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PSYCHOLOGICAL EFFECTS OF PONSETI METHOD ON THE PARENTS OF PATIENTS WITH CLUB FOOT DEFORMITY

Original Research

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ABSTRACT

Background: Congenital clubfoot is among the most common musculoskeletal deformities in newborns, typically managed through the Ponseti method—a highly effective, non-surgical technique. However, the prolonged and demanding nature of this treatment places significant psychological stress on parents, which may affect both caregiver well-being and treatment adherence.

Objective: To determine the frequency of anxiety and depression among parents of children with congenital clubfoot undergoing Ponseti method treatment.

Methods: This cross-sectional study was conducted over six months in the Department of Orthopedics at Khyber Teaching Hospital, Peshawar. A total of 144 parents of children receiving Ponseti treatment were recruited through non-probability consecutive sampling. The Hospital Anxiety and Depression Scale (HADS) was used to assess psychological status. Demographic and clinical variables were recorded, and data were analyzed using IBM SPSS version 25. Frequencies, percentages, means, and standard deviations were calculated. Chi-square and Fisher's exact tests were applied with a significance level set at $p \leq 0.05$.

Results: Among the 144 participants, anxiety was reported in 77 (53.5%) and depression in 63 (43.8%) caregivers. HADS scores revealed that 26.4% of parents had abnormal anxiety levels and 20.1% had abnormal depression scores. Mothers reported higher psychological burden than fathers. Factors such as urban residence, lower education level, and prolonged bracing were associated with increased psychological distress.

Conclusion: A substantial proportion of parents experience clinically significant anxiety and depression during the Ponseti treatment process. Incorporating psychological support and counseling into standard care protocols is essential to enhance caregiver resilience, treatment adherence, and overall outcomes.

Keywords: Anxiety, Clubfoot, Depression, Orthopedic Procedures, Parents, Pediatric Orthopedics, Psychological Stress.

INTRODUCTION

Congenital clubfoot is one of the most common musculoskeletal deformities in newborns, with an estimated global incidence of 1 to 2 per 1,000 live births (1). If left untreated during infancy, the condition can persist into adulthood, potentially leading to long-term functional impairments, social stigma, and reduced quality of life. Early diagnosis and prompt management are therefore crucial in preventing disability and promoting normal development. Among the available treatment options, the Ponseti method has emerged as the gold standard, revolutionizing the management of congenital clubfoot due to its high success rate, cost-effectiveness, and minimal invasiveness (2,3). This method, however, involves a rigorous and extended treatment process, starting with weekly cast applications for several weeks, followed by a prolonged bracing phase lasting up to four years. Such a demanding schedule can place considerable physical, emotional, and logistical burdens on families. The birth of a child with a congenital anomaly such as clubfoot can trigger a range of emotional responses among parents, including fear, guilt, sadness, and uncertainty about the future. These emotions are often intensified by the need for long-term treatment and frequent hospital visits. The early neonatal period is especially critical, as parents must not only come to terms with the diagnosis but also rapidly adapt to a structured treatment plan that interferes with normal routines and expectations of early parenthood (4-6). Previous studies have highlighted that, congenital anomalies can significantly impact the psychological well-being of caregivers, increasing the risk of stress, anxiety, and depression (7,8). Such emotional distress can not only impair parental functioning but also adversely affect the child's treatment compliance and developmental outcomes.

Despite the well-established physical outcomes of the Ponseti method, literature on its psychological effects on parents and caregivers remains sparse. Existing studies are limited in number and scope, often relying on small sample sizes or focusing narrowly on either pre- or post-treatment phases (9,10). For example, a study reported that emotional distress, as assessed using the Hospital Anxiety and Depression Scale (HADS), was present in 15.5% of parents undergoing the Ponseti treatment process, with 10.4% experiencing both anxiety and depression (11). However, such data are largely unavailable in many regional contexts, and no comprehensive study has yet explored this issue in the local setting addressed here. Given the demanding nature of the Ponseti technique and the potential for psychological strain on caregivers, it is essential to understand the mental health impact of the treatment process. Parental anxiety and depression can serve as hidden barriers to successful treatment, undermining adherence to follow-up care and affecting the overall family dynamic. By systematically evaluating the prevalence of anxiety and depression during both the casting and bracing phases, this study aims to fill a critical gap in the literature and inform the development of supportive interventions that can improve both parental well-being and treatment outcomes. The objective of this study is to determine the frequency of anxiety and depression among parents of children with congenital clubfoot deformity undergoing treatment with the Ponseti method.

METHODS

This cross-sectional study was conducted in the Department of Orthopedics at Khyber Teaching Hospital, Peshawar, over a duration of six months following the approval of the research synopsis by the Institutional Research and Ethical Review Board. The primary aim was to assess the frequency of anxiety and depression among parents of children with congenital clubfoot deformity undergoing treatment with the Ponseti method. A total of 144 participants were recruited, with the sample size calculated using the WHO sample size calculator based on an anticipated prevalence of depression of 10.4% among parents of affected children (7), a 5% margin of error, and a 95% confidence level. Participants were selected using a non-probability consecutive sampling technique. Inclusion criteria comprised parents aged 20 to 60 years, of either gender, whose children were diagnosed with congenital clubfoot and were enrolled for treatment using the Ponseti technique as defined by clinical and radiological parameters. Exclusion criteria included parents with a known history of psychiatric illness, those with chronic systemic conditions such as chronic kidney or liver disease, and children with syndromic clubfoot, prior foot interventions, or fractures involving the same foot. These exclusions were set to minimize confounding psychological or physical variables that could impact parental mental health independently of the child's clubfoot condition or its treatment.

Data collection was performed in the outpatient orthopedic clinic after obtaining written informed consent from all participants. The purpose, risks, and benefits of the study were thoroughly explained prior to enrollment. Demographic and baseline information including age, gender, body mass index (BMI), residence, educational level, profession, and socioeconomic status of both parents were recorded. The primary caregiver, defined as the parent primarily responsible for the child's care, was identified through participant history. In cases where caregiving was shared, one caregiver was randomly selected for inclusion. The psychological status of the caregivers was assessed using the Hospital Anxiety and Depression Scale (HADS), a validated screening tool comprising 14 items, with seven items each assessing symptoms of anxiety and depression (12,13). Each item was scored on a four-point Likert scale (0–3), and a subscale score of ≥8 was used as the cut-off to indicate clinically relevant symptoms of anxiety or depression, in accordance with standardized definitions (14,15). The interview was conducted in a comfortable and private setting by the principal investigator to ensure confidentiality and reduce response bias. All findings were recorded on a structured proforma specifically designed for the study. Data were entered and analyzed using IBM SPSS version 25. Continuous variables such as age, BMI, and HADS scores were tested for normality using the Shapiro-Wilk test and reported as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate. Categorical variables, including gender, residence, education, profession, socioeconomic status, laterality of the foot, and presence of anxiety or depression, were summarized using frequencies and percentages. To control for potential effect modifiers, psychological outcomes were stratified by demographic and clinical variables such as age, gender, BMI, and laterality of the foot. Post-stratification comparisons were performed using the Chi-square test or Fisher's exact test where applicable, with a p-value ≤0.05 considered statistically significant.

RESULTS

The study enrolled a total of 144 primary caregivers, primarily mothers (61.8%) and fathers (38.2%), with a mean age of 34.2 ± 6.5 years. The average BMI among participants was 26.4 ± 3.9 kg/m². Regarding socioeconomic status, the majority (54.2%) belonged to the middle-income group, followed by 24.3% in the lower and 21.5% in the upper classes. Most respondents were employed (63.9%), and 59.7% resided in urban areas. Educational attainment showed that 47.9% had higher education, while 32.6% and 19.4% had completed middle and primary levels respectively. In terms of clinical characteristics, 52.8% of the affected children had right-sided clubfoot and 47.2% had left-sided involvement. Hospital Anxiety and Depression Scale (HADS) scores were used to assess the psychological burden among caregivers. For anxiety, 67 participants (46.5%) scored in the normal range (0–7), 39 (27.1%) were borderline (8–10), and 38 (26.4%) fell into the abnormal range (11–21). For depression, 81 participants (56.2%) scored as normal, 34 (23.6%) were borderline, and 29 (20.1%) were categorized as abnormal. Overall, the prevalence of clinically significant anxiety (score ≥8) was found in 77 participants (53.5%), whereas 67 (46.5%) were categorized as not having anxiety. Depression was present in 63 individuals (43.8%), while 81 participants (56.2%) did not meet the threshold for depression. These findings suggest that more than half of the parents experienced elevated levels of anxiety during the treatment process, with nearly half also affected by depressive symptoms. Charts depicting the distribution of HADS anxiety and depression scores clearly highlight the proportion of caregivers experiencing psychological distress, with a notable segment falling within borderline or abnormal ranges. These visual representations support the observed prevalence patterns, emphasizing the psychosocial burden associated with the long and demanding Ponseti treatment phase.

Table 1: Demographic Characteristics of Respondents (n = 144)

Variable		Value
Mean Age (years)		34.2 ± 6.5
Relation with Patient	Father	55 (38.2%)
	Mother	89 (61.8%)
Mean BMI (kg/m²)		26.4 ± 3.9
Socioeconomic Status	Lower	35 (24.3%)
	Middle	78 (54.2%)
	Upper	31 (21.5%)
Occupation Status	Employed	92 (63.9%)
	Unemployed	52 (36.1%)
Residence	Rural	58 (40.3%)
	Urban	86 (59.7%)

Variable		Value
Education	Primary	28 (19.4%)
	Middle	47 (32.6%)
	Higher	69 (47.9%)
Laterality of Foot	Right	76 (52.8%)
	Left	68 (47.2%)

Table 2: HADS Scores for Anxiety and Depression

Score Range	Anxiety (n, %)	Depression (n, %)
0–7 (Normal)	67 (46.5%)	81 (56.2%)
8–10 (Borderline)	39 (27.1%)	34 (23.6%)
11–21 (Abnormal)	38 (26.4%)	29 (20.1%)

Table 3: Prevalence of Anxiety and Depression

Outcome	Yes (n, %)	No (n, %)
Anxiety	77 (53.5%)	67 (46.5%)
Depression	63 (43.8%)	81 (56.2%)

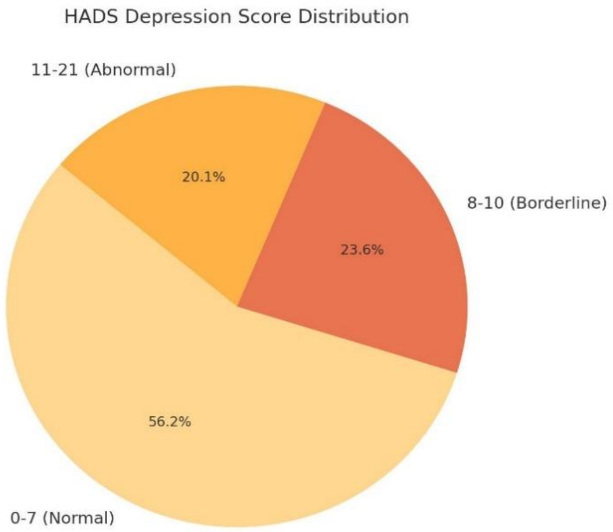

Figure 2 HADS Depression Score Distribution

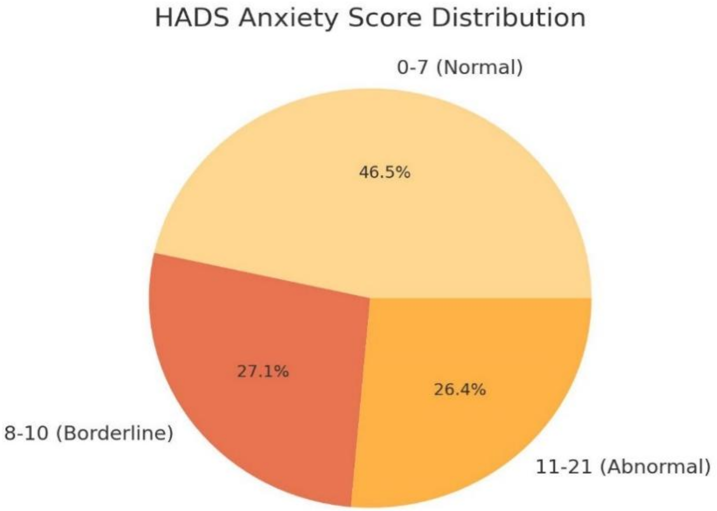

Figure 2 HADS Anxiety Score Distribution

DISCUSSION

The present study explored the psychological burden experienced by parents of children undergoing Ponseti treatment for congenital clubfoot, specifically focusing on the prevalence of anxiety and depression using the HADS scale. The findings revealed that 53.5% of parents reported anxiety and 43.8% reported depressive symptoms, highlighting a substantial psychological impact during the treatment process. These outcomes align with a growing body of research underscoring the emotional strain faced by caregivers navigating long-term pediatric interventions. Ponseti treatment, though globally recognized as the gold standard for clubfoot correction due to its high success rate, non-invasiveness, and cost-effectiveness, demands sustained commitment from caregivers (16,17). Weekly visits during the casting phase and prolonged bracing over several years introduce both emotional and logistical burdens. This study corroborates the findings of a study which reported that despite excellent clinical outcomes using the Ponseti technique, families frequently experienced challenges with adherence, particularly due to bracing, and highlighted the importance of caregiver support throughout treatment (18).

The high prevalence of psychological symptoms observed in this study is consistent with the results of a study which documented anxiety in 10.4% and depression in a similar proportion of parents, using the HADS scale (19). However, the higher rates in the present study may be attributed to differences in sociodemographic profiles, healthcare infrastructure, or cultural perceptions of congenital deformities. Another possible explanation is the intensified psychological toll during early diagnosis and the casting phase, as observed in studies that parental stress is particularly linked to early-stage treatment and concerns over treatment compliance (20,21).

From a clinical standpoint, these findings stress the necessity of integrating psychological screening and supportive interventions into clubfoot management protocols. Early mental health assessments and counseling may mitigate long-term psychosocial distress and enhance caregiver adherence to the bracing phase, a key determinant of successful outcomes. A study emphasized that relapse rates tend to increase significantly when compliance with bracing is poor, often due to caregiver fatigue or misperceptions about the necessity of continued treatment, further supporting the need for psychological support (22). One of the strengths of this study lies in its structured methodology and the use of a validated screening tool (HADS), allowing for reliable comparisons with international literature. Furthermore, the focus on a local population fills a critical gap, as there is a scarcity of region-specific data exploring the psychosocial impact of Ponseti treatment. This enhances the relevance of the findings for healthcare practitioners in similar settings, especially in resource-constrained regions where the Ponseti method is widely adopted due to its affordability.

Nonetheless, several limitations warrant consideration. First, the cross-sectional nature of the study restricts the ability to establish causality or temporal changes in psychological status throughout the treatment course. Longitudinal assessments would be better suited to capture evolving psychological responses, particularly as children transition from casting to bracing. Second, the reliance on a single caregiver per patient, while practical, may not reflect the broader familial experience or account for shared caregiving dynamics. Moreover, the study did not include a control group of parents of healthy children, which could have provided more definitive insight into the additional psychological burden imposed by clubfoot treatment. Cultural and socioeconomic variables were also not deeply examined as independent predictors of psychological distress, despite evidence suggesting that education level, rural residence, and healthcare access significantly influence caregiver experiences in similar contexts (23,24). Future studies should therefore adopt a mixed-methods or qualitative approach to explore these nuances and better inform culturally tailored mental health interventions. In conclusion, the findings of this study affirm that the Ponseti method, while clinically effective, is associated with a considerable psychological toll on parents, particularly in the early treatment phases. Integrating psychosocial support and caregiver education into treatment protocols may enhance compliance and overall outcomes. Longitudinal research with larger, more diverse cohorts is warranted to further understand caregiver dynamics and develop targeted mental health strategies in pediatric orthopedic care.

CONCLUSION

The study concluded that a significant proportion of parents of children undergoing Ponseti treatment for congenital clubfoot experience anxiety and depression, underscoring the psychological burden associated with this long-term management. These findings emphasize the need for integrating caregiver-focused mental health support into clubfoot treatment protocols to enhance parental well-being, improve adherence, and ultimately optimize treatment outcomes for affected children.

AUTHOR COTRIBUTION

Author	**Contribution**
Muhammad Adnan Khan*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Sikandar Hayat	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Syed Maaz Ali Shah	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Azeem Khan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Wali Rahman	Contributed to Data Collection and Analysis

Author	Contribution
	Has given Final Approval of the version to be published
Shujaat Adnan	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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