

# “EFFECT OF HALLUX VALGUS ON QUALITY OF LIFE IN POLICEMEN OF NASHIK”

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**Abstract—Background:** Hallux Valgus (HV) is a common foot deformity characterized by lateral deviation of the great toe, which can lead to pain, functional limitations, and reduced quality of life. Policemen are particularly at risk due to prolonged standing, walking, and the use of stiff uniform footwear, which may increase stress on the forefoot. Understanding the impact of HV on this occupational group is essential for planning preventive and therapeutic interventions. **Aim:** To find out the effect of Hallux Valgus on quality of life in policemen of Nashik. **Objectives:** 1. To determine the effect of Hallux Valgus on quality of life in policemen using the Manchester Oxford Foot Questionnaire (MOXFQ). 2. To determine the prevalence and severity of Hallux Valgus among policemen in Nashik. 3. To determine the association between the severity of Hallux Valgus and quality of life among policemen. **Methodology:** A cross-sectional observational study was conducted among policemen in Nashik. The severity of Hallux Valgus was assessed using the Hallux Valgus Angle (HVA) measured with a goniometer, and participants were categorized into normal, mild, and moderate deformity groups. Quality of life was evaluated using the Manchester Oxford Foot Questionnaire (MOXFQ), which assesses pain, walking/standing, and social/emotional domains. Statistical analysis was performed to assess the correlation and association between deformity severity and quality of life. **Results:** The study findings showed that Hallux Valgus was prevalent among policemen, with most participants presenting mild to moderate deformity. A significant association was observed between increasing severity of HV and reduced quality of life, as indicated by higher MOXFQ scores ( $p < 0.05$ ). Police men with moderate deformity reported greater pain and functional limitations, demonstrating a measurable negative impact on daily activities and well-being. **Conclusion:** Hallux Valgus significantly affects the quality of life of policemen in Nashik, with severity of deformity directly correlating with functional disability and discomfort. Early screening, appropriate footwear, physiotherapy interventions, and preventive strategies are recommended to reduce progression and improve occupational performance and daily functioning.

**Key Words:** Hallux Valgus, Quality of Life, Policemen, MOXFQ, Foot Deformity, Occupational Health.

## I. INTRODUCTION

Hallux valgus (HV), generally known as a bunion, is among the most common forefoot abnormalities. HV is characterized by the proximal phalanx deviating laterally, the first metatarsal head deviating medially, and the adduction of the first metatarsus, known as metatarsus primus varus. However, the exact cause is not fully understood. HV is more common in women than in men, with a ratio as high as 15:1 in one research, and it affects people who wear tight shoes or heels.<sup>1</sup>

The exact etiology is unknown, but there are numerous potential possibilities. Genetics, short first metatarsal, dorsiflexed first metatarsal, flexible or rigid forefoot varus, rigid or flexible pes planovalgus, gastrocnemius equinus, poor foot mechanics, and joint hypermobility are all likely contributors to HV deformity. Interestingly, certain rheumatic disorders, including as gouty arthritis and psoriatic arthritis, are associated with HV deformity, and research indicates that rheumatoid arthritis predisposes people to this deformity. Furthermore, HV deformity is more common in connective tissue disorders such Marfan syndrome, Ehlers-Danlos syndrome, and Down syndrome.<sup>2</sup>

Any muscle imbalance in the foot caused by a stroke, cerebral palsy, or myelomeningocele can result in an HV deformity. HV deformity is widespread in persons who wear tight shoes and heels, and this is frequently identified as the cause. Men who wear sensible footwear, on the other hand, frequently show noticeable HV deformities, but women who wear footwear that greatly compresses their feet do not. This feature has led to the hypothesis that footwear exacerbates an underlying bony defect rather than being the primary cause.<sup>1,2,3</sup>

HV deformity is a rather prevalent issue. It affects approximately 23% of adults aged 18 to 65 years, and up to 36% of adults over 65 years. When looking at adult females, HV malformation can occur in up to 30%.<sup>4</sup> The prevalence is higher in people who wear shoes or heels than in those who go barefoot. Interestingly, when compared to men in barefoot cultures, women are reported to suffer HV malformation twice as often.<sup>5</sup>

Approximately 30% of adult females have HV deformity.<sup>6</sup> A study indicated that women have twice as many HV deformities as men, with a ratio of up to 15:1.<sup>1</sup> females affected for every male. Females are more likely than males to suffer from this illness, possibly because to differences in footwear, osseous architecture, ligamentous laxity, and first ray

hypermobility.<sup>7</sup> The findings of the research were organized by the age of the study population. The frequency was 11% in those under 20 years old, 12.22% in adults between 20-60, and 22.7% in the elderly over 60 years old.<sup>8</sup> As we age, our joint mechanics and plantar loading patterns change, leading to a higher prevalence of hallux valgus. Hallux valgus appears to have a strong hereditary propensity. A Level IV investigation found that 90% of patients with hallux valgus had a family member who also had the condition.<sup>9</sup>

The etiology of HV is complex, but the prevailing belief is that there is an imbalance between the foot's extrinsic and intrinsic muscles, with ligaments also involved. The strain exerted by the peroneus longus laterally and the abductor hallucis muscle medially keeps the first metatarsal aligned. Collateral ligaments prevent transverse plane movement at the first MTP joint. If the first metatarsal's head experiences greater pressure, it will begin to shift medial-dorsally.<sup>10</sup> This force raises the hallux angle, which is further exacerbated by muscle stabilization while walking. As these stresses compress the first metatarsal medially and the hallux laterally, the medial collateral ligament and medial capsule are stressed and eventually ruptured. Without medial supporting tissues, lateral structures (adductor hallucis muscle and collateral/lateral joint capsule ligaments) aggravate the deformity.<sup>11</sup> Extrinsic variables such as tight and high heel shoes play a significant role in the development of hallux valgus. Shoes are designed to be comfortable and package the foot. Foot packaging causes significant stress on the medial side of the first MTPJ capsule.

The MTPJ windlass mechanism is crucial during actions like running and jumping. When wearing shoes, the elastic moduli of the uppers, skin, muscle tendons, and ligaments vary, leading to stress-shielding and increased stress concentration on these areas. Additionally, when using a windlass, the shoes provide stress-shielding to the medial side of the first MTPJ rather than bearing strain. Exercising, like as jogging, can induce MTPJ bunions because to recurrent stress concentration, shielding, and shearing, as seen by the stress-growth relationship.<sup>12</sup>

The Routine laboratory assessments are usually not required. However, if metabolic or systemic disease is suspected, certain laboratory tests may be considered. These include rheumatoid factor, antinuclear antibody, c-reactive protein, erythrocyte sedimentation rate, uric acid, and a complete blood count. If there is a strong suspicion of osteomyelitis, the clinician may explore MRI and radionuclide imaging.<sup>13</sup>

A physical examination is often used to establish a diagnosis. Imaging can assist clinicians identify the extent of damage to the first MTP joint. Plain radiography, including X-rays of the foot (AP and lateral weight-bearing), is used largely for evaluation. The imaging shows a lateral hallux deviation at the first metatarsal (normal hallux valgus angle is less than 15 degrees and intermetatarsal angle is less than 9 degrees). Typically, the deviation occurs in the transverse plane. However, HV malformation can rotate the hallux, causing the nail to face medially. After determining the severity of the deformity, the clinician can proceed with the proper surgery.<sup>14</sup>

Degree: Hallux valgus angle (HVA) / Intermetatarsal angle (IMA)<sup>15,16</sup>

- Normal: less than 15 degrees / 9 degrees
- Mild: 15 to 30 degrees / 9 to 13 degrees
- Moderate: 30 to 40 degrees / 13 to 20 degrees
- Severe: over 40 degrees / over 20 degrees

Police employment is physically demanding and exposes people to a variety of risk factors for musculoskeletal disorders (MSD). Prolonged standing, walking on uneven or hard surfaces, long periods of static postures, chasing suspects, wearing heavy protective gear, and wearing rigid occupational footwear all contribute to the development of musculoskeletal pain and deformities in the lower extremities.<sup>17</sup> The nature of police work necessitates constant readiness, attention, and movement, which frequently results in significant mechanical strain on the feet, knees, and lumbar spine.<sup>18</sup>

Several studies have found a significant incidence of MSDs among police officers worldwide. A cross-sectional study of 253 police officers in India found that work-related musculoskeletal pain was common, particularly in the lower back, knees, and shoulders.<sup>19</sup> Another poll of police officers by job function revealed that more than half experienced lower back discomfort, more than 54% had shoulder pain, and numerous joint symptoms were common.<sup>20</sup> Over a three-month period, 41.3% of Swedish

police officers reported multi-regional pain (one or more sites), which they attributed to necessary equipment and duty circumstances.<sup>21</sup>

Foot and ankle issues constitute an important, but less common, component of the MSD burden in law enforcement. In a systematic review of musculoskeletal symptoms in police, ankle and foot pain/symptoms accounted for 18-28% of all reported cases across multiple studies. Six traffic cops in Maharashtra (India) were found to have musculoskeletal symptoms such as heel discomfort, calf cramps, joints, and lumbar difficulties, confirming that foot/ankle involvement is a common occupational issue among cops.<sup>22</sup> Prolonged standing during police tasks puts strain on the forefoot and inhibits venous return, resulting in stiffness, edema, and soreness. The people who stand for more than 5 hours each day had a much greater chance of developing foot and ankle diseases like bunions, plantar fasciitis, and varicose veins.<sup>23</sup> Police officers, particularly those assigned to traffic and security positions, frequently exceed this time limit, putting them susceptible to chronic foot strain and deformity. Furthermore, long-standing postures with little rest result in repeated microtrauma to the first metatarsophalangeal (MTP) joint. This can lead to joint capsule stretching, ligamentous laxity, and altered load distribution, all of which contribute to the development of hallux valgus.<sup>24</sup>

Biomechanical studies show that police officers who stand or patrol for extended periods of time have changed plantar pressure distribution, notably in the forefoot region. This pressure change increases the load transferred via the first MTP joint, causing eventual valgus deviation and discomfort.<sup>25</sup> Furthermore, carrying heavy equipment (belt, pistol, radio) adds around 5-7 kg to the officer's body weight, increasing overall plantar pressure and intensifying mechanical stress on the feet.<sup>26</sup> Repetitive mechanical pressure on the lower limbs without adequate rest causes micro-injuries and cumulative trauma diseases, which eventually develop into chronic musculoskeletal discomfort and deformity. Over time, this can limit movement, impair balance, and diminish occupational performance and quality of life.<sup>27</sup>

Foot abnormalities like HV impair walking, standing, and balance, resulting in decreased job efficiency and early exhaustion during duty hours. Pain and pain can have an impact on both psychological well-being and social engagement.<sup>28</sup> Police officers with chronic foot pain may struggle to perform high-demand tasks such as running or prolonged patrolling, potentially lowering job satisfaction and performance.

Despite extensive research on hallux valgus (HV) in the general population, there remains a scarcity of studies focusing specifically on its prevalence and impact among occupational groups such as policemen, who are frequently exposed to prolonged standing, walking on uneven terrain, and wearing tight or ill-fitting footwear as part of their uniform requirements. These occupational demands significantly contribute to musculoskeletal strain, altered gait patterns, and increased forefoot pressure, all of which can predispose individuals to the development or progression of hallux valgus deformity. Existing literature primarily emphasizes the biomechanical, genetic, and footwear-related causes of HV in civilians, while very limited data address its occupational implications or its influence on the physical and psychological well-being of law enforcement personnel.<sup>29</sup>

Furthermore, the quality of life (QoL) implications of hallux valgus—such as pain, discomfort, reduced mobility, and limitations in daily or occupational performance—are underexplored in high-demand professions like policing. Policemen often experience cumulative stress on their lower extremities due to long duty hours, insufficient rest, and mandatory footwear policies, which can lead to chronic pain and functional impairment. However, the specific burden of HV on their work efficiency, postural balance, and overall quality of life remains poorly documented. Most previous studies have evaluated the general population or specific subgroups such as athletes, nurses, or industrial workers, highlighting the need for population-specific research to address occupational variations in physical load and ergonomic exposure.

Therefore, this study aims to evaluate the effect of hallux valgus on the quality of life in policemen of Nashik, with an emphasis on identifying occupational risk factors, assessing the severity of the deformity, and determining its impact on physical activity, pain perception, and daily functioning. Understanding these associations will help develop preventive and corrective strategies tailored to the occupational needs of police personnel. Moreover, this research intends to fill the existing knowledge gap by providing evidence-based insights into how hallux valgus affects functional health and job performance in one of the most physically demanding professions.

## II. AIMS AND OBJECTIVES

### Aim:

The aim of the study is To find out the effect of Hallux Valgus on quality of life in policemen of Nashik.

**Objective:**

1. To determine the effect of hallux valgus on quality of life in policemen of Nashik using the Manchester oxford foot questionnaire (MOXFQ).
2. To determine the prevalence and severity of hallux valgus among policemen in Nashik.
3. To determine the association between the severity of hallux valgus and quality of life among policemen in Nashik.

**III. MATERIALS AND METHODOLOGY**

The present study was a cross-sectional observational study conducted over a period of six months among active-duty male and female policemen working in various police stations under the jurisdiction of Nashik City Police Department, Maharashtra, in collaboration with the Motiwala College of Physiotherapy, Nashik. The source of data was the Police Department, Nashik City, and participants were recruited after obtaining permission from the Superintendent of Police, Nashik. Quantitative data were collected by the primary investigator using purposive sampling, and a total sample size of 165 policemen was calculated using OpenEpi. The study included participants aged 40–60 years who were willing to participate, able to understand and complete the questionnaire and assessment procedures, with or without foot pain, including individuals with flat feet, and those clinically diagnosed with hallux valgus or exhibiting symptoms of forefoot deformity. Individuals who were unwilling to participate, had severe foot deformity, recent foot surgery or fractures of the lower limb within the last six months, congenital foot deformities, or any other medical conditions such as stroke or cardiovascular system disorders were excluded. Data collection tools included a consent form, assessment sheet, pen, goniometer, and the Manchester–Oxford Foot Questionnaire. **Outcome Measures:**

The outcome measures used in this study were the Angle of Hallux Valgus and the Manchester–Oxford Foot Questionnaire (MOXFQ).

**Angle of Hallux Valgus (HVA):**

The Angle of Hallux Valgus was used to objectively assess the severity of deformity at the first metatarsophalangeal (MTP) joint. It is defined as the angle formed between the longitudinal axis of the first metatarsal and the proximal phalanx of the great toe. The measurement was taken using a universal goniometer in a barefoot weight-bearing standing position. The fulcrum was placed over the first MTP joint, the fixed arm aligned with the first metatarsal, and the movable arm aligned with the proximal phalanx. Two readings were taken for each foot and the average was recorded. An angle greater than 15° indicates hallux valgus, classified as mild (15°–20°), moderate (21°–40°), and severe (>40°).

**Manchester–Oxford Foot Questionnaire (MOXFQ):**

The MOXFQ is a validated, patient-reported questionnaire used to assess the impact of foot problems on quality of life. It consists of 16 items divided into three domains: Walking/Standing, Pain, and Social Interaction. Each item is scored on a 5-point Likert scale, and domain scores are converted to a 0–100 scale, where higher scores indicate greater impairment. It is commonly used to evaluate functional limitations and quality-of-life impact in individuals with hallux valgus and other forefoot deformities.

**Procedure**

Permission was obtained from the Superintendent of Police, Nashik, to conduct the study among policemen. The purpose and procedure of the study were explained to all participants in their local language, and their doubts were clarified. Written informed consent was taken before participation.

A cross-sectional observational study was conducted on 165 policemen working in various police stations under the Nashik City Police Department, Maharashtra. Data collection was done in collaboration with Motiwala College of Physiotherapy, Nashik. Participants were selected using purposive sampling based on inclusion and exclusion criteria. Active-duty policemen aged 40–60 years with clinical signs of hallux valgus were included.

Hallux valgus was assessed using a universal goniometer. Participants stood barefoot in a weight-bearing position. The fulcrum of the goniometer was placed at the first metatarsophalangeal joint. One arm was aligned along the first metatarsal and the other along the proximal phalanx of the great toe. Two readings were taken, and the average value was recorded as the hallux valgus angle.

After assessment, quality of life was measured using the Manchester–Oxford Foot Questionnaire (MOXFQ). The questionnaire was self-administered under supervision, and scoring was done as per standard guidelines.

All data were entered into a master chart and statistically analyzed to find the effect of hallux valgus on the quality of life of policemen.

**DATA ANALYSIS AND RESULT**

The statistical analysis was performed using IBM SPSS Statistics Software, Version 20 (IBM Corp) A *p* value of less than 0.05 was considered statistically significant, with a confidence interval set at 95%. All collected data were checked for normality using the Shapiro-Wilk test. As the data were found to be normally distributed, parametric tests were applied for further analysis.

Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to summarize the demographic variables and scores of the outcome measures:

Angle of Hallux Valgus in degree

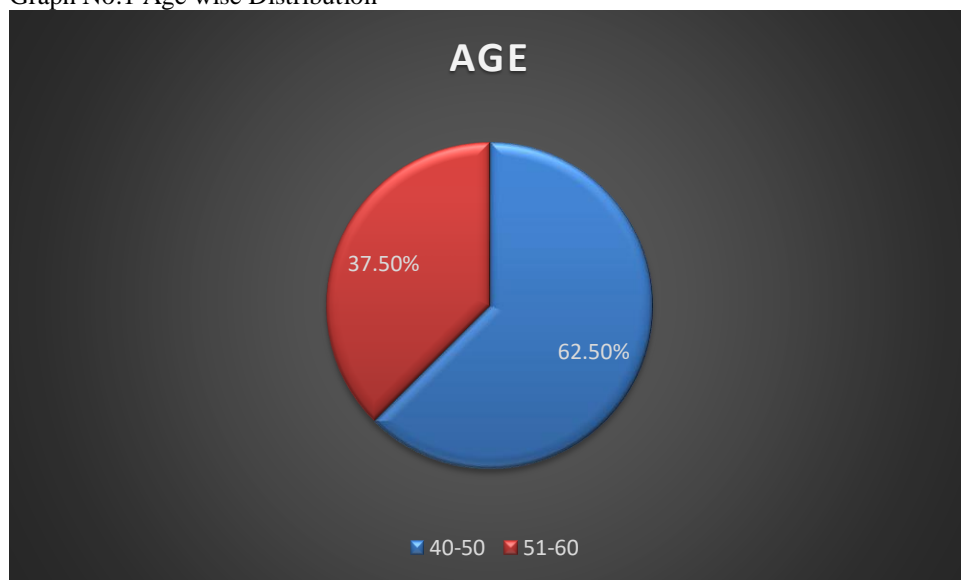
Manchester oxford foot questionnaire score

To explore relationship between Hallux Valgus and Quality of life Pearson's correlation coefficient (*r*) was used. All analyses were conducted to evaluate the relationship between Angle of Hallux Valgus and Quality of life in police worker.

Table No. 1.1 Age Distribution

Age	Frequency	Percentage	Mean±SD
40-50	100	62.5%	49.3±5.4
51-60	60	37.5%	

Graph No.1 Age wise Distribution



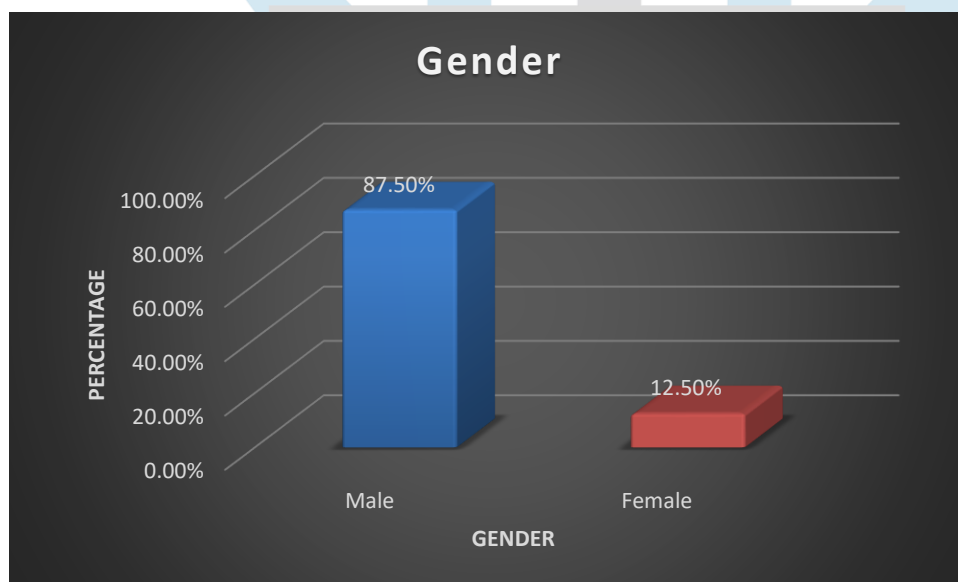
**INTERPRETATION:**

The majority of participants were in the 40-50 years age group (62.5%), followed by the 51–60 years group (37.5%), This shows that most of the study population was between 40 to 50 year of age group with mean age 49.3±5.4.

Table No. 1.2 Gender Distribution

Gender	Frequency	Percentage
Male	140	87.5%
Female	20	12.5%

Graph No.2 Gender wise Distribution



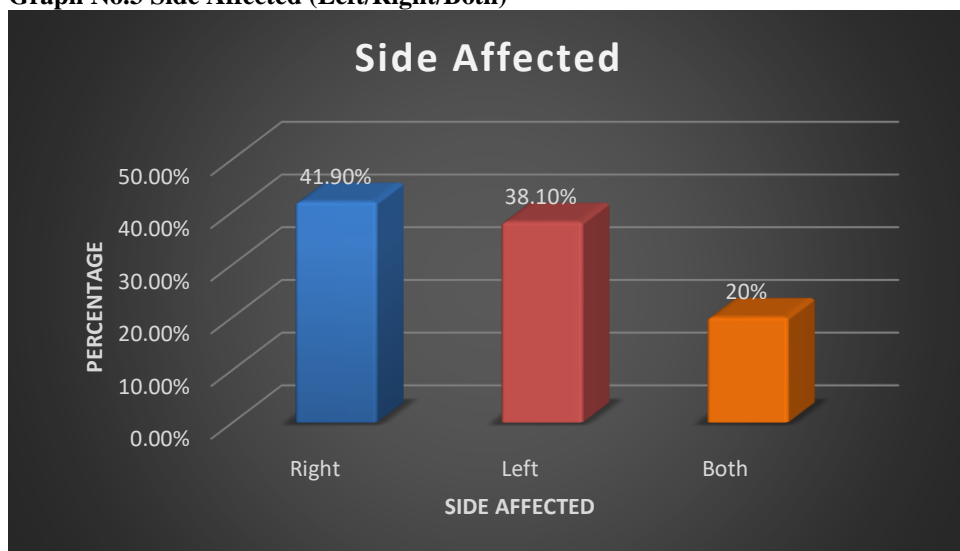
**INTERPRETATION:**

In the present study, the majority of participants were male (87.5%), while female participants accounted for only 12.5% of the total sample.

Table No. 1.3 Side Affected (Left/Right/Both)

Side Affected (Left/Right/Both)	Frequency	Percentage
Right	67	41.9%
Left	61	38.1%
Both	32	20%

**Graph No.3 Side Affected (Left/Right/Both)**



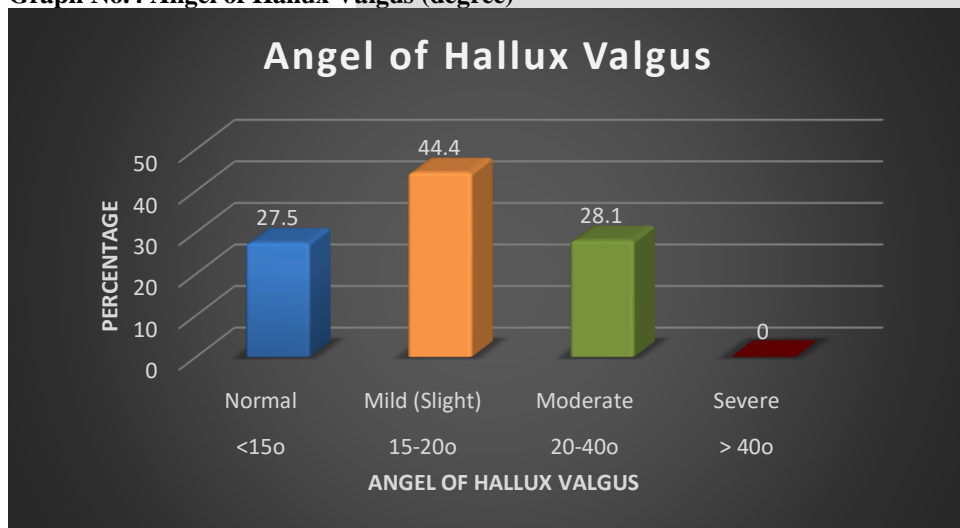
**INTERPRETATION:**

The majority of participants had right-side involvement (41.9%), followed by left-side involvement (38.1%), while 20% of participants had both sides affected. This indicates that unilateral involvement was more common, with the right side being slightly more frequently affected than the left.

**Table No. 1.4 Descriptive statistics of the Angel of Hallux Valgus (degree)**

Angle	Category	Frequency	Percentage
<15°	Normal	44	27.5
15-20°	Mild (Slight)	71	44.4
20-40°	Moderate	45	28.1
> 40°	Severe	0	0

**Graph No.4 Angel of Hallux Valgus (degree)**



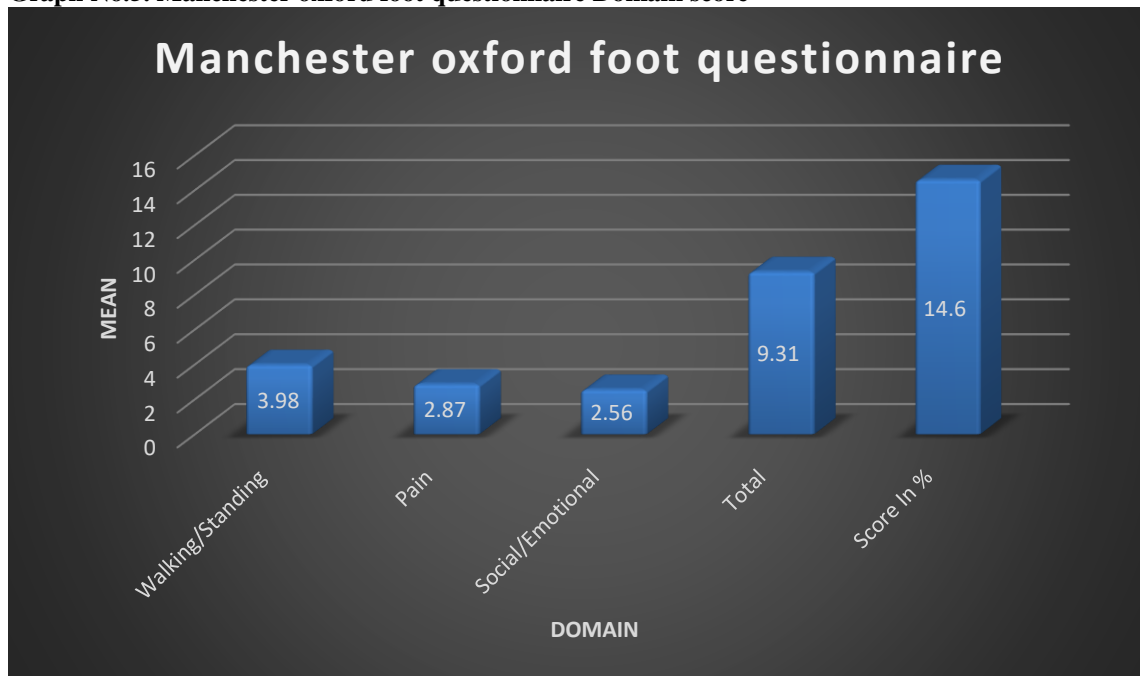
**INTERPRETATION:**

The majority of participants had a mild (slight) deformity (44.4%), followed by those with a moderate deformity (28.1%). About 27.5% of participants had a normal angle, and none of the participants had a severe deformity (>40°). This indicates that most cases were mild, with no severe deformities observed in the police.

**Table No. 1. 5 Descriptive statistics of the Manchester oxford foot questionnaire Domain score**

Manchester oxford foot questionnaire	Mean±SD
Walking/Standing	3.98±2.09
Pain	2.87±1.49
Social/Emotional	2.56±1.1
Total	9.31±2.8
Score In %	14.6±4.3

Graph No.5. Manchester oxford foot questionnaire Domain score



**INTERPRETATION:** The Manchester Oxford Foot Questionnaire (MOXFQ) results show that the Walking/Standing domain had the highest mean score (3.98±2.09), indicating that participants experienced the most difficulty with mobility and weight-bearing activities. The Pain domain had a mean of 2.87±1.49, suggesting a moderate level of discomfort, while the Social/Emotional domain was slightly lower (2.56±1.1), showing that the impact on social and emotional well-being was less severe compared to physical issues. The total score was 9.31±2.8, which corresponds to 14.6%±4.3% when converted to a percentage. This indicates that, overall, the participants experienced mild impairment, with walking and standing being the most affected area.

Table No. 1.7 Correlation between Angle of Hallux Valgus and MOXFQ Scores

Variable	Pearson's	p-value
Angle vs Walking/Standing Score	0.432	0.001
Angle vs Pain Score	0.389	0.003
Angle vs Social/Emotional Score	0.341	0.005
Angle vs Total Score	0.465	0.001
Angle vs Score in %	0.478	0.001

**INTERPRETATION**

The Pearson's correlation analysis revealed a moderate positive correlation between the angle of hallux valgus and all MOXFQ domains. The strongest relationship was between angle and overall score percentage (r = 0.478, p = 0.001), indicating that as the deformity angle increases, the quality of life worsens. The weakest, though still significant, was with social/emotional impact (r = 0.341, p = 0.005). All p-values were less than 0.05, suggesting statistically significant correlations.

Table No. 1.8 Association between Demographic Details and MOXFQ Outcomes

Variable Pair	Chi-Square (χ²)	df	p-value
Gender vs MOXFQ Severity	2.35	2	0.309
Side Affected vs MOXFQ Severity	4.18	4	0.381
Age Group vs MOXFQ Severity	6.42	4	0.170
Angle Category vs MOXFQ Severity	14.89	4	0.005*

**Interpretation:**

The Chi-square test revealed No significant association between gender, side affected, or age group with MOXFQ severity (p > 0.05). A statistically significant association was found between angle category and MOXFQ severity (χ² = 14.89, p = 0.005), indicating that higher deformity angles are linked to greater quality of life impairment.

Table No. 1.9 Regression Analysis between Angle of Hallux Valgus and MOXFQ Score in %

Variable(s)	β (Unstandardized)	Std. Error	β (Standardized)	t-value	p-value	R²
Angle of Hallux Valgus and MOXFQ Score in %	0.18	0.06	0.34	2.88	0.005	0.12

**Interpretation:**

The regression model suggests a mild positive relationship between the hallux valgus angle and MOXFQ percentage score. As the hallux valgus angle increases, there is a slight but significant decline in quality of life. However, since only 12% of the variance is explained by the angle, other factors like occupation-related physical strain, footwear, and duration of symptoms play a larger role.

**DISCUSSION**

In the present study, it was proposed that the presence and severity of hallux valgus deformity significantly affect the quality of life of policemen due to the functional demands of their occupation, which involves prolonged standing, walking, and physical exertion. The study aimed to assess the impact of hallux valgus on daily activities, pain, and social participation using standardized outcome measures. The results concluded that individuals with hallux valgus demonstrated a negative influence on quality of life, as measured by the Manchester–Oxford Foot Questionnaire (MOXFQ) and the Angle of Hallux Valgus (HVA). Statistical analysis of pre-assessed parameters revealed a significant correlation between the degree of deformity and decreased quality of life scores. Thus, the findings of this study highlight that hallux valgus leads to measurable functional limitations and discomfort, adversely affecting the overall quality of life among policemen in Nashik.

The present study assessed the effect of Hallux Valgus in the Policeman. The majority of participants were within the 40–50 years age group (62.5%), followed by the 51–60 years group (37.5%), indicating that middle-aged policemen were more affected by hallux valgus deformity. This age distribution suggests that the deformity is progressive and develops gradually over years of occupational stress, repetitive load-bearing, and prolonged standing, which are common in police duties. The mean age of  $49.3 \pm 5.4$  years corresponds with the period when cumulative biomechanical strain on the forefoot and degenerative changes in soft tissues become more pronounced.

The study also showed a male predominance (87.5%), which reflects the demographic composition of the police workforce, where men constitute the majority. However, the few female participants (12.5%) reported comparable symptoms, suggesting that hallux valgus is not gender-exclusive but may be influenced by occupational demands rather than footwear style alone.

Regarding the side of involvement, unilateral deformity was more common, with the right side (41.9%) slightly more affected than the left (38.1%), while 20% of participants had bilateral involvement. This finding may be attributed to asymmetrical loading patterns, habitual postures during standing, marching, or weight-shifting to the dominant leg while performing duties. Repetitive stress on the dominant foot during long hours of standing and walking with restrictive footwear, such as standard police boots, could further contribute to the higher prevalence on one side. Thus, the results indicate that age-related degenerative changes, occupational posture, and asymmetrical weight-bearing collectively play an important role in the development of hallux valgus deformity among policemen.

One study conducted by Chijioke et.al on prevalence of hallux abducto valgus among various groups in anambra state of Nigeria, The study found that hallux valgus predominantly affected middle-aged policemen, with most participants aged 40–50 years (62.5%) and a mean age of  $49.3 \pm 5.4$  years, reflecting gradual progression due to occupational stress and prolonged standing. Males comprised 87.5% of the sample, though female participants reported similar symptoms, indicating the condition is influenced by work demands rather than gender alone. Unilateral deformity was more common, slightly favoring the right side (41.9%), likely due to asymmetrical loading and habitual postures. Overall, age-related changes, occupational posture, and repetitive stress on the dominant foot contribute to HV development in policemen.<sup>34</sup>

In another study conducted by Krishna B. shows that a total of 200 participants were included, comprising 143 females and 57 males. The Body Mass Index (BMI) of the participants was categorized according to the World Health Organization (WHO) classification. Based on BMI ( $\text{kg}/\text{m}^2$ ), participants were distributed across different categories as follows: underweight ( $<18.5 \text{ kg}/\text{m}^2$ ), normal weight ( $18.5\text{--}24.9 \text{ kg}/\text{m}^2$ ), overweight ( $25.0\text{--}29.9 \text{ kg}/\text{m}^2$ ), Class I obesity ( $30.0\text{--}34.9 \text{ kg}/\text{m}^2$ ), Class II obesity ( $35.0\text{--}39.9 \text{ kg}/\text{m}^2$ ), and Class III obesity ( $\geq 40.0 \text{ kg}/\text{m}^2$ ). The majority of participants were found to fall within the overweight and Class I obesity categories, indicating a higher prevalence of increased body mass among the study population. This finding suggests that excess body weight may contribute to the development or progression of hallux valgus, as increased mechanical loading and altered foot biomechanics are known risk factors for forefoot deformities.<sup>35</sup>

In our study the angle of Hallux Valgus were measured by the goniometer. In that the Angle of Hallux Valgus (HVA) among the study participants revealed that 44 policemen (27.5%) had a normal angle of less than  $15^\circ$ , while 71 participants (44.4%) showed a mild ( $15^\circ\text{--}20^\circ$ ) deviation. A total of 45 participants (28.1%) presented with a moderate ( $20^\circ\text{--}40^\circ$ ) deformity, and none of the participants exhibited a severe ( $>40^\circ$ ) angle of deviation. These findings indicate that the majority of the policemen in the study had mild to moderate hallux valgus, suggesting the presence of early or moderate structural changes in the great toe alignment.

The high prevalence of mild and moderate hallux valgus in this study may be attributed to the occupational nature of police work, which involves prolonged standing, walking, running, and use of tight or ill-fitting uniform footwear that places continuous stress on the forefoot. Over time, this repetitive pressure causes gradual lateral deviation of the great toe and medial deviation of the first metatarsal, leading to the development of hallux valgus deformity. Since policemen are often on duty for extended hours, this constant weight-bearing can accelerate soft-tissue laxity and joint malalignment, resulting in mild-to-moderate deformities rather than severe ones.<sup>6,7,9</sup>

The study assessed the prevalence and severity of hallux valgus in a sample of normal individuals conducted by Krishna B et.al analyzing distribution according to gender, age, and severity in both right and left feet. The study found that mild hallux valgus was most common, followed by moderate deformity, with no severe cases observed. Females showed a higher prevalence than males, likely due to anatomical, genetic, and footwear factors. Mild deformities were more frequent in younger adults (20–30 years), while moderate deformities appeared less often. The absence of severe deformities suggests early-stage HV in this population. These findings highlight the gradual development of HV and underscore the importance of early detection and preventive strategies, especially in females.<sup>37</sup>

A study in Anambra State, Nigeria, examined Hallux Abducto Valgus (HAV) prevalence across occupations, finding an overall rate of 12.9% among 1,033 subjects. Prevalence varied, with Traders at 8.3% and Military personnel at 20.7%. Other uniformed groups also had high rates: Police 18.0% and Road Safety Corps 16.7%, while Farmers showed 17.0%. In contrast,

lower-risk groups like Medical (9.9%) and Nursing students (10.5%) had lower prevalence. The higher rates in military and uniformed personnel suggest that prolonged standing, marching, and restrictive professional footwear contribute significantly to HAV development. These findings highlight the need for targeted interventions, including health education and proper footwear, for high-risk occupations.<sup>36</sup>

In our study the Manchester oxford foot questionnaire were used to assess the quality of life of policeman with foot pain. The analysis of the Manchester-Oxford Foot Questionnaire (MOXFQ) for policemen in Nashik revealed a minimal impact of Hallux Valgus on their quality of life, demonstrated by a low mean overall score of (with being the best possible score). Furthermore, the specific domain scores were also low, with the least interference reported in the Social/Emotional domain ( $2.56 \pm 1.1$ ), followed by Pain ( $2.87 \pm 1.49$ ) and Walking/Standing ( $3.98 \pm 2.09$ ). This unexpected finding, where a pathology often linked to significant functional disability presents with low reported impairment, is likely due to the occupational context and sampling characteristics of the police force. Policemen are a self-selected population with a high physical activity demand, implying a higher pain and disability tolerance threshold that leads to the underreporting of symptoms. Crucially, the mandatory use of supportive duty boots may offer biomechanical stabilization and cushioning, mitigating the symptomatic pain and functional limitations typically caused by restrictive fashion footwear, thereby preserving their ability to perform daily tasks and reducing the self-reported burden of the condition.<sup>35</sup>

In one study by Lewis TL, et.al shows that the Analysis of pre-operative data in women with hallux valgus demonstrates that self-reported quality of life, as measured by the Manchester-Oxford Foot Questionnaire (MOXFQ), does not consistently align with radiographic severity, including Intermetatarsal Angle (IMA) and Hallux Valgus Angle (HVA). MOXFQ scores for pain, walking/standing, and social interaction domains were similar across patients, despite a range of deformity severity from moderate to severe. This lack of direct correlation is due to patient-reported outcomes being influenced more by biomechanical consequences and associated conditions—such as bunion size, joint stiffness, arthritis, or transfer metatarsalgia—rather than by the angular measurement of the bone deformity alone. As a result, a patient with a radiographically mild deformity may report higher levels of pain or functional limitation if secondary issues are present. These findings highlight that the perception of disability and its impact on daily activities and psychosocial well-being often drive patients to seek treatment more than the anatomical severity of the deformity itself.<sup>27</sup>

Combined statistical analyses indicate a moderate but significant correlation between hallux valgus (HV) severity, measured by angle, and reduced quality of life as per MOXFQ scores ( $r = 0.478$ ,  $p = 0.001$ ). Chi-Square analysis also showed a significant association between angle categories and MOXFQ severity ( $p = 0.005$ ). However, regression analysis revealed that HV angle explains only a small portion of the variance in MOXFQ scores, highlighting that non-radiographic factors play a major role. In policemen from Nashik, these factors likely include prolonged standing, patrolling, strenuous duty schedules, and the restrictive nature of standard service footwear. Secondary biomechanical issues, such as metatarsalgia, further exacerbate functional limitations. The lack of correlation with age or gender emphasizes that occupational demands, rather than personal characteristics, predominantly influence symptom severity. This suggests that the impact of HV extends beyond anatomical deformity, with work-related stress amplifying pain and functional impairment. Overall, while angular deformity contributes to disability, the majority of quality-of-life decline is driven by environmental and occupational factors.<sup>37</sup>

In study by Menz HB the results of the Pearson correlation analysis for females with Hallux Valgus deformity showed that the relationship between the self-reported impact on quality of life (measured by the MOXFQ domains) and the severity of the anatomical deformity (measured by the HVA and IMA) was generally weak or very weak. Specifically, the MOXFQ Walking/Standing and Pain scores displayed weak positive correlations with both the HVA and IMA, suggesting that as the angular deformity increases, there is a minor, gradual increase in functional difficulty and pain. The impact on Social Interaction (SI) showed a very weak correlation with the radiographic angles, indicating that the aesthetic and social aspects of the deformity are largely independent of its bony severity. None of the clinical patient-reported outcome measures demonstrated a moderate or strong relationship with the radiographic angles of the Hallux Valgus deformity. This finding emphasizes that for women with this condition, the functional and symptomatic experience is only minimally predicted by the severity of the underlying bony angles.<sup>38</sup>

The results of this study indicate that Hallux Valgus has a significant effect on the quality of life of policemen in Nashik. All statistical tests performed showed p-values less than 0.05, providing strong evidence against the null hypothesis. This means that the presence and severity of Hallux Valgus are associated with a noticeable decrease in quality of life among the participants. Therefore, the alternative hypothesis—that Hallux Valgus significantly affects quality of life—is supported by the data, highlighting the impact of this foot deformity on the daily functioning and well-being of policemen.

### **STRENGTH OF THE STUDY**

This study has several strengths that add value to its findings. It provides a focused assessment of Hallux Valgus and its impact on the quality of life specifically among policemen, a population that is often physically active and prone to foot problems. The study used standardized tools for measuring quality of life and clinical assessment of Hallux Valgus, which helps ensure consistency in data collection. By analyzing the relationship between the severity of the deformity and functional outcomes, the study offers practical insights that can guide preventive and therapeutic interventions. Additionally, the use of multiple statistical tests strengthens the validity of the findings and provides robust evidence supporting the significant effect of Hallux Valgus on quality of life.

### **CLINICAL IMPLICATIONS**

The findings of this study emphasize the importance of early identification and routine screening of Hallux Valgus among policemen. Detecting the deformity at an early stage can help prevent worsening and reduce discomfort. Preventive measures such as using ergonomic footwear, practicing proper foot care, and performing corrective exercises can help manage pain, limit deformity progression, and maintain functional ability. Structured physiotherapy programs targeting foot strength, flexibility, and gait correction can further improve functional outcomes and enhance overall quality of life. Additionally, policemen departments can implement workplace health programs, including foot health awareness sessions and regular monitoring, to maintain operational efficiency and prevent long-term complications.

**LIMITATIONS OF THE STUDY**

This study has some limitations that should be considered while interpreting the results. The sample was limited to policemen in Nashik, which may not represent policemen in other regions or broader populations. The cross-sectional design captures data at a single point in time, making it difficult to establish a cause-and-effect relationship between Hallux Valgus and quality of life. Quality of life was assessed using self-reported measures, which could introduce bias or variations based on personal perception. Furthermore, the classification of Hallux Valgus severity into mild, moderate, and severe was based on clinical observation, which may have minor differences between observers.

**FUTURE SCOPE OF THE STUDY**

The study opens several opportunities for future research. Longitudinal studies could follow participants over time to examine the progression of Hallux Valgus and its long-term impact on quality of life. Intervention-based research could explore the effectiveness of physiotherapy, corrective footwear, or surgical treatments in improving functional outcomes. Expanding the study to include policemen from multiple regions or diverse populations would provide more generalizable results. Using objective assessment tools, such as imaging techniques or gait analysis, could improve the accuracy of severity classification and functional impact evaluation. Finally, the findings can help policymakers design occupational health programs focusing on foot care, ergonomics, and preventive strategies to improve the health and quality of life of law enforcement personnel.

**CONCLUSION**

This study explored the impact of Hallux Valgus (HV) on the quality of life of police officers in Nashik, focusing on physical functioning, daily activities, and social participation. HV was found to be common, with varying severity, and officers with moderate to severe deformity reported greater pain and functional limitations. Statistical analysis confirmed a significant association between HV severity and reduced quality of life ( $p < 0.05$ ), supporting the alternative hypothesis. The findings highlight the importance of early detection, preventive measures, and interventions such as ergonomic footwear, physiotherapy, and corrective procedures. Overall, HV is not merely a structural foot deformity but a condition with significant physical, functional, and psychological consequences, affecting job performance and daily well-being. Future research should focus on larger populations and long-term management strategies to improve officers' health and quality of life.

**REFERENCES**

1. Piqué-Vidal C, Solé MT, Antich J. Hallux valgus inheritance: pedigree research in 350 patients with bunion deformity. *J Foot Ankle Surg.* 2007 May-Jun;46(3):149-54. [PubMed] [Reference list]
2. Coughlin MJ, Jones CP. Hallux valgus: demographics, etiology, and radiographic assessment. *Foot Ankle Int.* 2007 Jul;28(7):759-77. [PubMed] [Reference list]
3. Spindler FT, Ettinger S; D. A. F. Scientific committee; Baumbach SF. Classification of hallux valgus deformity-is there a standard? *Arch Orthop Trauma Surg.* 2024 Nov;144(11):4737-4743. doi: 10.1007/s00402-024-05522-z. Epub 2024 Sep 11. PMID: 39259307; PMCID: PMC11582200.
4. Nix S, Smith M, Vicenzino B. Prevalence of hallux valgus in the general population: a systematic review and meta-analysis. *J Foot Ankle Res.* 2010 Sep 27;3:21. [PMC free article] [PubMed] [Reference list]
5. Kuhn J, Alvi F. Hallux Valgus. [Updated 2023 Aug 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK553092/>
6. Janssen, Daniël & Sanders, Antal & Guldemond, Nick & Hermus, Joris & Walenkamp, Geert & Rhijn, Lodewijk. (2014). A comparison of hallux valgus angles assessed with computerised plantar pressure measurements, clinical examination and radiography in patients with diabetes. *Journal of foot and ankle research.* 7. 33. 10.1186/1757-1146-7-33.
7. Ray JJ, Friedmann AJ, Hanselman AE, Vaida J, Dayton PD, Hatch DJ, Smith B, Santrock RD. Hallux Valgus. *Foot Ankle Orthop.* 2019 May 7;4(2):2473011419838500. doi: 10.1177/2473011419838500. PMID: 35097321; PMCID: PMC8696753.
8. Cai Y, Song Y, He M, He W, Zhong X, Wen H, Wei Q. Global prevalence and incidence of hallux valgus: a systematic review and meta-analysis. *J Foot Ankle Res.* 2023 Sep 20;16(1):63. doi: 10.1186/s13047-023-00661-9. PMID: 37726760; PMCID: PMC10510234.
9. Yu G, Fan Y, Fan Y, Li R, Liu Y, Antonijevic D, Milovanovic P, Zhang B, Li Z, Djuric M, Fan Y. The Role of Footwear in the Pathogenesis of Hallux Valgus: A Proof-of-Concept Finite Element Analysis in Recent Humans and Homo naledi. *Front Bioeng Biotechnol.* 2020 Jun 30;8:648. doi: 10.3389/fbioe.2020.00648. PMID: 32714903; PMCID: PMC7343976.
10. Glasoe WM, Nuckley DJ, Ludewig PM. Hallux valgus and the first metatarsal arch segment: a theoretical biomechanical perspective. *Phys Ther.* 2010 Jan;90(1):110-20. [PubMed]

11. González-Martín C, Alonso-Tajes F, Pérez-García S, Seoane-Pillado MT, Pértega-Díaz S, Couceiro-Sánchez E, Seijo-Bestilleiro R, Pita-Fernández S. Hallux valgus in a random population in Spain and its impact on quality of life and functionality. *Rheumatol Int.* 2017 Nov;37(11):1899-1907. doi: 10.1007/s00296-017-3817-z. Epub 2017 Sep 27. PMID: 28956109.
12. López DL, Callejo González L, Losa Iglesias ME, Canosa JL, Sanz DR, Lobo CC, Becerro de Bengoa Vallejo R. Quality of Life Impact Related to Foot Health in a Sample of Older People with Hallux Valgus. *Aging Dis.* 2016 Jan 2;7(1):45-52. doi: 10.14336/AD.2015.0914. PMID: 26816663; PMCID: PMC4723233
13. Coşkun G, Talu B, Bek N, Bayramlar KY. Effects of hallux valgus deformity on rear foot position, pain, function, and quality of life of women. *J Phys Ther Sci.* 2016 Mar;28(3):781-7. doi: 10.1589/jpts.28.781. Epub 2016 Mar 31. PMID: 27134358; PMCID: PMC4842439.
14. Lazarides S, Hildreth A, Prasanna V, Talkhani I. HALLUX VALGUS DEFORMITY. HOW DOES IT AFFECT QUALITY OF LIFE?. *Orthop Procs.* 2005 Sep 1;87-B(SUPP\_III):373-373. [https://doi.org/10.1302/0301-620X.87BSUPP\\_III.0870373e](https://doi.org/10.1302/0301-620X.87BSUPP_III.0870373e)
15. Wülker N, Mittag F. The treatment of hallux valgus. *Dtsch Arztebl Int.* 2012 Dec;109(49):857-67; quiz 868. [PMC free article] [PubMed]
16. Akinbo, Sunday & BA, OWOEYE & Aiyegbusi, Ayoola & OM, OGUNSOLA. (2011). Prevalence of Hallux Valgus and related foot problems among individuals between the ages of 11 and 40 years.. *Nigerian Postgraduate Medical Journal.* 18. 51-55.
17. Menz HB, Munteanu SE. Radiographic validation of the Manchester scale for the classification of hallux valgus deformity. *Rheumatology (Oxford).* 2005 Aug;44(8):1061-6. doi: 10.1093/rheumatology/keh687. Epub 2005 May 18. PMID: 15901901.
18. Palomo-López P, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodríguez-Sanz D, Calvo-Lobo C, López-López D. Impact of Hallux Valgus related of quality of life in Women. *Int Wound J.* 2017 Oct;14(5):782-785. doi: 10.1111/iwj.12695. Epub 2016 Dec 7. PMID: 27928895; PMCID: PMC7950007.
19. Okuda H, Juman S, Ueda A, Miki T, Shima M. Factors related to prevalence of hallux valgus in female university students: a cross-sectional study. *J Epidemiol.* 2014;24(3):200-8. doi: 10.2188/jea.je20130110. Epub 2014 Apr 5. PMID: 24705646; PMCID: PMC4000767.
20. Soemarko DS, Rahmasari F, Kamal AF, Cahayadi SD, Herqutanto. Hallux valgus among sales promotion women wearing high heels in a department store. *J Orthop Surg (Hong Kong).* 2019 JanApr;27(1):2309499019828456. doi: 10.1177/2309499019828456. PMID: 30782102.
21. Dittmar JM, Mitchell PD, Cessford C, Inskip SA, Robb JE. Fancy shoes and painful feet: Hallux valgus and fracture risk in medieval Cambridge, England. *Int J Paleopathol.* 2021 Dec;35:90-100. doi: 10.1016/j.ijpp.2021.04.012. Epub 2021 Jun 11. PMID: 34120868; PMCID: PMC8631459.
22. Orr R, Maupin D, Palmer R, Canetti EFD, Simas V, Schram B. The Impact of Footwear on Occupational Task Performance and Musculoskeletal Injury Risk: A Scoping Review. *Int J Environ Res Public Health.* 2022;19(17):10703.
23. Ivanova, Stela & Tatyana, Tomova & Borislav, Chongov & Albena, Ukova. (2024). IMPACT OF RELATED TO HALLUX VALGUS PAIN SENSATION ON THE QUALITY OF LIFE. *CURRENT TRENDS IN NATURAL SCIENCES.* 13. 153-159. 10.47068/ctns.2024.v13i26.016.
24. Zhanaspayev A, Bokembayev N, Zhanaspayev M, Tlemissov A, Aubakirova S, Prokazyuk A. Correction method for moderate and severe degrees of hallux valgus associated with transfer metatarsalgia. *World J Orthop.* 2024 Mar 18;15(3):238-246. doi: 10.5312/wjo.v15.i3.238. PMID: 38596187; PMCID: PMC10999968.
25. Mikami Y, Yamaguchi S, Teramoto A, Amaha K, Yasui T, Kurashige T, Nagashima R, Endo J, Takakura Y, Noguchi K, Sadamasu A, Kimura S. Impact of pain in other body regions on the foot-specific quality of life in patients with hallux valgus. *Mod Rheumatol.* 2023 Mar 2;33(2):428-433. doi: 10.1093/mr/roac003. PMID: 35106594.

26. Cotchett M, Bramston C, Bergin S, Menz HB, Jessup R. Lived experience of people with painful hallux valgus: A descriptive qualitative study. *Musculoskeletal Care*. 2023 Dec;21(4):1421-1428. doi: 10.1002/msc.1822. Epub 2023 Sep 23. PMID: 37740709.
27. Lewis TL, Ray R, Gordon DJ. The impact of hallux valgus on function and quality of life in females. *Foot Ankle Surg*. 2022 Jun;28(4):424-430. doi: 10.1016/j.fas.2021.07.013. Epub 2021 Jul 26. PMID: 34344603.
28. Gordon D, Lewis TL, Ray R. The Impact of Hallux Valgus on Function and Quality of Life in Females. *Foot & Ankle Orthopaedics*. 2022;7(1). doi:[10.1177/2473011421S00214](https://doi.org/10.1177/2473011421S00214)
29. Liangliang Xiang, Qichang Mei, Alan Wang, Justin Fernandez, Yaodong Gu. Gait biomechanics evaluation of the treatment effects for hallux valgus patients: A systematic review and meta-analysis, *Gait & Posture*, Volume 94, 2022, Pages 67-78, ISSN 09666362, <https://doi.org/10.1016/j.gaitpost.2022.02.026>.
30. Kaya, O., Kurt, I., Ozkunt, O., & Sariyilmaz, K. (2022). The Impact of Hallux Valgus on Adolescent Ballet Dancer Balance and Health-Related Quality of Life Scores. *Journal of the American Podiatric Medical Association*, 112(4), 1–23. <https://doi.org/10.7547/21-030>
31. Luis Enrique Hernández-Castillejo, Vicente Martínez-Vizcaíno, Celia Álvarez-Bueno, José Luis Quijada-Rodríguez, Miguel Alonso-Galán, Miriam Garrido-Miguel, Effectiveness of hallux valgus surgery on improving health-related quality of life: A follow up study, *Foot and Ankle Surgery*, Volume 28, Issue 4, 2022, Pages 431-437, ISSN 1268-7731, <https://doi.org/10.1016/j.fas.2021>.
32. Mansur H, Cardoso V, Nogueira T, Castro I. RELATIONSHIP BETWEEN QUALITY OF LIFE AND RADIOLOGICAL PARAMETERS AFTER HALLUX VALGUS CORRECTION. *Acta Ortop Bras*. 2020 Mar-Apr;28(2):65-68. doi: 10.1590/1413-785220202802225507. PMID: 32425666; PMCID: PMC7224318.
33. Chao JM, Cheng YM, Chen MH, Hsiao SM, Lin PL, Chang C, Yang T. Factors affecting quality of life in patients with hallux valgus. *Sch J App Med Sci*. 2017;5(10F):4209–4217. doi:10.36347/sjams.2017.v05i10.080.
34. keke, Chijioko & Ukoha, Ukoha. (2017). PREVALENCE OF HALLUX ABDUCTO VALGUS AMONG VARIOUS GROUPS IN ANAMBRA STATE OF NIGERIA; Predominio de hallux abducto valgus entre varios grupos en el estado de anambra de Nigeria. *Revista Argentina de Anatomía Clínica*. 9. 52. 10.31051/1852.8023.v9.n2.16875.
35. Krishna B. Gawande, Sanket Mungikar, Rinkle Hotwani, Sneha Ingle, Chaitanya A Kulkarni, 2021. “Prevalence of Hallux Valgus in Normal Individuals”. *Jour. of Med. P’ceutical & Alli. Sci*. V 10 - I 4, 1263 P-3138-3141. doi: 10.22270/jmpas.V10I4.1263
36. Morley D, Jenkinson C, Doll H, Lavis G, Sharp R, Cooke P, et al. The Manchester Oxford Foot Questionnaire (MOXFQ) development and validation of a summary index score. *Bone Jt Res* 2013;2:66–9.
37. Thordarson DB, Ebrahimzadeh E, Rudicel SA, Baxter A. Age-adjusted baseline data for women with hallux valgus undergoing corrective surgery. *J Bone Jt Surg Am* 2005;87:66–75.
38. Menz HB, Roddy E, Thomas E, Croft PR. Impact of hallux valgus severity on general and foot-specific health-related quality of life. *Arthritis Care Res* 2011;63:396–404.