

# Physical Hindrances in the Environment for the Patients with Congenital Lower Limb Deformities Presenting in Rehabilitation Department of Benazir Bhutto Hospital of Rawalpindi, Pakistan

Aqsa Aamir<sup>1</sup>, Zubair Javaid<sup>2</sup>, Rizwana Shahid<sup>3\*</sup>, Ajla Javaid<sup>4</sup> and Aamir Nawaz Khan<sup>5</sup>

1Final year student of BSc (Hons) Orthotics & Prosthetics, Rawalpindi Medical University, Pakistan

2Head of Orthopedics, Holy Family Hospital, Rawalpindi, Pakistan

3Assistant Professor Community Medicine, Rawalpindi Medical University, Pakistan

4Lecturer Orthotics & Prosthetics, Benazir Bhutto Hospital, Rawalpindi, Pakistan

5Senior Registrar Orthopedics, Benazir Bhutto Hospital, Rawalpindi, Pakistan

\*Corresponding author: Rizwana Shahid, Assistant Professor Community Medicine, Rawalpindi Medical University, Pakistan

Received:  April 28, 2023

Published:  May 05, 2023

## Abstract

**Objectives:** To determine physical hindrances in the environment among patients with congenital lower limb deformities and effect of these hindrances on the living of disabled people.

**Subjects & Methods:** A cross-sectional descriptive study was carried out among 100 patients admitted in Rehabilitation department of Benazir Bhutto Hospital Rawalpindi with congenital lower limb deformities who were included in the study through consecutive non-probability sampling. The data was gathered pertaining to demographics, type and severity of limb deformity. The functionality of the deformed limb was measured by using Lower Extremity Functional Scale (LEFS). Physical hindrances faced in the environment by our study subjects were evaluated by a structured questionnaire encompassing questions about physical hindrances faced in accessing education and healthcare services, independency while walking, need of assistance for daily life activities including self-care, lack of ramps and automatic doors as problematic in various institutes and shopping malls and accessibility to pedestrian area. The data was analyzed by means of SPSS 21 software. Mean  $\pm$  SD of LEFS scale was calculated. Descriptive statistics were applied for all demographics and physical hindrances. Sex-wise difference in LEFS score of the patients was determined by independent sample t-test.  $P < 0.05$  was considered significant.

**Results:** About 63% of the study subjects were males and 53% were 6-10 years old. Overall mean LEFS score was  $40 \pm 3.80$ . statistically significant gender-based difference in LEFS score was determined ( $P < 0.0005$ ) with comparatively less score among females. About 42% patients had problem in stair climbing while 37% and 21% faced trouble in using toilets and walking long distances respectively. Around 70% of the cases found accessing healthcare services problematic due to lack of ramps and handrails. All patients used to accomplish their routine activities specially those related to healthcare with support of others. Approximately 81% respondents couldn't access the pedestrian area and 84% were faced difficulty in going in and out of the main entrance.

**Conclusion:** Diverse environmental barriers in accomplishment of daily life activities and gaining education were attributed to congenital lower limb deformities. Patients were also confronted with problems in transportation.

**Keywords:** Physical hindrances; congenital lower limb deformities; LEFS score; healthcare services

## Introduction

Lower limb deformities among children can be congenital as well as acquired as result of trauma, infections, tumors or any other accompanying medical ailment [1]. Pediatric limb deformities are primarily congenital that are attributed to some disruptive events during pregnancy [2]. Although organs of various systems are rarely involved by lower limb deformities; however, one or more bones either unilaterally or bilaterally may probably be affected [3]. Undoubtedly, lower limb congenital malformations are primarily ascribed to genetic defects and environmental factors [4]; in developing countries like Pakistan such deformities are indirectly linked to consanguineous and early marriages as well [5]. According to the World Health Organization, congenital deformities not only negatively impact the healthcare system of a country, but also drastically influence the families and communities due to subsequent life-long disability [6]. Physical activity is of utmost importance among human beings for their body growth and development otherwise they are subjected to detrimental lifetime consequences [7].

Children with congenital malfunctioning of lower limbs usually suffer from gait abnormalities that seems quite distressing as they cannot participate normally in social festivities [8]. Such children occasionally have to undergo traumatic experiences of various surgical or non-surgical treatment options [9]. Pakistan has been perceived as a suitable country to study the congenital malformations [10] but data pertaining to its resultant physical disruptions is scarce. The present study is therefore intended to inquire the physical hindrances faced in the environment by the patients with congenital lower limb deformities. In addition, the effects of these hindrances on the living of disabled persons will also be studied. This research would enable the orthotists and prosthetics to facilitate the disabled individuals by provision of suitable devices for overcoming the activity limitations.

## Subjects & Methods

A cross-sectional descriptive study was carried out among 100 children presenting with congenital lower limb deformities in rehabilitation department of Benazir Bhutto Hospital Rawalpindi during 2021. The patients with cleft foot, club foot, tarsal coalition, tibial hemimelia, metatarsus adducts were enrolled in this study through consecutive non-probability sampling. Patients with acquired congenital deformity were excluded from the study. This research was done in accordance with STROBE guidelines. The data was collect-

ed through a structured questionnaire pertinent to patient demographics (age and gender), type and severity of limb deformity through informed consent. Moreover, the functionality of the deformed limb was measured by using Lower Extremity Functional Scale (LEFS) that is based on 5-point Likert scale varying from (Extreme difficulty or unable to perform = 0) to (No difficulty = 4). This scale is comprised of 20 items with respect to 20 different daily life activities with maximum score of 80 [11]. LEFS is a valid tool with excellent internal reliability ( $\alpha=0.96$ ) [12]. Physical hindrances faced in the environment by our study subjects were assessed by a customized questionnaire comprising of questions about physical hindrances faced in accessing the education and healthcare services, independency while walking, need of assistance for daily life activities including self-care, lack of ramps and automatic doors as problematic in various institutes and shopping malls and accessibility to pedestrian area. The data was analyzed by means of SPSS 21 software. Mean  $\pm$  SD of LEFS scale was calculated. Descriptive statistics were applied for all demographics and physical hindrances. Gender-based difference in LEFS score was measured by independent sample t-test.  $P < 0.05$  was taken as significant.

## Results

Of the total 100 patients with lower limb deformities, 63% were males. Majority (53%) of our study subjects were 6-10 years old as depicted below in Figure 1. The average score of LEFS among our patients was computed to be  $40 \pm 3.80$  that is illustrative of the difficulty experienced by our respondents while performing different activities. However, gender-wise difference in LEFS score was statistically significant ( $P = 0.0005$ ) with female children facing greater difficulty in mobilizing than those of male cases as shown below in Table 1. On analyzing the physical hindrances in the environment to access quality education, majority (42%) faced difficulty in stair climbing while 37% and 21% had difficulty in using toilets and walking long distances respectively. The physical hindrances encountered to access the healthcare services by our study subjects are illustrated below in Figure 2. 100% of our patients needed assistance in accomplishment of their routine tasks like self-care. About 89% of our respondents were unable to use the bus stop facilities and 84% were unable to go in and out of the main entrance. Around 81% of the individuals were unable to access the pedestrian area and 10% were incapable of using the automatic doors and ramps.

**Table 1:** Gender-based statistical difference in LEFS score.

LEFS score (mean $\pm$ SD)		P-value
Males (n =63)	Females (n =37)	
43.3 $\pm$ 5.1	39.7 $\pm$ 4.4	0.0005

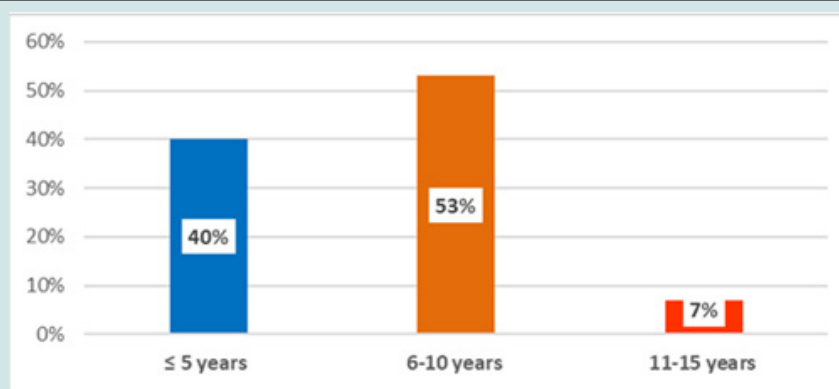


Figure 1: Age group of the patients.

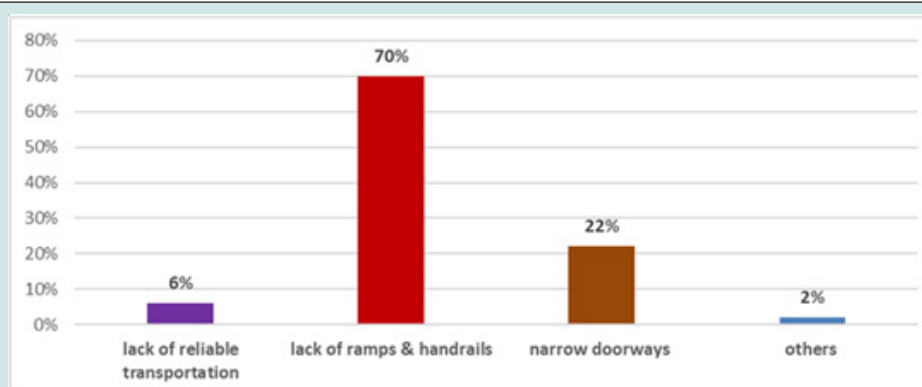


Figure 2: Hindrances in accessing healthcare facilities.

## Discussion

Deformities of lower extremities have considerably been reported among children [13]. Although deformities commence in childhood, but their detrimental effects are to be faced throughout life [14]. Such patients not only need physical assistance, but healthcare is also necessitated for their optimal mental and social well-being [15]. About 63% of the males in current study were having lower limb deformities. Similarly, a descriptive study carried out by Ullah S et al among isolated people of Chitral revealed comparatively more musculoskeletal limb deformities among males [16]. On the other hand, a study done among South Korean achondroplasty patients elicited that 68.2% of the cases were those of females [17]. Contrary to this, a prospective study among South Korean patients illustrated that 60.3% of the males were having either idiopathic or post-traumatic discrepancies in length of lower limbs to whom any intervention was also not applicable for rectification [18]. These gender-based discrepancies in occurrence of limb deformities in different regions of Pakistan needs elucidation for highlighting the actual propensity of this problem for streamlining the healthcare aids and services accordingly.

LEFS score of the patients in our study is  $40 \pm 3.80$  that revealed increased difficulty in performing daily life functions with females facing greater difficulty than those of male cases ( $P= 0.0005$ ). This

tool has been proven both reliable and valid for perceiving the difficulties to which people with lower limb musculoskeletal problems are confronted with [19]. This tool has profoundly been approved in various clinical studies across the globe and hence its psychometrics are not questionable [20]. In a study by Dingmans SA et al, LEFS score among healthy people without any lower limb distortion was computed to be around 77. On analyzing gender-based variation in score, females had relatively low score ( $P=0.03$ ). Better LEFS scores have been calculated among normal youngsters, while LEFS score among cases with lower limb fracture or surgery was 64 [21]. Although study participants of our study were children but low LEFS score is attributed primarily to deformed lower limbs. Measuring the LEFS score of the patients has also been recommended before planning total knee arthroplasty as well in order to forecast postoperative functional outcomes [22]. The utility of LEFS scale in decision making pertaining to field of orthotics and prosthetics is undeniable.

Most (42%) of our patients experienced stair climbing quite problematic while 37% of the cases complained of difficulty in using toilets. About 21% of the respondents perceived walking long distances extremely exertional. In a study by Minder Gt et al, lower limb deformity and resultant abnormality of gait was attributed to X-linked genetic disorder among adolescents and adults [23]. Even

X-linked deformities of lower limb bones have also been reported among children that ultimately led them towards gait compensations [24]. About 37% and 21% of respondents with lower limb deformities had difficulty in using toilets and walking long distances. However, such cases did not reveal drastic difference from other students pertaining to academic performance [25]. A similar study by Uhl TL et al revealed reduction of walking distance due to flexion deformity of knee [26]. Despite the surgical management and rehabilitative measures, such lower limb deformities are likely to recur; occasionally such deformities need clinical maneuvering under anesthesia for optimization [27]. Patients with such lower limb distortions should be subjected to adequate physical therapies to facilitate them in having better quality of life.

## Conclusion & Recommendations

Patients with lower limb congenital malformations were encountered with numerous environmental barriers in order to undertake their routine life activities and in getting access to quality education and healthcare facilities. They were also confronted with unreliable transportation services. The provision of proper assistive devices in suitable environment like installation of ramps for access to wheelchairs, automatic doors, widening of doorways, availability of lifts can play a pivotal role in enhancing the functional outcome of the patients with lower limb disabilities. Community education can also help a great deal in facilitation of such individuals.

## Limitations of Study:

Small sample size due to COVID-19 pandemic.

## Conflict of Interest

None.

## Source of Funding

None.

## References

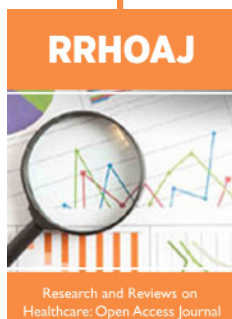
- Chhina H, Klassen AF, Kopec JA, Oliffe J, Iobst C, et al. (2021) What matters to children with lower limb deformities: an international qualitative study guiding the development of a new patient-reported outcome measure. *J Patient Rep Outcomes* 5(1): 30.
- Tayel SM, Fawzia MM, Al Naqeeb NA, Gouda S, Al Awadi SA, et al. (2005) A morpho-etiological description of congenital limb anomalies. *Ann Saudi Med* 25 (3): 219-227.
- Syvänen J, Nietosvaara Y, Hurme S, Perheentupa A, Gissler M, et al. (2012) Maternal risk factors for congenital limb deficiencies: A population-based case-control study. *Paediatr Perinat Epidemiol* 35(4): 450-458.
- Center for Disease Control and Prevention (2016), USA.
- Bhatti NA, Mumtaz S, Malik S (2019) Epidemiological study of congenital and hereditary anomalies in Sialkot district of Pakistan revealed a high incidence of limb and neurological disorders. *Asian Biomed Res Rev News* 13(2): 49-60.
- World Health Organization. *Congenital Disorders*. 2023.
- Brzezinski M, Czubek Z, Niedzielska A, Jankowski M, Kobus T, et al. (2019) Relationship between lower-extremity defects and body mass among Polish children: A cross-sectional study. *BMC Musculoskeletal Disord* 20: 84.
- Michielsen A, Van Wijk I, Ketelaar M (2011) Participation and health-related quality of life of Dutch children and adolescents with congenital lower limb deficiencies. *J Rehabil Med* 43(19): 584-589.
- Montpetit K, Hamdy RC, Dahan-oliel N, Zhang X, Narayanan UG, et al. (2009) Measurement of health-related quality of life in children undergoing external fixator treatment for lower limb deformities. *J Pediatr Orthop* 29(8): 920-926.
- Afzal M (2019) Clinical and Molecular Genetic Study of Kindreds with Limbs and Neurological Anomalies. *Clinical and Molecular Genetic Study of Kindreds with Limbs and Neurological Anomalies*.
- Lower Extremity Functional Scale (LEFS).
- Binkley JM, Stratford PW, Lott SA, Riddle DL (1999) The lower extremity functional scale (LEFS): scale development, measurement properties, and clinical application. *Phys Ther* 79(4): 371-383.
- Latalski M, Bylina J, Fatyga M, Repko M, Filipovic M et al. (2013) Risk factors of postural defects in children at school age. *Ann Agri Environ Med* 20(3): 583-587.
- Jones S, Khandekar S, Tolessa E (2013) Normal variants of the lower limbs in pediatric orthopedics. *Int J Clin Med* 4(7B): 12-17.
- Asadi-Lari M, Tamburini M, Gray D (2004) Patients' needs, satisfaction and health related quality of life: Towards a comprehensive model. *Health Qual Life Outcomes* 2: 32.
- Ullah S, Dasti JI, Malik S (2015) Descriptive epidemiology of hereditary musculoskeletal and limb defects in the isolated population of Chitral, North-West Pakistan. *Pak J Med Sci* 31(5): 1047-1052.
- Kim SJ, Balce GC, Agashe MV, Song SH, Song HR (2012) Is bilateral lower limb lengthening appropriate for achondroplasia? mid-term analysis of the complications and quality of life. *Clin Orthop Relat Res* 470(2): 616-621.
- Chhina H, Klassen A, Kocic J, Park S, Fortes C et al. (2017) Quality of life of children with lower limb deformities: A systematic review of patient-reported outcomes and development of a preliminary conceptual framework. *Journal of Limb Lengthening and Reconstruction* 3(1): 19-29.
- Watson CJ, Propps M, Ratner J, Zeigler DL, Horton P, et al. (2005) Reliability and responsiveness of lower extremity functional scale and the anterior knee pain scale in patients with anterior knee pain. *J Orthop Sports Phys Ther* 35(3): 136-146.
- Stratford PW, Heart DL, Binkley JM, Kennedy DM, Alcock GK et al. (2005) Interpreting lower extremity functional status scores. *Physiother Can* 57(2): 154-162.
- Dingemans SA, Kleipool S, Mulders M, Winkelhagen J, Schep NWL et al. (2017) Normative data for the lower extremity functional scale (LEFS). *Acta Orthopaedica* 88(4): 422-426.
- Turcotte JJ, Kelly ME, Fenn AB, Grover JJ, Wu CA et al. (2022) The role of the lower extremity functional scale in predicting surgical outcomes for total joint arthroplasty patients. *Arthroplasty* 4(1): 3.
- Mindler GT, Kranzl A, Stauffer A, Kocijan R, Ganger R et al. (2021) Lower Limb Deformity and Gait Deviations Among Adolescents and Adults With X-Linked Hypophosphatemia. *Front Endocrinol (Lausanne)* 12: 754084.
- Mindler GT, Kranzl A, Stauffer A, Haeusler G, Ganger R et al. (2020) Disease-Specific Gait Deviations in Pediatric Patients With X-Linked Hypophosphatemia. *Gait Posture* 81: 78-84.
- Niemelä BJ, Hedlund A, Andersson G, Wahlsten VS (2008) Prominent ears: The effect of reconstructive surgery on self-esteem and social interaction in children with a minor defect compared to children with a major orthopedic defect. *Plast Reconstr Surg* 122(5): 1390-1398.
- Uhl TL, Jacobs CA (2011) Torque measures of common therapies for the treatment of flexion contractures. *J Arthroplasty* 26(2): 328-334.
- Sancheti P, Gugale S, Shyam A (2022) Total Knee Arthroplasty in Knees with Fixed Flexion Deformity. In *Knee Arthroplasty* 47-57.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: [Submit Article](#)

DOI: [10.32474/RRHOAJ.2022.07.000275](https://doi.org/10.32474/RRHOAJ.2022.07.000275)



### Research and Reviews on Healthcare: Open Access Journal

#### Assets of Publishing with us

- Global archiving of articles
- Immediate, unrestricted online access
- Rigorous Peer Review Process
- Authors Retain Copyrights
- Unique DOI for all articles