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Research Article

Socio-Demographic Characteristics and Treatment Details of Children with Clubfoot Deformity in a Tertiary Care Institute: An Observational Study

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ABSTRACT

Objective: The objectives of this investigation are to investigate the social, demographic, and treatment-related factors that contribute to the management of children with clubfoot.

Methods: A prospective observational study was conducted from July to September 2016. Using a semi-structured questionnaire, we conducted interviews with families of children enrolled in the RBSK program between January 2014 and September 2016. Our objective was to collect information regarding their social and demographic characteristics, treatment history, and any factors that may have influenced their care.

Results: Of the 136 infants diagnosed with clubfoot, 69.1% were male and 77.2% had the condition in both feet. The majority of the parents (77.9%) were between the ages of 20 and 30. 80.1% of families encountered transportation challenges, while 78.7% were required to travel more than 10 kilometres to access treatment centres. The average waiting time for services was 21 minutes. Healthcare providers referred approximately 75.8% of the children, while 88.9% of parents were motivated to adhere to the treatment plan. The condition's awareness experienced a significant increase, from 1.47% prior to diagnosis to 85.29% subsequent to it.

Conclusions: Despite the challenges associated with transportation, the availability of free therapy, useful healthcare guidance, and brief waiting times, parents were primarily motivated to complete treatment. Improving accessibility and alleviating the burden on larger institutions could be achieved by extending clubfoot treatment to community outreach programs.

Keywords: Accessibility, Parental compliance, RBSK program, Treatment challenges, Clubfoot.

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INTRODUCTION

Clubfoot is "a congenital musculoskeletal deformity" that is particularly prevalent in developing countries and is one of the most common.[1,2] It is a developmental disability that significantly impacts approximately 220,000 infants in these regions each year.[3] Clubfoot is a condition that affects 1 to 3 out of every 1,000 live births worldwide. India has a significantly higher incidence of clubfoot, with an estimated 25,000 neonates born with this condition each year.[4]

The condition is typically defined by a complex deformity that includes adduction of the forefoot, cavus, varus of the heel, and equinus of the ankle. The cause is typically idiopathic in the majority of cases. Males are disproportionately afflicted, with a male-to-female ratio of 2:1.[4]

The Ponseti, a non-invasive treatment approach, has become the global standard for the management of clubfoot. This technique, which entails serial manipulation and casting, followed by bracing, is highly effective when executed correctly.[5,6]

Nevertheless, untreated or improperly treated cases of clubfoot may progress to "neglected clubfoot," a grievous disability that restricts opportunities for education and employment and impairs ambulation.7 Consequently, neglected clubfoot perpetuates cycles of poverty and disability, thereby requiring a public health approach to the condition.[5,6,7]

Under the National Health Mission, the Rashtriya Bal Swasthya Karyakram (RBSK) is a national health initiative that has been implemented by the Government of India. This initiative concentrates on the early detection and intervention of a variety of health conditions, such as clubfoot, in the target age group of birth to 18 years. The program guarantees that children receive comprehensive treatment and intervention at no cost to the family.[8,9]

The Ponseti method is employed to manage infants with clubfoot on an outpatient basis in our tertiary care facility. This method entails weekly plaster-casting for five to six weeks, followed by bracing to maintain correction and prevent recurrence. The objective of this investigation is to investigate the socio-demographic and treatment-related factors that affect the management and outcomes of children with clubfoot deformity in order to identify the barriers and facilitators to effective treatment.

MATERIALS AND METHODS

Study Design: Present observational study was done at a tertiary care hospital.

Study Population: The study included 136 children diagnosed with idiopathic clubfoot who presented to the outpatient department between January 2014 and September 2016. Children with syndromic or neurogenic clubfoot were excluded from the study to maintain homogeneity in the sample. All children were screened through the Rashtriya Bal Swasthya Karyakram (RBSK), a national program for early detection and intervention of congenital disabilities, diseases, deficiencies, and developmental delays. Informed consent was obtained from the parents or legal guardians of each participant.

Diagnosis of Clubfoot: The diagnosis of clubfoot was made clinically based on the presence of the four key deformities: cavus, adductus, varus, and equinus. Each foot was assessed for severity using the Pirani scoring system, which categorizes the deformity into mild, moderate, or severe.

Treatment Protocol: All children were treated using the Ponseti method, which consists of two phases:

- Casting Phase: Weekly serial manipulation and casting were performed for five to six weeks. Each manipulation aimed to gradually correct the deformity, starting with the cavus and progressing to the adductus, varus, and equinus components. The plaster cast extended from the toes to the groin, ensuring full foot and ankle immobilization.
- Tenotomy: In cases where the equinus deformity persisted after casting, a percutaneous Achilles tenotomy was performed under local anaesthesia. This minor procedure allowed for full dorsiflexion of the ankle.
- Bracing Phase: After achieving correction with casting, children were transitioned to the second treatment phase, which involved using a foot abduction brace. The brace was worn full-time for three months and then during sleep for up to three years to prevent recurrence.

Follow-up: The children were followed up weekly during the casting phase and at regular intervals during the bracing phase. Compliance with bracing was monitored, and any complications or recurrence of deformity were documented. The primary outcomes assessed were the correction of deformity, recurrence rates, and any complications associated with the treatment. The duration of therapy, including the number of casts and the need for tenotomy, was also recorded.

Data Collection: Data on demographic characteristics, clinical findings, and treatment outcomes were collected using a structured proforma. This included age, sex, laterality of the deformity, initial Pirani score, number of casts required, the occurrence of tenotomy, and follow-up results.

Statistical Analysis: All data were entered into a statistical software program and analyzed using descriptive statistics. Continuous variables such as age and treatment duration were summarized using mean and standard deviation, while categorical variables were presented as frequencies and percentages.

RESULTS

Table 1: Socio-demographic Characteristics of the Children

Variables	Frequency (n)	Percentage (%)
Age groups		
• 0 to 6 months	11	8.1
• 6 to 12 months	13	9.6
• 12 to 36 months	69	50.7
• >36 months	43	31.6
Sex Distribution of Children		
• Male	94	69.1
• Female	42	30.9
Religion		
• Hindu	110	80.8
• Muslim	22	16.1
• Others	4	2.9
Feet Affected		
• Both	105	77.2
• Single	31	22.7
Age at Time of Treatment Commencement		
• 0 to 6 months	76	55.8
• 6 to 12 months	14	10.2
• 12 to 36 months	33	24.2
• >36 months	13	9.5
Age Distribution of Respondents		
• Up to 20 years	5	3.6
• 20 to 30 years	106	77.9
• 30 to 40 years	25	18.3
Educational Status of Respondents		
• Illiterate	48	35.2
• Primary	37	27.2
• Secondary	36	26.4
• Graduate or higher	15	11.0
Socioeconomic Class		
• Upper	12	8.8
• Upper middle	34	25.0
• Middle	20	14.7
• Lower Middle	53	39.0
• Lower	17	12.5

Table 1 highlights that most children (50.7%) were between 12 and 36 months of age, with a predominant male representation (69.1%). Most children (77.2%) had bilateral clubfoot deformity. Most children (55.8%) began treatment within the first six months of life. The respondents, mostly parents, were primarily in the age group of 20 to 30 years (77.9%), and a significant portion had limited education, with 35.2% being illiterate. Socio-economically, many families belonged to the lower middle class (39.0%), indicating a potential influence of economic factors on access to healthcare. These findings suggest that early treatment initiation is common, but socioeconomic and educational disparities may affect healthcare accessibility and treatment outcomes.

Table 2: Factors Influencing the Treatment of Patients

Factors	Frequency (n)	Percentage (%)
Transport Problem		
• Yes	109	80.1
• No	27	19.8
Distance to Clinic		
• <10 km	29	21.3
• 10-15 km	57	41.9
• 15-20 km	23	16.9
• >20 km	27	19.8
Time Constraints for Treatment Follow-up		
• Yes	86	63.2
• No	50	36.8
Waiting Time in OPD		
• 0 to 30 min.	98	72.0
• 30 to 60 min.	29	21.3
• 60 to 120 min.	9	6.6
• >120 min.	0	0.0
Financial Problem Due to Treatment		
• Yes	20	14.7
• No	116	85.3

The factors influencing the treatment of children with clubfoot reveal that transport issues were a significant barrier, with 80.1% of respondents reporting problems. Additionally, 78.7% of families had to travel more than 10 kilometres to reach the clinic, contributing to the reported time constraints during treatment follow-ups, as experienced by 63.2% of participants. Despite these challenges, most respondents (72.0%) faced short waiting times of less than 30 minutes during outpatient visits, and financial burdens were minimal, with 85.3% indicating no financial difficulties due to the treatment, highlighting the accessibility of care provided at no cost. These findings underscore the need to address logistical barriers while maintaining efficient, cost-free services.

Table 3: Treatment Details

Treatments details	Frequency (n)	Percentage (%)
Referring Personnel		
• ASHA/AWW	32	23.5
• Ayush	23	16.9
• MBBS	48	35.2
• Nil/Direct	33	24.2
Treatment Given		
• Cast	55	40.4
• Foot Abduction Braces	29	21.3
• Cast + Foot Abduction Braces	47	34.5
• Exercise	5	3.6
Motivation for Treatment Completion		
• Motivated	121	88.9
• Not Motivated	15	11.0

The treatment details indicate that most children (75.8%) were referred by healthcare personnel, with MBBS doctors being the primary referring source (35.2%), followed by ASHA/AWW workers (23.5%). In terms of treatment, casting alone was the most common method (40.4%), while 34.5% of patients received a combination of casting and foot abduction braces. Most parents (88.9%) were motivated to complete the treatment, demonstrating high compliance, which is crucial for successful outcomes. These findings highlight the importance of healthcare provider referrals and the effectiveness of the Ponseti method, as well as the strong parental commitment to treatment completion.

DISCUSSION:

Clubfoot is a visible external deformity that is easily identifiable and treatable, with an incidence ranging from 1 to 2 per 1,000 live births, affecting approximately 100,000 to 200,000 children annually worldwide, of which 80% of the burden occurs in low- and middle-income countries. Our study findings align with previous research, indicating that males are affected at twice the rate of females, similar to the findings of Moorthi RN et al.[10] This male predominance is consistently observed across various studies on clubfoot.

One of the key findings of our study is the influence of transport and distance on treatment adherence. A significant proportion of respondents (78.6%) travelled more than 10 kilometres to the clinic, which imposed time and financial burdens, particularly for families relying on daily wages. This aligns with previous studies where distance and transportation challenges have been reported as significant barriers to accessing healthcare. In contrast, only 21.3% of families lived within 10 kilometres of the clinic. Most respondents were labourers or daily wage workers, and two-thirds expressed concerns about the time constraints involved in treatment and follow-up, as time spent on these activities directly affected their income. These findings underscore the need for more decentralized treatment options to alleviate the burden of travel and reduce the opportunity cost for families.

Our study showed that 91% of respondents had a waiting time of less than one hour, and none waited longer than two hours, which contrasts sharply with the findings of Kazibwe H et al.[11], where 81% of respondents reported waiting times of more than two hours. The shorter waiting times in our study may have contributed to the high levels of treatment compliance and parental motivation.

Regarding financial barriers, 85% of respondents reported no financial difficulties, as the treatment was free of charge under the Rashtriya Bal Swasthya Karyakram (RBSK). The remaining 15% of families who faced some financial issues were likely impacted by travel costs and the loss of income due to time spent on treatment. This is in contrast to the findings of Alam Z et al.,[12] where most patients had to bear the entire cost of treatment, emphasizing the importance of free or subsidized treatment programs like RBSK in low-resource settings.

Our study also highlights the effectiveness of the RBSK program, as over 75% of cases were referred by healthcare professionals trained under this initiative. This reflects the success of RBSK in early identification and referral for clubfoot treatment. Only 24% of patients came to the clinic directly, indicating a lack of awareness about clubfoot among parents before diagnosis. Our findings further supported the idea that knowledge about the condition increased dramatically post-diagnosis.

Finally, most parents (88.9%) were motivated to complete the treatment, which can be attributed to effective counselling, the provision of free treatment, and the relatively short waiting times in the outpatient department. This high level of motivation is critical for successfully treating clubfoot, which requires consistent follow-up and adherence to bracing protocols after casting. Similar findings of high parental compliance were also noted in other studies, emphasizing the importance of healthcare provider support in ensuring treatment adherence.

CONCLUSION

In conclusion, our study identifies key factors influencing clubfoot treatment, including transport challenges, financial concerns, and the pivotal role of healthcare provider referrals. Decentralizing treatment services and raising awareness are crucial to improving access and outcomes. Despite transport issues, high parental motivation for treatment completion, driven by free care, effective healthcare guidance, and short waiting times, contributes to treatment success. However, low education levels and socioeconomic status may hinder timely care-seeking.

LIMITATIONS

One limitation of this study is the relatively small sample size, which may not represent the larger population. Additionally, as the study was conducted in a single tertiary care hospital, the findings may not be generalizable to other regions or healthcare settings. Despite this, the study effectively identifies several barriers to treatment and key factors contributing to successful treatment outcomes, such as parental motivation and healthcare provider support.

RECOMMENDATIONS

- There is a need to decentralize clubfoot treatment services, extending care beyond referral hospitals and into the community through outreach programs to improve accessibility.
- Increased awareness programs regarding congenital anomalies, particularly clubfoot, are essential to enhance early diagnosis and promote timely treatment-seeking behaviour among parents and caregivers.
- Further studies with larger and more diverse populations should be conducted to validate these findings and explore additional factors influencing treatment outcomes.

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