture, each given a score of 0, 0.5, or 1 based on the severity of the deformity. These signs are divided into two groups:

Hindfoot:

- Severity of the posterior crease
- Emptiness of the heel
- Rigidity of equinus

Midfoot:

- Medial crease
- Curved lateral border
- Lateral head of the talus

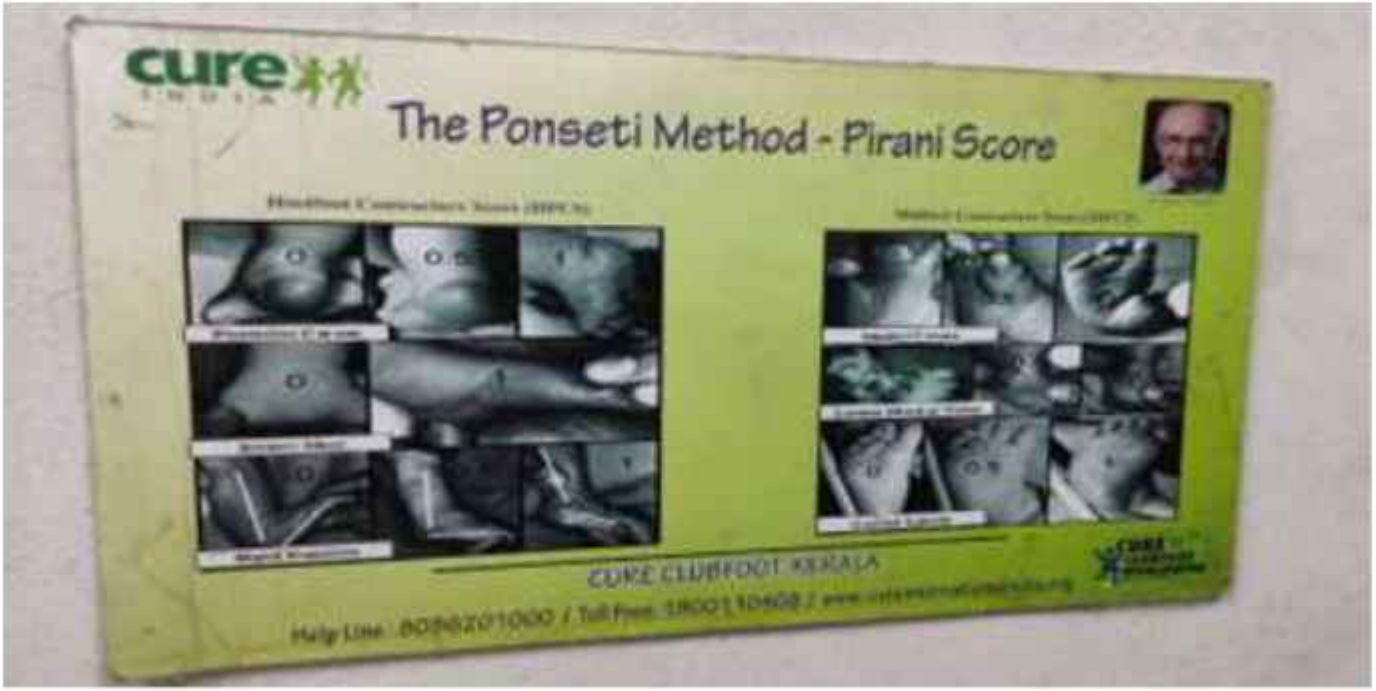

Figure 2: Pirani Scoring System chart placed at the Govt. Medical College, Thiruvananthapuram

A higher Pirani score indicates a more severe Club Foot deformity. Pirani score help in severity assessment, treatment planning and help monitor progress of treatment over time.

Treatment

The treatment of Club Foot aims to correct the foot's position and achieve a functional, pain-free foot. The Ponseti method, a non-surgical treatment that has become the gold standard. The treatment is affordable and effective, making it accessible to a wide range of populations, particularly in resource-limited settings. It involves two phases. The first phase consists of a series of gentle manipulations and plaster casts, and this constitutes the corrective phase (Fig 3) wherein the afore mentioned Pirani Scoring system helps determine the degree of correction.

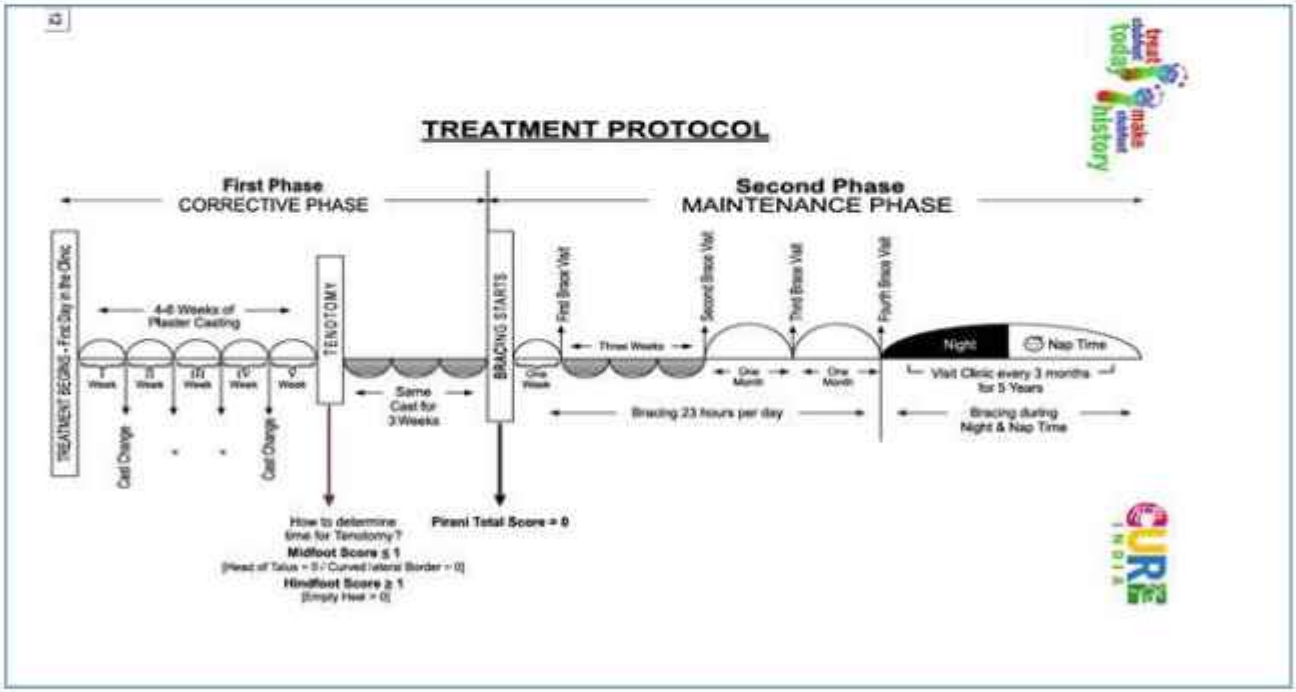

Figure 3: Treatment Protocol for Club Foot using Ponseti Technique developed by CURE India

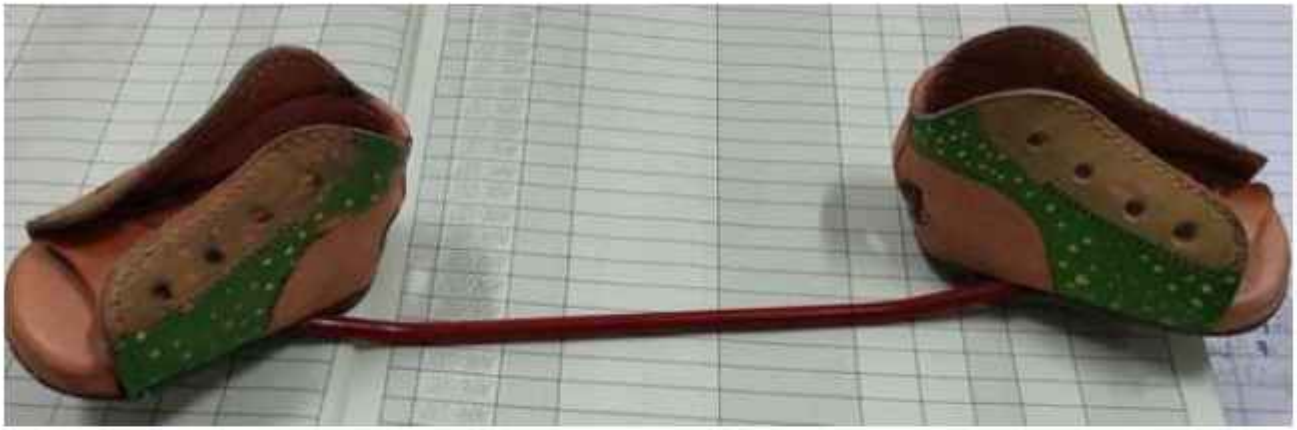

Figure 4: Foot Abduction Brace (FAB)

The second phase is a period of maintenance which involves the use of a corrective Foot Abduction Brace (FAB) (Fig 4) to hold the foot corrected in the first phase in place. The brace should be worn for 23 hours per day during the first three months, followed by night time and nap time use (12 – 14hrs/day) until the child reaches 4 to 5 years of age. Strict compliance with the bracing protocol is essential, as non-compliance is the most common cause of relapse in corrected clubfoot cases. In cases where the Ponseti method fails to achieve adequate correction, surgical interventions such as Tenotomy may be necessary. These may include Posteromedial soft tissue release, tendon lengthening or transfer and osteotomies or joint procedures, Surgical techniques vary depending on the child's age, the severity of the deformity and response to prior treatment(López-Carrero et al., 2023).

Rehabilitation

Rehabilitation plays a vital role in the management of Club Foot. Physical therapy is essential to improve foot mobility, strength, and function. Regular follow-up care is necessary to monitor foot development, assess brace compliance and address any complications or relapses at an early stage.

Figure 5: (Left) Instruction on FAB usage being given to parents of a newborn at Govt. Medical College Thiruvananthapuram. (Right)A child with club foot who just received her first FAB.

Chapter 2
The Club Foot Free Kerala Programme

The International Conference on "Clubfoot Free Kerala

The International Conference on "Clubfoot Free Kerala – None Shall Be Disabled Due to Clubfoot" was convened on 6 December 2021 by the Health and Family Welfare Department, Government of Kerala, in partnership with CURE India and with knowledge support from UNICEF and WHO. The event was conceptualised as part of Kerala's larger vision of inclusive health, recognising that birth defects such as clubfoot significantly affect the mobility, quality of life, and future opportunities of children if left untreated. The conference brought together policymakers, health experts, clinicians, civil society actors, and international thought leaders to deliberate on strategies for eliminating disability from clubfoot through evidence-based, non-invasive interventions.

The conference opened with an inaugural session chaired by senior dignitaries. The Hon'ble Chief Minister of Kerala, Shri Pinarayi Vijayan, set the tone by affirming the state's commitment to strengthen child health and disability prevention within the broader Aardram Mission and SDG framework. Hon'ble Chief Minister emphasised Kerala's achievements in reducing infant and neonatal mortality, while noting that preventable birth defects, such as clubfoot, must be addressed systematically. The Hon'ble Health Minister, Smt. Veena George, reinforced this commitment by stressing Kerala's continued focus on disability prevention, improved health outcomes, and quality of life, especially through early identification and correction of congenital anomalies. Senior representatives from the Ministry of Health and Family Welfare (Government of India), UNICEF, and public health experts such as Dr. B. Ekbal underscored Kerala's pioneering leadership in this initiative and positioned it as a model for replication globally

The conference had two Sessions and the theme for Session 1 was "From Hope to Triumph" which focussed on reduction of disability due to club foot and other birth defects, and Session II on the focused specifically on the Kerala Clubfoot Programme.

Session 1 focussed on the aetiology, epidemiology, and management of clubfoot, led by experts such as Dr. Sankar V.H. and Dr. Shanavas E.K. The sessions covered the public health significance of congenital anomalies, emphasising that while Kerala has made progress in mortality reduction, long-term morbidity from untreated birth defects remains a major challenge. Detailed discussions were held on the epidemiology of clubfoot in India, and the success of the Ponseti method as the gold-standard intervention. Paper presentations by postgraduate students and field functionaries showcased research on birth defects and disability reduction, reflecting the programme's objective of linking academic knowledge with field-level application.

Session II focused specifically on the Kerala Clubfoot Programme and featured both national and international experts. Dr. Rajan Khobragade, Principal Secretary (Health & Family Welfare), outlined the state's progress in establishing clubfoot clinics and scaling up early detection and treatment. Case studies from district hospitals demonstrated the integration of government and civil society efforts. Dr. Santhosh George from CURE India presented the organisation's model of non-invasive management and its impact in Kerala, while Dr. Shafique Pirani and Dr. Mathew Varghese highlighted the importance of the Pirani scoring system and the broader public health model for clubfoot management. International experts such as Ms. Rosalind Owen (Global Clubfoot Initiative, UK) and Dr. Norgrove Penny (University of British Columbia, Canada) enriched the deliberations with global perspectives on treatment compliance, multidisciplinary engagement, and sustainability of clubfoot programmes.

The conference concluded with a round table discussion on Clubfoot management program, where experts highlighted the importance of strengthening prenatal detection, ensuring widespread awareness among parents and communities, expanding the network of trained orthopaedic specialists, and enhancing compliance with Foot Abduction Brace (FAB) protocols. Kerala's model of combining civil society partnerships with state-led health infrastructure was identified as a replicable framework for other regions. The conference also flagged the need for broader integration of congenital anomaly prevention and rare disease management within

Kerala's child health programmes. The international conference served as a platform for wider dissemination of clinical and public health best practices, and a roadmap for expanding clubfoot clinics to all districts of Kerala. The brochure for this programme is given as Annexure II.

During this Programme the Hon'ble Chief Minister, Sri Pinarayi Vijayan announced the Club Foot Free Kerala Programme to be initiated in partnership with the NGO Cure India. In 2021, the Kerala Government renewed its MoU with CURE India to implement the clubfoot programme in the State (GO attached in Annexure III).

Awareness	A child is born with clubfoot and there is awareness that clubfoot is a treatable condition
Identificationand Referral	A child is born with clubfoot and identified correctly as such and referred for treatment, ideally within the first few months of life
Clubfoot Clinic and Access	The baby and family are able to access a dedicated clubfoot clinic
Capacity, training and resources	The child receives proper treatment by clinicians trained in the Ponseti method and treatment supplies are available
Casting	The child's feet are manipulated and casted according to Ponseti protocols for 4-8 weeks
Tenotomy	A tenotomy of the Achilles tendon is performed by a trained provider
Foot Abduction Brace (FAB)	A FAB is fitted and used consistently as the child grows
Adherence	The child adheres to bracing and follow up for 4-5 years

Table 1: Factors involved in Club Foot treatment according to Dr. Roselyn Owens

Club foot treatment involves raising awareness, followed by identifying and referring the child to a clubfoot clinic equipped with trained professionals and the necessary resources. Treatment is not a one-time intervention; it demands ongoing dedication and effort over several years. A team of trained professionals consisting of doctors, nurses and other support stuff is required for provision of comprehensive care. The entire team, including the child's family, plays a crucial role, as the family is a vital partner in the treatment process. Table 1 shows the various factors that contribute to successful Club Foot treatment. Club foot treatment in Kerala has been able to cover almost all these aspects carefully in its Club Foot Free Kerala Programme, starting with the care pathway which is outlined below.

The Patient Care Pathway

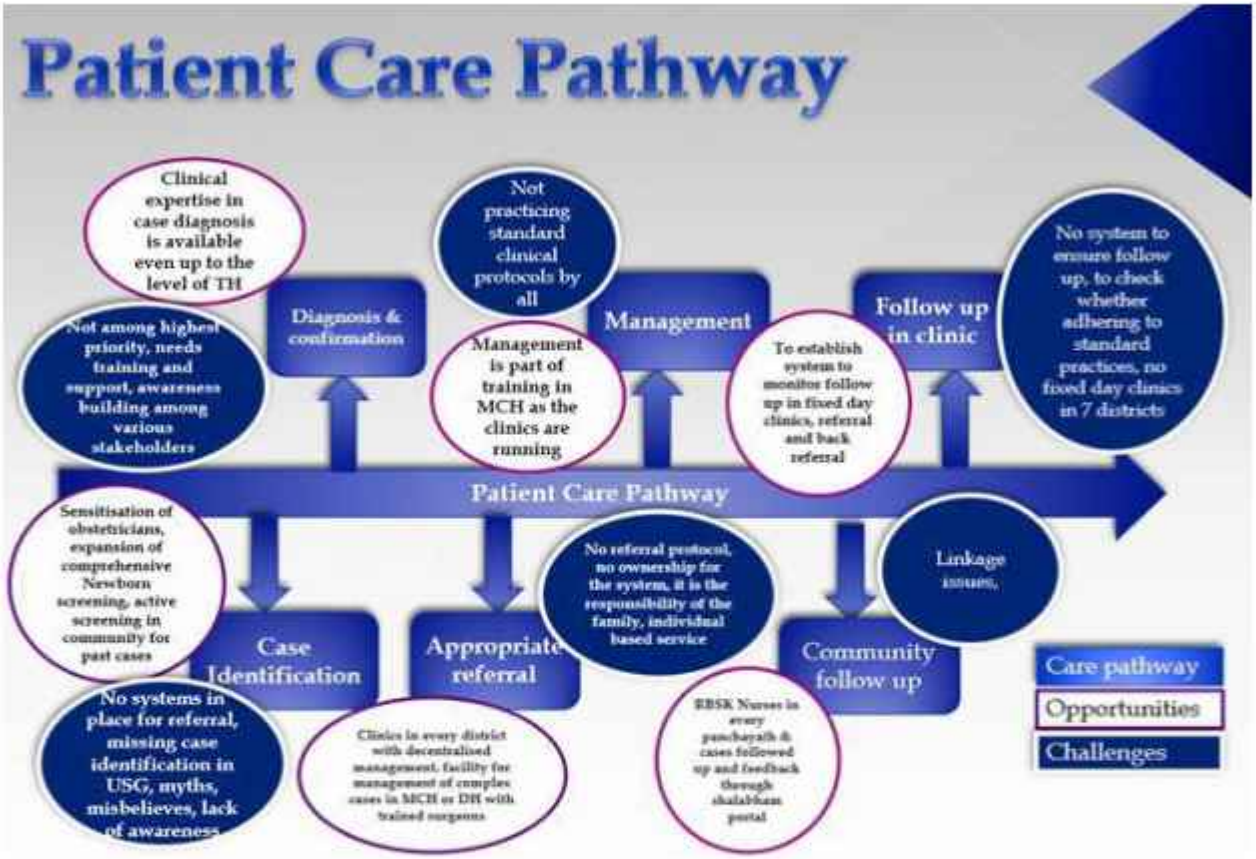

Figure 6: Care pathway for Clubfoot made by Dr. Sreehari, former nodal officer -RCH programme

Every new-born child delivered at Government Health Facilities is screened by the Delivery Point Staff or Nurses under the Rashtriya Bal Swasthya Karyakram (RBSK) for Visual Birth Defects. Club-foot detection in the State generally occurs during this time. As the treatment using Ponseti technique needs to be initiated in the first week of birth, the child is immediately referred to the concerned department.

Subsequently, an RBSK form for the child is then filled up and entry is made to the Shalabham portal. A template of this form used at the Govt. Medical College Thiruvananthapuram is attached as Annexure IV. An RBSK card and a Cure India card is generated for the child at this point. Following this, the details of the Child are entered into the register at the Club foot clinic (Fig 7).

Figure 7: Registers used at Govt. Medical College Thiruvananthapuram

The parents are given a counselling at the clinic by a Counsellor or Coordinator appointed by Cure India or any other designated staff. Their follow up is then taken up by the coordinator or other staff at the clinic. The follow-up and progress of the child's treatment can also be monitored by the local RBSK nurse at the new-born's place of residence, using the Shalabham portal. Figure 8 shows the timeline of Club foot treatment of a child as shown in the portal.

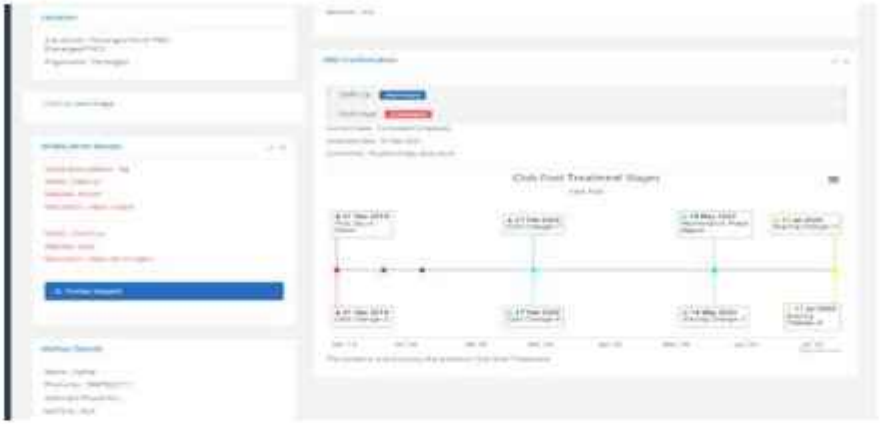

Figure 8: Clubfoot treatment progress in the Shalabham portal

The care pathway thus ensures that identification and referral happen at the earliest possible point after birth. Once at the Club Foot clinic, the team of professionals provide care and monitor adherence to the treatment protocol.

At the Conference on Clubfoot organised in 2021, some issues pertaining to existing facilities on Club foot treatment in Kerala were raised by the speakers. These included the non-screening of private delivery points and a lack of awareness of free treatment at public sector facilities. The conference also stressed on the crucial role played by counsellors in ensuring treatment adherence. Another point of discussion was the lack of compliance to the treatment, mostly due to accessibility issues, which was expected to be addressed with expansion of treatment envisaged in the programme.

Current status of the programme

By 2023, a total of 4037 children have been availed Club Foot treatment from the 15 clinics operated in association with CURE India. Among these 371 were added in the last year. By 2024, 4427 children have been added to the programme.(Fig.9). Table 2 shows the Club Foot clinic days at facilities in various districts.

District	Clinic days
Trivandrum	Monday, Wednesday & Saturday
Alappuzha	Monday & Tuesday
Kottayam	Monday, Friday
Thrissur	Wednesday, Thursday & Saturday
Palakkad	Monday
Kozhikode	Friday & Saturday
Wayanad	Tuesday
Kannur	Monday
Kasaragod	Thursday

Table 2: Clinic days at various districts

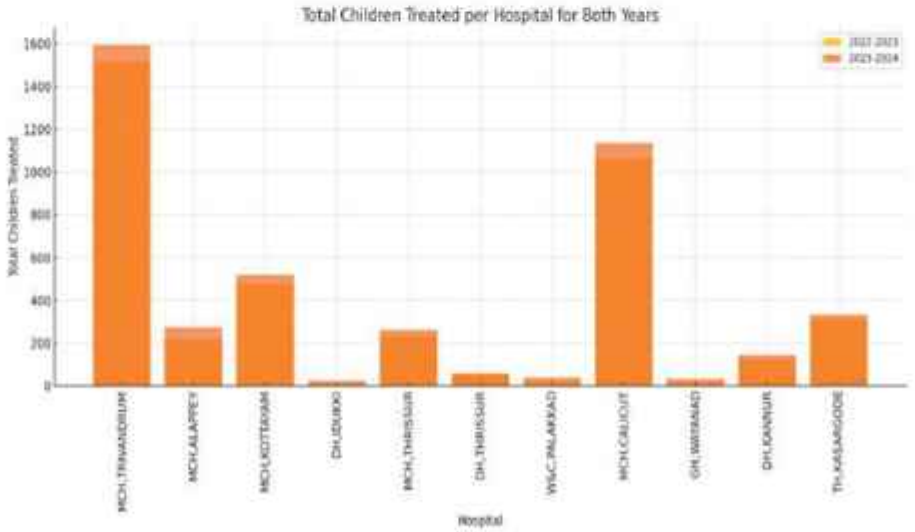

Figure 9: Children treated at various facilities (Source: Impact Report Kerala 2022-23&2023-24, CURE India)

Most number of children have been treated at the Govt. Medical College Thiruvananthapuram, followed by Govt. Medical College Calicut (Figure 10).

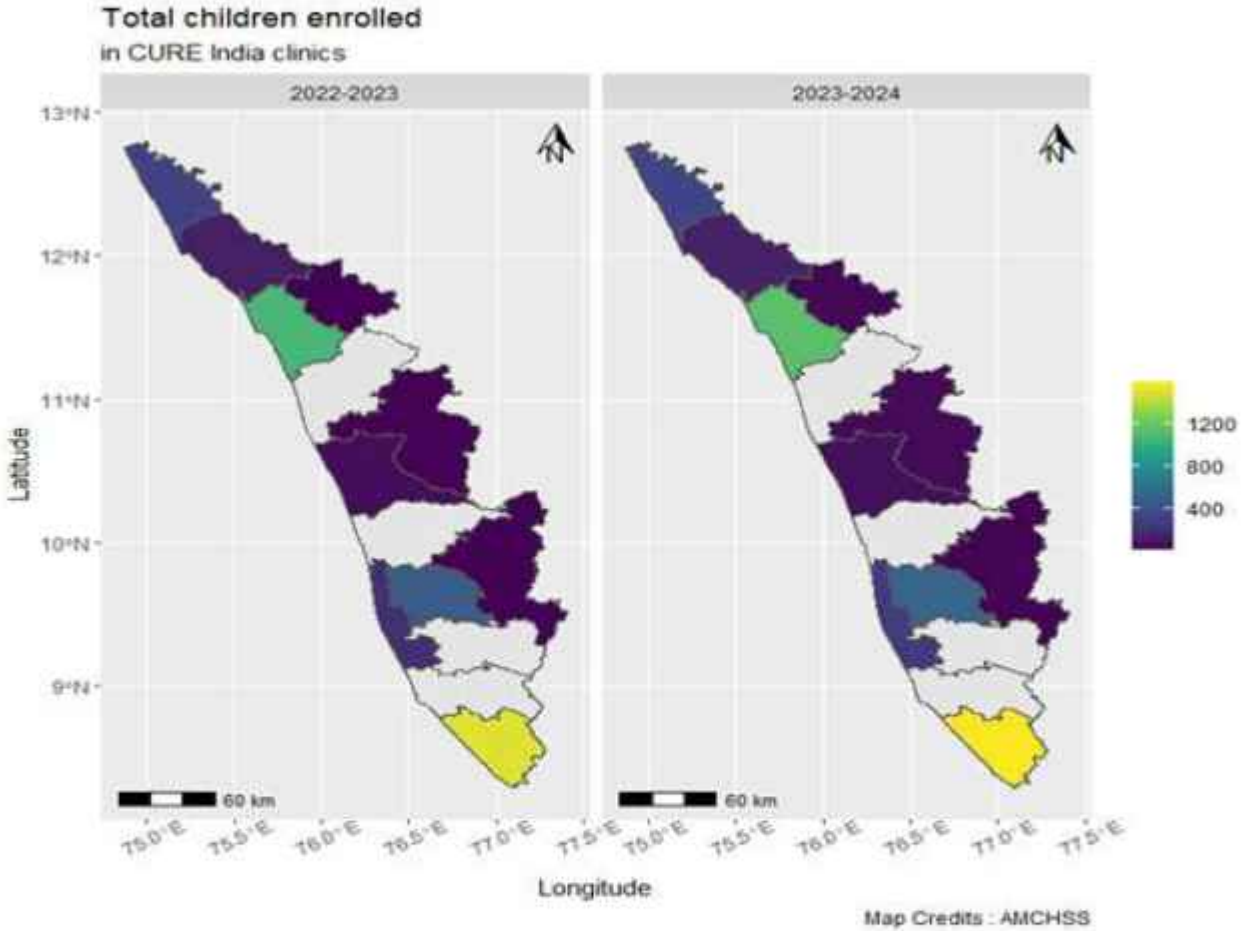

Figure 10: Total children enrolled by district

Among the 371 children enrolled in 2022-2023, most were from Thiruvananthapuram, followed by Kozhikode and Kottayam. In 2023-24, Kozhikodesurpassed Thiruvananthapuram in the number of new enrolment(Fig 11).

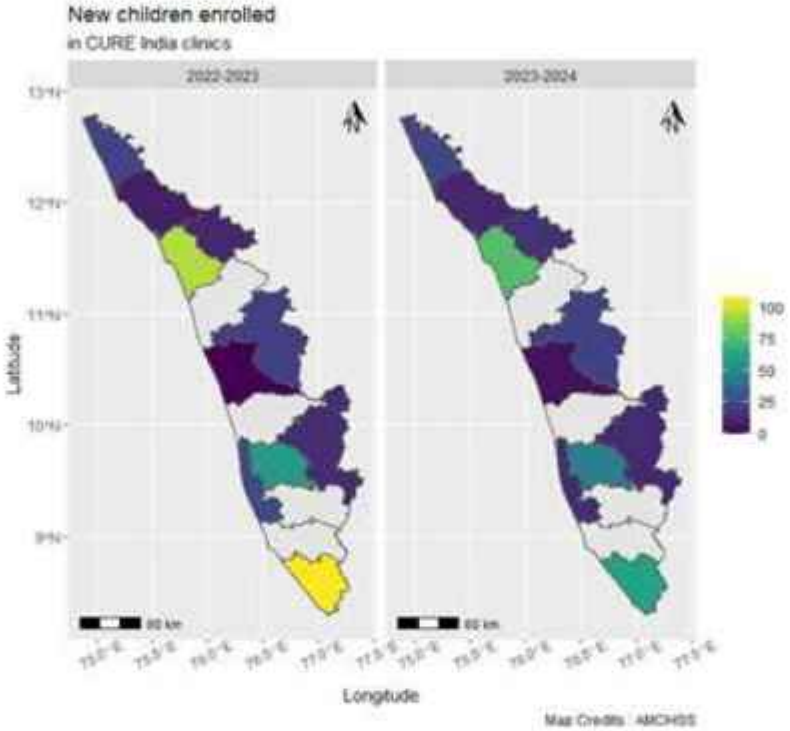

Figure 11: New children enrolled by district

Most number of castings were done in Thiruvananthapuram in both years (Fig 12). Among the 69 tenotomies done in 2022-23, 20 were done in Thiruvananthapuram. There was a slight decrease in tenotomies in 2023-24, with only 59 being done in total, among which most were done in Kottayam. Most follow-ups were in Thiruvananthapuram in both years, as they have the most children enrolled (Fig 13).

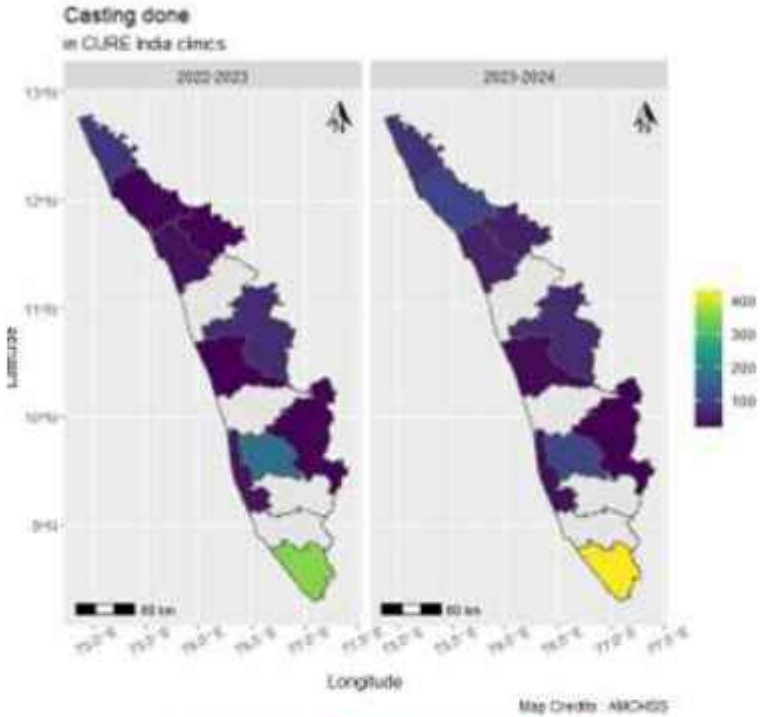

Figure 12: Casting done per district

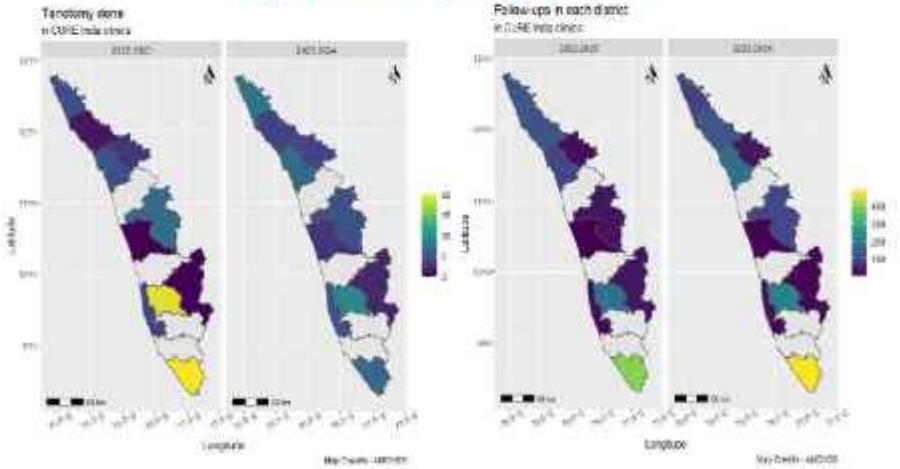

Figure 13: (left) Tenotomy done per district, (right) follow-ups per district

Chapter 3
Programme Implementation

In association with CURE India, the Govt has been able to provide treatment to 62.5 – 92 % of children born with Club Foot in the State. Club foot clinics have started at 36 public facilities in the state as of 2024, among which 15 are operated across 10 districts in partnership with CURE India. A list of these facilities is given in Annexure V.

Capacity Building

Figure 14: Clubfoot day celebration at Kozhikode (Source: Impact Report Kerala 2022-23&2023-24, CURE India)

Several training sessions have been conducted under the aegis of the programme for staff such as Mid-level Service Providers MLSPs within the health system. In March 2023, medical training programs were conducted for orthopaedic doctors in the state. Following this on 6th June 2023, Club foot day was celebrated, and a MoU was submitted with the Rotary Governor of Kozhikode, Dr. Sethu Siva(Fig.14). Various trainings were

conducted till 2024 with the 10th one being conducted in March 2024 at Thiruvananthapuram for orthopaedic doctors and nurses from 36 Club foot clinics.

Under the programme, 42 capacity building trainings were done for ASHAs in 7 districts, among which Kozhikode witnessed 20 trainings (Fig 15). ASHAs were trained on the importance of early treatment for Club foot and proper usage of the Foot Abduction Brace (FAB). ASHAs being the grassroot level health workers have been empowered through the training to raise awareness in the community at household level and direct those unaware of treatment options to the Club foot clinics.

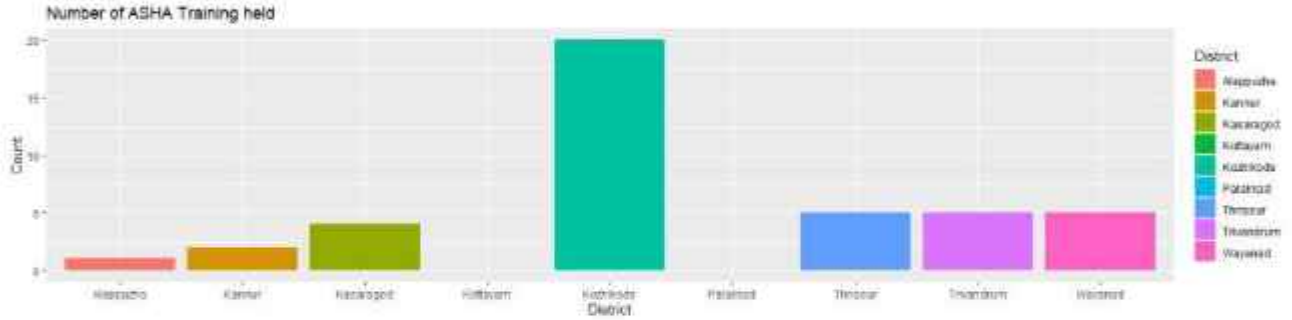

Figure 15: ASHA Trainings held (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

A total of 231 ASHAs were trained with more than 50 ASHAs being trained in Wayanad (Fig 16).

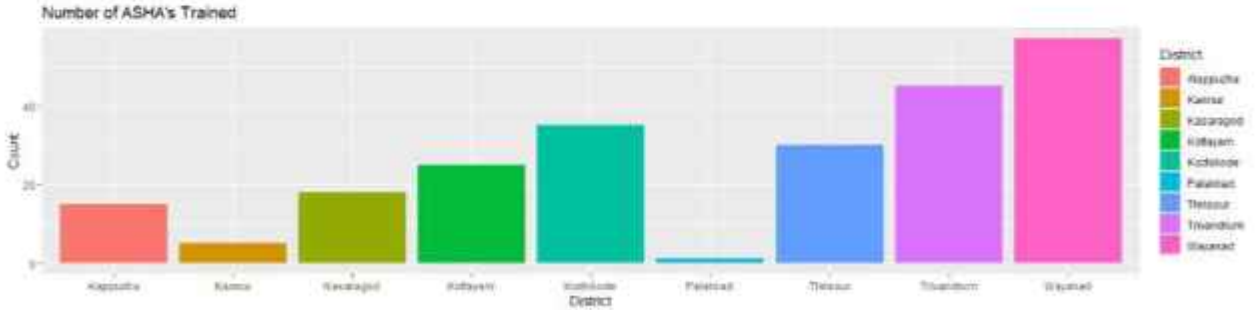

Figure 16: ASHAs trained (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

Trainings were held at 208 Anganwadis with more than 70 trainings held in Anganwadis in Kannur (Fig.17)

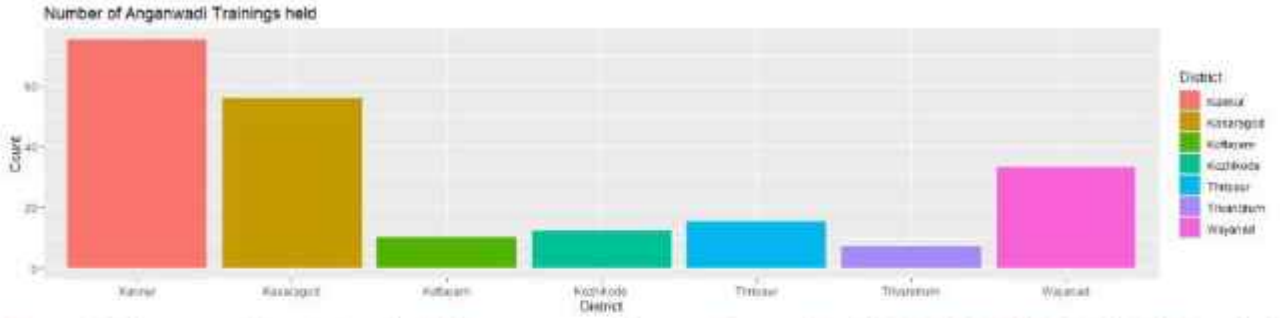

Figure 17: Anganwadi trainings held (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

More than 900 Anganwadi workers were trained in these 208 Anganwadis. With about 200 being trained in Kottayam alone. (Fig.18). Anganwadi workers have been given training on detection of club foot so that they may refer those presenting with symptoms at the Anganwadi to the nearest Club foot clinic for treatment. They are also taught the importance of early detection, available treatment options and the need for treatment adherence for club foot. Thus, they can encourage parents availing Anganwadi services to follow through with the treatment procedures.

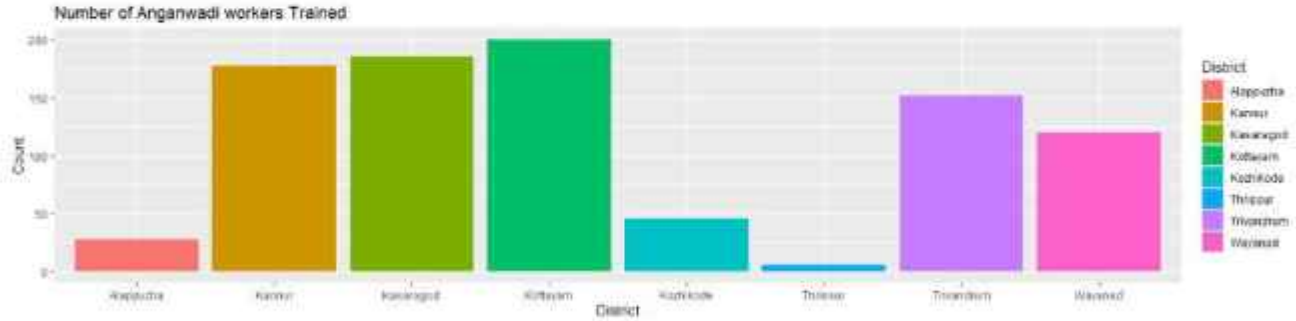

Figure 18: Anganwadi workers trained (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

Outreach Activities

With the goal of improving enrolments and compliance to treatment, outreach activities were taken up at all districts. Schools, Anganwadis and grassroot level health centres have been visited as part of the outreach activities. Home visits to tribal residences have been conducted as well. Outreach activities involve meetings and educational sessions with teachers and parents as participants. Outreach efforts were more in the Northern districts of Kannur and Kasaragod. Enrolments at Thiruvananthapuram remained high. However, despite significant outreach efforts the Northern districts of Kannur, Kasaragod and Wayanad showed scant improvement in enrolment numbers (Fig 19).

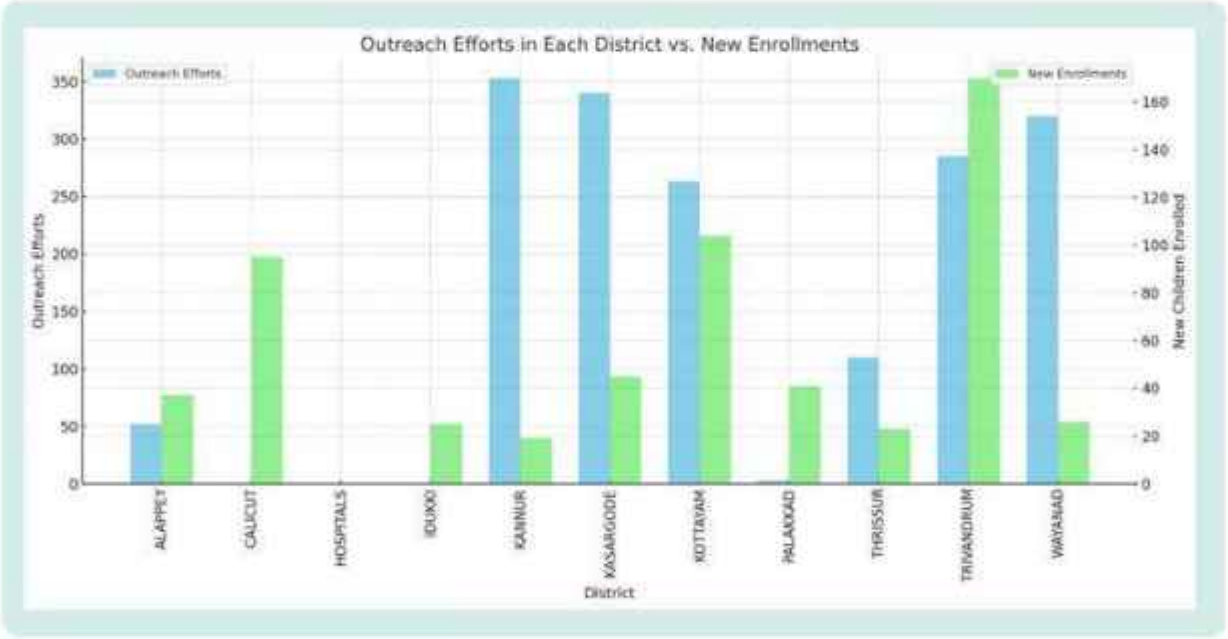

Figure 19: Outreach and enrolment (Source: Impact Report Kerala 2022-23&2023-24, CURE India)

In 8 district, 206 homes were visited as part of Club Foot outreach programmes. More than 50 houses were visited in Wayanad alone (Fig 20).

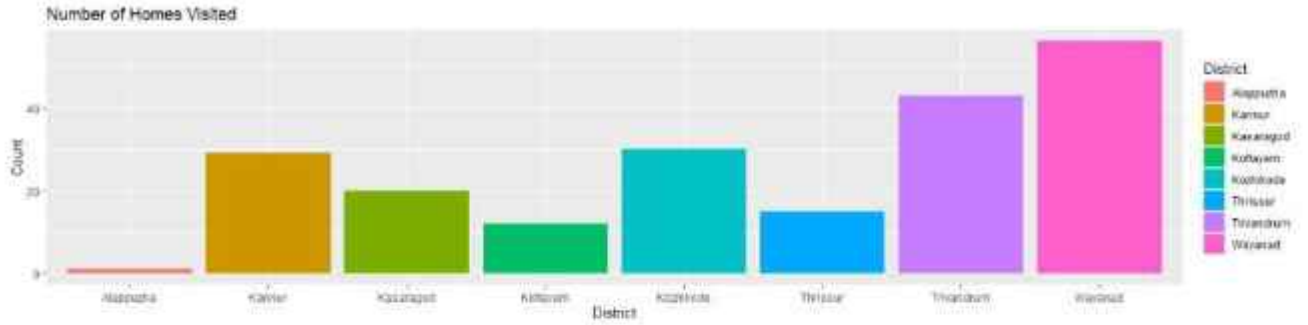

Figure 20: Homes visited for outreach (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

More than 100 schools were visited in the state as part of outreach activities. About 40 schools were visited in Kasaragod alone (Fig 21).

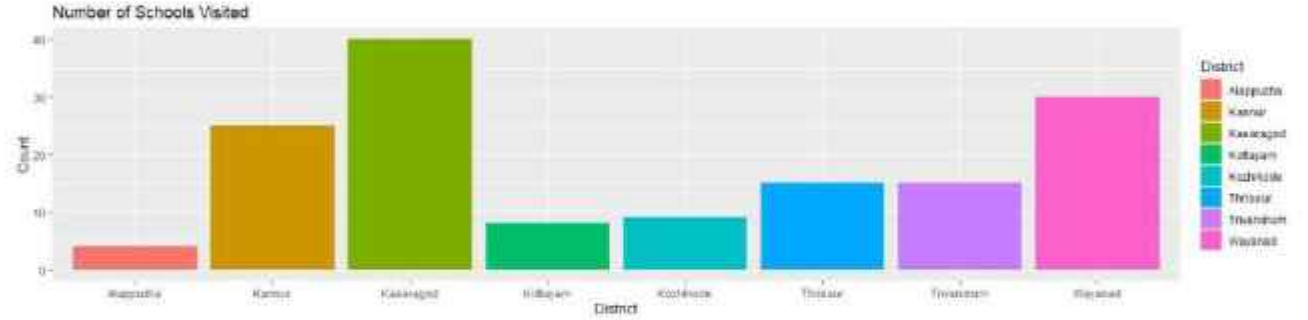

Figure 21: Schools visited for outreach (Data source: Impact Report Kerala 2022-23&2023-24, CURE India)

Thus, under the Club Foot Free Kerala Programme, outreach activities, capacity building exercises such as training sessions, awareness generation through Club Foot day observance etc. have been carried out. The Govt. has therefore taken initiatives to address the factors that affect Club Foot treatment (given in Table 1) and has been able to make available, affordable and accessible care.

Success stories

The clubfoot clinics in Kerala have witnessed countless transformations, each a testament to the power of early intervention and unwavering support. Here are four inspiring stories of patients whose lives were positively impacted by the dedicated healthcare system and the unwavering support of their families.

Master Raj (name changed) was born with bilateral clubfoot in 2017. He was referred to the GMCT's Pediatric Orthopedics department from the Women & Child hospital where he was born. His club foot treatment started within 6 days of birth. He continues to wear his FAB at night even now as per the instructions of his Doctor.. His mother says with immense joy that *"He can run, walk, jump everything! We are more than happy with the treatment he got".* Figure 22 shows Master Raj at different stages of treatment

Figure 22: Club foot treatment done for Master Raj

Master Akshay (name changed) started his treatment in 2018 and completed it in 2023. He had initially started treatment at a private facility and was referred to the GMCT at 6 months of age. He had unilateral club foot of the left leg. Now, off the FAB since more than a year, he has been advised to do physiotherapy exercises and follow-up with his doctor every 6 months. When asked how the treatment was, his mother said " We have got very good treatment". Figure 23 shows Master Akshay posing post his treatment in 2024.

Figure 23: Master Akshay post treatment

Figure 24: Master Daniel posing proudly after treatment

Master Daniel (name changed), whose family hails from the outskirts of Thiruvananthapuram, was diagnosed with bilateral clubfoot in 2017. As of 2024, a year and a half has passed since the completion of his treatment. His father said that his legs were very twisted and that initially they were doubtful of the treatment as Daniel used to cry while wearing the FAB. He now says that they are happy to have stuck with the treatment as Daniel is able to walk around like any normal child now. Figure 24 shows Master Daniel after completion of his treatment.

Master Ravi (name changed) was born with bilateral club foot (Fig.25) He was referred to the GMCT from SAT. Although his parents were worried seeing his condition, the doctors at SAT allayed their concerns by remaining firm that it can be easily corrected. In 2024, the now eight- year old Master Ravi has completed his FAB phase and continues to do the exercises shown to him by his doctor.

Figure 25: Master Ravi pre and post treatment

Chapter 4

Conclusions and Recommendations

The Government of Kerala, in partnership with CURE India, have made commendable strides in Club Foot treatment in the State. With more than 4000 children availing their services, the State has been able to provide affordable care to children thereby relieving them and their parents off the tremendous physical, emotional and financial burden.

CURE India has engaged in effective outreach activities through which it was able to raise awareness in the community. Multiple training programmes conducted for Doctors, Nurses, MLSPs and other health staff have helped build health system capacity to tackle the condition. The treatment for clubfoot is a long process which requires strict adherence to the treatment protocol for the best prognosis. Employment of specialised staff such as Medical Social Workers and Counsellors for educating parents and ensuring follow-up can improve adherence to treatment. Several barriers such as accessibility and affordability has been addressed effectively through the expansion of care to 36 public sector facilities. Improvements in outreach activities with the use of various types of media such as TV, FM, social media could help improve awareness in the community. Moreover, arranging for good quality materials such as plaster and cotton used can also ensure effective treatment delivery. However, tailored strategies for each district may be required based on local challenges determined by geographic and demographic factors.

An excellent example of the effectiveness of early intervention is the successful treatment and rehabilitation of an infant with Club foot. When parents realise first-hand the transformational power of competent care, they are frequently motivated to seek treatment as soon as possible. This emphasizes the value of comprehensive care along with successful patient education and awareness initiatives. Therefore, consistent good quality care will not only able to improve the lives of individual children but also contribute to a broader shift in parental perception, encouraging timely intervention and ultimately reducing the long-term consequences of clubfoot. With continued dedicated efforts to provide the best possible care, we can work towards making Kerala Club Foot free.

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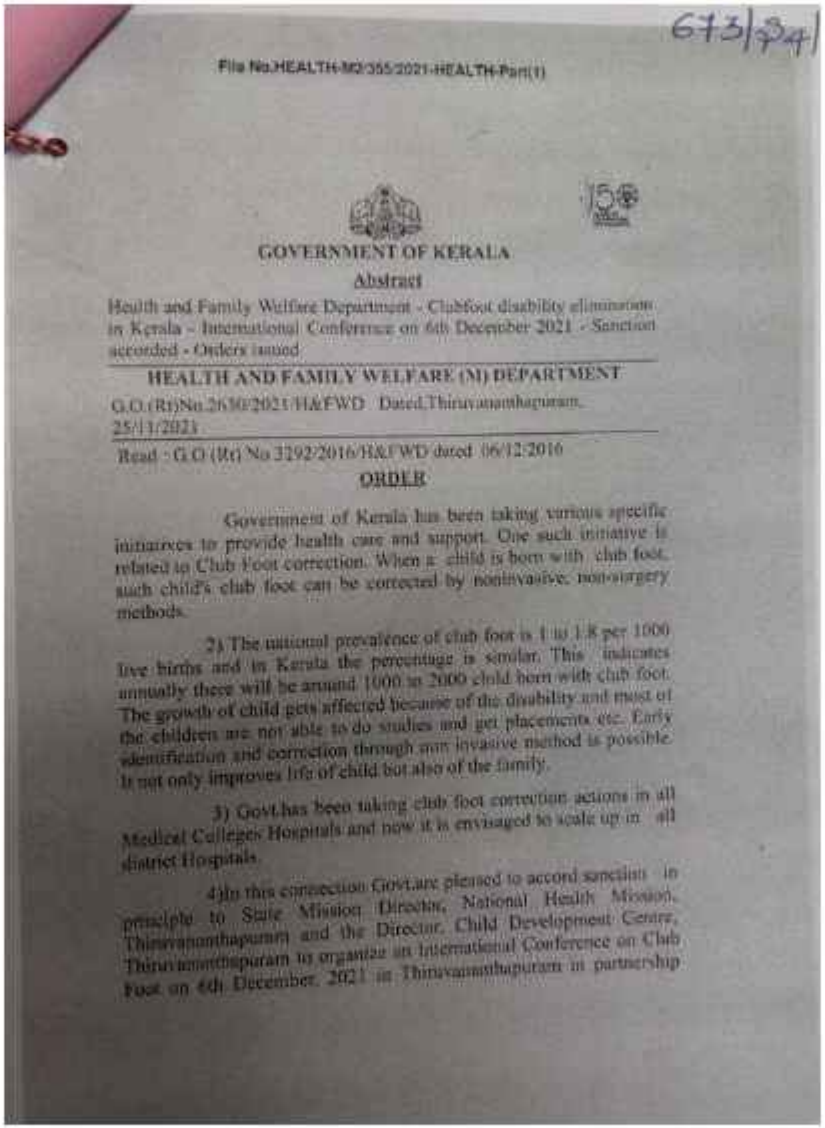
ANNEXURES

Annexure - I



673/24

File No.HEALTH-M2/355/2021-HEALTH-Part(1)

GOVERNMENT OF KERALA

Abstract

Health and Family Welfare Department - Clubfoot disability elimination in Kerala – International Conference on 6th December 2021 - Sanction accorded - Orders issued

HEALTH AND FAMILY WELFARE (M) DEPARTMENT

G.O.(Rt)No.2630/2021/H&FWD Dated,Thiruvananthapuram, 25/11/2021

Read - G.O (Rt) No 3292/2016/H&FWD dated 06/12/2016

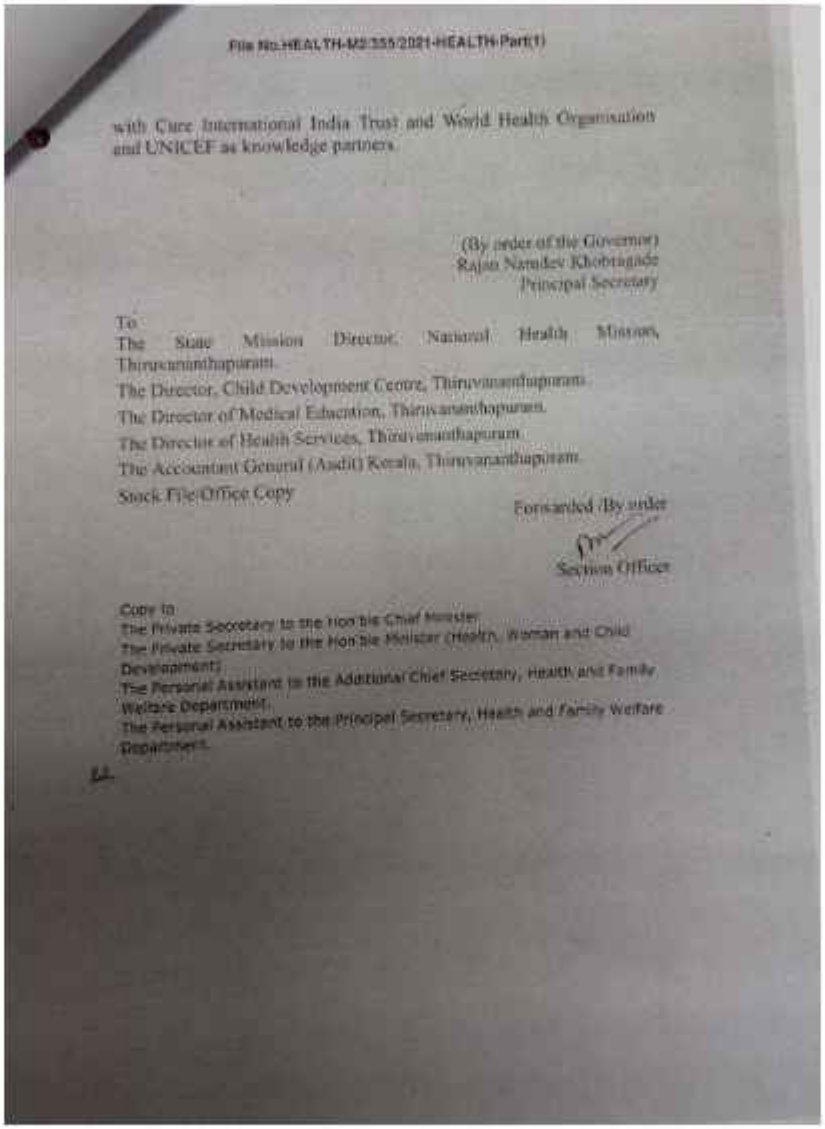
ORDER

Government of Kerala has been taking various specific initiatives to provide health care and support. One such initiative is related to Club Foot correction. When a child is born with club foot, such child's club foot can be corrected by noninvasive, non-surgery methods.

2) The national prevalence of club foot is 1 to 1.8 per 1000 live births and in Kerala the percentage is similar. This indicates annually there will be around 1000 to 2000 child born with club foot. The growth of child gets affected because of the disability and most of the children are not able to do studies and get placements etc. Early identification and correction through non invasive method is possible. It not only improves life of child but also of the family.

3) Govt.has been taking club foot correction actions in all Medical Colleges Hospitals and now it is envisaged to scale up in all district Hospitals.

4)In this connection Govt.are pleased to accord sanction in principle to State Mission Director, National Health Mission, Thiruvananthapuram and the Director, Child Development Centre, Thiruvananthapuram to organize an International Conference on Club Foot on 6th December, 2021 in Thiruvananthapuram in partnership



File No.HEALTH-M2/355/2021-HEALTH-Part(1)

with Cure International India Trust and World Health Organisation and UNICEF as knowledge partners.

(By order of the Governor)
Rajan Namdev Khobragade
Principal Secretary

To
The State Mission Director, National Health Mission, Thiruvananthapuram.
The Director, Child Development Centre, Thiruvananthapuram.
The Director of Medical Education, Thiruvananthapuram.
The Director of Health Services, Thiruvananthapuram.
The Accountant General (Audit) Kerala, Thiruvananthapuram.
Stock File/Office Copy

Forwarded /By order

Section Officer

Copy to
The Private Secretary to the Hon'ble Chief Minister.
The Private Secretary to the Hon'ble Minister (Health, Woman and Child Development)
The Personal Assistant to the Additional Chief Secretary, Health and Family Welfare Department.
The Personal Assistant to the Principal Secretary, Health and Family Welfare Department.

Annexure - II

Department of Health & Family Welfare
Government of Kerala

Inaugural Function on Monday, December 6th 2021
at 11 am - 12 noon

Inauguration by Shri. Pinarayi Vijayan
Hon'ble Chief Minister of Kerala

Presided by Smt. Veena George
Hon'ble Minister for Health and Family Welfare,
Woman & Child Development

International Conference on Club Foot

Online-offline mode

Venue : Mascot Hotel, PMG Junction, Thiruvananthapuram

In partnership with
CURE India

Knowledge Partners
WHO, UNICEF and CDC Kerala

"Clubfoot free Kerala"- None shall be disabled due to Clubfoot

Clubfoot

Dear Madam/Sir

Thiruvananthapuram 24/11/2021

Greetings from Kerala!
Kerala Health has been taking all efforts to control and mitigate COVID 19 pandemic and we continue our efforts to minimize new infections, focus on providing treatment in time and doing fast vaccination. In making SDG a reality, we are now working on the next phase of response to pandemic- 'Working around COVID'. In order to do that we are bringing attention to various other prevailing health issues. Kerala has always been focusing on various measures for disability prevention and we would like to inform you that Clubfoot disability elimination as a program was initiated by the Government of Kerala in 2011.

As we celebrate 10 years of this unique initiative, it's time we make sure that every child born with clubfoot gets complete care so that no child is left without treatment. Health and Family Welfare Department in partnership with CURE India is taking various activities related to Clubfoot management.

In this context, the Department of Health and Family Welfare, Kerala is organizing an International conference on 6th December 2021 in hybrid mode at Mascot Hotel, Thiruvananthapuram, the capital city of Kerala. **The Honourable Chief Minister of Kerala Shri. Pinarayi Vijayan** has graciously agreed to inaugurate the conference and will launch a program to make Kerala Clubfoot disability free state. **Smt. Veena George Honourable Minister for Health and Family Welfare, Woman and Child Development** will preside over the function. Dr. B. Ekbal, Former Vice Chancellor, University of Kerala will deliver a special address.

The conference is organized with technical assistance from World Health Organization, UNICEF and Child Development Centre, Kerala and involvement of all the Departments and our partner Indian Academy of Pediatrics. The National and International experts on clubfoot management will share their expertise in the management of clubfoot. A session for Postgraduate trainees, practicing doctors and para medical staff will also be conducted. A workshop on the management of clubfoot for all the doctors and paramedical staff of clubfoot clinics is organized. Clubfoot clinics will be expanded to forty four numbers. With this initiative, it is expected that every child born with clubfoot in Kerala will be given appropriate early treatment for clubfoot. The conference is being organized in a hybrid mode with both online and offline facility. We invite you to attend the programme and solicit your active participation.

Team
KERALAHEALTH

Kerala Health Conference Links

11.00-12.00 : Inaugural Programme

Session I

12.00 to 15.30	**Hall A: "From Hope to Triumph"** - Reduction of disability due to club foot and other Birth Defects (for postgraduates and field functionaries)
12.00 - 12.05	**Introduction & Address on Clubfoot free Kerala** **Dr. Rajan Khobragade IAS** Principal Secretary, H& FWD
12.05 - 12.25	**Etiology and Epidemiology of Clubfoot** **Dr. Sankar V.H.** Additional Professor Pediatrics & Consultant Geneticist, CDC
12.25 - 12.45	**Management of Clubfoot** **Dr. Shanavas E.K.** Additional Professor, Dept. of Orthopedics Medical College, Tvpm.
12.45 - 15.30	**Paper Presentations** Clubfoot and other Birth Defects
14.00 - 15.30	**Hall B: "Translating ideas to Action"** **Dr. Mathew Varghese** Hon. Medical Director, CURE India - Workshop on Reduction of disability due to club foot (for Doctors, Nurses , Paramedical staff)

Session II

16.00 - 16.15	Address by **Smt. Veena George** Hon'ble Minister for Health and Family Welfare, Woman & Child Development, Kerala
16.15 - 16.30	Key note address **Shri. Vikas Sheel IAS** Addl.Secretary & Mission Director, NHM Ministry of Health & Family Welfare, Govt. of India
16.30 - 17.00	Kerala - Clubfoot program **Dr. Rajan Khobragade IAS** Principal Secretary, Health & Family Welfare Dept. **Dr. Manoj J.H** Orthopedic Consultant, Clubfoot Clinic, Taluk Hospital, Tirkaripur
17.00 - 17.45	Club Foot – Non invasive management- Civil society and Government partnership Elimination of Disability from Clubfoot - the CURE India model **Dr. Santhosh George** Director, CURE India, New Delhi "The Pirani Score" - How it helps me treat clubfoot more effectively **Dr. Shafique Pirani** "Clubfoot Management the Public health model" **Dr. Mathew Varghese**
17.45 - 18.30	Plenary Talk - Clubfoot management **Ms. Rosalind Owen** Executive Director, Global Clubfoot Initiative London, UK
18.30 - 19.30	Round Table – Clubfoot management - Way forward

Dr. Norgrove Penny
Clinical Professor
University of British Columbia, Canada

Dr. Ahmad Hasan
Director of Operations
The LittleFeet Club, USA

Dr. Mathew Varghese
CURE India

Dr. Babu George
Director
Child Development Centre

Dr. Santhosh George

Dr. Shafique Pirani
Clinical Professor, Paediatric Orthopaedics division,
Royal Columbian Hospital,
University of British Columbia, Canada

Dr. Vikas Gupta
Professor, Central Institute of Orthopaedics
VMMC & Safdarjang Hospital, New Delhi

Dr. Venkatesan Sampath Kumar
Associate Professor, Dept of Orthopedics,
AIIMS, New Delhi

Moderator : Dr. M. Zulfikar Ahamed
Clinical Professor of Pediatric & Adolescent Cardiology,
CDC Kerala

www.keralahealthconference.in


Clubfoot International Conference
Inauguration


Clubfoot Int
Conference


Clubfoot International Conference
Club Foot


Ponseti Clubfoot Treatment: The Pirani Score and Quality Assurance - 30 years experience
Dr Shafique Pirani
Paediatric Orthopaedics
Pankaj Jain
Technologist, Delhi


• RunFree2030: Global Strategy to End Clubfoot Disability
• Ambition: Ensure by 2030 at least 70% of children born with clubfoot in LMICs can access treatment.
• Investment of $160 million - treat over 1.2 million children & generate $154 billion in additional lifetime earnings.
RUNFREE

Annexure - III

File No.HEALTH-M2/355/2021-HEALTH

GOVERNMENT OF KERALA

Abstract

Health & Family Welfare Department. –Clubfoot Management programme - Guidelines for implementation -Orders issued.

HEALTH AND FAMILY WELFARE (M) DEPARTMENT

G.O.(Rt)No.2879/2021/H&FWD Dated,Thiruvananthapuram, 22/12/2021

Read: Letter dated 21/09/2021 from Cure International Trust Limited for the renewal of MoU with Government of Kerala regarding Club Foot Treatment in the State.

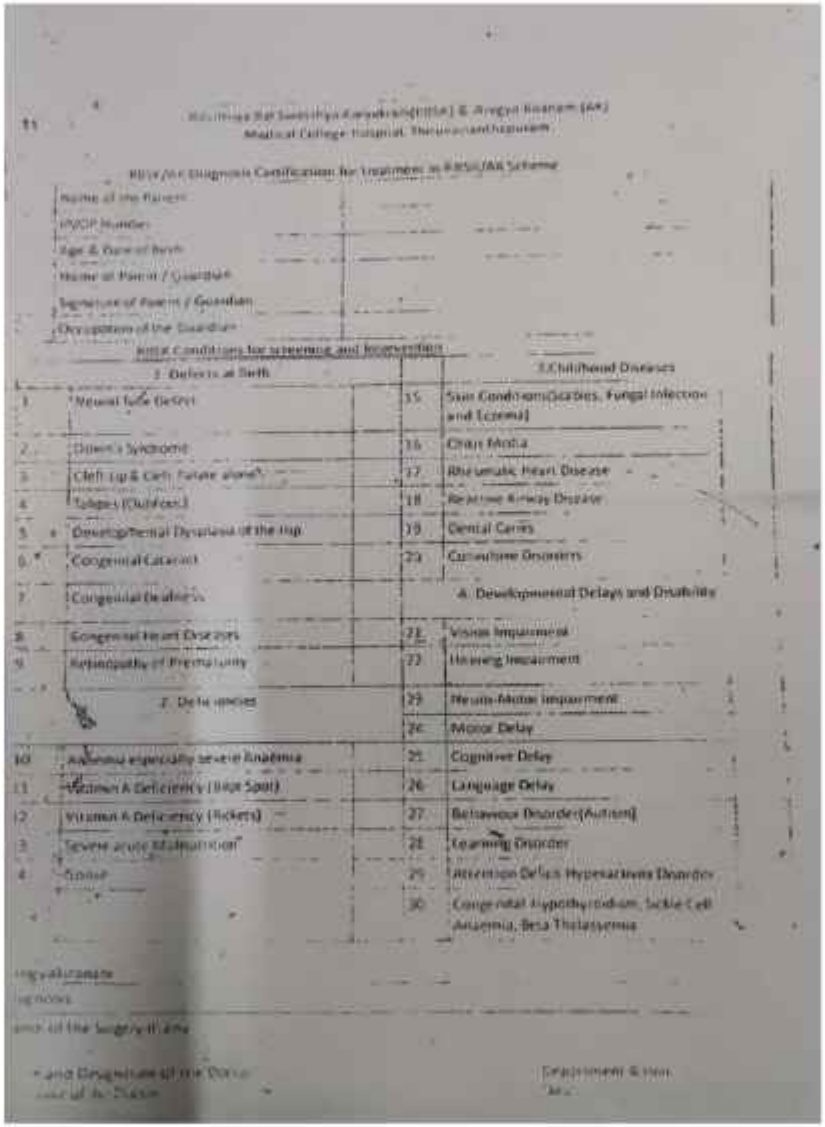
ORDER

Clubfoot is one among the most common birth defect identified at birth under the Comprehensive Newborn Screening program in Kerala. Although there are different methods adapted for correction of Clubfoot, Ponseti method is the widely accepted and followed treatment in the clinics in Kerala. At present there are established clinics only in seven districts and mostly in the Medical College Hospitals. Government is planning to expand the programme in specific hospitals throughout Kerala. Club Foot Clinics are functioning in collaboration with Cure International India since 5th August 2011 and the MOU signed with them expired on 11th August 2021. CURE International India Trust vide letter read above had requested to renew the MoU which has been signed between Government of Kerala and the CURE International India Trust for the implementation of club foot programme, for another 5 years.

Government have examined the matter in detail and are pleased to accord sanction for the implementation of the Club foot programme in the State for another 5 years in collaboration with CURE International India Trust. Sanction is also accorded to Execute MOU in this regard.

The guideline as appended to this order is also approved for the effective implementation of the programme.

(By order of the Governor)
Rajan Namdev Khobragade
Principal Secretary



Medical College Hospital, Thiruvananthapuram

RBSK/AK Diagnosis Certification for Treatment in RBSK/AK Scheme

Name of the Parent
UHID/P Number
Age & Date of Birth
Name of Parent / Guardian
Signature of Parent / Guardian
Occupation of the Guardian

Brief Conditions for screening and Intervention

	1. Defects at Birth		3.Childhood Diseases
1	Neural Tube Defect	15	Skin Conditions(Scabies, Fungal Infection and Eczema)
2	Down's Syndrome	16	Cleft Lip & Cleft Palate alone*
3	Cleft Lip & Cleft Palate alone*	17	Rheumatic Heart Disease
4	Talipes (Clubfoot)	18	Recurrent Kidney Disease
5	Developmental Dysplasia of the Hip	19	Dental Caries
6	Congenital Cataract	20	Convulsive Disorders
7	Congenital Deafness		4. Developmental Delays and Disabilities
8	Congenital Heart Disease	21	Visual Impairment
9	Retinopathy of Prematurity	22	Hearing Impairment
	2. Deficiencies	23	Neuro-Motor Impairment
		24	Motor Delay
10	Anaemia especially severe Anaemia	25	Cognitive Delay
11	Vitamin A Deficiency (Bitot Spot)	26	Language Delay
12	Vitamin A Deficiency (Rickets)	27	Behaviour Disorder(Autism)
13	Severe acute Malnutrition*	28	Learning Disorder
14	Goitre	29	Attention Deficit Hyperactivity Disorder
		30	Congenital Hypothyroidism, Sickle Cell Anaemia, Beta Thalassemia

Investigations
Diagnosis
Site of the Surgery if any

* and Diagnosis of the Doctor
Date of the Doctor

Signature & Seal
Dr.

Annexure - IV

CLUBFOOT CLINICS IN KERALA

Sl. No	District	Institution
1	Thiruvananthapuram	MCH Trivandrum
		DH Nedumangaud
		GH Neyyattinkara
2	Kollam	THQH Karunagappally
		THQH Kottarakkara
		MCH Paripally
		DEIC Kollam
3	Pathanamthitta	THQH Ranni
		GH Adoor
		THQH Thiruvalla
4	ALAPPUZHA	MCH Wandanam
		DH MAVELIKARA
		THQH CHERTHALA
5	Kottayam	MCH Kottayam
		THQH Vaikom
		GH Pala

Sl. No	District	Institution
6	Idukki	DH IDUKKI
		DH THODUPUZHA
7	Ernakulam	DH ALUVA
		GH MUVATTUPUZHA
		MCH KALAMASERRY
8	Thrissur	GH THRISSUR
		MCH THRISSUR
		THQH KUNNAMKULAM
		GH IRINJALAKUDA
9	Palakkad	THQH,MANNARKKAD
		DH Palakkad
		THQH,OTTAPALAM
		GTSH Kottathara
		THQH Alathur
		THQH,CHITTUR
10	Malappuram	GMCH MANJERI
		THQH THIRURANGADI
		DH TIRUR

Sl. No	District	Institution
11	Kozhikode	MCH Kozhikode
		DH Vatakara
		TH Thamarassery
12	Wayanad	DEIC WAYANAD
13	Kannur	DH KANNUR
		GH THALASSERY
		TH PERAVOOR
14	Kasargod	TH THRIKARIPUR
		GH KASARAGOD

Annexure - V

Pirani Classification System

The Pirani classification system is a clinical tool used to assess the severity of clubfoot deformity and to monitor treatment progress. It is based on the observation of six physical signs, which are divided into two groups: midfoot and hindfoot. Each sign is scored on a scale of 0 to 1, with 0 indicating no abnormality, 0.5 indicating moderate abnormality, and 1 indicating severe abnormality.

Pirani Score Components:

1. Midfoot Contracture Score (MCS)

Medial Crease:

0: No crease.

0.5: Shallow crease.

1: Deep crease.

Curvature of the Lateral Border:

0: Straight lateral border.

0.5: Mildly curved lateral border.

1: Severely curved lateral border.

Position of the Talus Head:

0: Talus easily palpable.

0.5: Talus partially palpable.

1: Talus not palpable (covered by navicular).

2. Hindfoot Contracture Score (HCS)

Posterior Crease:

0: No posterior crease

0.5: Shallow posterior crease

1: Deep posterior crease

Rigidity of Equinus:

0: No equinus deformity

0.5: Mild equinus deformity (able to dorsiflex partially).

1: Severe equinus deformity (rigid plantarflexion).

Empty Heel:

0: Normal heel (heel pad easily felt).

0.5: Heel pad slightly displaced.

1: Heel pad significantly displaced (empty heel).

Scoring:

Each foot is scored out of a maximum of 6 points.

0: No deformity.

1-2: Mild deformity.

3-4: Moderate deformity.

5-6: Severe deformity.

- **A Pirani score of 4+ is likely to require at least four Ponseti casts**
- **A Pirani score of <4 will require three or fewer Ponseti casts**
- **A foot with a hindfoot score of 2.5 or 3 has a 72% chance of requiring an Achilles tenotomy**

" We now run ....and play"

The club foot corrected children