



## Original Article

## Quality of Life of Lower Limb Amputees; A Comparative Study between Rehabilitated vs Non-Rehabilitated Groups

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## ABSTRACT

Amputation is a surgical operation for the removal of a limb that is necessary when limb recovery is impossible, where lower limb amputation (LLA) is frequently carried out for several reasons, such as diabetes, infection, RTA, or locally unresectable tumors. **Objective:** To compare the quality of life of lower limb amputee population between rehabilitated and non-rehabilitated groups. **Methods:** A cross-sectional study was conducted on 185 patients having lower limb amputation, out of which 115 patients were taking physiotherapy sessions and 70 were not taking any physiotherapy sessions. The data were collected from CHAL Foundation Islamabad and CHAL Foundation Swabi. A self-structured questionnaire (containing demographics, and clinical characteristics of participants) and SF-36 questionnaire was used to gauge the quality of life of both rehabilitated and non-rehabilitated groups of lower limb amputees. **Results:** The findings indicate that there was a significant difference found in the quality of life of lower limb amputees between the rehabilitated group and the non-rehabilitated group. **Conclusions:** To conclude, in light of our preliminary findings, we infer that the quality of life of lower limb amputees in rehabilitated group participants was better than those of non-rehabilitated group participants.

## INTRODUCTION

Amputation of the lower limb is a life-changing event that results in significant physical and psychological challenges for the affected individual [1]. Lower limb amputation may be due to various causes such as trauma, peripheral vascular disease, infections, and tumors [2]. The loss of a limb can have a profound impact on the quality of life of an individual, affecting their mobility, independence, self-esteem, and social interactions [3]. One of the primary physical challenges for lower limb amputees is mobility [4]. Amputees may have to rely on a prosthetic limb, which can take time to adjust to and may limit their mobility to some extent. They may also experience pain or discomfort in

their residual limb, which can further impact their mobility. However, with proper rehabilitation, training, and support, many amputees are able to regain a high level of mobility and independence [5]. The emotional impact of lower limb amputation can also be significant. Amputees may experience depression, anxiety, and loss of self-esteem, particularly in the initial stages after surgery. The loss of a limb can also have a profound effect on one's sense of identity and body image. However, with the help of counseling, peer support groups, and a positive attitude, amputees can often successfully adjust to their new reality [3]. Social challenges may also arise for lower limb

amputees [6], including difficulties in finding suitable employment or housing, and negative attitudes and stigma from society. However, efforts to promote awareness and acceptance of individuals with disabilities, as well as the provision of support and resources for amputees, can help to address these challenges [7]. Rehabilitation is a critical aspect of the care of amputees, and it involves a comprehensive multidisciplinary approach that addresses physical, psychological, and social needs [3]. The rehabilitation process includes pre-prosthetic training, prosthetic fitting, gait training, and psychological counseling. The goal of rehabilitation is to help the amputee regain their functional independence, improve their mobility and quality of life, and facilitate their reintegration into society [2]. Despite the importance of rehabilitation, not all amputees receive adequate rehabilitation services. The reasons for this may include limited access to healthcare facilities, inadequate resources, or lack of awareness about the importance of rehabilitation. Consequently, some amputees may not undergo rehabilitation or may receive suboptimal rehabilitation services. As a result, their functional outcomes and quality of life may be significantly compromised [7]. Amputation adversely affects health related QOL in multiple ways, particularly the physical domains of health, with consequential difficulty in work and usual activities. The people with amputation have several problems regarding their independent mobilizations and their overall quality of life. With the use of prosthesis, the QOL becomes better in amputees [5, 8]. The main purpose of this study was to compare the quality of life of lower limb amputee population between rehabilitated and non-rehabilitated group. The study compared the functional outcomes, physical abilities, psychological well-being, and social interactions of rehabilitated and non-rehabilitated lower limb amputees. This study's findings contribute to the understanding of the importance of rehabilitation in the care of lower limb amputees and highlight the need for increased access to rehabilitation services. This study helps to spread awareness that no doubt amputation due to any reason is physically and emotionally devastating for victims, but with proper rehabilitation programs patients can maintain their quality of life.

## METHODS

A descriptive cross sectional study design was conducted at CHAL foundation Islamabad and CHAL foundation Swabi from 2<sup>nd</sup> August 2022 till 31<sup>st</sup> January 2023. In this study, convenient (Non-probability) sampling technique was used and the sample size was calculated to be approximately 190 with confidence level 95%, level of alpha 5 % and standard deviation 11 by using Rao Soft Software. Ethical approval was taken from the ethics review committee of Margalla

Institute of Health Sciences and written informed consent was taken from all participants before enrollment in the study to ensure ethical willingness. The primary hypothesis of the research was that there is significant difference found between quality of life of lower limb amputees in rehabilitated and non-rehabilitated groups. This hypothesis was tested in the study by data gathered from a sample of lower limb amputees who had undergone rehabilitation and a sample of lower limb amputees who had not taken part in rehabilitation. Patients of either gender with age 18 years or above having unilateral/bilateral lower limb amputation were included while unwilling or participants having diagnosed with psychological disorders and cognitive impairment were excluded from the study. In this study, QOL refers to functioning and wellbeing in physical, mental and social dimensions of life. Rehabilitated group includes the patients undergoing physical therapy after lower limb amputation. People who don't receive any physical therapy after lower limb amputation are included in non-rehabilitated group. Data collection was done by using self-structured questionnaire containing demographic data and clinical characteristics of participants and SF-36 questionnaire was used to evaluate quality of life. Each participant was interviewed individually in order to complete the data collection. SF-36 is a valid and reliable tool that measure 8 health related subscales: Physical functioning (PF, 10 items), role limitation due to physical health (RLPH, 4 items), bodily pain (BP, 2 items), general health perception (GH, 5 items), vitality (VT, 4 items), social functioning (SF, 2 items), role limitation due to emotional problems (RLEP, 3 items) and perceived mental health (MH, 5 items). Higher scores indicate better functioning within the specific domains [9]. Data collected were analyzed through SPSS version 21.0 (Statistical Procedure of Social Sciences) software. Data were inspected using descriptive statistics (mean, standard deviation, frequency and percentage). An independent t-test was used to find out the difference between two groups. The p-value less than 0.05 was considered statistically significant.

## RESULTS

Questionnaires were distributed among 200 participants out of which 11 were not fulfilling the eligibility criteria as they were under 18 year so excluded out from the study. Out of remaining 189, 4 were not willing to give data so finally data were analyzed for 185 participants. Demographic details of participants were recorded and each participant was interviewed individually in order to complete the data collection. The mean age (years) of participants included in the rehabilitated group was  $38.91 \pm 12.16$  and of non-rehabilitated group amputees was  $38.69 \pm 12.00$ . The demographic details of the participants of both groups are given below in Table 1.

**Table 1:** Showing the demographic details and clinical characteristics of participants of both groups

Variables		Rehabilitated Group (n=115) N (%)	Non-rehabilitated Group (n=70) N (%)
Gender	Male	86 (75%)	42 (60%)
	Female	29 (25%)	28 (40%)
Occupation	Employed	55 (48%)	30 (43%)
	Unemployed	60 (52%)	40 (57%)
Qualification	Illiterate	16 (13%)	13 (18%)
	Primary	14 (12%)	3 (4%)
	Secondary	51 (44%)	29 (41%)
	Intermediate	26 (22%)	16 (22%)
	Graduate	8 (6%)	9 (13%)
Cause of Amputation	Diabetes	43 (37%)	24 (34%)
	Infection	11 (9%)	8 (11%)
	Cancer/Tumor	15 (13%)	6 (8%)
	RTA	27 (23%)	23 (33%)
	Others	19 (16%)	9 (13%)
Level of Amputation	Foot including toes/ Partial foot	18 (16%)	16 (23%)
	Ankle disarticulation	14 (12%)	7 (10%)
	Transtibial	44 (38%)	25 (36%)
	Knee disarticulation	3 (3%)	4 (6%)
	Transfemoral	34 (29%)	13 (18%)
Hip disarticulation		2 (2%)	5 (7%)
Side of Amputation	Right	61 (53%)	35 (50%)
	Left	41 (36%)	24 (34%)
	Both	13 (11%)	11 (16%)
Use of Prosthesis	Yes	96 (83%)	54 (77%)
	No	19 (16%)	16 (23%)

The p-value was less than 0.05 as shown in Table 2 so null hypothesis was rejected hence proved that there is significant difference found between all domains of quality of life of lower limb amputees in rehabilitated and non-rehabilitated group.

**Table 2:** Showing the mean score of all domains of sf-36 of rehabilitated and non-rehabilitated group

SF-36 Domains	Rehabilitated Group	Non-Rehabilitated Group	p-value
General Health	62.72±24.37	43.04±26.29	.000
Physical Functioning	62.09±37.45	32.83±32.96	.000
Role of Physical Functioning	40.96±19.99	27.71±15.43	.000
Role emotional functioning	56.23±49.63	31.90±46.26	.001
Social functioning	62.83±19.97	50.18±29.60	.001
Vitality	56.17±25.57	34.00±25.11	.000
Mental health	64.35±19.86	44.74±25.79	.000
Bodily pain	60.69±23.02	46.59±29.53	.000

## DISCUSSION

The current study was about the quality of life of amputees, providing comparison between two groups, who were taking rehabilitation and those who were not taking any rehabilitation. We have divided the participants in two groups i.e., Rehabilitated group and non-rehabilitated

group. The rehabilitation group included 75% male and 25% female participants while the Non-Rehabilitation group had 60% male and 40% female participants. Males predominated over females in this study. Similar to this, a larger proportion of men than women were included in the total sample size of certain other researches on the community of people who had undergone amputation [7, 10, 11]. A cross-sectional study on quality of life of lower limb amputation in Sweden, included more females than males [12]. In current study, the findings indicated that both groups contain a greater proportion of unemployed individual, while a study conducted in Netherlands on employment status, job characteristics, and work-related health experience of people with lower limb amputation showed that most of the participants had a good rate of job participation but had faced difficulties in work place, 64% amputees were working at the time of their study [13]. Another previous study also included a greater number of employed population than unemployed ones [14]. In a study conducted by Razak *et al.*, there were equal number of employed and unemployed lower limb amputees [2]. A previously conducted study contained unemployed participants more than employed ones [15]. Most of the participants of both groups had completed their secondary level education, whereas in a previous study majority of the members were illiterate [1]. More people with high school level education were found in a prior study [14]. Another study included greater number of people (66.6%) having education level > grade 12 and 26% high school graduates in their project to examine the use and satisfaction with prosthetic limb devices [16]. This study revealed that 37% and 34% patients from rehabilitated and non-rehabilitated group respectively had gone through amputation due to diabetes, followed by RTA i.e., 23% participants in rehabilitated group and 33% participants in non-rehabilitated group. Some other studies indicated that the amputation more commonly occur due to vascular causes as compare to non-vascular causes [17, 18]. Accidents (40.8%) were the leading cause of amputation in previously conducted study [7]. According to a study from the past 45% of patients had their limb amputated as a result of trauma [19]. Similarly, trauma was also a leading cause of amputation in a survey on QOL, prosthetic use and problems on consequences of non-vascular transfemoral amputation [14]. Our study revealed that transtibial level of amputation is higher than all others in our both groups of participants having lower extremity amputation i.e., 38% for rehabilitation group and 36% for non-rehabilitation group. Second common level of amputation in rehabilitated group were 29% people with transfemoral amputation and in non-rehabilitated group there were 23% participants with partial foot amputation. Similar to our study, another

research conducted in Pakistan contains more number of patients having transtibial level of amputation [19]. Some other studies showed that higher number of lower limb amputee population was suffering with transtibial level of amputation (below knee amputation) [12, 18] Whereas a study conducted in Ethiopia, by Berhe et al., showed that above knee amputation was 35% leading the total percentage of their data and below knee amputation was 23% followed by digital amputation [10] Similarly another study conducted to evaluate the emotional factors and QOL of individuals with chronic persistent pain after amputation reported higher number of individual with transfemoral amputation i.e., 44% [20]. Both unilateral and bilateral amputation have different status of quality of life, but in current study quality of life is evaluated regardless of unilateral and bilateral lower limb amputation. There were 53% patients having right-sided lower limb amputation, 36% patients with left-sided lower limb amputation and 11% participants were amputated bilaterally. While in non-rehabilitated group, 50% participants with right-sided amputation, 34% left sided- amputee and 16% participants with their both lower limbs amputated were included. In a prior study on quality of life among lower limb amputees at a tertiary prosthetic rehabilitation center, have major portion of right sided amputation (44%) followed by left sided (34%) and both (20%) [21]. Another previously conducted study, in which quality of life and subjective function in children was assessed, both unilateral and bilateral groups of children having lower limb amputation were compared [22]. A higher percentage of people in both of our groups wore prosthetics. A study conducted by Matos et al., reported more left sided amputees (59%) in their study [7]. In a previous study conducted by Melo et al., majority of responders were unilaterally amputated (86%) than bilateral [23]. Prosthesis is an artificial device that substitutes a missing part and is intended to improve quality of life is the most important rehabilitation metric for amputees. A previous study on the factors affecting the quality of life of lower limb amputees found that 66% of participants used prosthetics while 44% used aids such as canes or crutches [4]. A prior study conducted on quality of life and physical activity levels in adult and elderly people who have had lower limb amputations, in which a lesser proportion of elderly participants used prosthetics [23]. A study conducted in Malaysia contained 58.1% people using prosthesis [2]. A significant difference was found between quality of life of lower limb amputees in rehabilitated and non-rehabilitated group. Mean scores of all the domains of SF-36 questionnaire of rehabilitated group were higher than those of non-rehabilitated group, thus the quality of life of rehabilitated group participants after lower limb amputation was better than the non-rehabilitated group

participants. A previous study conducted by Akarsu et al., concluded that scores of SF-36 were significantly lower in the bilateral amputee group in comparison with the unilateral group [24]. A prior study revealed that elderly individuals with lower limb amputation are more susceptible to present negative health outcomes than adults with lower limb amputation [23]. Prior to this study, there was no research comparing the quality of life of lower limb amputees of both rehabilitated and non-rehabilitated groups.

## CONCLUSIONS

Considering the findings of this study, we conclude that lower limb amputees in the rehabilitation group participants had a higher quality of life than those in the non-rehabilitation group participants.

## Authors Contribution

Conceptualization: SN, SSH

Methodology: MS

Formal Analysis: IG

Writing-review and editing: SN, SSH, MS, IG

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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## REFERENCES

- [1] Amjad T, Kalsoom UKU, Bairam S. Quality of life among lower limb prosthesis users attending artificial limb center of fauji foundation hospital Rawalpindi. *Pakistan Armed Forces Medical Journal (PAFMJ)*. 2018; 68(1): 114-8.
- [2] Razak MM, Tauhid MZ, Yasin NF, Hanapiah FA. Quality of life among lower limb amputees in Malaysia. *Procedia-Social and Behavioral Sciences*. 2016 Jun; 222: 450-7. doi: 10.1016/j.sbspro.2016.05.135.
- [3] Kizilkurt OK, Kizilkurt T, Gulec MY, Giynas FE, Polat G, Kilicoglu OI, et al. Quality of life after lower extremity amputation due to diabetic foot ulcer: the role of prosthesis-related factors, body image, self-esteem, and coping styles. *Dusunen Adam: Journal of Psychiatry & Neurological Sciences*. 2020 Apr; 33(2): 109-9. doi: 10.14744/DAJPNS.2020.00070.
- [4] Sinha R, Van Den Heuvel WJ, Arokiasamy P. Factors affecting quality of life in lower limb amputees. *Prosthetics and Orthotics International*. 2011 Mar; 35(1): 90-6. doi: 10.1177/0309364610397087.
- [5] Pran L, Baijoo S, Harnanan D, Slim H, Maharaj R,



- Naraynsingh V. Quality of life experienced by major lower extremity amputees. *Cureus*. 2021 Aug; 13(8): e17440. doi: 10.7759/cureus.17440.
- [6] Madsen UR, Hommel A, Bååth C, Berthelsen CB. Pendulating: A grounded theory explaining patients' behavior shortly after having a leg amputated due to vascular disease. *International Journal of Qualitative Studies on Health and Well-Being*. 2016 Jan; 11(1): 32739. doi: 10.3402/qhw.v11.32739.
- [7] Matos DR, Naves JF, Araujo TC. Quality of life of patients with lower limb amputation with prostheses. *Estudos de Psicologia (Campinas)*. 2019 Dec; 37. doi: 10.1590/1982-0275202037e190047.
- [8] Yosuf NM, Ahmad AC, Sulong AF. Quality of life of diabetes amputees following major and minor lower limb amputations. *Medical Journal of Malaysia*. 2019 Feb; 74(1): 25-9.
- [9] Ware Jr JE. SF-36 health survey update. *Spine*. 2000 Dec; 25(24): 3130-9.
- [10] Gebreslassie B, Gebreselassie K, Esayas R. Patterns and causes of amputation in Ayder Referral Hospital, Mekelle, Ethiopia: A three-year experience. *Ethiopian Journal of Health Sciences*. 2018 Jan; 28(1): 31-6. doi: 10.4314/ejhs.v28i1.5.
- [11] Almohammadi AA, Alnashri MM, Harun RA, Alsamiri SM, Alkhatieb MT. Pattern and type of amputation and mortality rate associated with diabetic foot in Jeddah, Saudi Arabia: A retrospective Cohort Study. *Annals of Medicine and Surgery*. 2022 Jan; 73: 103174. doi: 10.1016/j.amsu.2021.103174.
- [12] Lindgren Westlund K. Quality of Life of Lower Limb Amputees in Sweden: A Comparative Cross-sectional Study. 2021: 69.
- [13] Schoppen T, Boonstra A, Groothoff JW, de Vries J, Göeken LN, Eisma WH. Employment status, job characteristics, and work-related health experience of people with a lower limb amputation in The Netherlands. *Archives of Physical Medicine and Rehabilitation*. 2001 Feb; 82(2): 239-45. doi: 10.1053/apmr.2001.18231.
- [14] Hagberg K and Brånemark R. Consequences of non-vascular trans-femoral amputation: A survey of quality of life, prosthetic use and problems. *Prosthetics and Orthotics International*. 2001 Jan; 25(3): 186-94. doi: 10.1080/03093640108726601.
- [15] Webster JB, Hakimi KN, Williams RM, Turner AP, Norvell DC, Czerniecki JM. Prosthetic fitting, use, and satisfaction following lower-limb amputation: a prospective study. *Journal of Rehabilitation Research and Development*. 2012; 49(10): 1453.
- [16] Pezzin LE, Dillingham TR, MacKenzie EJ, Ephraim P, Rossbach P. Use and satisfaction with prosthetic limb devices and related services. *Archives of Physical Medicine and Rehabilitation*. 2004 May; 85(5): 723-9. doi: 10.1016/j.apmr.2003.06.002.
- [17] Zidarov D, Swaine B, Gauthier-Gagnon C. Quality of life of persons with lower-limb amputation during rehabilitation and at 3-month follow-up. *Archives of Physical Medicine and Rehabilitation*. 2009 Apr; 90(4): 634-45. doi: 10.1016/j.apmr.2008.11.003.
- [18] Asano M, Rushton P, Miller WC, Deathe BA. Predictors of quality of life among individuals who have a lower limb amputation. *Prosthetics and Orthotics International*. 2008 Jun; 32(2): 231-43. doi: 10.1080/03093640802024955.
- [19] Hisam A, Ashraf F, Rana MN, Waqar Y, Karim S, Irfan F. Health related quality of life in patients with single lower limb amputation. *Journal of the College of Physicians and Surgeons Pakistan*. 2016 Oct; 26(10): 851-4.
- [20] Padovani MT, Martins MR, Venâncio A, Forni JE. Anxiety, depression and quality of life in individuals with phantom limb pain. *Acta Ortopedica Brasileira*. 2015; 23: 107-10. doi: 10.1590/1413-78522015230200990.
- [21] Shankar P, Grewal VS, Agrawal S, Nair SV. A study on quality of life among lower limb amputees at a tertiary prosthetic rehabilitation center. *Medical journal Armed Forces India*. 2020 Jan; 76(1): 89-94. doi: 10.1016/j.mjafi.2019.02.008.
- [22] McQuerry J, Gammon L, Carpiaux A, Talwalkar V, Iwinski H, Walker J, et al. Effect of amputation level on quality of life and subjective function in children. *Journal of Pediatric Orthopaedics*. 2019 Aug; 39(7): e524-30. doi: 10.1097/BPO.0000000000001321.
- [23] Melo VH, Sousa RA, Improta-Caria AC, Nunes MA. Physical activity and quality of life in adults and elderly individuals with lower limb amputation. *Revista da Associação Médica Brasileira*. 2021 Oct; 67: 985-90. doi: 10.1590/1806-9282.20210382.
- [24] Akarsu S, Tekin L, Safaz I, Göktepe AS, Yazicioğlu K. Quality of life and functionality after lower limb amputations: comparison between uni-vs. bilateral amputee patients. *Prosthetics and Orthotics International*. 2013 Feb; 37(1): 9-13. doi: 10.1177/0309364612438795.