

# PREVALENCE OF HALLUX VALGUX DEFORMITY IN ADULTS

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## ABSTRACT:

**Background:** Hallux valgus is common foot deformity in adult population, hallux valgus deformity is also known as splay foot or bunion. In this deformity big toe move to lateral side of the foot and protruding of the first metatarsal bone to outside and angle between big toe and second is decrease. Objective of this current study was to evaluate the prevalence of hallux valgus deformity in adults.

**Method:** This is a cross sectional study was done through non probability sampling technique. Taking history on Performa from 215 different age group participants from 18 - 50 year old who were selected to the general population of district Punjab Gujarat of Pakistan. Goniometer and VAS Scale is use to find out the hallux valgus deformity of foot in adult and their level of pain. Descriptive method of statistics was used for frequency and Percentage. Data analysis was done in IBM SPSS Statistics 21.

**Result:** Sample of 112 female participants and 103 male participants included, left foot of female was more effected male having 47.9% of hallux valgus and female having 52.1%. Left foot 54.0%, bilateral foot 28.4% show hallux valgus deformity, Occupations students having 30.2% of hallux valgus deformity, house wife showed 27.0%, and 80.5% of participant having hallux valgus deformity statistical significant p-value <0.001, BMI body mass index of participants having 30.14±5.26.

**Conclusion:** Hallux valgus deformity is more common in younger adult as compare to older and there severity is varied from person to person but most of them having mild deformity without any pain but having pain when they put their feet in shoes for most of the time. Result show that hallux valgus 20 degree is more common in adult female population, foot wear, weight, shoes shape play major role in the formation of hallux valgus deformity of foot

**Key words:** Hallux valgus, Metatarsophalangeal joint, Prevalence, Body mass index

## INTRODUCTION

Hallux valgus is foot deformity commonly occur at first metatarsophalangeal joint due to this reason it cause pain and mostly effects on the life of the individuals. It is the lateral protruding of big toe and medial side movement of first metatarsal. This often leads to the development of soft tissue and bony prominence on the medial side is called a bunion. Pronation of hind foot, Pes Planus is also major cause of the Bunion formation<sup>1</sup>. Common in flat foot and hammer toes, pain and impaired gait shift the weight to lateral and posterior side late heel raise and decrease single limb balance position. Pain and numbness is due to the compression. Pain is not present in all adult having Hallux Valgus, pain is present in some cases only. First Metatarsophalangeal (MTJ) joint consist of the sesamoid bone, ligaments, and muscles laxity.<sup>2</sup> the structure start to stretch if any abnormality develop in it

Due to this reason pain is increase and wearing of use put pressure on the bunion bone size also increase and patient is not able to supinate his foot and shift weight of body to lateral side of the foot. If non operative treatment is fail surgery must be performed for sever hallux valgus<sup>2</sup>. Angle less than 15 is normal and do not hallux valgus presence. If the Angles is 20° and greater than are major one to diagnose hallux valgus.

More common in women as compare to men previous study show that Hallux valgus is exist in older population but current studies show that it is present in adult and getting worse with increasing age<sup>3</sup>. Causes of hallux valgus. Some people have genetically presses of hallux valgus but some people due to heavy weight of the body or higher body mass lead to the foot problems. Foot wear (tight fitted shoes) or heel shoes lead to increase chances of hallux valgus deformity, Congenital deformity or predisposition, Chronic Achilles tendon Flat foot, Systemic disease, Hyper mobility of first Meta tarsal joint, Also associated with knee, hip osteoarthritis.<sup>4</sup>

Indication of hallux valgus is common in male and female include Lateral side movement of the Metatarsophalangeal (MTP) joint ,Swelling ,Shortening of muscle ,Tenderness Weakness of abductor muscle, Pain is present in most of them due to inflammation . While intrinsic factors such for long time use of tight fitted use produce a lot of problem and putting more Pressure on big toe lead to sever hallux valgus development <sup>6</sup>.

Mild Hallux valgus can be treated by manual therapy and exercise such as stretching ,rest ice ,change shoes outfit electrical muscle stimulation .currently toe separator is use it is placed between toe and second finger and with passage of the time aligned bone into normal position decrease pain and improve the walking quality ,gait pattern and posture of individuals during walking.

## METHODOLOGY

An descriptive cross- sectional study was conducted. Data were collected from general adult population in District Punjab Gujrat of Pakistan through non probability sampling techniques. Adults having age group 18-50 year who selected from general population of Gujrat participants who met the inclusion and exclusion criteria were selected , August 2022 to Nov 2022 was the duration of study. Detail about consent forms were explain to participants prior to filling the forms person who were not interested, having hallux valgus surgery , flat foot deformity, post-surgery of foot were excluded. Goniometer and VAS Scale is used in this study. Necessary demographic information such as name , age , height , weight and body mass index was noted in the consent form BMI of the person was measured using formula  $BMI = \text{weight in kg} / \text{height in m}^2$ . Height was measured by using inches tape and weight was measured by using weight machine. To find out the angle between toe and second finger goniometer was use if the angle is 15 or < 15 is consider as normal but for hallux valgus its value is 20 consider as mild if it is >20 to 40 is consider as moderate hallux valgus if it value is >40 is consider as sever.

If participant complain of pain during walking and prolonged use of shoes wearing data also included in consent form to determine the pattern and reason of pain Vas Scale is used having value 0 -10 . 0 represent no pain , 1-3 having mild pain , 4-7 having moderate pain and 8-10 having sever pain

## ETHICAL CONSIDERATION

This study was approved by institutional review board (IRB) of University of Lahore. Oral and written informed consent was taken from all selected Participants. Before data collection they were informed that their information kept confidential and anonymous throughout the study. All the participants would be volunteer and their identity would not be revealed in results during publications.

## Data analysis

Data will be entered and analyzed using statistical package for social sciences (SPSS) software version 20. For descriptive analysis ,mean and standard deviation will be calculated for quantitative variables whereas frequency and percentage will be calculated for qualitative variables. For inferential statistics , Goniometer and VAS SCALE are used. All results will be calculated at 95% confidence interval and p-value<0.005 will be considered as a significant value

## RESULTS:

A sample of 215 adults between age group of 18-50 year were selected by nonprobability convenient sampling techniques. Females are more prone to develop hallux valgus deformity and left foot is more prominent as compare to male. The percentage for variable participants Age group 18-24 is 33.0%, 25-30 having 20.50%,31-35 was 9.3%,36-40 was 6.0% , 41-45 was 13.0% , 46-50 was 18.1%.The percentage for variable height was  $59.12 \pm 9.3351$  and percentage for variable weight was  $70.44 \pm 15.32$ . The percent for variable body mass index was  $30.14 \pm 5.26$  The percentage for variable intensity of pain , participants were no pain 55.8% , participants were mild pain 27.4% , participant were moderate pain 15.3% , participants were sever pain 1.4% .figure 1 ,

Table1

	Mean $\pm$ S.D
Age of participant in (years)	32.39 $\pm$ 10.92
Height(inches)	59.12 $\pm$ 9.3351
Weight(kg)	70.44 $\pm$ 15.32272

Body mass index (BMI) kg/m <sup>2</sup>	30.14±5.25991
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The percentage of variables having hallux valgus positive was 80.5 and variables having hallux valgus negative was 19.5. Table 2

Variable		n(%)
Hallux valgus	Positive	173(80.5)
	Negative	42(19.5)
	Total	215(100.0)

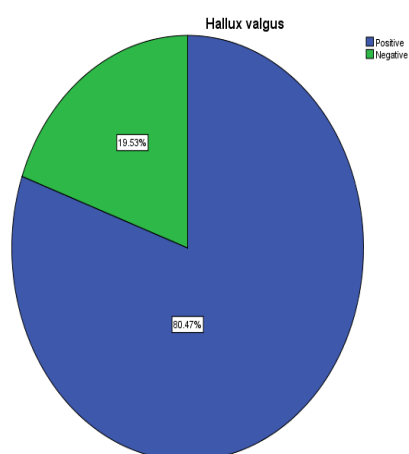


Figure1. Prevalence of hallux valgus in adults

Table 3. Descriptive analysis for Association of hallux valgus deformity and variables

Association	Person Chi Square	df	P value
Association of family history with hallux valgus deformity in adults	11.793	1	.001
Association of occupation with hallux valgus	26.651	3	.000
Association of type of shoes with hallux valgus	3.771	3	.287
Association of shoes shape with hallux valgus	1.782	3	.619
Association of how many days do you put your feet in shoes with hallux valgus	1.875	3	.599
Association of do you wear heel shoes with hallux valgus	13.809	2	.001
Association of height of your heel shoes with hallux valgus	6.357	2	.042

**DISCUSSION:**

Foot play important role in our life the main function of foot is to weight bear and provide support and stability to the body and prevent for falling and losing gait and balance .The purpose of study to find out the prevalence of hallux valgus deformity in adult (younger , middle adult is included in this study ) but the older adults was excluded. To find out hallux valgus deformity of foot use goniometer and for pain use vas scale, foot prints and radiographs was also used to determine the hallux valgus but these are not use in this study. Hallux valgus is most common foot deformity and its prevalence is more in female population as compare to male population , left foot is mostly involve which may lead to complications and problems in life such as Achilles tendon tightness , contracture , laxity , osteoarthritis of knee , impaired balance , gait change , weight move toward lateral side of foot , pain during walking and foot wear when they get worse with the passage of time person is unable to maintain their body weight and posture increase the risk of fall.

The study was done by using goniometer scale in 112 female participants and 103 male participants, male having 47.9% of hallux valgus and female having 52.1% of hallux valgus. In left foot 54.0% participant show hallux valgus deformity and in bilateral foot 28.4% show hallux valgus deformity.

According to occupation students having 30.2% of hallux valgus deformity , house wife showed 27.0% of hallux valgus and other having 21.4% of hallux valgus , 80.5% of participant having hallux valgus deformity .This technique is not expansive , easy and less time consuming process, satisfactory for routine clinical use, low costs, noninvasive . In the present day society the higher prevalence of hallux valgus deformity in younger female is due to use of restricted tight fitted shoes, narrow toe box shoes and mostly heel shoes use constrict the foot that lead to pain in walking and wearing shoes redness of the big toe bone and put pressure on big toe due to this reason toe move to second finger and angle between two fingers is reduce . The mild deformity of hallux valgus was more prominent than other level of severity for both gender and severity is increase from mild to progressive with the passage of time . If participants having pain find out the underline cause of pain , many treatment option is use to prevent pain such as

using of wide toe box , silicon toe separator is use it reduce inflammation prevent from blister pain and friction , contact sole is also used to prevent it mostly physical therapy intervention is best such as stretching and mobilization

**LIMITATIONS:**

Foot radiographs and foot prints are also used to find out the hallux valgus angle but do not use in this study ,Impact of hallux valgus on mobility and quality of life was not focused .This study was observational base ,Permission issued were faced during data collection ,More patients with different disease entities that cause hallux valgus

**CONCLUSION:**

Conclusion of this study showed that hallux valgus deformity is higher in younger adult as compare to medial adult and older adult. The severity of hallux valgus is varies from person to person and with the passage of time it get worse, most of them having mild deformity without pain. The result show that hallux valgus of left side is more effected and prominent , foot shape , BMI , heel type of shoes e.g. heel wearing play important role in development of hallux valgus

**Conflict of interest:**

There was no any conflict of interest.

**Financial Statement:**

No funding's were given by any authorities, it was a project thesis of doctor of physical therapy.

**Data Availability:**

Data will be provided on the demand by corresponding author.

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