



## Original Article



## Factors Affecting Parental Satisfaction with Ponseti Treatment in Children with Clubfoot

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## ABSTRACT

Clubfoot, also known as congenital talipes equinovarus (CTEV), is a common lower-limb developmental disorder. **Objectives:** To assess the factors affecting parental satisfaction with Ponseti treatment in children with clubfoot presenting at a tertiary care hospital. **Methods:** It was a cross-sectional study carried out in the Department of Orthopaedics, Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan, from January 2024 to December 2024. We enrolled the 150 parents (either mother or father of children aged more than 18 years) of children diagnosed with clubfoot and who were undergoing Ponseti treatment. Parents were interviewed, and data were collected on socio-demographic factors, and their satisfaction level was assessed using a modified orthotics prosthetics user survey. Data were analysed using SPSS version 23. **Results:** The median age of the parents was 39 years, and most were female (54%). 59.3% of the parents were satisfied with the Ponseti clubfoot treatment, and 40.7% were unsatisfied. The multivariate analysis revealed female gender (AOR=17.90, 95% CI=6.05-53.29), duration of treatment  $\geq 8$  months (AOR=8.30, 95% CI: 2.88-23.93), being employed (AOR=8.76, 95% CI=2.65-29), primary education (AOR=5.69, 1.49-21.62), intermediate education (AOR=7.35, 1.84-29.35) and graduate level education (AOR=10.80, 95% CI=2.52-46.19) were identified as major factors for parental satisfaction for ponseti treatment in children with clubfoot. **Conclusions:** It was concluded that factors such as being a father, children with short duration of treatment, having no job and education are significantly associated with parental dissatisfaction. Therefore, appropriate educational interventions should be devised to improve treatment results and adherence rates.

## INTRODUCTION

Clubfoot, also known as congenital talipes equinovarus (CTEV), is a common lower-limb developmental disorder [1, 2]. It is usually detected at the time of birth; however, although it may also be detected at an early stage of pregnancy (from the 12th week) using a transvaginal ultrasound exam or in late stages of pregnancy (from the 3rd trimester) using an abdominal ultrasound [3]. Midfoot cavus, hindfoot equinus and varus, and forefoot adduction are all characteristics of clubfoot [2]. Every year, around 174,000 babies are born with clubfoot worldwide, with

nearly 90% of them from developing countries [4]. In developing countries like Pakistan, the incidence of CTEV was reported as 6,000 to 7,000 on average per year [5]. In nearly half of all cases of clubfoot, both feet are affected, and the incidence of clubfoot is greater in boys than girls (2/3 of children with clubfoot) [6]. Clubfoot disorder is 30 times more likely among siblings of afflicted children. The probability of CTEV associated with monozygotic siblings is 33%, whereas among dizygotic twins it is just 3% [7]. The causes of clubfoot are a combination of environmental and



genetic factors [8]. If clubfoot is not treated, then it has a potentially negative impact on the quality of life of the children. It makes a child disabled with the inability to perform daily activities. This also results in familial dependence and social stigma [9]. Before 2006, there were a variety of conservative therapy options for CTEV, including surgical intervention and the Kite approach [10]. Ponseti therapy, on the other hand, has lately gained popularity in Pakistan [10]. It is an effective, conservative, and now regarded gold-standard therapy for CTEV, consisting of weeks of strict manipulation and casting. An Achilles tenotomy is done when there is inflexible equinus and all other foot abnormalities have been corrected. After that, the child has to wear a brace for 4 to 5 years [9]. The process from diagnosis to treatment is simple, but it takes a long time [11]. Parents have to bring their child to the hospital for the casting process for weeks. Then parents have to go through an intensive bracing phase until their child is four years old. This process has a potential psychological impact on the child and their parents [11]. As a result, parents should be counselled by clinic assistants or parent educators as soon as possible after being diagnosed, so that they can understand each phase of Ponseti therapy and any obstacles they may face [9]. So, it is important to assess the factors associated with the satisfaction level of parents regarding treatment so that targeted interventions may be devised. These interventions can assist parents in sticking to their treatment plans, especially during the bracing period. Although the Ponseti method is the gold standard for treating clubfoot, parental satisfaction and adherence remain critical for successful outcomes. However, there is limited local evidence exploring the factors influencing parental satisfaction with Ponseti therapy, particularly in developing country settings like Pakistan. This study aims to determine how satisfied parents are with Ponseti therapy and the factors that influence it.

## METHODS

It was a cross-sectional study carried out in the Department of Orthopaedics, Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan, from January 2024 to December 2024. This research was approved by the ethical review committee of JPMC with IRB reference No. F.2-82/2023-GENL/20/JPMC, and written informed consent was taken from the parents of the children before initiating data collection. The sample size of 150 subjects was estimated by taking the frequency of favourable psychological outcome as 74.5% among parents [12], absolute precision as 7% and a 95% confidence level. The study enrolled the parents (either mother or father of age more than 18 years) of children diagnosed with clubfoot and who were undergoing Ponseti treatment. The research

excluded single parents, parents with mental illness or receiving psychiatric treatment, and parents of children who had previously failed therapy. Subjects were selected using a non-probability consecutive sampling technique. Parents were interviewed and data were collected on socio-demographic factors like age, gender, duration of treatment, ethnicity, income status, employment status and education. Parents' satisfaction with either the Mitchell brace or the Steenbeek brace was assessed using the modified orthotics prosthetics user survey (OPUS) [12]. Eleven items were included in the survey. The responses to each item were reported as "yes" or "no". A score of "1" was given to the "yes" response, and a score of "0" was given to the "no" response. An overall score of  $\geq 8$  out of 11 was deemed satisfactory, whereas a score  $< 8$  was considered unsatisfactory. The researcher acquired all of the data himself, and the identities of the participants were coded to ensure confidentiality. Data were analyzed using SPSS version 23.0. Distribution of numeric data like age and duration of treatment was checked using the Shapiro-Wilk test, and median along with inter-quartile range were reported. Whereas, frequency and percentage were reported for categorical variables like gender, ethnicity, income status, employment status, education, survey items and overall satisfaction. Univariate logistic regression analysis was performed by taking parents' satisfaction as the dependent variable and other factors like age, duration of treatment, gender, ethnicity, income status, employment status and education as independent variables. All the independent factors which were significant in univariate analysis were moved into a single multivariate model. Multivariate logistic regression was applied.  $A p < 0.050$  was considered statistically significant.

## RESULTS

In a total of 150 participants, the median age was 39.00 (29.00–51.25) years. There were 81 (54.0%) participants who were female. The median duration of Ponseti treatment of children was 9 (9–10) months. The monthly income of 74 (49.3%) participants was  $< 20,000$  PKR. The employment status of 53 (35.3%) participants was unemployed. The educational status of 9 (6.0%) participants was illiterate. Details about the baseline characteristics of study participants are shown in table 1.

**Table 1:** Baseline Characteristics of Parents (n=150)

Variables	Frequency (%)	
Age of Parents (Years)	<40	76 (50.7%)
	$\geq 40$	74 (49.3%)
Gender	Male	69 (46.0%)
	Female	81 (54.0%)
Ethnicity	Urdu Speaking	16 (10.7%)
	Sindhi	31 (20.7%)

	Punjabi	44 (29.3%)
	Pathan	43 (28.7%)
	Baloch	16 (10.7%)
Monthly Income	<20,000 PKR	74 (49.3%)
	20,000-50,000 PKR	57 (38.0%)
	>50,000 PKR	19 (12.7%)
Employment Status	Employed	97 (64.7%)
	Unemployed	53 (35.3%)
Education	Primary	29 (19.3%)
	Matric	46 (30.7%)
	Intermediate	27 (18.0%)
	Graduate	29 (19.3%)
	Post Graduate	10 (6.7%)
	Illiterate	9 (6.0%)

There were 140 (93.3%) parents who agreed that braces were easy to put on, 127 (84.7%) agreed that the braces were durable, and 119 (79.3%) agreed that the skin was free of abrasions and irritations. The response to the questions agreed upon by the parents is shown in figure 1.

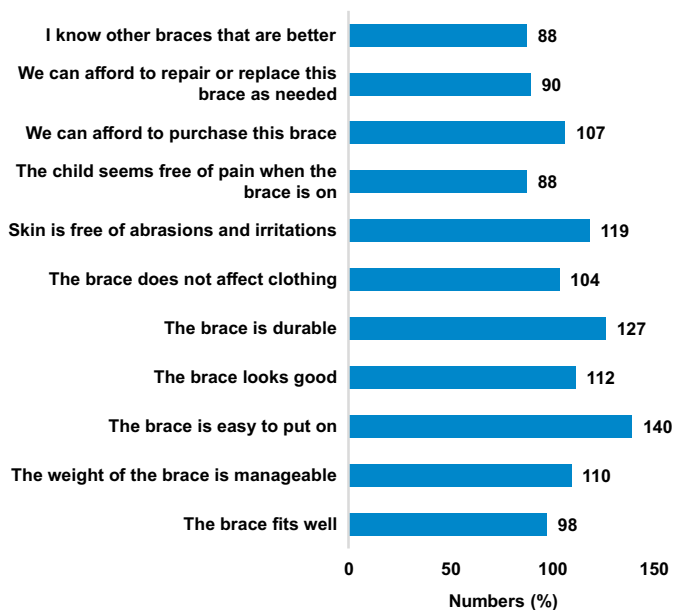


Figure 1: Frequency Distribution of Satisfaction Level of Parents

Overall, there were 89 (59.3%) parents who were satisfied with the Ponseti treatment of clubfoot. In univariate logistic regression, factors associated with parental satisfaction were tested. Factors such as age<40 years (OR=2.16, 95% CI: 1.12-4.21), female gender (OR=11.95, 95% CI=5.45-26.19), duration of treatment≥8 months (OR=5.319, 95% CI: 2.60-10.87), family monthly income of 20,000-50,000 (OR=2.85, 95% CI=1.36-5.69), being employed (OR=2.77, 95% CI: 1.39-5.54), being graduate (OR=11.47, 95% CI=0.57-228.53) were significantly associated with satisfaction of parents. In multivariate analysis, female gender (AOR=15.99, 95% CI=5.32-48.08), duration of treatment ≥8 months (AOR=7.10, 95% CI: 2.51-20.13), and being employed (AOR=8.51, 95% CI:1.71-33.09, p=0.008) were identified as major factors for parental satisfaction for ponseti treatment in children with clubfoot, as shown in table 2.

Table 2: Univariate and Multivariate Analysis for Parental Satisfaction of Children with Clubfoot

Variables	Satisfaction		Univariate Analysis			Multivariate Analysis		
	No (%)	Yes (%)	OR	95% CI	p-Value	AOR	95% CI	p-Value
<b>Age in Years</b>								
<40 Years	24 (39.3%)	52 (58.4%)	2.16	1.12-4.21	0.023	1.64	0.56-4.86	0.366
≥40 Years	37 (60.7%)	37 (41.6%)	Reference					
<b>Gender</b>								
Male	48 (78.7%)	21 (23.6%)	Reference					
Female	13 (21.3%)	68 (76.4%)	11.95	5.45-26.19	0.001	15.99	5.32-48.08	<0.001
<b>Duration of Treatment (Months)</b>								
<8	37 (60.7%)	20 (22.5%)	Reference					
≥8	24 (39.3%)	69 (77.5%)	5.319	2.60-10.87	0.001	7.10	2.51-20.13	<0.001
<b>Ethnicity</b>								
Urdu Speaking	9 (14.8%)	7 (7.9%)	Reference					
Sindhi	11 (18.0%)	20 (22.5%)	2.34	0.68-8.01	0.177	-	-	-
Punjabi	15 (24.6%)	29 (32.6%)	2.49	0.77-7.99	0.127	-	-	-
Pathan	18 (29.5%)	25 (28.1%)	1.79	0.56-5.68	0.327	-	-	-
Baloch	8 (13.1%)	8 (9.0%)	1.29	0.32-5.16	0.723	-	-	-
<b>Monthly Income (PKR)</b>								
<20,000	39 (63.9%)	35 (39.3%)	Reference					
20,000-50,000	16 (26.2%)	41 (46.1%)	2.85	1.36-5.96	0.005	1.53	0.43-5.50	0.511
>50,000	6 (9.8%)	13 (14.6%)	2.41	0.82-7.03	0.106	0.76	0.14-4.09	0.749
<b>Employment status</b>								
Unemployed	30 (49.2%)	23 (25.8%)	Reference					
Employed	31 (50.8%)	66 (74.2%)	2.77	1.39-5.54	0.004	8.51	1.71-33.09	0.008

Education								
Illiterate	7(11.5%)	2(2.2%)	1					
Primary	7(11.5%)	22(24.7%)	11	1.842-65.67	0.009	10.03	0.52-191.78	0.126
Matric	31(50.8%)	15(16.9%)	1.69	0.31-9.16	0.541	1.76	0.10-31.12	0.699
Intermediate	8(13.1%)	19(21.3)	8.31	1.41-49.06	0.019	10.48	0.52-211.39	0.125
Graduate	5(8.2%)	24(27.0%)	16.8	2.65-106.13	0.003	11.47	0.58-228.53	0.110
Post Graduate	3(4.9%)	7(7.9%)	8.17	1.03-64.94	0.047	3.10	0.08-124.80	0.549

## DISCUSSION

CTEV is a congenital condition which, if not treated, raises the likelihood of impairment and misery as the patients grow older [10, 13]. Ponseti treatment is a conservative technique for treating CTEV, which was previously managed by physiotherapy, strapping and invasive surgical procedures [14]. Ponseti treatment is a very effective initial treatment for idiopathic clubfoot, however, good post-corrective management is essential for its success [15]. However, during treatment, parents of the affected child are likely to experience a variety of challenges, anxiety and ambiguities [12, 16]. If the treating doctor fails to identify and address these problems and concerns, the parents may quit therapy at any time [17]. Therefore, it is crucial that parents of the affected child should be satisfied with Ponseti treatment because it has been claimed that the actual challenge of this treatment is not the manipulation and casting, but rather the long-term abduction bracing that is agreeable to both the child and the family [16, 17]. Hence, this research highlights the important factors associated with parental satisfaction regarding Ponseti treatment. In our study, 59.3% of the parents were satisfied with the Ponseti treatment. Wherein, the highest satisfaction was observed for easiness of braces (93%) and the durability of the braces (85%), respectively. In the study by Mazelan *et al.*, about 44% of the parents were completely satisfied and 37% were fairly satisfied with the treatment. [18] Evans *et al.*, found that even with the family issues, problems with foot abduction brace and other problems associated with Ponseti treatment, 93% of the parents were satisfied with the treatment [19]. Rasheed *et al.*, found that 83% of the parents did not want to quit the treatment at any point in time because they were satisfied with the Ponseti treatment. He also discovered that parents were satisfied with the time of treatment completion, but had difficulty with the casting phase [11]. Hence, to improve outcomes, good physician-patient communication is required, in which they can exchange information and clarify problems so that caregivers become more confident, knowledgeable, and satisfied, and have a positive belief in their treatment and are more likely to adhere to it. The median age of the parents was 39 years, with the majority of them being under 40 years old. This indicates that the bulk of the parents were in their productive age. In a study by Esan *et al.*, about 62% of the parents were in their productive age, with a mean age of 31 years [20]. This suggests that the role of parents as

caregivers, particularly mothers, may interfere with efficiency at work, which leads to a reduction in productivity with a significant impact on the economic status of the family. The unique aspect of our study was determining parental satisfaction factors. The results showed that younger parents aged <40 years were 2.16 times more likely to be satisfied with club foot treatment. It could be because young parents might have fewer treatment expectations than older parents. The results also showed that females had higher satisfaction levels in terms of treatment. The higher female satisfaction can be associated with direct contact with the doctor, more knowledge about the disease, and managing the children solely. The duration of treatment >8 months was a significant factor for parental satisfaction. It might be because of treatment adherence, getting effective results from the management, and understanding the disease. This study showed that socioeconomic status played a significant role. Parents employed and earning between 25 to 50000 rupees were more satisfied. It might be because of trusting the doctor, having less knowledge about the treatment, and getting the treatment done as soon as possible. However, some other researchers have shown contradictory results where high socioeconomic status parents were more satisfied with the treatment [21]. On the other hand, a study found that socio-economic status did not alter the satisfaction of parents [22].

This study relied on self-reported parental satisfaction, which may introduce response bias and limit objective assessment of treatment outcomes. Additionally, being a single-center study with a relatively limited sample size, the findings may not be generalizable to broader populations. Future multicenter longitudinal studies should incorporate objective clinical outcomes alongside parental perceptions to better evaluate long-term effectiveness of Ponseti treatment.

## CONCLUSIONS

It was concluded that factors such as being a father, children with short duration of treatment, having no job and education are significantly associated with parental dissatisfaction. Therefore, appropriate educational interventions should be devised to improve treatment results and adherence rates.

## Authors' Contribution

Conceptualization: SS, WB

Methodology: PA, MAM, AG, SK, MA

Formal analysis: MAM

Writing and Drafting: MAM, SS, WB

Review and Editing: PA, MAM, AG, SK, MA, SS, WB

All authors approved the final manuscript and take responsibility for the integrity of the work

## Conflicts of Interest

All the authors declare no conflict of interest.

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