Current Trends in Natural Sciences (on-line) ISSN: 2284-953X ISSN-L: 2284-9521 Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

IMPACT OF RELATED TO HALLUX VALGUS PAIN SENSATION ON THE QUALITY OF LIFE

Stela Ivanova^{1,*}, Tatyana Tomova¹, Borislav Chongov¹, Albena Ukova¹

¹ Faculty of Public Health, Health Care and Tourism, NSA "Vasil Levski", 1 Gurgulyat Street, 1000 Sofia, Bulgaria



Abstract

Hallux valgus (HV) is one of the most common chronic deformations. It causes pain and difficulty with footwear and many patients require surgery. Hallux valgus is common and moderate or greater deformity is associated with foot pain, decreased function and worse foot health. Pain is not only a highly noxious experience per se, but it can also have an overwhelmingly negative effect on nearly every other aspect of life, including mood and capacity to function in daily roles. The purpose of this study is to estimate the impact of related to hallux valgus deformity pain on the quality of life in untreated subjects. Materials and methods: A self-reported questionnaire was distributed through podiatrists, orthopedists and kinesitherapists to 65 patients, suffering from hallux valgus deformity. Questionnaire includes 3 sections: (1) personal information, pain localization and pain intensity; (2) Manchester Foot Pain and Disability Index (MFPDI); (3) EuroQol- 5 Dimension (EQ-5D-5L). Results: Responses from MFPDI shows markedly impairment of avoiding of standing for a long time, feeling of self-conscious about the feet and the shoes, having constant pain in the feet which is worsening in the evening, and more pain and discomfort during everyday activities. Most of the subjects felt mild to moderate pain. The maximum average degree of pain is correlated with the pain presented below the ball of the hallux, the local pain of the deformity (over 4.29) in relation to the absence of pain in the region of the first metatarsophalangeal joint (under 3). It feels more painful when combined with pain under the balls of all the other toes and/or under the fifth toe. Feeling pain under the ball of the hallux with or without pain under the balls of the other toes (metatarsalgia) was associated with significantly higher scores on the Functionality, Personal Appearance, and Pain subscales of the MFPDI, but not on the Work/Leisure subscale. However, the values are below 50% of the MFPDI subscales range. Conclusions: The intensity and localization of pain in hallux valgus deformity worsens some aspects of the quality of life, mainly related to the avoidance of activities that require prolonged standing and the concern about the feet and the shoes that must be worn.

Keywords: hallux valgus, pain, quality of life.

1. INTRODUCTION

Hallux valgus (HV) is one of the most common chronic deformations, affecting approximately 12–70% of general population and 30–58% of women (Palomo-López et al., 2017). It is characterized by progressive lateral deviation of the great toe at the first metatarsophalangeal joint (MTPJ) and is commonly associated with a painful overlying soft-tissue prominence, the "bunion" (Roddy, 2011). HV in the adult is a degenerative disorder. It causes pain and difficulty with footwear and many patients require surgery (Cho et al., 2009). The deformity is recognised as a major public health problem with escalating trajectories. Given the high incidence related to orthopaedic foot surgery,

https://doi.org/10.47068/ctns.2024.v13i26.016

Current Trends in Natural Sciences (on-line) ISSN: 2284-953X ISSN-L: 2284-9521 Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

its association may pose notable health problems in women, such as osteoarthritis, disability, greater risk of falling, impaired balance and gait patterns, toe muscle weakness, worse physical performance, lesser quality of daily life and many others (Palomo-López et al., 2017).

Hallux valgus is common and moderate or greater deformity is associated with foot pain, decreased function and worse foot health. (Cho et al., 2009). HV-induced pain is the main factor affecting patients' quality of life (Chao et al., 2017). The pain that cannot be controlled by conservative treatment is the first indication for a surgery, followed by increased dissatisfaction with foot appearance and difficulties with choosing footwear (Chao et al., 2017; Hogea et al., 2017). Pain is not only a highly noxious experience per se, but it can also have an overwhelmingly negative effect on nearly every other aspect of life, including mood and capacity to function in daily roles (Katz, 2002). HV deformity is accompanied by significant foot -specific pain and disability, muscle weakness around the first MTPJ and increased mediolateral postural sway. (Nix et al., 2012). People with moderate-severe HV or painful HV have impaired physical functions expressed in slower usual and maximum walking speed and decreased hallux plantar pressure (Nishimura et al., 2015).

The pain associated with hallux valgus is not localized only around the 1st MTPJ, but also covers the areas of the other MTPJs and specifically under metatarsal heads, called metatarsalgia (Besse, 2016). The patients may feel the pain over the bunion or in the 2nd MTPJ (Hogea et al., 2017). Qualitative examination of foot pain locations in a cross-sectional study reveals that the most common site of reported pain is the first MTP joint (60%), followed by pain in the lesser MTP joints, hallux, and lesser toes. Midfoot pain and heel pain are reported by some participants (Hurn et al., 2014). Other research has found that increasing severity of HV degree results in increased load on metatarsal heads. 2nd MTPJ was the region where patients from all grades of deformity had highest proportion of pain, followed by the 3rd MTPJ. The percentage of pain in 2nd MTPJ and 3rd MTPJ was similar across all degrees of HV. In addition, the pain locations of 2nd MTPJ and 3rd MTPJ showed an upward trend with increases in HV severity degree (Chang et al., 2020).

According to some authors both general and foot-specific health-related quality of life (HRQOL) are progressively lower with increasing severity of HV deformity, regardless of foot pain (Roddy, 2011). Other studies have shown, conversely, that there was no correlation between radiographic HV deformity and health related quality of life measures but found moderate correlation between foot-specific (Manchester–Oxford Foot Questionnaire (MOXFQ) Index score) and health-related quality of life (EQ-5D-5L Index) and foot pain (VAS-Pain) scores (Lewis et al., 2022). Third authors indicates that greater levels of kinesiophobia symptoms and pain were associated with higher HV deformity degrees (Palomo-López et al., 2020). According to Abhishek self-reported HV and the big toe pain but not HV alone associates with impaired quality of life (QOL) (Abhishek et al., 2010). Women with bilateral painful HV exhibited poorer self-reported foot function and performance-based physical function than those without HV (Sacli et al., 2023; Eksilmez et al., 2024).

The purpose of this study is to estimate the impact of the pain related to hallux valgus deformity on the quality of life in untreated subjects in Bulgaria.

2. MATERIALS AND METHODS

A self-reported questionnaire was distributed through podiatrists, orthopedists and kinesitherapists to their patients, suffering from hallux valgus deformity. Questionnaire includes 3 sections. Section 1 collected personal information, informed consent, pain localization (Figure 1) and VAS-Pain

Current Trends in Natural Sciences Vol. 13, Issue 26, pp. 153-159, 2024 https://doi.org/10.47068/ctns.2024.v13i26.016

Current Trends in Natural Sciences (on-line) ISSN: 2284-953X ISSN-L: 2284-9521 Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

scale for measuring pain intensity. Section 2 was translated but not validated Manchester Foot Pain and Disability Index (MFPDI) questionnaire. Section 3 included validated EuroQol 5-Dimension 5-level questionnaire (EQ-5D-5L). Results were processed with SPSS software.



Figure 1. Pain localization

3. RESULTS AND DISCUSSIONS

We studied 65 subjects (62 women and 3 men) with a mean age of 46.87 years. Pain intensity, as measured by a visual analogue scale (VAS), varies widely from no pain "0" (13.8% of the participants) to the maximum pain a person can tolerate "10" (1.5% of the participants). However, most of the subjects felt mild to moderate pain with a peak score of "4" (18.5% of the participants) (Figure 2). Average pain intensity was 3.74. Most of the participants (48%) felt pain only under the ball of hallux, fallowed by not feeling pain (18%), pain under 1-4 toes (14%), pain under 2-4 toes (9%), pain under all toes (8%), and pain under 1 and 5 toes (5%) (Figure 3).



Figure 2. Distribution of participants according to VAS-pain scale



Figure 3. Distribution of participants according pain localization

https://doi.org/10.47068/ctns.2024.v13i26.016

Current Trends in Natural Sciences (on-line) ISSN: 2284-953X ISSN-L: 2284-9521 Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

The maximum average degree of pain is correlated with the pain presented below the ball of the hallux, the local pain of the deformity (over 4.29) in relation to the absence of pain in the region of the first metatarsophalangeal joint (under 3). It feels more painful when combined with pain under the balls of all the other toes and/or under the fifth toe (Table 1).

Feeling pain under the ball of the hallux with or without pain under the balls of the other toes (metatarsalgia) was associated with significantly higher scores on the Functionality, Personal Appearance, and Pain subscales of the MFPDI, but not on the Work/Leisure subscale. However, the values are below 50% of the MFPDI subscales range (Table 1).

ball of	ball of	ball of		MFPDI Subscales					
hallux	2 nd -4 th toes	5 th toe		Functional	Personal Appearance	Pain	Work/Leisure	VAS	
yes	yes	yes	Mean	7.4*	1.6*	3**	20.40 6.2 **		
			Ν	5					
		no	Mean	7.22**	7.22** 2**		12.22	4.56**	
			N		9				
	no	yes	Mean	4.00	2.00	6.5	0.50	5.5	
			N		2				
		no	Mean	4.35**	2.29**	3.32**	5.58	4.29**	
			N	31					
no	yes	no	Mean	3.33*	1.67*	2.67*	8.67	3**	
			N		6	i			
	no	no	Mean	1.75*	1.25*	1.25*	0.42*	0.75*	
			N	12					
			Range	0-20	0-4	0-10	0-100	0-10	
							*α ≤ 0.05, **	$\alpha \leq 0.01$	

Table 1. Correlation between pain localization, MFPDI subscales and VAS-pain scale



Figure 4. MFPDI responses with markedly impaired quality of life related to pain perception in hallux valgus

https://doi.org/10.47068/ctns.2024.v13i26.016

Detailed analysis of separate responses from MFPDI shows markedly impairment of avoiding of standing for a long time (52% answered "yes, on some days or on most/very day(s)"), feeling of self-conscious about the feet (66% answered "yes, on some days or on most/very day(s)") and the shoes (83% answered "yes, on some days or on most/very day(s)"), having constant pain in the feet (57% answered "yes, on some days or on most/very day(s)") which is worsening in the evening (66% answered "yes, on some days or on most/very day(s)"), and more pain and discomfort during everyday activities (58% answered "yes, on some days or on most/very day(s)") (Figure 4).

Although most scores are ranged between 1 and 2, which is associated with good HRQOL, results from correlation analyzes between pain localization and EQ-5D-5L questionnaire showed a tendency for all subscales to be worse if the pain is more comprehensive than if there was no pain sensation (Table 2). Exception was Pain/discomfort subscale with scores ranged from 1.46 to 2.67.

ball of	hall of	hall of		EQ-5D-5L subscales					Sum of	
hallux	2^{nd} - 4^{th} toes	5 th toe		Mobility	Self-care	Usual activities	Pain/ discomfort	Anxiety/ depression	subscales	
yes	yes	yes	Mean	1.8**	1.8	1.2**	2.4**	1.6*	8.8**	
			Ν	5.00						
		no	Mean	1.67**	1**	1.44**	2.11**	1.67**	7.89**	
			Ν				9.00			
	no	yes	Mean	1.33	1	1.33	2.67	1.33	7.67	
			Ν				2.00			
		no	Mean	1.68**	1.06**	1.18**	2.12**	1.53**	7.56**	
			Ν				31.00			
no	yes	no	Mean	1.57**	1.14**	1.29**	1.71**	1.57**	7.29**	
			Ν				6.00			
	no	no	Mean	1.31**	1.08**	1.15**	1.46**	1.54**	6.54**	
			Ν				12.00			
			Range	1-5	1-5	1-5	1-5	1-5	0-25	
$*\alpha \le 0.05, **\alpha \le 0.01$						$**\alpha \le 0.01$				

Table 2. Correlation between pain localization, EQ-5D-5L subscales and their su

Our results are consistent with those of the other authors. Nix et al. also reported that people with HV have significantly more difficulty with footwear and concerns about appearance, but they correlated it with the severity of deformity. Participation in physical activities, general health and physical functioning were not adversely affected in their study (Nix et al., 2012). The presence of Hallux valgus was associated with reduced quality of life and increases foot pain, disability and functional limitation shown by Foot Health Status Questionnaire (FHSQ) and Foot Function Index (FFI) questionnaires (González-Martín et al., 2017). Amongst participants with foot pain, increasing hallux valgus severity was also significantly associated with greater impairment on the pain and function subscales of the MFPDI after adjusting for age, sex and body mass index (Menz et al., 2011).

Gordon et al. concluded that patients with HV deformity have a significantly reduced quality of life based on EQ-5D-5L questionnaire comparing patients presented with HV for consideration for surgery with general UK population reference dataset (Gordon et al., 2022). Another study using Visual Analogue Scale (VAS) and EQ-5D shows negatively impact of HV on the health-related

https://doi.org/10.47068/ctns.2024.v13i26.016

Current Trends in Natural Sciences (on-line) ISSN: 2284-953X ISSN-L: 2284-9521 Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

quality of life, on the psychological wellbeing, on anxiety/depression symptomatic and psychopathological dimensions, on self-reported foot-pain/discomfort, mobility and function before surgery (Hogea et al., 2017). Menz et al. used SF-36 and MFPDI. They found a progressive reduction in all SF-36 component scores (indicative of greater impairment) as the severity of hallux valgus increased (Menz et al., 2011). Yamamoto et al. also used SF-36 and all subscales and physical components summery scores were significantly lower for the subjects with HV compared with general population (Yamamoto et al., 2016). Our study was limited only to the participants with presented HV deformity and without analyzing the degree of deformation. Most participants experienced mild to moderate pain and did not need surgery. This explains the good results of HRQOL measured by EQ-5D-5L questionnaire, although all subscales worsened if the pain was felt more comprehensively.

Chang et al. studied relationship between HV deformity and metatarsal pain. The proportion of patients with pain in 2^{nd} MTPJ and 3^{rd} MTPJ was 50.63% and 68.7% of total feet, respectively. The mean VAS scores of 2^{nd} MTPJ and 3^{rd} MTPJ pain were 6.57 and 5.72. There were no significant differences in pain between 1^{st} MTPJ and 4^{th} - 5^{th} MTPJ, regardless of HV severity (Chang et al., 2020). According to Yamamoto et al. the mean pain VAS was 44 ± 28 (from 0 – 100-point scale) and $3^{4\%}$ of the subjects had lesser toe pain (Yamamoto et al., 2016). Another study exhibit that the most common site of reported pain was the 1^{st} MTPJ (60%), while pain in the lesser MTPJ and lesser toe was reported in 27% and 7% respectively. The proportion of participants according severity of pain in their study was 16 (with disabling foot pain) : 40 (with mild to moderate pain) : 4 (without foot pain) (Hurn et al., 2014). The results of our study are very close to those. Although average pain intensity in our study had been 3.74 the maximum mean pain value was 6.2 when was felt under the ball of all toes. In our study, however, most of the participants felt pain only under 1^{st} MTPJ (48%) and only 11% had pain in the region of 5^{th} MTPJ. Probably the existing difference is because asymptomatic participants were also included in our examined group.

4. CONCLUSIONS

The intensity and localization of pain in hallux valgus deformity worsens some aspects of the quality of life, mainly related to the avoidance of activities that require prolonged standing and the concern about the feet and the shoes that must be worn. Some of the results were not statistically significant due to the relatively small number of cases in the groups. Therefore, conducting an analysis on a larger number of subjects and development of pain management strategies are necessary.

5. ACKNOWLEDGEMENTS

This research is conducted under a project with institutional funding from NSA "Vasil Levski", Sofia, Bulgaria.

6. REFERENCES

Abhishek, A., Roddy, E., Zhang, W., & Doherty, M. (2010). Are hallux valgus and big toe pain associated with impaired quality of life? A cross-sectional study. *Osteoarthritis and cartilage*, 18(7), 923-926.

Besse, J. L. (2017). Metatarsalgia. Orthopaedics & Traumatology: Surgery & Research, 103(1), S29-S39.

Chang, C., Wang, Q. F., Guo, J. C., Li, D. D., Fan, Y. B., & Wen, J. M. (2020). The biomechanical relationship between hallux valgus deformity and metatarsal pain. *Journal of healthcare engineering*, 2020(1), 8929153.

Chao, J. M., Cheng, Y. M., Chen, M., Hsiao, S., Lin, P., Chang, C., & Yang, T. (2017). Factors Affecting Quality of Life in Patients with Hallux Valgus. *Sch J App Med Sci*, 5(10), 4209-17.

https://doi.org/10.47068/ctns.2024.v13i26.016

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521

Current Trends in Natural Sciences (CD-Rom) ISSN: 2284-9521 ISSN-L: 2284-9521

- Cho, N. H., Kim, S., Kwon, D. J., & Kim, H. A. (2009). The prevalence of hallux valgus and its association with foot pain and function in a rural Korean community. *The Journal of Bone & Joint Surgery British Volume*, 91(4), 494-498.
- Eksilmez, B. S., Ucurum, S. G., Kirmizi, M., & Cansabuncu, G. (2024). Comparison of foot function and physical performance between women with and without bilateral painful hallux valgus. *Foot and Ankle Surgery*, *30*(2), 155-160.
- González-Martín, C., Alonso-Tajes, F., Pérez-García, S., Seoane-Pillado, M. T., Pértega-Díaz, S., Couceiro-Sánchez, E., ... & Pita-Fernández, S. (2017). Hallux valgus in a random population in Spain and its impact on quality of life and functionality. *Rheumatology international*, 37, 1899-1907.
- Gordon, D., Lewis, T. L., & Ray, R. (2022). The impact of hallux valgus on function and quality of life in females. *Foot & Ankle Orthopaedics*, 7(1), 2473011421S00214.
- Hogea, L. M., Hogea, B. G., Nussbaum, L. A., Grigoraş, M. L., Andor, B. C., Levai, C. M., & Bredicean, A. C. (2017). Health-related quality of life in patients with hallux valgus. *Rom J Morphol Embryol*, 58(1), 175-179.
- Hurn, S. E., Vicenzino, B. T., & Smith, M. D. (2014). Correlates of foot pain severity in adults with hallux valgus: a cross-sectional study. *Journal of foot and ankle research*, 7, 1-10.
- Katz, N. (2002). The impact of pain management on quality of life. *Journal of pain and symptom management*, 24(1), S38-S47.
- Lewis, T. L., Ray, R., & Gordon, D. J. (2022). The impact of hallux valgus on function and quality of life in females. *Foot and Ankle Surgery*, 28(4), 424-430.
- Menz, H. B., Roddy, E., Thomas, E., & Croft, P. R. (2011). Impact of hallux valgus severity on general and foot-specific health-related quality of life. *Arthritis care & research*, 63(3), 396-404.
- Nishimura, A., Ito, N., Nakazora, S., Kato, K., Ogura, T., & Sudo, A. (2018). Does hallux valgus impair physical function? *BMC musculoskeletal disorders*, 19, 1-9.
- Nix, S. E., Vicenzino, B. T., & Smith, M. D. (2012). Foot pain and functional limitation in healthy adults with hallux valgus: a cross-sectional study. *BMC musculoskeletal disorders*, *13*, 1-10.
- Palomo-López, P., Becerro-de-Bengoa-Vallejo, R., Losa-Iglesias, M. E., López-López, D., Rodríguez-Sanz, D., Romero-Morales, C., ... & Mazoteras-Pardo, V. (2020). Kinesiophobia and pain intensity are increased by a greater hallux valgus deformity degree-kinesiophobia and pain intensity in hallux valgus. *International journal* of environmental research and public health, 17(2), 626.
- Palomo-López, P., Becerro-de-Bengoa-Vallejo, R., Losa-Iglesias, M. E., Rodríguez-Sanz, D., Calvo-Lobo, C., & López-López, D. (2017). Impact of Hallux Valgus related of quality of life in Women. *International wound journal*, 14(5), 782-785.
- Roddy, E. (2011). Epidemiology and impact of hallux valgus: more than just bunions. Journal of foot and ankle research, 4, 1.
- Sacli, B., Ucurum, S. G., Kırmızı, M., & Cansabuncu, G. (2023). Comparison of foot function, physical performance, and quality of life between women with and without symptomatic bilateral hallux valgus deformity. *Gait & Posture*, 106, S99-S100.
- Yamamoto, Y., Yamaguchi, S., Muramatsu, Y., Terakado, A., Sasho, T., Akagi, R., ... & Takahashi, K. (2016). Quality of life in patients with untreated and symptomatic hallux valgus. *Foot & ankle international*, *37*(11), 1171-1177.