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ORIGINAL ARTICLE

Developmental dysplasia of hip (DDH): Role of assessing the geographical prevalence in Pakistan for screening to minimize the late presentation of DDH.

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ABSTRACT… Objective: To assess the prevalent regions of Pakistan for screening to minimize the late onset of DDH. **Study Design:** Retrospective study. **Setting:** Department of Orthopaedic & Spine Center, Ghurki Trust Teaching Hospital, Lahore. **Period:** January 2015 to December 2021. **Methods:** All the infants and children less than 15 years of age of both genders with the diagnosis of DDH at GTTH, Prime and Mercy Teaching Hospital, Mercy Teaching Hospital, Peshawar and Prime Teaching Hospital Peshawar from who received the surgical treatment (open and close reduction with or without acetabular osteotomy) were included in the study. The medical history of patients including age, gender, anatomical site, and geographic locations were retrospectively analyzed. All the data were entered and analyzed using Excel and SPSS software Version 22. **Results:** A total of 1390 were analyzed and diagnosed with DDH among these more than half of the children 1017(73.1%) were females while fewer than 373(26.8%) were males. The average age of children at the time of diagnosis was 4.5 years ranging from 6 months to 15 years. Almost half of the patients 960(69.1%) were diagnosed between the age of 1 to 5 years. More than half cases 869(62.5%) had unilateral DDH than bilateral DDH 521(37.5%). In this study, we assessed the majority of cases 20.3% cases were from Quetta, 10.5% from Peshawar, and 9.5% were from Lahore. **Conclusion:** DDH is a problem that ranges from minor acetabular dysplasia to irreversible hip dislocation. Depending on the health facilities, screening programs for early detection differ across the world. Due to lack of screening, late presentation of DDH is common and swaddling is another risk factor of it. Physical examination should be highly valuable in diagnosing early DDH, especially in Khyber Pakhtunkhwa and Balochistan's various cities as these are highly deprived areas where health services are inadequate and the prevalence of late diagnosis is very high. Awareness should be done among parents regarding safe methods to safely swaddle their infants.

Key words: Development Dysplasia Of Hip (DDH), DislocationGeographical Locations, Screening, Ultrasonography.

INTRODUCTION

Hip dysplasia is a condition in which the femoral head, acetabulum, or both are abnormally shaped, sized, or positioned. The bulk of anomalies has been observed to be caused by acetabulum maldevelopment. Secondarily, the femoral head is affected as a result of non-physiological biomechanics from the anteverted acetabulum or therapy.[1] Subluxation of the partial dislocation, acetabular dysplasia, and full dislocation of the femoral head from the true acetabulum are all indications of DDH. In a newborn with true congenital hip dislocation, the femoral head can be moved and decreased into and out of the true acetabulum. In an older child, the femoral head stays displaced, and the femoral head and acetabulum develop abnormalities i.e., pulvinar.[2]

Developmental dysplasia of the hip (DDH) describes the spectrum of structural abnormalities that involve the growing hip. Early diagnosis and treatment are critical to providing the best possible functional outcome. GTTH and Galaxy hospital are doing a lot of DDH which are neglected in the last few years (drainage area of cases and number of DDH Cases per year on average). As there are no previous studies conducted in Pakistan regarding the prevalence of DDH. This article is to identify the areas of Pakistan, from which we are receiving frequent cases of neglected

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untreated late DDH. This article will highlight the importance of organizing the health programs in those areas having a high prevalence of DDH to give awareness among patients and doctors.

DDH's prevalence varies depending on several factors.[3] The most frequent risk factors for DDH include abnormal intrauterine position, female gender, positive family history, and oligohydramnios.[4-6] Breech, hyperextension hip swaddling is thought to be a cause.[5-6] DDH is a prevalent and inevitable reason for childhood impairment, and it accounts for a significant amount of pediatric orthopedic practice. Late diagnosis (commonly referred to as diagnosis beyond three months) is associated with a higher likelihood of requiring surgery and a higher risk of long-term problems.[7]

Due to a well-functioning newborn screening system, DDH is generally uncommon in the developed world.[8] In our present clinical practice, though, it is not rare to meet an older child with untreated DDH. In many sections of the country, particularly in Pakistan, tertiary level care and comprehensive screening programs are missing. Before attempting to treat DDH, the treating surgeon should have a thorough understanding of the circumstances that cause it. With each passing year, the child's treatment becomes more complex and difficult. Osteoarthritis develops in early adulthood if the dysplastic alterations are not controlled.[9]

The cause of hip developmental dysplasia (DDH) is uncertain. However, epidemiologic/ demographic data can provide a wealth of information. Because of the many classifications of hip dysplasia, the different techniques of diagnosis, the various ages of the population investigated, the examiner's clinical expertise, and different geographic locations, the epidemiologic literature on DDH is large and perplexing.[10]

As literature is scarce regarding the geographic distribution of patients with DDH so this study will help in assessing those areas of Pakistan having a high prevalence of DDH so that screening can be done to make early diagnosis possible in DDH. As a result, the study was carried out to emphasize the need of screening every infant and especially according to different geographic regions to minimize the late presentation of DDH. Early diagnosis, which is required for early therapy, is the most important condition for attaining the best treatment results and minimizing the risk of hip osteoarthritis in adults. The efficacy of therapy is exploited when diagnosed within the first month or, if possible, the first days of life.[11] Early treatment of DDH is desirable because the results of treatment depend upon the age of the patient and unilateral or bilateral dislocation when treatment begins. Our research emphasizes the need of determining the most common geographical regions in Pakistan as the first step in formally understanding the disease's burden from the perspective of the family to screen every baby and reduce late-presenting DDH.

METHODS

A retrospective study was conducted at the Department of Orthopaedic & Spine Center, Ghurki Trust Teaching Hospital, Lahore, Mercy Teaching Hospital, Peshawar and Prime Teaching Hospital Peshawar from from (January 2015 –to December 2021). Ethical approval letter (Dated: 01/01/2021 Ref No. 2021/01/R-10) was taken before the use of information obtained from the Hospital database. All these data were available in our record. No consent was taken from patients to collect the information, as it is a retrospective study and no personal data of patients was disclosed in the current study. All the infants and children less than 15 years of age of both genders with the diagnosis of DDH at GTTH, who received the surgical treatment (open and close reduction with or without acetabular osteotomy) were included in the study. A non-probabiliity consecutive sampling technique was used to collect the data. The medical history of patients including age, gender, anatomical side, and geographic locations were retrospectively analyzed. All the data were entered and analyzed using Excel and SPSS software Version 22. Frequencies, percentages, and visual representation were done to draw the conclusion based on the sample to assess the prevalent city of Pakistan with a high incidence of DDH.

RESULTS

Characteristics	Categories	n	%age
Gender	Male	373	26.8
	Female	1017	73.1
Age	1-15 months	19	1.4
	16-30 months	12	0.9
	1-2	495	35.6
	3-5 years	465	33.5
	6-10 years	313	22.5
	11-15 years	86	6.2
Anatomical Side	Unilateral	869	62.5
	Bilateral	521	37.5
Swaddled Child as baby	Yes	520	37.4
	No	870	62.6

Table-I. Demographic characteristics of children with DDH (n=1390)

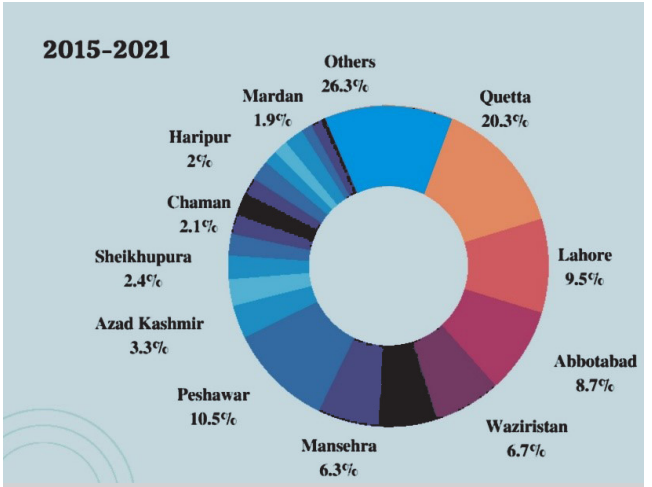

Figure-1. Distribution of cases with different geographical locations

As shown in Table-I, a total of 1390 were analyzed and diagnosed with DDH among these more than half of the children 1017(73.1%) were females while fewer than 373(26.8%) were males. The average age of children at the time of diagnosis was 4.5 years ranging from 6 months to 15 years. Almost half of the patients 960(69.1%) were diagnosed between age 1-5 years, 313(22.5%) were between 6-10 years and fewer cases 12(0.8%) were diagnosed early between age 16-30 months, and 1-15 months as 19(1.4%) respectively. In the majority of cases, 869 (62.5%) had unilateral DDH than bilateral DDH 521(37.5%). At the time of presentation, swaddled history was also taken from parents either they swaddled their child as a baby then 520 (37.4%) answered yes while the majority 870(62.6%) answered no in this case. In this study, we assessed the majority of cases from areas 281 out of 1309 cases were from Quetta, 120 from Abbottabad, 146 from Peshawar, 110 from Lahore, and minority cases from upper Punjab areas (Sialkot Gujranwala, etc). On the other hand, we can say that the majority 20.3% of cases were from Quetta, 10.5% from Peshawar, and 9.5% were from Lahore. (Figure-1)

DISCUSSION

The most prevalent congenital musculoskeletal illness in infants is Developmental Dysplasia of the Hip (DDH). The condition can range from a simple flattening of the acetabular canal to complete femoral head dislocation. If not treated, DDH can lead to early hip osteoarthritis and, in the most severe cases, a limp with substantial functional impairments, even before the age of walking. is exploited when diagnosed within the first month or, if possible, the first days of life.[11]

It is not necessarily sufficient in identifying DDH on its own. Because certain dysplastic, unstable, subluxated, or dislocated hips cannot be diagnosed, or a normal hip may be mistakenly labeled pathologic if evaluated by an inexperienced individual, the diagnosis cannot be made.[12,13]

The age group of one to five years seemed to have the greatest incidence of late diagnosis in our study. This is in line with the most prevalent clinical presentation, in which the child's aberrant gait is discovered after he or she has begun walking. Females were more diagnosed than males. We found more cases from the Balochistan, Khyber-Pakhtunkhwa areas, Azad Kashmir, and the upper region of Punjab. So incidence was high in these regions. We don't have a screening program for Developmental dysplasia of hip (DDH) or a systematic referral mechanism for these children in such regions. As a result, the majority of our children have DDH that has been neglected or presented late, necessitating more invasive surgical treatment. Among these, Swaddled cases were also assessed. Surgery for unilateral hip dislocation before the age of 8 years, and surgery for bilateral hip dislocation before the age

of 5.5 years, had better outcomes than surgery beyond that age. Age and unilateral or bilateral dislocation, on the other hand, should not be used as a primary basis for making decisions. It is advisable to do a detailed case-by-case analysis.[20]

Zimri et al.[20] conducted the study in 2018 and the results indicated that patients were found to be more from Gilgit-Baltistan, KPK, Azad Jammu, and Kashmir, Afghanistan, and upper Punjab, as well as Islamabad and Rawalpindi's key catchment areas. Our study provided the same results as the previous study that as more of the cases were presented in our hospital from the Balochistan, Khyber-Pakhtunkhwa areas, Azad Kashmir, and the upper region of Punjab.

Swaddling keeps the hip extended and adducted in theory, however radiographs of cradled newborns' hips show that they are not in true adduction, with up to 15–20° of abduction conceivable.[14] Many people believe that newborn swaddling, which is common in many cultures, is a crucial component in the development of DDH.[15]

Physical examinations should be delayed until after the neonatal period, according to studies, because of the high probability of impulsive stabilization in the first four weeks of life.[16,17] According to Hadlow, 50% of hips that were unstable at birth stabilized completely within 5 days.[18] Despite the high value of ultrasonography for DDH screening, clinical examination by an expert orthopedic surgeon is more fulfilling in primary DDH screening in underdeveloped countries for early diagnosis due to limited health facilities. However, if the newborn has risk factors as discussed like family history, swaddling, etc, or if the clinical examination is suspicious, ultrasonography by an experienced sonographer will be required.[19]

Our study has some advantages, this is a multicenter study so the study results can be generalized to the rest of the population. The limitation in this study is that the used questionnaire was limited in data and must revise to include more data related to risk factors of developmental dysplasia of the hip and more ultrasound detailed measurements according to Graft classification. Another drawback of this study is as the medical records were reviewed retrospectively; we did not see patients at final follow-up specifically for this study, and the medical records might not be entirely reliable. Limb length, in particular, could be subject to variations because we have more referrals from the Balochistan, Khyber-Pakhtunkhwa areas, Azad Kashmir, and the upper region of Punjab. But still, this audit will help us to reach out to these influential areas and the data is still useful.

Figure-1. Swaddled baby

CONCLUSION

DDH is a problem that ranges from minor acetabular dysplasia to irreversible hip dislocation.

Figure-2. Preoperative radiology of 5 years old female children diagnosed with Lt. DDH

Depending on the health facilities, screening programs for early detection differ across the world. Due to lack of screening, late presentation of DDH is common and swaddling is another risk factor of it. Physical examination should be highly valuable in diagnosing early DDH, especially in Khyber Pakhtunkhwa and Balochistan's various cities as these are highly deprived areas where health services are inadequate and the prevalence of late diagnosis is very high. Awareness should be done among parents regarding safe methods to safely swaddle their infants.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Farman ul Haq:** Conceptualization and framework of study.
2	**Waheed Altaf:** Writing draft.
3	**Ziarmal Khan:** Data collection.
4	**Bilal ud din:** Data collection.
5	**Kamran Sabir:** Data collection.
6	**Sarmad Khan:** Data collection.
7	**Atiq uz Zaman:** Supervision of study.