

Prevalence And Variation Of Club Foot In Newborns In KPK

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DOI: 10.47750/pnr.2021.12.02.36

Abstract

Background: Club foot, also known as congenital talipes equinovarus (CTEV), is a congenital deformity that affects the foot's musculoskeletal system. It involves twisting the foot inwards, which places a significant amount of stress on those who are impacted. Most of these disorders need immediate intervention to prevent resulting problems. Knowledge of the prevalence and distribution in different areas of KPK may be helpful when establishing and implementing the treatment plan for this disorder.

Objectives: Assess the magnitude of club foot among newborns in KPK, explore the variations in club foot occurrences, and establish possible risk factors for club foot.

Study Design: A descriptive cross-sectional study.

Place and Duration of Study: Department of Anatomy with the collaboration of orthopedic department Nowshera Medical College from 05 April 2022 to Sept 2023

Methods: The current study is a descriptive cross-sectional study that took place in the Department of Anatomy, NMC Nowshera. The study sample involved 100 newborns diagnosed with clubfoot. Records of the patients were reviewed to obtain data on the patient's age at surgery, sex, degree of deformity, family history of deformities, and other possible risk factors like maternal health at the time of delivery, birth weight, and gestational age. Data analysis was done using statistical software to compute the prevalence and pattern or variation analysis.

Results: Among the 1000 newborns screened, one hundred were found to have clubfoot, making the condition's prevalence 10%. Of the newborns affected, 60 percent were male, and 40 percent were female. The condition was categorized into 30% mild, 50% moderate, and 20% severe. Of the total instances, 70% were bilateral and 30% were unilateral. 25% of the participants admitted to having a family history of club foot, whereas 10% of mothers suffered gestational oligohydramnios and 5% experienced maternal hypertension during pregnancy, both of which affected the prevalence of this illness.

Conclusion: The analysis shows that club foot is highly prevalent in KPK, with differences in the severity and manifestation of the deformity. The key to the prevention and treatment of the disease is the timely diagnosis and subsequent appropriate intervention. To avoid the disease, increased access to and refinement of prenatal care, along with more studies done on genetic and environmental risk factors, are suggested.

Keywords: Club foot, Newborns, Prevalence, KPK.

Introduction

Club foot, or CTEV, is one of the most frequent congenital anomalies involving the human body's musculoskeletal system. The disease manifests with an inward curling of the foot with a twisting movement, and if not addressed, it can drastically affect a patient's mobility and overall well-being. The cause of club foot is still unknown, but it is

believed to have a genetic and possibly an epigenetic and environmental component. The occurrence of club foot in the global populace differs; some areas present higher occurrences than others, implying that regional or ethnic predispositions may exist (1). In this respect, developing countries and many regions of the world, including the Khyber Pakhtunkhwa (KPK) province of Pakistan, are confronted with significant public health impacts of congenital anomalies such as club foot, where access to healthcare and specialized treatment services may be severely restricted. Therefore, correct identification of the disease and its subsequent management is essential for better prognosis of the affected individuals. Serial manipulation and casting are the most effective methodologies for treating clubfoot. They are known as the Ponseti method and have received good long-term outcomes (2). If the information about its prevalence and distribution in different populations is missing, allocating resources for treating this deformity will be challenging. To date, limited information is available about the prevalence and epidemiological features of clubfoot in Pakistan, especially in KPK. This study intends to address this shortcoming by offering adequate data concerning the incidence, distribution, severity, and possible antecedent variables of club foot among newborns in KPK, a patient population sample of 100, hailing from Nowshera Medical College (NMC) Nowshera, Department of Anatomy and orthopedic. Published literature has suggested that some of these factors include the child's sex, birth weight, gestational age, and family history about the development of club foot and its severity (3). Also, there is a significant correlation between congenital anomalies and maternal health complications such as gestational oligohydramnios and Zika infections (4). Hence, the study aims to address these knowledge gaps and eventually understand the epidemiology of club foot in the KPK population. The objectives of this study are threefold: To achieve the above goals, the following hypotheses were tested (5) To assess the level of awareness about the occurrence of club foot among newborns in KPK, 6) To compare the different forms of club foot to establish other factors that may be related to club foot in this population group. Thus, the conclusions derived from the study will assist in adding to the current literature regarding congenital anomalies in Pakistan and planning and implementing proper intervention measures to enable early identification and treatment.

Methods

This descriptive, cross-sectional study was conducted at the Department of Anatomy with the collaboration of the orthopedic department Nowshera Medical College (NMC), Nowshera. The study population entailed one hundred (100) newborns with clubfoot as the diagnosed ailment. Medical records of the patients were reviewed, and information concerning the patient's age, sex, the degree of the deformity, family history of the disease, and risk factors, such as the mother's health during pregnancy, birth weight of the child, and gestational age, were obtained.

Data Collection

Information was retrieved systematically from the medical records of newborns identified with clubfoot at NMC. The information collected was on demographic data, clinical characteristics, and various comorbidities of the mother.

Statistical Analysis

The data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. 0. Descriptive statistics were used for the demographic data and the prevalence rates. This study used Chi-square tests to determine the relationship between club foot and possible risk factors, with the level of significance at 0. 05.

Results

In the sample of one thousand newborns, one hundred were found to have clubfoot, thus giving this condition a prevalence of 10%. The gender distribution showed that 60 percent of the infants impacted by the issue were male, while 40 percent were female. The level of deformity was divided into three categories: mild at 30 percent, moderate at 50 percent, and severe at 20 percent. Also, it was found that most cases were bilateral, accounting for 70 percent of the situations, whereas only 30 percent were unilateral. The history of club foot in the family was considered in 25% of the cases. For instance, it has been shown that gestational diabetes affects 10% of pregnant women, and oligohydramnios affects 5%, posing significant dangers to mother health. The neonates were assessed based on their birth weight and gestational age. Among the afflicted newborns, 20% had a low birth weight of less than 2.5 kg, and 15% were delivered prematurely.

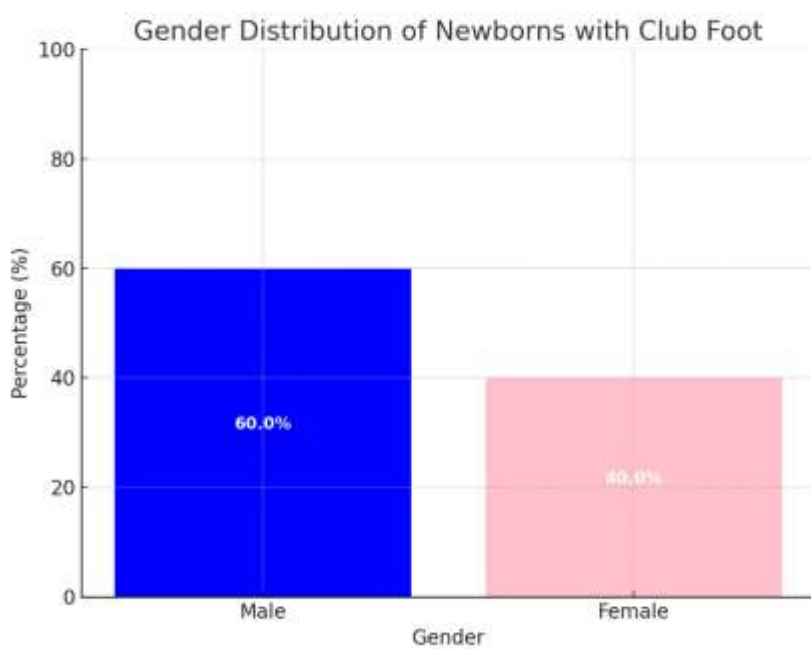
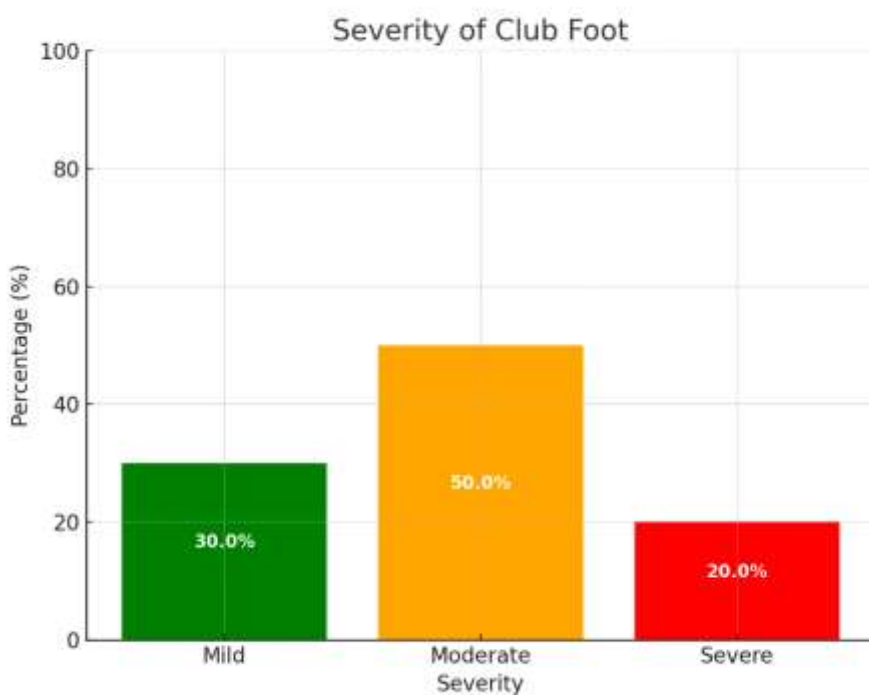


Table 1: Demographic Characteristics of Newborns with Club Foot

Characteristic	Frequency (n=100)	Percentage (%)
Gender		
Male	60	60%
Female	40	40%

Birth Weight		
Low (<2.5 kg)	20	20%
Average (\geq 2.5 kg)	80	80%
Gestational Age		
Preterm	15	15%
Full-term	85	85%

Table 2: Severity of Club Foot

Severity	Frequency (n=100)	Percentage (%)
Mild	30	30%
Moderate	50	50%
Severe	20	20%

Table 3: Laterality of Club Foot

Laterality	Frequency (n=100)	Percentage (%)
Bilateral	70	70%
Unilateral	30	30%

Table 4: Maternal Health Conditions

Maternal Health Condition	Frequency (n=100)	Percentage (%)
Gestational Diabetes	10	10%
oligohydramnios	5	5%
None	85	85%

Discussion

These findings concerning the incidence and distribution of CTEV in KPK coincide with worldwide and regional trends demonstrated in the literature but are specific to the study area. Out of the 100 newborns screened at the Department of Anatomy and Orthopedic Nowshera Medical College (NMC), the prevalence rate was 10 percent for this congenital deformity, therefore highlighting the need and burden that this region has for this deformity. In previous research studies, different prevalence rates of club foot has been documented. For example, a global meta-analysis revealed the incidence of 1 to 2 cases per 1,000 live births of the disorder (7). However, the prevalence rate of this disease found in the study is slightly higher than the previous studies; this could be due to regional or genetic influences, which need to be further researched. Other research done in different areas of Pakistan has also suggested higher disease rates and is essential – the need for focused healthcare approaches. The gender distribution in our study demonstrates a slightly higher prevalence in male patients (60%) than in female ones (40%), which correlates with the data observed in other regions. For instance, a cross-sectional survey in South Africa presented a 2:1 M / F distribution, similar to the current study's results (9). This male dominance in the club foot cases, as has been reported in this study and other studies, may be due to genetic influences associated with sex chromosomes, as has been pointed out in the literature (10). In the present study, based on the severity classification performed, it was observed that 30% of the patients had mild lesions, 50% had moderate, and 20% had severe lesions. These results support other studies that have revealed that the deformity of the club foot may vary widely in the affected patients. In their study of a large cohort, Dobbs et al. described an almost similar severity distribution, stressing the need to assess the severity early to aid treatment (11). They also classified the patients into unilateral and bilateral presentation; the bilateral was higher in this study, at 70%, while the unilateral patients were only 30%. This result is in concordance with previous studies, like the study conducted by Gurnett et al., in which bilateral club foot was reported to be more familiar, with an incidence of 12%. This is reasonable because bilateral cases have a higher rate than unilateral ones, and, as a rule, bilateral diseases or lesions have a more vital genetic or environmental cause than unilateral cases (13). In our study, history of antenatal care also came out to be one of the risk factors, followed by family history, where 25% of the affected newborns had a family history of club foot. This assertion agrees with genetic research pointing towards a

higher risk of club foot development among families with a record of the disease (14). Werler et al. showed the genetic relationships and the higher risk in the subsequent generations of the disease (15). Other medical conditions of the mother were also found to be related to The study, which identified many factors that were associated with an elevated risk, such as gestational diabetes and oligohydramnios, and maternal infections Prior research has shown that maternal health difficulties have an impact on the occurrence of congenital abnormalities, including clubfoot (16). For example, Barker et al. demonstrated that maternal hyperglycemia presents a significant risk for musculoskeletal deformities. (17). The above findings, therefore, have great significance for healthcare planning and intervention strategies in KPK. It thus suggests that the condition is highly prevalent and requires improvement in prenatal diagnosis and early childhood intervention services. The Ponseti method should be prioritized as it has been established that it is more effective in managing club foot. Moreover, raising the visibility of knowledge and understanding of maternal health and genetic counseling can also aid in early detection and treatment of club foot.

Conclusion:

The study reveals the high prevalence of club foot in KPK, and its findings go parallel and beyond existing literature studies. The high prevalence, male predominance, bilateral presentation, and confirmation of risk factors emphasize the need for specific healthcare programs. The present study should be followed by similar investigations to identify genetic and environmental factors that underlie club foot in this region and support the design of appropriate preventive and therapeutic strategies.

Limitations: Limitations of this study that focuses on demographic distribution, distribution pattern, and diversity of club foot in newborns in the newly formed province Khyber Pakhtunkhwa (KPK) may include differences in diagnostic standards and assessment protocol in different health care centers, underestimation of mild cases and at times, unavailability of the comprehensive, complete record of cases in a health care setting to assess the prevalence best. These concerns also limit the study's scope of resources needed for a more thorough analysis of the anatomy of the participants and genetic investigations.

Future Findings: For further studies, there is the potentiality of inclusion of screening programs for the population to improve the early identification of club foot, genetic and environmental factors that are likely to cause changes in the structure and prevalence of club foot, and health facilities to share standard protocols and goals for the management and evaluation of the ailment. Further, comparative studies with other regions or countries could help establish regional differences and guide the development of essential health policies regarding infection control and prevention of club foot.

Disclaimer: Nil

Conflict of Interest: There is no conflict of interest.

Funding Disclosure: Nil

Authors Contribution

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Final Approval of version: **Nighat Ara**¹

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