

**How to Cite:**

Arshad, N., Khan, H. M. M. H., Rehman, K. U., Sadiq, M. A., Rehman, M., & Attiq, N. (2023). Frequency of phantom limb pain, limb sensation and stump pain among amputees. *International Journal of Health Sciences*, 6(S10), 1176–1181. <https://doi.org/10.53730/ijhs.v6nS10.13872>

## **Frequency of phantom limb pain, limb sensation and stump pain among amputees**

**Dr. Naveed Arshad, M.Phil**

Rehabilitation Sciences, Assistant Professor, Islamabad Medical and Dental College, Islamabad, Pakistan  
Corresponding author email: [olijann@gmail.com](mailto:olijann@gmail.com)

**Dr. Hafiz Muhammad Manan Haider Khan, Ph.D**

Rehabilitation Sciences, Associate Professor, Shifa Tameer-e-Millat University, Islamabad, Pakistan

**Dr. Khalil Ur Rehman, FCPS**

General surgery, Associate Professor, Foundation University Medical College Islamabad, Pakistan

**Dr. Muhammad Attique Sadiq, FCPS, FRCS, FACS**

General surgery, Associate Professor, Foundation University Medical College Islamabad, Pakistan

**Dr. Muhammad Rehman, FCPS**

Orthopaedic Surgery, Senior Registrar, Islamabad Medical and Dental College, Islamabad, Pakistan

**Dr. Nadia Attiq, FCPS**

General Surgery, Senior Registrar, Foundation University Medical College Islamabad, Pakistan

**Abstract**--Objective: To quantify the frequency of phantom limb pain, limb sensation and stump pain among amputees aging 20–75 years. Methods: An observational cross-sectional study was done. A population of 75 amputees were selected using non-probability convenient sampling and after setting the inclusion and exclusion criteria. Standard questionnaires; Groningen Questionnaire Problems after Arm Amputation (GQPAA) and Groningen Questionnaire Problems after Leg Amputation (GQPLA), were filled by interviewing the patients. All the patients were approached in the hospitals. Data was collected from Pakistan Institute of Medical Sciences, Islamabad and Fauji Foundation Hospital, Rawalpindi. The duration of study was 6 months from June 2021 to December 2021. Results: After compiling

all the results from the questionnaires, it was unveiled that among 75 amputees, mean age was  $43.12 \pm 11.43$  years. Out of these amputees, 53.3% were upper limb amputees and 46.7% were lower limb amputees. the frequency of phantom sensation was 62.7%, 57.3% reported phantom limb pain and 84% experienced stump pain. Conclusion: The study concluded that most prevalent among the population was stump pain, which was followed by phantom limb sensations and the least prevalent of these three was phantom limb pain among the population.

**Keywords**---amputees, amputation stumps, hypesthesia, pain, phantom limb.

## Introduction

French Military surgeon, Ambroise Pare (1510–1590), who gave the first ever medical description of sensations occurring after limb amputation surgery. He found that patients reported severe pain, after the amputation, in the missing limb.<sup>1</sup> In 1872, a civil war surgeon, Silas Weir Mitchell described how few patients experienced presence of a missing limb and even experienced pain in that limb. He termed it, for the first time, as the “phantom limb”.<sup>2</sup> However, phantom pain or phantom sensation is not limited to just the limbs, it can be felt after surgical removal of other parts of the body e.g., teeth, eyes, breasts etc. Most common site of occurrence is however, the limbs.<sup>3</sup> Phantom complex consists of three distinct fundamentals. Phantom limb sensation (PLS): Any other sensation than pain being referred to the missing limb. Phantom limb Pain (PLP): Sensation of pain referred to the absent limb. Stump pain (SP): Pain in the amputated stump.<sup>4</sup>

Phantom limb phenomenon is very common and experienced among 60%–85% of post-amputation patients as per different studies.<sup>5</sup> Whereas some other researchers report the incidence to be at least 85% among amputees, affecting the amputees earlier in the post-op phase and continuing as a chronic issue, leaving long term effects.<sup>6</sup> Phantom limb pain can appear immediately or after several years of amputation. Characterized by burning, throbbing, cramp-like or shooting pain, it is found to be more intense in peripheral portions of the limb. Another finding is that it can present as strong sensitivity of the phantom limb with the chronic presence or just as painful cramps in case of shorter spell.<sup>7</sup>

There is no strong agreement on the mechanisms of the syndrome, regardless of the richness of literature on phantom limb syndrome: phantom limb pain has been credited to spinal plasticity, memories, cortical re-mapping, genetic make-up and neuromata.<sup>8</sup> Previously, it was believed that phantom limb pain and limb sensations are merely psychological in origin rather than a physical one. But as the new studies came, post-amputation changes are observed both in central and peripheral nervous systems.<sup>9</sup> The aim of the study was to quantify the frequency of phantom limb pain, limb sensation and stump pain among amputees.

## Methodology

An observational cross-sectional survey was conducted between June and December 2021. The study design required frequency of phantom limb pain, phantom limb sensation and stump pain among amputees. A population of 75 amputees due to diabetes, blood vessel disease, accident or congenital reasons, ages 20-75 years and both male/female was selected from Pakistan Institute of Medical Sciences (PIMS), Islamabad and Fauji Foundation Hospital, Rawalpindi. Informed written consent was taken as well as getting approval from the ethical committee of the institute. Any recent head injury, any hearing or vision issue and mental disorders were excluded from the study. Non-probability convenient sampling was done for data collection.

The participation of the patients was voluntarily based. Standard questionnaire named, Groningen Questionnaire Problems after Arm Amputation (GQPAA) and Groningen Questionnaire Problems after Leg Amputation (GQPLA) were filled by interviewing the patients. All the patients were approached in the hospitals. The data was entered and analyzed by using SPSS version 23. Qualitative variables were presented in the form of frequency and percentages whereas quantitative variables were presented in the form of mean and standard deviation.

## Results

A population of 75 amputees were selected for this study, out of which 59 (78.7%) were males and 16 (21.3%) were females. Participants mean age was  $43.12 \pm 11.43$  years with range of 22-71 years. As per the data collected from the questionnaires 48 (64%) were left-handed and 27 (36%) were right-handed; however, 48 (64%) were left footed and 27 (36%) were right footed. 40 (53.3%) were amputated on left side and 35 (46.7%) were amputated on right side. From a total of 75 amputees, 40 (53.3%) were upper limb amputees out of which 5 (12.5%) were amputated at shoulder level, 5 (12.5%) at upper arm level, 15 (37.5%) at elbow level, 6 (15%) at lower arm level and 9 (22.5%) at wrist level; 35 (46.7%) were lower limb amputees out of which 1 (2.9%) was amputated at hip level, 7 (20.0%) at thigh level, 11 (31.4%) at knee level, 7 (20.0%) at lower leg level and 9 (25.7%) at ankle level. Most found reason for amputation was diabetes, as it was reported by 36 (48%) participants, 18 (24%) reported blood vessel disease, 14 (18.7%) reported accident and only 7 (9.3%) reported cancer as the reason for amputation.

Table I  
Statistics for phantom limb sensations, n=75

Phantom sensations	Frequency	Percent
Never	28	37.3 %
A few times a year	5	6.7 %
A few times a month	6	8.0 %
A few times a week	19	25.3 %
A few times a day	16	21.3 %
A few hours per hour	1	1.3 %

Table II  
Statistics for phantom limb pain, n=75

Phantom pain	Frequency	Percent
Never	32	42.7 %
A few times a year	2	2.7 %
A few times a month	10	13.3 %
A few times a week	15	20.0 %
A few times a day	16	21.3 %

Table III  
Statistics for stump pain, n=75

Stump pain	Frequency	Percent
never	12	16.0 %
a few times a month	20	26.7 %
a few times a week	17	22.7 %
a few times a day	23	30.7 %
a few hours per hour	3	4.0 %

## Discussion

Stankevicius et al conducted a study on individuals with amputations due to chronic ischemia of lower limb, to quantify the frequency of phantom limb pain, limb sensation and stump pain. 26% patients experienced phantom limb pain, 17% patients reported the sensation of phantom limb and 10% patients complained of stump pain. Painful paresthesia and burning sensations were most experienced clinical features. They also found out that patients on antidiabetic therapy (oral) before amputation were on increased risk of phantom limb pain after the amputation.<sup>10</sup> Whereas, in our study 62.7% experienced phantom sensations, 57.3% reported phantom limb pain and 84% experienced stump pain.

Nardone et al undertook a study to quantify the prevalence of phantom limb pain, phantom sensations, stump pain and stump sensations. The reason for amputation in totals 98.5% was traumatic injury and only 1.5% patients were amputated due to spreading of infection. Phantom limb pain was found to be prevalent in 44.6% of the population, whereas phantom sensations were recorded 53.8% among the amputees. Similarly, stump pain was experienced by 61.5% of the patients and 78.5% of the population complained of stump sensations. Only 6.9% felt a rather worse condition with the passage of time, some patients didn't feel any difference and 48.2% patients experienced improvement in the condition. Diers et al found that 28% patients felt pain immediately post-amputation, few patients felt pain between 1 and 12 months which contributes as 3% of the population and 41% of the population started complaining about the pain after a year.<sup>12</sup> In comparison to the abovementioned research, this study unveiled that the frequency of phantom sensation was 62.7%, 57.3% reported phantom limb pain and 84% experienced stump pain.

## Conclusion

The study concluded that that most frequent among the population was stump pain which was followed by phantom limb sensations and the least frequent of these three was phantom limb pain among the population.

## Authors Contribution

NA; provided concept/research design and did manuscript writing.

HMMHK did data collection and project management.

KUR & MAS, did statistical analysis and project management.

MR & NA did critical revision of the manuscript for important intellectual content.

NA takes the responsibility and is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Grant Support & Financial Disclosures:** None

## References

1. Ahmed A, Bhatnagar S, Mishra S, Khurana D, Joshi S, Ahmad SM. Prevalence of phantom limb pain, stump pain, and phantom limb sensation among the amputated cancer patients in India: a prospective, observational study. *Indian J Palliat Care.* 2017;23(1):24-35. <https://doi.org/10.4103/0973-1075.197944>
2. Diers M, Krumm B, Fuchs X, Bekrater-Bodmann R, Milde C, Trojan J, et al. The prevalence and characteristics of phantom limb pain and Non-Painful phantom phenomena in a nationwide survey of 3,374 unilateral limb amputees. *J Pain.* 2022;23(3):411-423. <https://doi.org/10.1016/j.jpain.2021.09.003>
3. Griffin SC, Tsao JW. A mechanism-based classification of phantom limb pain. *Pain.* 2014;155(11):2236-2242. <https://doi.org/10.1016/j.pain.2014.05.016>
4. Hu X, Trevelyan E, Yang G, Lee MS, Lorenc A, Liu J, et al. The effectiveness of acupuncture or TENS for phantom limb syndrome. II: A narrative review of case studies. *Eur J Integr Med.* 2014;6(3):365-381. <https://doi.org/10.1016/j.eujim.2014.02.001>
5. Jerath R, Beveridge C, Jensen M. Default 3D Space, Thalamus, Consciousness, Corticothalamic Feedback Loop, Contralateral Neglect, Phantom Limb, Lateral Inhibition. *World J Neurosci.* 2019;9(01):1-21. <https://doi.org/10.4236/wjns.2019.91001>
6. Kaur A, Guan Y. Phantom limb pain: A literature review. *Chin J Traumatol.* 2018;21(06):366-368. <https://doi.org/10.1016/j.cjte.2018.04.006>
7. Kuffler DP. Origins of phantom limb pain. *Mol Neurobiol.* 2018;55(1):60-69. <https://doi.org/10.1007/s12035-017-0718-9>
8. Liu Y. The Pathophysiology of Phantom Limb Pain. In 2020 3rd International Conference on Humanities Education and Social Sciences (ICHESS 2020). 2020:343-346. Atlantis Press. <https://doi.org/10.2991/assehr.k.201214.521>
9. McCormick Z, Chang-Chien G, Marshall B, Huang M, Harden RN. Phantom

- limb pain: a systematic neuroanatomical-based review of pharmacologic treatment. *Pain Med.* 2014;15(2):292-305. <https://doi.org/10.1111/pme.12283>
10. Nardone R, Versace V, Sebastianelli L, Brigo F, Christova M, Scarano GI, et al. Transcranial magnetic stimulation in subjects with phantom pain and non-painful phantom sensations: a systematic review. *Brain Res Bull.* 2019;148(5):1-9. <https://doi.org/10.1016/j.brainresbull.2019.03.001>
  11. Stankevicius A, Wallwork SB, Summers SJ, Hordacre B, Stanton TR. Prevalence and incidence of phantom limb pain, phantom limb sensations and telescoping in amputees: A systematic rapid review. *Eur J Pain.* 2021;25(1):23-38. <https://doi.org/10.1002/ejp.1657>
  12. Yaputra F, Widyadharma IP. Management of phantom limb pain: a review. *Int J Med Rev Case Reports.* 2018;5(5):29-32. <https://doi.org/10.5455/IJMRCR.Phantom-Limb-Pain>