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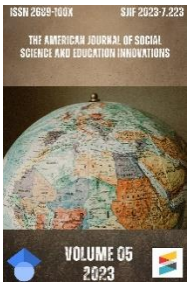

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Research Article

IMPACT AND PREVALENCE OF CONGENITAL FOOT DEFORMITIES IN BRAZIL, 2012 - 2022

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ABSTRACT

Evaluate the prevalence of congenital foot deformities in Brazil, as well as their epidemiological profile during the period of 2012 to 2022 and their impacts. This is a research conducted through secondary data analysis and cross-sectional typology in the databases of the Ministry of Health - Health Information (TABNET), made available by the Department of Informatics of the Unified Health System (DATASUS). Descriptors in health sciences: "deformidade do pé" and "foot deformities". A total of 55,472 cases of congenital foot deformities were registered in Brazil. The Southeast region had the highest prevalence with 43.1% of the cases. 57.3% of the cases were diagnosed by the age of

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10 years old. The epidemiological profile of congenital foot deformities reveals risk factors to which a certain population is exposed, such as teratogenic agents.

KEYWORDS

Equinovarus clubfoot; congenital foot deformity; orthopedics; pediatrics.

INTRODUCTION

Congenital foot deformities are malformations associated with the fetal formation period with functional and/or structural alterations(OPAS, 2020). They consist of embryological alterations during the gestational period with environmental, genetic, infectious, nutritional, socioeconomic factors and/or due to external causes (alcoholism, smoking, and use of teratogenic substances: drugs with iatrogenic effects, such as Thalidomide)(OPAS, 2020).

Congenital clubfoot (CCF) is a vicious position of the foot in relation to the leg, leading to resting on the ground without adequate support points. It clinically presents in several forms: talus-vertical foot, talus-valgus foot, and metatarsal clubfoot; equinovarus foot is the most common form of CCF and its causes may be congenital or acquired. Idiopathic CCF comes from underlying changes that explain the condition and does not resolve voluntarily(Wynne-Davies, 1972).

The influence of genetic factors on the occurrence is by a dominant gene of low penetrance, with a proportion 17 times higher in first-degree relatives and six times higher in second-degree relatives(Dietz, 2002).Therefore, the clinical presentation takes into consideration the anatomical positions of adduction-supination of cavism, forefoot, varus of the calcaneus, equinism, medial and plantar deviation of the anterior part of the talus, with an angle between the long axis of the head-neck and the axis of the body of the talus between 115-135° as clinical and physical examination characteristics of equinovarus foot that should be observed and identified(Dietz, 2002).

The treatment of congenital clubfoot is performed with the Ponseti method, which is a manipulation technique added to the use of plaster prosthesis, foot abduction orthosis with 23 hours a day for 4 months, keeping the foot in the position initially corrected. And later, a percutaneous tenotomy of the Achilles tendon(Bevan, et al., 2007; Guidera, Brennan, 1985; Kowalczyk, Lejman, 2008; Machida, Inaba, Nakamura, 2017).

The aim of the present study was to determine the number of children with CCF. Evaluating their deaths outcomes and social repercussions, comparing the diagnosis and treatment instituted.

MATERIALS AND METHODS

The present scientific work is a retrospective epidemiological study, quali-quantitative, whose data were collected by consulting the databases of the Ministry of Health - Health Information (TABNET), made available by the Department of Informatics of the Unified Health System (DATASUS), at the electronic address (http://www.data- sus.gov.br), accessed during the whole research period. Because it is a public domain database, it was not necessary to submit the project to the Research Ethics Committee.

The study population consists of patients hospitalized for congenital foot deformities, and this manifestation

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was evaluated in both genders, of all ethnicities and age groups, in public and private services in the period from 2012 to 2022 in Brazil. It was measured the years with the highest incidence of hospitalizations for congenital foot deformities, whose data were collected from the analysis of the category entitled ICD morbidity list - 10.

The research gathers health data and involves the category "epidemiology and morbidity", with the group "SUS Hospital Morbidity (SIH/SUS)" being selected, as well as the option "General, by place of hospitalization - from 2012", specifying Brazil and its regions. In addition to the category "hospitalizations", " cost of hospital services", "average cost of hospitalization", "days of hospitalization", "deaths", and "age group" were selected. The terms came from the Health Sciences Descriptors platform at the electronic address. The result includes articles in Portuguese and English. A documentary research was conducted with a literature review based on articles selected from the SciELO, PubMed and LILACS databases published between 2000 and 2021, using the terms: "deformidade do pé" and "Foot Deformities". The selection criteria for the articles included those that address relevant aspects about congenital foot deformities and their epidemiological profile, as well as their definition, diagnosis, etiology, pathophysiology, risk factors, symptomatology, treatment, and complications.

RESULTS

Between 2012 and 2022, there have been 55,472 cases of congenital foot deformities registered in Brazil, with a homogeneous distribution of the results during the period. 43.1% were registered in the Southeast region, with 12,664 (22.8%) in the state of São Paulo. The Northeast was the second region with the highest number (24.6%) (Picture 1).

During the period studied, a small disparity between genders was observed. Men corresponded to 62.3% of the cases and women to 37.7%. Regarding the number of deaths related to congenital foot deformities, 37 cases were recorded, 38.2% of which were in the Southeast region.

The age ranges recorded show an early diagnosis of congenital foot deformities with 57.3% in the first 10 years of life (Table 1).

The largest numbers of procedures for the treatment of congenital malformations of the musculoskeletal system were performed in the Southeast region (36.4%), followed by the Northeast (31.2%). The average number of days of hospitalization was 1,9. A total of 106,238 days were spent during the study period. The average amount spent per hospitalization was R$ 457,00, totaling a value of R$ 15.670.204,00 with hospital expenses in Brazil.

DISCUSSION

Congenital clubfoot is a pathology of easy perception and consequently easier diagnosis. However, the data pointed out by the studies show that the diagnosis and the beginning of treatment still occur, in a significant portion, in a late stage. The Southeast region presented the highest number of cases, 23,933 records, making possible to infer a greater exposure of this population to teratogenic agents, such as drugs, medications, and infections.(DATASUS,2020). It was also the region with the highest number of procedures for the treatment of congenital malformations of the musculoskeletal system, which shows a well-directed assistance and evaluation for a susceptible population, and also investments of resources to solve the problem.

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Arthrogryposis is a pathology in which the baby has multiple joint contractures associated with changes in the skin, subcutaneous cell tissue, absence of skin folds, muscle atrophy, joint deformities with limited mobility, stiffness, and thickening of periarticular structures. Deformities are more severe the more distal the affected joints, and are related to many CCF cases(Simis, Fucs, 2008).

Myelodysplasia and arthrogryposis stand out as a causal factor for equinovarus foot(Bevan, et al., 2007). Clubfoot in patients with arthrogryposis usually manifests itself as a severe condition that is difficult to treat and has a high recurrence rate(Bevan, et al., 2007). And arthrogryposis multiplex congenita (AMC) and equinovarus clubfoot generate greater posterior tibial artery tension, fostering insufficient dorsiflexion angles(Kowalczyk, Lejman, 2008).

In view of the high rates of diagnosis and its consequences, adequate treatment is essential. The Ponseti method consists of a therapeutic procedure with phases, respectively: correction of the lesion and maintenance. It consists of manipulations and plaster applications to correct the components of the deformity. And as maintenance, a foot abduction orthosis is used, full time for 4 months and then partially (14 hours/day) until the child is at least 4 years old(Dietz, Noonan, 2016; Boehm, et al., 2008; Herring, 2001; Zionts, et al., 2010).

Surgical treatment involves corrective osteotomies, triple modeling arthrodesis or talectomy. There are risks of complications such as skin necrosis, neurovascular injury, infection, and severe loss of range of motion. This is due mainly to the fact that the medial column of the foot is anatomically shortened and the neurovascular bundle is tense, which limits the correction in equinocavus and adducted inveterate clubfoot(Sizínio, et al., 2017; Zionts, et al., 2012).

The need for tenotomy or not, associated with the method is verified according to each patient's clinical condition. Yet, it is worth noting that the association of the technique with tenotomy of the Achilles tendon is seen as the preferred approach reported in the literature, since equinovarus clubfoot cases are classified as complex and can bring poor prognosis when managed incorrectly(Sizínio, et al., 2017; Zionts, et al., 2012; Abraham, et al., 2021; Church, et al., 2020; Maranho, Volpon, 2011).

The high recurrence of equinovarus clubfoot in children with AMC after treatment with the Ponseti method is also described in the literature. However, scientific evidence supports the statement that patients who have had their deformities reduced after the method have had no total, but rather partial, recurrence of deformities(Matar, Beirne, Garg, 2016). And some of the consequences/ sequelae of equinovarus clubfoot include: reduced range of motion, especially dorsiflexion and plantar bend(Dietz, Noonan, 2016; Boehm, et al., 2008).

CLOSING REMARKS

Congenital limb deformities are the main congenital anomalies in the country. The epidemiological profile of congenital foot deformities reveals risk factors to which a given population is exposed, such as teratogenic agents. In this scope, it is possible to demonstrate not only the impact that this pathology has on the population, but also to direct the creation of preventive strategies.

Table 1. Diagnosis by age group of patients with congenital foot deformity

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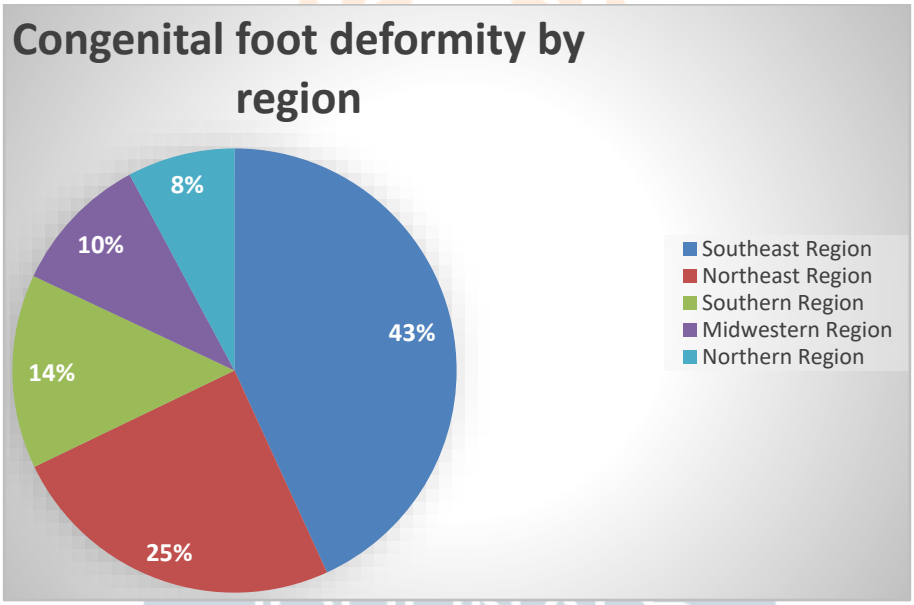
Age group	Number of diagnosis
Less than 1 year old	16.940
1 – 9 years old	23.650
10 – 19 years old	8.409
20 years old or more	6.473
	55.472

Picture 1. Congenital foot deformity by region



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