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CONGENITAL FOOT ANOMALIES;

FREQUENCY AMONG CHILDREN REPORTING AT CHAL FOUNDATION, SWABI, PAKISTAN

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ABSTRACT… Background: Congenital foot anomalies affect a large number of children throughout the world. Rehabilitation of these anomalies is expensive and time consuming. There are many factors responsible for these anomalies. Incidence of these anomalies varies in different areas of the world. The aim of this study is to determine the frequency of congenital foot anomalies among children reporting at Chal foundation, Swabi, Pakistan. **Study Design:** A cross sectional descriptive study. **Setting:** Chal Foundation, Swabi, Pakistan. **Period:** October 2012 – October 2014. **Methodology:** Sample was selected using the convenience sampling technique. A total of 1141 patients visited the center, out of which 408 cases of congenital foot anomalies. Patient demographics including name, age, gender and district along with diagnosis and side involvement was noted, and analyzed on SPSS v21.0. **Results:** A sample of 408 patients was taken from which 70.3% were males and 29.7% were females. The mean age of the patients was 4.47 years at the time of visit. Only 5.9% cases were reported within the first year after birth. Right side foot anomaly was observed in 23.8% cases and 20.3% cases had left side foot anomaly. Bilateral anomaly was observed in 55.9% cases. Among the 408 cases, the most often reported was CTEV, observed in 79.7% cases. The second most common anomaly was pes planus, observed in 8.8% cases. **Conclusion:** Congenital foot anomalies are common musculoskeletal anomalies affecting a large number of children, the most prevalent of which is CTEV. Unfortunately few people seek management in time either due to lack of facilities or awareness. Prevalent cousin marriages in the society may also play an influential role in increased risk of such anomalies to occur. Many of these anomalies can be managed conservatively with physical therapy and orthotics if reported in due time. Attention should be paid on educating people regarding identification and timely management of such conditions.

Key words: Congenital foot anomalies, frequency, congenital talipes equinovarus, metatarsus adductus, pes planus, pes cavus.

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INTRODUCTION

A congenital deformity is defined as any anatomical or structural flaw in the form of malformations/dysplasia, chromosomal disarrays or metabolic and genetic disorders[1], which may occur as a single or multiple defect. Congenital foot anomalies are anatomical or structural foot defects at the time of birth, affecting function and communal acceptance. Causes of congenital foot anomalies can be multi-factorial[2], the most common of which is idiopathic. Other causes include hereditary, radioactivity, chemotherapy and cousin marriages.[3] The incidence rate of foot deformities in new born is as high as 4%, 3/4th of which are mostly adductus anomalies.[4] Metatarsus adductus and "Congenital talipes Equinovarus" (CTEV), occurs in 1-2/1,000 cases, though the prevalence is lower in Asians and greater in Hispanics.[5,6]

According to a study conducted in Pakistan, among all the cases with congenital anomalies, 9% were musculoskeletal in origin, out of which the most common was CTEV (6%).[7] The occurrence of calcaneo-valgus is 5%, and maybe unilateral or bilateral, and is more common in females.[4,6] The occurrence of Polydactyly is the same regardless of gender, and is more common in Negroes

(3.6-13/1,000 live births) than Caucasians (0.3-1.4/1,000 live births).[8] Syndactyly is believed to have a hereditary factor, and the occurrence is 1/15,000 live births.[9]

Accessory tarso-navicular bone occurs mostly in females and is bilateral, and the prevalence in children ranges from 4-21%.[10] Pes-cavus has a prevalence of 8-15%, and 60% of individuals with pes-cavus complain of foot pain. Pes-planus on the other hand is characterized by a low longitudinal arch, and is normal in young children and resolves as the child grows.[11,12]

Hallux Valgus is commonly associated with pes-planus, and is also considered as a genetic anamoly,[13] the incidence of which is amplified with age. Pes planus is also found to influence tibiofemoral angle resulting in valgus angulation at the knee.[14] The incidence of hallux valgus is 3%, 9%, and 16% for age 15 to 30, 31 to 60 and above 60 respectively.[13] The natural prognosis of all adductus anomalies, except CTEV has been shown to be positive. Prospective monitoring showed that for 87% and 95% of children at age of 6 and 16 years respectively, the adductus anomalies had resolved.[4]

METHODOLOGY

A descriptive cross sectional study was carried out at Chal Foundation, Swabi Centre. Prior approval was obtained from the concerned authorities before data collection. Sample was selected using non-probability convenience sampling technique. A total of 1141 patients visited the centre, out of which 408 Known cases of congenital foot anomalies, visiting the center in the time frame of October 2012 – October 2014 were included in the study. Patient demographics including name, age, gender and district along with diagnosis and side involvement was noted. Data was analyzed for frequency distribution on SPSS v21.0.

RESULTS

A sample of 408 patients was taken from which 287(70.3%) were males and 121(29.7%) were females. The mean age of the patients was 4.47±4.895 years at the time of visit. Median and Mode for age were 3 and 1 year respectively. Only 21(5.1%) cases were reported within the first year after birth, whereas 86(21.1%) cases were reported after 1 year, 75(18.4%) after 2 years and 50(12.3%) cases were reported after 3 years of birth. One hundred and seventy three (42.4%) cases were 4 years or above at the time of reporting to the center. A total of 374(91.7%) cases were from District Swabi, 20(4.9%) from Buner, 7(1.7%) from Mardan, 3(0.7%) from Nowshera, 2(0.5%) from Haripur, 1(0.2%) from Attock and 1(0.2%) from Swat. Right side foot anomaly was observed in 97 (23.8%) cases and 83(20.3%) cases had left side foot anomaly. Bilateral anomaly was observed in 228(55.9%) cases. Among the 408 cases, the most often reported was “Congenital Talipes Equinovarus” (CTEV), observed in 325(79.7%) cases. The second most common was pes planus, observed in 54(13.2%) cases among which 0.5% cases were found to have pes plano valgus. (Table-I).

DISCUSSION

According to the findings of the study the most commonly occurring congenital foot anomaly is found to be “Congenital Talipes Equino Varus”, which was found in 79.7% of the reported cases in accordance with a study conducted at University of Lowa by Vijay Kancherala et al.[15] The second most commonly found anomaly was pes planus occurring in 13.2% of the total cases reported in this study. CTEV was the most commonly found anomaly regardless of gender and was mostly bilateral. In the current study, CTEV was accompanied with genu valgum in 0.2% of the cases. The most important finding of the study was that only 21(5.1%) out of 408 cases were reported within the first year after birth, and 42.3% cases were 4 years old or above at the time of reporting to the center. Such statistics are alarming considering the fact that early diagnosis and management is crucial for a promising prognosis. Delayed reporting can be the result of lack of awareness or lack of facilities, both of which need to attended.

Diagnosis	Side			Total	Percentage
	Right	Left	Bilateral		
Congenital Talipes Calcaneo valgus (CTCV)	1	1	2	4	0.9
Congenital Talipes Equinovarus (CTEV)	82	79	164	325	79.7
CTEV+Genu Valgum	0	0	1	1	0.2
Neonatal Foot Drop	3	0	2	5	1.2
Hallux Valgus	0	1	4	5	1.2
Metatarsus Adductus	1	0	1	2	0.5
Pes Cavus	1	0	2	3	0.7
Equinus	5	1	3	9	2.1
Congenital Pes Planus	4	1	49	54	13.2
Total	97	83	228	408	100

Table-I. Frequency of cases according to their diagnosis and side involvement

Diagnosis	Gender		Total
	Male	Female	
Congenital Talipes Calcaneo Valgus (CTCV)	3	1	4
Congenital Talipes Equinovarus (CTEV)	235	90	325
CTEV+Genu Valgum	1	0	1
Neonatal Foot Drop	3	2	5
Hallux Valgus	0	5	5
Metatarsus Adductus	0	2	2
Pes Cavus	2	1	3
Equinus	5	4	9
Congenital Pes Planus	38	16	54
Total	287	121	408

Table-II. Gender distribution according to diagnosis

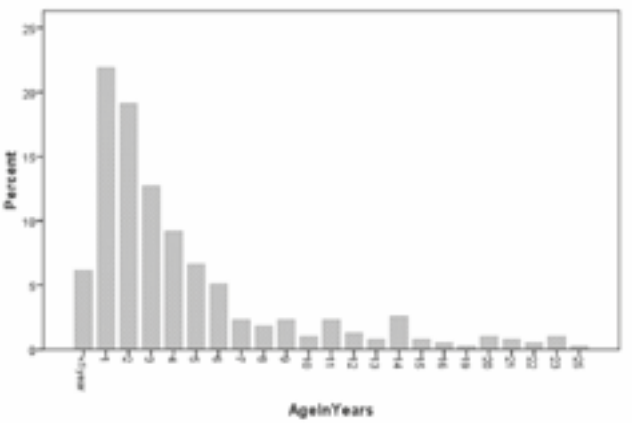

Figure-I. Percentage distribution of age in years

Moreover lack of awareness of risk factors and prevalence of cousin marriages in the region increases the risk of newborns having congenital foot anomalies.

In a cross sectional study conducted at Ayub Teaching Hospital, 2,360 patients admitted to Neonatal Intensive Care Unit from Oct 2009-Jan 2010 were included. Congenital anomalies were found in only 100 patients, the most common of which involved the Central Nervous System (31%). Musculoskeletal anomalies were found in 9% of the patients, the most common of which was, Congenital Talipes Equino Varus (6%).[7] This finding was similar to the current study which also reported CTEV to be the most frequently occurring foot anomaly.

Another longitudinal prospective study, conducted over a period of 16 years included 2,401 newborns.[4] The study reported an incidence of 4% for foot anomalies, 3/4th of which were different types of adducts deformities, similar to the current study which reported CTEV to be

the most frequently occurring foot anomaly.[4] The study reported the natural course and prognosis of all congenital foot anomalies to be encouraging except CTEV[4], which emphasizes the early diagnoses and management of CTEV among newborns, but unfortunately the current study reports a delayed reporting of children with congenital foot anomalies because of either lack of facilities or awareness.

The incidence of Metatarsus adductus is found to be 1-2/1000 according to literature[2,3] and the current study shows the frequency of Metatarsus adductus to be 0.5%. The occurrence of calcaneo-valgus is 5%, and maybe unilateral or bilateral, and is more common in females[3], whereas the current study shows the frequency of calcaneo-valgus to be, though no female was seen to have the condition. Literature suggests the prevalence of pes-cavus around 8-15%[11,12], and 60% of individuals with pes-cavus complain of foot pain, and the current study showed a frequency of 0.7% . Pes-planus is normal in young children and resolves as the child grows, but if it does not resolve it is considered an anomaly.[11,12] Hallux Valgus is commonly associated with pes-planus, and is also considered as a genetic anomaly.[11,13,16] The incidence of pes planus is amplified with age. The current study showed pes planus to be the second most occurring anomaly, and was found in 13.2% cases. According to literature the incidence of hallux valgus is found to be 3%, 9%, and 16% for age 15 to 30, 31 to 60 and above 60 respectively[11,13,16], The current study reported Hallux valgus in1.2% of cases.

CONCLUSION

Congenital foot anomalies are common musculoskeletal anomalies affecting a large number of children, the most prevalent of which is CTEV. Unfortunately few people seek management immediately after birth, thus having negative effects on prognosis, either due to lack of facilities or awareness. Prevalent cousin marriages in the society may also play an influential role in increased risk of such anomalies to occur in newborns. Many of these anomalies can be managed conservatively with physical therapy and orthotics if reported in due time. Attention should be paid on educating people regarding identification and timely management of such conditions.

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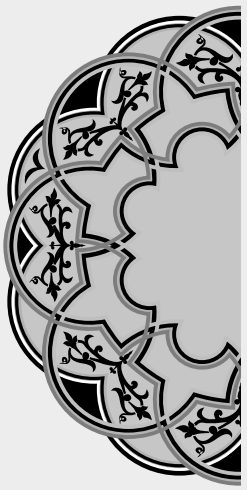

*"I learned that every mortal will taste **DEATH**.*
*But only some will taste **LIFE**. "*

RUMI

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Imam Hussain	IH designed and did topic selection, data collection, statistical analysis, thesis writing and manuscript writing	
2	Muhammad Osama	MO designed and did topic selection, data collection, data entry, statistical analysis manuscript writing and final manuscript approval.	
3	Reem Javed Malik	RJM did data entry statistical analysis and manuscript writing	