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**Original Article**

# Prevalence and Factors Leading to Hallux Valgus in Adults

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## ABSTRACT

Hallux valgus deformity is an abnormal aberration of the main metatarsal and parallel aberration of the Hallux (Big Toe), which is mistakenly interpreted as an augmentation of bone or tissue surrounding the Big Toe joint. **Objective:** The goal of this cross-sectional study was to determine the prevalence of hallux valgus in adults and the variables that cause it. **Methods:** A sample of 160 young adults (both genders aging b/w 18 to 55 years) was evaluated for hallux valgus using the non-probability purposive sampling technique in Lahore Pakistan. The data were collected through a standardized Bunion Questionnaire and Manchester scale. It took six months to complete, whereas, the data was analyzed using SPSS version 21. **Results:** For data analysis means, standard deviations were used along with chi-square testing. Adults had a 37.5 percent prevalence of hallux valgus, and the current study indicated that the primary risk variables were growing age, with females suffering more than males. The usage of heels on a regular basis was one of the key risk factors for patients with hallux valgus. **Conclusion:** The outcomes of the research might lead to improved biomechanical therapies to eliminate needless foot posture loads and the usage of non-ergonomic shoes.

## INTRODUCTION

Foot and ankle issues are linked to mobility and stability impairment, incapacity, falls, and fractures in the elderly [1]. Bunion or hallux valgus deformity is a typical deviation of the main metatarsal and Hallux (Big Toe) parallel deviation that is mistakenly perceived as bone or tissue enlargement surrounding the Big Toe joint. Hallux valgus was assumed to be a protrusion of additional tissue, the first metatarsal head, or both, caused by ill-fitting footwear in the eighteenth century [2]. Commonly hallux valgus is associated with foot discomfort and substantial functional disability [3]. Hallux valgus is seen to be more common in females than males and in Caucasians and African Americans. Additionally, older age and body mass index variations are also responsible for hallux valgus [4]. Other associated factors with HV are ligamentous laxity, race, flat foot, the shape of the first metatarsal head, knee pain, osteoarthritis [5]. In this typical condition, hallux valgus pain and inactivity are significant factors. In older individuals, hallux valgus can be a cause of disability and increases the risk of falling [6]. In older individuals; osteoarthritis is a condition that can cause many other conditions described by Kellgren and Moore. Radiographic findings reveal that osteoarthritis in the first metatarsophalangeal joint can be related to the presence of osteoarthritis in the knee joint and joint of hands [7]. Whereas, theories revealed osteoarthritis of the first

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metatarsophalangeal joint is responsible for the occurrence of hallux valgus [8]. Positive family history can be a cause of hallux valgus, in -90% of individuals. Other contributing factors are uncomfortable shoes like shoes with high heels, tight front parts, and other secondary factors like a large first metatarsophalangeal joint, round first metatarsophalangeal joint, large inter-metatarsal edge, and prolonged pronated foot. In older Individuals' chance of occurrence is ranging b/w 21-65% (including 4,249 individuals age >30 years) reported with a prevalence of 28%. Ratio for the chance of occurrence in both genders is 9:1 for females and males respectively and obviously related with increasing age. A huge number of medical procedures around the lower leg and foot are used to cure this condition [9]. Hallux valgus is a main cause of orthopedic foot and lower leg medical procedures every year, because of its huge connection with foot pain and handicap, disability, and high risk of falls in older age individuals. Hallux valgus is most likely to be in African Americans than white, whereas, an increase in weight in different affects differently. Pes planus and hallux valgus can also be related because of the disarrangement of the foot [4]. In a general observation rheumatoid joint inflammation forefoot distortion can be a major cause of hallux valgus [10]. Radiographs are used to examine hallux valgus angle measurements in order to determine the severity and incidence of hallux valgus. A hallux valgus angle greater than 15° explains the existence of HV [5]. The sagittal plane is particularly essential for evaluating the range of motion in the metatarsophalangeal joint since here is where the typical range is assessed, which is around 45° of plantar flexion to around 90° of dorsiflexion [1]. While mobility during weight bearing generally requires only a few degrees of plantar flexion to less than 70 degrees of dorsiflexion, a small amount of adduction and abduction can occur in the inclined plane at the metatarsophalangeal joint of the big toe during weight bearing and non-weight bearing. 7 On radiography, hallux valgus is produced by a 15-degree prominence rise in the edge shape longitudinal bisections of the first metatarsal and proximal phalanx [11]. Sheree Nix et al. undertook a fundamental inquiry into the prevalence of Hallux Valgus in the general population, as well as a meta-analysis, revealing a high frequency of Hallux Valgus in the general population and highlighting the broad variance in commonness ratings among exams. Our data also back up idea that Hallux Valgus affects more women and the elderly. This paper identifies the difficulties that make it difficult to present an accurate picture of HV prevalence in general public, as well as recommendations for further research [12]. Artful dancing movement produces hallux valgus, according to a research done by Hildur Einarsdottir et al. among artists. In comparison to non-artists [13], radiographs of 63 active and 38 resigned artists of both genders indicated no differences in the valgus angulations of the hallux [14]. Hylton B. Menz et.al Finally, regardless of age, sex, weight file (BMI), or discomfort in various regions, there is a dynamic decline in foot specific HRQOL with increasing severity of hallux valgus deformation [15]. These findings show that hallux valgus is a severe and incapacitating musculoskeletal disorder, and they imply that acting to repair or slow the development of the deformity might have considerable advantages beyond pain reduction [16]. K. Matsubura his investigation demonstrates that feeble TGS corresponds with hallux valgus in 10-12 year– old young ladies. Frail TGS may add to hallux valgus in the potential or beginning times. In this way, fortifying TGS is important for keeping the beginning of hallux valgus and growing great foot act [17]. Pedro v. Munuera et.al Another study found that in feet with partite sesamoids, the bulge and length of the primary metatarsal are more pronounced than in feet without this disease. In contrast to normal feet, feet with hallux valgus had a much greater frequency of bipartite average sesamoid [18]. R.Raymakers and W. Waugh et.al The researchers found that arthrodesis of the first metatarsophalangeal joint, along with excision of the lesser arch of the foot with stabilized subluxation and painful callosities, is a good therapy or treatment for painful hallux valgus. According to research, this pooling procedure was conducted on thirty feet in twenty-five individuals [19]. A.H.N.Robinson et.al concluded that Medical procedure for hallux valgus, while in fact requesting, has a high rate of accomplishment in fittingly chosen patients. Nonetheless, few patients have poor results following the task. Randomized controlled preliminaries are expected to elucidate the elements which finish up a decent result [20]. There are many reasons behind the occurrence of hallux valgus, current cross-sectional study will help find the prevalence of hallux valgus among adults along with of risk factors responsible for the development of hallux valgus. The current study will manifest the occurrence of hallux valgus in an Asian country Pakistan, various factors can be a result of this discomforting condition The study will raise awareness about the factors that cause hallux valgus, as well as how to prevent it from progressing to disability or functional limitations.

## METHODS

The current cross-sectional study was taken to find the prevalence of hallux valgus and its causative factors in adults. A sample of 160 young adults was evaluated for hallux valgus using the non-probability purposive sampling technique in Lahore Pakistan. The data were obtained

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using a standardized Bunion Questionnaire and Manchester scale after the individuals signed an informed consent form. A self-evaluation of hallux valgus is the Manchester Scale. It has four different levels of severity: 0 for no deformity, 1 for mild deformity, 2 for moderate deformity, and 3 for severe deformity (hallux valgus). The baseline survey asked about personal information such as name, age, and gender, as well as questions about risk factors for hallux valgus. E.g. BMI, flat foot, foot discomfort, osteoarthritis, and rheumatoid arthritis are all factors to consider. It took six months to complete, and SPSS version 21.0 was used to analyses the data. For data analysis means, standard deviations were used along with chi-square testing to find the association of hallux valgus with risk factors. Inclusion Criteria was Adults (both genders, ages 18 to 55 yrs) with discomfort in the first metatarsophalangeal joints, with flat feet, obese people, with osteoarthritis and rheumatoid Arthritis. While exclusion criteria were adolescents, children, people with bone Tumors, neuroma and with metatarsal hairline fractures

## RESULTS

Table 1 reveals that the average age of persons in my study sample is 27.9, and the majority of those who took part in the study were b/w 20 to 30 years of age.

| Total (N) | 160 |
|---|---|
| Mean+SD | 27.59+10.1 |
| Minimum | 18.00 |
| Maximum | 55.00 |

**Table 1:** Expressive statistics for age

Table 2 shows that 86.9% of people in current study sample wear open shoes, 80.6% of participants were not having complain of hallux valgus preventing them from doing daily activities, and 19.4% of participant activities of daily living were prevented due to hallux valgus. 14.4% of patients had mild deformity, 8.1 percent had moderate deformity, and 15.0 percent had severe deformity, according to the results.

| Characteristics | | Frequency | Percent |
|---|---|---|---|
| Usage of Open or Flat Shoes | No | 21 | 13.1 |
| | Yes | 139 | 86.9 |
| | Total | 160 | 100.0 |
| Avoid participating in daily living activities | No | 129 | 80.6 |
| | Yes | 31 | 19.4 |
| | Total | 160 | 100.0 |
| Deformity | No deformity | 100 | 62.5 |
| | mild deformity | 23 | 14.4 |
| | Moderate deformity | 13 | 8.1 |
| | Severe deformity | 24 | 15.0 |

**Table 2:** Different characteristics among participants

The p-value (p-value=0.01) indicates that there is a substantial link between hallux valgus or bunions, which make walking difficult, and wearing heels, Table 3.

| Uncomfortable to walk because of hallux valgus or bunions | Use of heels | | Total | P-value |
|---|---|---|---|---|
| | No | yes | | |
| No | 87 | 36 | 123 | 0.01 |
| Yes | 18 | 19 | 37 | |
| Total | 105 | 55 | 160 | |

**Table 3:** Association between use of heels and uncomfortably to walk because of your hallux valgus or bunions

There is a strong link (p=0.01) between diagnosed hallux valgus and hallux valgus or bunions that cause foot or back discomfort, Table 4.

| Knowledge of hallux valgus | Bunions or hallux valgus are the source of your foot or back pain | | Total | P-value |
|---|---|---|---|---|
| | No | yes | | |
| No | 108 | 9 | 117 | 0.01 |
| Yes | 20 | 23 | 43 | |
| Total | 128 | 32 | 160 | |

**Table 4:** Association between bunions or hallux valgus as a source of your foot or back pain

The p-value indicates that there is substantial relation between diagnosed hallux valgus and gender (p-value=0.01), Table 5.

| Gender | Diagnosed with hallux valgus | | Total | P-value |
|---|---|---|---|---|
| | No | yes | | |
| Male | 58 | 12 | 70 | 0.01 |
| Female | 59 | 31 | 90 | |
| Total | 117 | 43 | 160 | |

**Table 5:** Cross tabulation b/w gender and hallux valgus

The p-value for the substantial connection between Manchester scales for measuring hallux valgus and gender is significant (P-value=0.02), Table 6.

| Manchester Scale for evaluating hallux valgus (provided for better understanding) | | Gender | | Total | P-value |
|---|---|---|---|---|---|
| | | M | F | | |
| No deformity | Frequency | 53 | 47 | 100 | 0.02 |
| | Percentage | 75.7% | 52.2% | 62.5% | |
| Mild deformity | Frequency | 7 | 16 | 23 | |
| | Percentage | 10.0% | 17.8% | 14.4% | |
| Moderate deformity | Frequency | 3 | 10 | 13 | |
| | Percentage | 4.3% | 11.1% | 8.1% | |
| Severe deformity | Frequency | 7 | 17 | 24 | |
| | Percentage | 10.0% | 18.9% | 15.0% | |
| Total | Frequency | 70 | 90 | 160 | |
| | Percentage | 100.0% | 100.0% | 100.0% | |

**Table 6:** Cross tabulation b/w gender and Manchester Scale for evaluating hallux valgus

## DISCUSSION

According to a recent research, hallux valgus is a prevalent condition that has all the earmarks of being inextricably related to age and female sex. It has been associated to nodal osteoarthritis, knee pain, big toe pain, self-revealed osteoarthritis, and self-detailed rheumatoid joint +pain and inflammation [21]. A recent study found a connection between hallux valgus and age and gender [22]. When Mafart conducted the greatest epidemiologic study of hallux valgus, he observed that males had a higher incidence of the condition than females. Hallux valgus is a

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frequent condition that appears to be inextricably tied to ageing and female sex. In this study, females had a higher prevalence of Hallux Valgus than males. This assertion is supported by previous studies [23, 24]. Current study indicated a strong relationship (20%) between hallux valgus and foot and back discomfort. In Australia, the prior research is the most thorough population-based assessment of foot discomfort. According to the data, one out of every five persons has foot pain, discomfort, or hardness, with females, those aged 50 and over, and those classed as overweight having a higher frequency [25]. Nonetheless, even in those under the age of 45, at least 10% of patients suffer from substantial foot discomfort. The total prevalence rate recorded in this research is higher than that found in the United Kingdom's Cheshire Foot Pain and Disability Survey (10 percent) [26]. According to this study, 19.4% of adults prevent participation in daily living activities for those who had Hallux Valgus, and 80.6% of adults had not prevented in daily living activities for those who had Hallux Valgus. Current study 31.3% of participants changed in normal foot movement due to hallux valgus and 68.8% of participants does not change in normal foot movement due to hallux valgus. 17.5% of participants had laterally deviated foot while walking. According to recent prevalence data from the Framingham Study, 19 percent of men and 29 percent of women reported foot pain on most long days of the month, with a predominance of anguish in specific foot regions ranging from 7 percent to 13 percent of those who refrain from walking due to foot pain [27]. Results shows Hallux valgus was also caused by the form of the shoes. J.E.Dunn and colleagues Finally, studies in the United States that included clinical assessments of more particular groups showed outcomes that were identical to ours. Bunions, corns, and calluses are more frequent among women, according to some. Women's shoes are commonly considered as a contributing element. Increased heel stature distributes pinnacle weight to the hallux and increases forefoot top weight. Prior to the advent of Western footwear styles, bunions were considered to be uncommon in Japan [28]. According to this study, the Hallux Valgus angle, which is generally measured clinically using radiographs, is utilised to detect hallux valgus. The severity of Hallux Valgus is typically measured using criteria such as the Manchester scale on photographs or diagrams of the foot, or by measuring the Hallux Valgus angle in the tracing's outlines [29]. The Manchester scale was used to measure the severity of hallux valgus, with some participants having no deformity (62.5%), mild deformity (14.4%), moderate deformity (8.1%), and severe deformity (15.0%). According to H. B. Menz and S. E. Munteanu, the Manchester scale is a feasible test for assessing hallux valgus angle using radiograph data [28].

## CONCLUSION

Hallux valgus affects 37.5 percent of adults, and the primary risk variables, according to the present study, were rising age and females suffering from hallux valgus more than males. The everyday use of heels was one of the most significant risk factors for patients suffering with hallux valgus. Bunions or hallux valgus are more common in people who wear heels, making walking difficult and causing back pain, reducing their quality of life. The incidence of hallux valgus is also associated with work-related stress.

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