





# COMPARATIVE ASSESSMENT OF FUNCTIONAL ABILITY AND QUALITY OF LIFE IN LOWER LIMB AMPUTEES WITH PROSTHETICS IN CHILDREN, ADOLESCENTS AND ADULTS


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## ABSTRACT

**Background of the Study:** Physical activity and exercise part of maintaining good health. Its benefits are associated with improved life quality in the physical, psychological, and social sectors. Physical exercise is therefore essential to the recovery of amputees. A person's quality of life might suffer when a limb is amputated. The quality of life for amputees in order to improve health, though, is little understood. The primary objective of this study was to look into the quality of life and physical activity of male adults and adolescents who had lower limb prosthesis.

**Methodology:** Lower-limb amputees participated in the cross-sectional, descriptive study. investigation. 72 Adolescents (5-17 years) and male adults (18-40 years) with unilateral transtibial and transfemoral amputees participated. The World Health Organization Quality of Life scale (WHOQOL) self-administration questionnaire was used to evaluate quality of life. Whereas, to check lower extremity conditions in the participants, The Lower Extremity functionality Scale was used.

**Results:** Low Extremity Functions had significant positive relationship with overall

Quality of Life with mean  $32.45 \pm 9.44$  and the strength of the correlation was  $.24^*$ . Moreover, components of Quality-of-Life Environmental Health and Physical Health shows significant positive relationship with Lower Extremity Functions. Physical Health and Social Relationship showed non-significant correlation with lower Extremity Function.

**Conclusion:** It was concluded that the age group differences were not significant with the Quality of Life, Physical health, Psychological health, social relationship and environmental health. However, the results showed that the quality of life and the lower extremity functional scale had a positive relationship. If the QOL of the individual increases that LEFS also increases. The social relationships and the psychological health do not correlate with the lower extremity functions but, the physical health and the environmental health has a significant impact on it.

**Keywords:** Amputation, physical activity, life quality, prosthetic, lower limb, adolescents.

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## Introduction

Amputation as a consequence of an accident, injury, or medical operation can be upsetting. Several factors can contribute to discomfort, such as issues with blood vessels, tumors, infections, severe tissue damage, malfunctions, and more. When a body part is amputated congenitally, it happens before birth. Amputation is the sectioning of one or more bones to remove a limb or a portion of a limb, whereas disarticulation is surgery done on the joint line<sup>1</sup>. Congenital amputation is a rare case of a congenital disorder in which embryonic limbs are severed by constrictive bands. Physical exercise is linked to physical fitness and can be beneficial in the rehabilitation of amputees<sup>2,3</sup>. Physical inactivity has been linked to problems linked to significant mortality risk in modern societies<sup>4</sup>. So that might be linked to some of the reasons for amputation<sup>5,6</sup>. However, evidence demonstrates that amputation can have a detrimental effect on the welfare and quality of life of those affected, regardless of how severe it is.<sup>7,8</sup> The condition of the residual and contralateral limbs, the fit of their prosthesis, and other factors specific to this population have been The quality of life (QoL) of patients with lower limb amputations has been connected to the state of the residual and contralateral limbs, the fit of their prosthesis, and other characteristics unique to this population linked to the quality of life (QoL) of people with lower limb amputations<sup>9</sup>, and the time since amputation. Furthermore, general characteristics e.g., walking distance mobility issues, depression symptoms, and social support have been proposed as key predictors of QoL. One of the challenges is that each person's experience with body part loss and replacement will have different meanings and effects. Furthermore, the process of adjusting to life following an amputation is a lifelong task that involves not only physical but also psychological changes. Researchers from Florianopolis, Brazil and Glasgow's University of Strathclyde examined the physical activity and quality of life of amputees in southern Brazil in a study carried out by Santa Catarina State University students in 2011. They used a total of 40 questionnaire items, with a response rate of 55%. Significant correlations between a number of QOL domains, as well as between physical activity level and psychological QOL, were also discovered. There was no connection found between gender and levels of life satisfaction or physical activity. However, they came to the conclusion that among extremely active amputees of either gender, physical activity does not relate to quality of life, except in the psychological realm<sup>10</sup>. In order to compare the quality of life (QoL) profiles of amputees to the general population and identify major environmental and amputation-related factors that affect lower limb amputees, research was done in 2017. The study found that amputees had considerably lower SF-36 PCS and MCS ratings than the general population. In this study, it was found that work status, use of an assistive device, use of a prosthesis, comorbidities, phantom-limb pain, and residual stump pain were substantially associated with PCS and MCS scores, which explained 47.8% and 29.7% of variation, respectively. Age and the amount of time after an amputation accounted for an additional 3% of the difference in PCS scores<sup>11</sup>. Jill and Shesh, two teenagers with bone sarcoma of the lower extremities, in 2006. Patients who underwent limb-sparing femur surgery performed similarly to a small number of rotation-plasty patients but better than those who had an above-the-knee amputation<sup>12</sup>. Bekkering W.P assessed that the outcomes of the prospective study revealed that, with the exception of the mental QoL domains, survivors' quality of life improves two years after removal of the bone tumor and the ensuing limb-sparing or ablative surgery. The first year following surgery was when these gains were the most noticeable<sup>13</sup>. T S Kastaad in 2017, found out that young adults with CLLD who underwent surgical lengthening did not significantly vary from those who underwent lengthening prostheses in terms of physical function or quality of life. Young adults with CLLD demonstrated considerably worse physical function and lower HRQoL in various domains compared to the general Norwegian population<sup>14</sup>. According to WS Li, SY Chan, and colleagues, bilateral lower limb amputees from the 2008 Sichuan Earthquake had superior rehabilitation outcomes in terms of ambulation, adjustment, and quality of life when their knee joints were preserved, they used prosthetics, exercised, and received education<sup>15</sup>. A study done in Malaysia, lower limb amputees generally had a good quality of life. The highest-scoring positive quality of life was supported by the psychosocial domain the most (66.6)<sup>18</sup>. Sarah et.al in

2008 suggested that eight of the twelve associations were statistically significant, per the analysis. Scores on the social components of each questionnaire showed a very high association with one another. Less significant connections were found between the social part of the WHOQOL- Brief questionnaire and the functional and athletic components of the TAPES questionnaire<sup>19</sup>. In a study Akarsu and colleagues compared to the unilateral group, the physical function, physical role, and emotional role SF-36 scores were significantly worse in the bilateral amputee group. The frequency of prosthesis use was positively correlated with SF-36 categories (except pain). Significantly higher ratings were obtained by the unilateral amputee group compared to the bilateral amputee group<sup>20</sup>. People with lower limb amputation (LLA) may be at higher mortality risk than the general population due to high levels of sedentary behavior and physical inactivity habits. Potential techniques for improving the poor results of physical therapy following lower limb amputation include interventions to reduce sedentary behavior and enhance physical activity<sup>25</sup>. This work paves the way for further investigations about quality of life and functional disability in lower limb amputated patients using prosthesis, unilaterally or bi-laterally in Pakistan population.

## Methodology

72 Adolescents and adult males would be selected for this study from different Hospitals of Lahore. It was cross-sectional design. The World Health Organization Quality of Life scale (WHOQOL) self-administration questionnaire was used to measure Quality of Life for the purposes of data collection. The Lower Extremity functioning Scale was employed to assess the individuals' lower extremity conditions. To choose the sample size, a non-probability purposive sampling technique was employed. Face-to-face interviews were used to fill out questionnaires prior to the data collection. Proper Guidance regarding the filling of the questionnaires were be given to all the participants, and they were instructed to fill every item and express their honest responses as well. Clinical information and dialysis-related data was obtained from the patient's file records.

## Results

72 participants were selected for this cross-sectional study to determine the QOL and Physical activities among Adolescents with Amputees. Pie chart shows the age frequency and percentages. Participant's age (mean age was 4.35) ranged from 5-40 years. 5.7% participants were of age 5-10 years. 20.0% were ranged from 11-15 years. 11.4% were participants from the age range of 16-20 years, 11.4% were participants from the age range of 21-25 years. 17.1% participants were from age 26-30 years, 15.7% were from age 31-35 years and 18.6% participants were from 36-40 years.

Variables	M	SD	1	2	3	4	5	6
1 Lower Extremity functions	32.45	9.44	-	.24*	.84*	.63*	.77*	.25*
2 Overall Quality of life	79.18	14.2		-	.23*	.89*	.43*	.47*
3 Environmental Health	24.77	5.59			-	.26*	.79*	.44*
4 Physical Health	21.24	5.21				-	.08*	.55*
5 Psychological Health	17.88	3.38					-	.06*
6 Social relationships	7.11	2.08						-

Table 1: Correlation Between Study Variable (N=70)

Table shows that Low Extremity Functions has significant positive relationship with overall Quality of Life. Moreover, components of Quality-of-Life Environmental Health and Physical Health shows significant positive relationship with Lower Extremity Functions. Physical Health and Social Relationship showed non-significant correlation with lower Extremity Function.

## Discussion

This study evaluated the outcomes with post-amputation discomfort, functional status, and perceived body image in male patients with traumatic lower limb amputations (LLA) and controls. Additionally, it evaluated one's quality of life (QOL) and mental health. Another study conducted by Nur Amira Adlana et.al evaluated, Pearson correlation to determine the strength of the linear association between the LEFS and PLUS-MTM scores. In this investigation, the obtained value for  $r$  was 0.600, indicating that both instruments have a somewhat favorable connection<sup>16</sup>. However, this study determined bivariate correlation of QOL and LEFS measuring the  $P$  value was [p 0.45] and .24 was a positive strength of relationship and also demonstrate that the correlation was significant. 57 survivors, including 22 with amputations and 35 with limb salvage, took part in Robert R.S.'s study. At the time of this evaluation, participants ranged in age from 16 to 52 and were 12 to 24 years post-diagnosis. No differences between the comparison groups were found. Quality of life was significantly predicted by lower limb function ( $p$  0.001), and neither the length of time since diagnosis nor the type of surgery changed this relationship ( $p$  0.001). Life quality is unrelated to upper limb function<sup>17</sup>. This study showed that there was no comparing age group differences found in association with general health, Psychological health, Social relationships and Environmental health. General HRQL was significantly lower in Swedish, according to the results of the SF-36. Heat/sweating in the prosthetic socket (72%), sores/skin irritation from the socket (62%), being unable to walk in woods and fields (61%) and being unable to walk swiftly (59%) were the issues that were most frequently mentioned as lowering quality of life. In addition to discomfort in the stump (51%), pain from phantom limbs (48%), back pain (47%) and pain in the other leg (46%), more than half of the population claimed to be in misery<sup>21</sup>. Prosthetic users who had lower limb amputations reported that mobility factors, such as postural changes, topography, and obstructions, reduced their ability to do difficult tasks. When updating the Prosthetic Limb Users Survey of Mobility, high-level mobility traits discovered in these focus groups might be included to evaluate mobility in physically active individuals and athletes who have had amputations<sup>22</sup>. Most amputees were overall satisfied with their condition and they considered quality of life as good. The scores of quality of life perception, different domains of quality of life along with functional level<sup>23</sup>. The author suggests that it is essential for subsequent research to focus on older adults who would be able to attain and sustain prosthetic walking or who would benefit more from regaining non-prosthetic mobility. Senior people should be chosen based on their mobility capacity and environmental limitations<sup>24</sup>.

## Conclusion

It was concluded that the quality of life and the lower extremity functional scale had a positive relationship. If the QOL of the individual increases that LEFS also increases. The social relationships and the psychological health do not correlate with the lower extremity functions but, the physical health and the environmental health has a significant impact on it.

### AUTHORS' CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

**Conception or Design:** Umber Nawaz & Badar Sohail

**Acquisition, Analysis or Interpretation of Data:** Badar Sohail, Gul-e-Sehar

**Manuscript Writing & Approval:** Aqsa Sohail, Gul-e-Sehar, Syed Asadullah Arslan, Ashfaq Ahmad

All authors acknowledge their accountability for all facets of the research, ensuring that any concerns regarding the accuracy or integrity of the work are duly investigated and resolved.

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