

## Original Article

# Retrospective analysis of Quality of Life for patients received Prosthetic limbs to overcome their Physical Disability

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## Abstract

**Background:** Quality of life (QoL) is affected by physical and psychosocial parameters after amputation. Aims of Person with amputations are to reintegrate in community and improved mobility, optimum quality of life should be among the top priorities of prosthetic and rehabilitation center. The purpose of the study was to retrospectively assess the QoL of the patient receiving artificial limbs to overcome their physical disability.

**Methodology:** A retrospective cross-sectional study was conducted among 120 lower limb prosthetic users; the study duration was four months. Data were collected using the World Health Organization Quality of Life Instruments (WHOQoL-BREF) questionnaire. SPSS Version 16.0 was used for statistical analysis, Mann-Whitney U test and Kruskal-Wallis test were used to compare domain QoL score.

**Results:** Out of 120 respondents, 66(55%) were early prosthetic users and 54(45%) were late prosthetic users. 61(50.8%) lower limb amputees were availing rehabilitative services and 44(36.7%) were employed. Male participant's mean scores were significantly higher in all domains of QoL as compared to females. There was a significant mean difference among male and female patients concerning physical health ( $p=0.003$ ), psychological health ( $p=0.027$ ), social relationship ( $p=0.005$ ) and environment ( $p=0.000$ ). There were significant differences in the overall QoL domain and the above-mentioned aspects ( $p<0.05$ ) among the enrolled patients with different working statuses. There was a significant difference in the environment and overall QoL scored in different age group participants.

**Conclusion:** The findings of the study showed that gender, working status and age have significant influences on the QoL of the patients who received Prosthetic limbs to overcome their Physical Disability.

## Keywords

Physical health, Psychological health, Disability, Prosthetics, Domain Score



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## Introduction

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Patients with physical disabilities have unique social, emotional and spiritual needs in addition to their physical needs. Losing a limb is a devastating event, both physically and mentally, whether the loss is due to trauma or disease in either way profoundly impact every aspect of the patient's life<sup>1, 2</sup>. Currently, the larger part of all Lower Limb Amputation (LLA) is performed because of peripheral vascular disease (PVD) and the reported yearly frequency exceeds somewhere around 12 and 44 every 100,000 persons, with the highest risk among persons with diabetes mellitus. Approximately 10%, experiencing an LLA incurred because of injury, tumor, inborn appendage deficiency, contamination, or different reasons without any component of PVD.

A previous study found that the highest numbers of cases are traumatic events and the male to female degree inside traumatic removals has been accounted to be 2:1<sup>3</sup>. It has been evaluated that 664,000 persons were living with LLA in the United States in 2005 and more than 900,000 with minor amputation<sup>4,5</sup>. The quantity of lower appendage removals is expected to increase in the United States to 58,000 every year by 2030<sup>6,7</sup>.

Prosthetic legs have been in use since ancient times. After World War II, the need for prosthetic formation and particular recovery programs for people with limb removal was strengthened. Major research in prosthetics was conducted after World War II when the first research center established that worked toward the advancement of prosthetic devices<sup>8</sup>. Previous studies found that usage of Prosthetic limb among amputees were range from 27-86%<sup>6,7,9</sup>. Psychological issues that occur in a person with the prosthesis are well documented in literature<sup>8,10,11</sup>.

Well-being and quality are affected by physical and psychosocial parameters after amputation. Aims of Person with amputations are to reintegrate in community and improved mobility, optimum QoL should be among the top priorities of prosthetic and rehabilitation center<sup>8,12</sup>. The amputations of the lower limb constitute a major handicap that involves functional and professional incapacity. The assessment of QoL rarely instigated in routine medical practice and there is no proper guidance to assess QoL in the field of the prosthesis.

The study aimed to assess the QoL of Physically Disabled Patients with Prosthetic Legs. Studies stated that there is increasing emphasis on clinical outcome measurement by clinicians, physicians and therapists in the field of prosthesis<sup>13</sup>. Assessment of health outcomes may help to improve, quality of care provided by health care practitioner, Quality of health and eventually QoL of the individual. This study may help to reduce incapacity of lower limb amputees by creating awareness that prosthesis and rehabilitation services may improve QoL.

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## Methodology

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A Cross-sectional, analytical study was conducted to assess the QoL of physically disabled patients with prosthetic legs. The duration of the study was four months from November 2014 to February 2015. Patients with a physical disability using prosthetic legs were selected from prosthetics and orthotics departments at the Institute of Physical Medicine and Rehabilitation (IP&MR). The sample size was 120, inclusive of both genders with the age >13 years. The patients who visited the IP&MR for eight weeks during the data collection were included in the study while amputees other than lower limb with prosthesis were excluded.

Data was collected with the support of doctors and physiotherapists working at the study site, who also contributed to the selection process. Demographic details including age, gender, rehabilitative services, date of amputation, use of prosthesis and level of education were obtained. QoL of lower limb amputees was measured by applying the WHOQoL-Bref Urdu Translated self-administered questionnaire, containing 26 items and the responses were rated on a 5-point Likert scale. Five being most stratified and being least, four domains like physical health, psychological health, social relationship and environment. Cronbach's alpha for each of four domains scores ranges from 0.66 to 0.88, demonstrating good internal consistency and face content validity<sup>14</sup>.

Statistical analysis of the data was performed with SPSS Version 16.0 and Microsoft Excel (2013) program was used for data presentation. Mean  $\pm$  SD was used for the display of quantitative variables, frequency and

percentages were used for qualitative variables. Mann-Whitney U test and Kruskal-Wallis test was used to compare the domain QoL score of male and female, participants with different age group and working status. The level of significance was set at 0.05 for all tests. Approval was obtained from the Head of Department of orthotics and prosthetics department at IP&MR, and institutional ethical review committee. Inform consent from patients with prosthetic legs was taken by explaining the purpose and objectives of the study.

## Results

This study engaged a total of 120 lower limb amputees with prosthetics as respondents, out of the total, 77% were males and 23% were females. 55% were early prosthetic users and 45% were late prosthetic users. Most of the respondents were unemployed i.e. 63.3% as shown in table I.

**Table I: Socio-Demographic and Clinical Characteristics of the enrolled patients (n=120)**

Variables		n(%)
Gender	Male	92(77)
	Female	28 (23)
Age	16-25 years	22(18.3)
	26-35 years	18(15.5)
	36-45 years	20(16.7)
	46-55 years	36(30.0)
	56-65 years	12(10)
	> 65 years	12(10)
Duration of Prosthesis	Early Prosthetic User	66(55)
	Late Prosthetic User	54(45)
Marital Status	Single	28(23.3)
	Married	92(76.7)
Working Status	Employed	44(36.6)
	Unemployed	76(63.3)
Rehabilitation Services	Yes	61(50.8)
	No	59(49.2)

The gender-wise distribution of the QoL score in four domains of WHOQoL-Bref is presented in table 2. Male participants scored significantly higher in physical health ( $p=0.003$ ), psychological health ( $p=0.027$ ), social relationship ( $p=0.005$ ) and environment ( $p=0.000$ ). Two groups did not differ significantly in general health and general QoL.

**Table 2: Mann-Whitney U test comparison of QoL Scores with respect to Gender**

QoL Domain	Male (n=92)	Female (n=28)	p-value
	Mean Rank		
General QoL	62.93	52.5	0.146
General Health	62.8	52.93	0.153
Physical Health	65.63	43.64	0.003
Psychological Health	64.37	47.79	0.027
Social Relationship	65.35	44.57	0.005
Environment	66.67	40.21	-
Overall QoL	66.39	41.14	0.001

\*p-value <0.05 is considered significant.

There was also a significant difference in physical health, psychological health, social relationship, environment and overall QoL domain among different work categories shown in Table 3.

**Table 3: Comparison of QoL Scores with different working status**

QoL Domain	Student (n=8)	Employed (n=44)	Unemployed (n=26)	Retired (n=14)	Housewife (n=14)	p-value
	Mean Rank					
General QoL	62	67	55.04	65.36	52.5	0.365
General Health	63.25	59.95	66.65	64.36	52.93	0.593
Physical Health	87	57.91	73.35	63.36	43.64	0.004
Psychological Health	99.75	55.36	77.88	47.36	47.79	-
Social Relationship	64.5	57.05	80.27	64.21	44.57	0.004
Environment	86	53.95	85.58	60.5	40.21	-
Overall QoL	93	56.77	79.19	57.64	41.14	-

\*p value <0.05 is considered significant.

There was a significant difference in the environment and overall QoL scored in different age group participants. The rest of the QoL score did not differ significantly among different age groups shown in Table 4.

Table 4: Comparisons of QoL scores with respect to Age

QoL Domain	Age (Years)						p-value
	16-25 (n=22)	26-35 (n=18)	36-45 (n=20)	46-55 (n=36)	56-65 (n=12)	> 65 (n=12)	
	Mean Rank						
General QoL	50.23	72.83	54.4	66	50.67	64.33	0.19
General Health	60.23	70.72	50.6	61.67	46	73.17	0.15
Physical Health	74.59	76.17	45.2	52.67	56.67	64	0.21
Psychological Health	76.05	64.5	47.4	55.56	59.5	63.67	0.138
Social Relationship	43.32	71.17	55.5	64.89	65.83	65.83	0.116
Environment	68.14	74.28	47.6	49.17	69	72.83	0.026
Overall QoL	70.95	79.72	41.7	52.11	62	67.5	0.007

\*p value <0.05 is considered significant.

## Discussion

The main objective of this study was to investigate QoL of lower limb amputees with artificial limbs and to compare QoL of males and females, different age group participants, and different working statuses. Around 36% of our study participants rated their QoL as good and 31% reported it as neither poor nor good. 18.3%, 51.7% and 13.3% of participants were dissatisfied, satisfied and very satisfied with their health, respectively. In comparison, a study conducted in Thailand including patients with unilateral lower-limb amputees reported the QoL being poor (5%), fair (86.7%) and good (8.3%). They also reported that people who had higher education, employment and long duration of amputation had much better QoL<sup>15</sup>. Studies reported that there is increased depression, social discomfort and reduction in general health-related QoL among lower limb amputees<sup>16</sup>.

In this study, males had significantly higher QoL scores in domains of physical health, psychological health, social relationship and environment (Mean Rank 65.63, 64.37, 65.35, 66.67) in comparison to females (Mean Rank 43.64, 47.79, 44.57, and 40.21). There was significant p-value on all four domains including physical health (p=0.003),

psychological health (p=0.027), social relationship (p=0.005) and environment (p=0.000). But the two groups did not differ significantly in general health and general QoL. A study conducted on the Swedish population reported that males reported better health-related QoL than females. Males have higher mean mobility scores than females<sup>17</sup>. Studies reported that there is a higher prevalence of amputation among males. More male subjects (88%) were observed with amputation as compared to females, which is also supported by other studies. While females are more susceptible to psychosocial adjustment problems and exhibit psychological symptoms including anxiety and depression<sup>10</sup>. Thus, females with amputation face increased coping difficulties than males, they are more vulnerable and their QoL is adversely affected. There is a contradictory finding in another study that reported that females have a higher score in four domains of WHOQoL-BREF than males<sup>11</sup>.

In our study, 30% of the respondents were 46-55 years old, 18% were between 16-25 years and 10% of the respondents were more than 65 years of age. There was a significant difference in the environment domain (p=0.026) in the QoL score and the rest of the domains are non-significant in all age groups.

From a broader perspective, the practical experiences of patients with higher amputation level and advanced age are poorer than that of young age people with a lower amputation level<sup>18</sup>. Normally it is believed that the somatic state and the existence of comorbid calculate the efficient possibilities after amputation<sup>19</sup>. Walking with a prosthesis in cardiopulmonary diseases costs extra requirement of energy. Amputees with locomotor system diseases reduce efficient prospective<sup>20</sup>. Mueller et al., reported that higher occurrence of skin-problems were associated with younger age, female gender, diabetic history, higher frequency of washing the stump, increased use of antibacterial soap and smoking<sup>21</sup>.

There was a significant difference in all four domains, physical health, psychological health, social relationship and environment ( $p=0.004$ , 0.000, 0.004 and 0.000) respectively. Employment is among the most common factors that are not only associated with QoL but also with psychosocial adjustment and activity restriction. As employment are physically more energetic and shows an increase in psychosocial adjustment. The working person with an amputation will be required to perform more physical activity as compared to non-working person<sup>22,23</sup>. The presence of phantom limb pain was found to negatively affect the functional satisfaction with the prosthesis. A similar high unemployment rate has also been found among amputees in Jordan<sup>10</sup>.

In developed countries, despite differences, similar factors adversely impact the QoL<sup>1</sup>. The role of occupational status on QoL is not primarily stated in developed countries. It might be due to the presence of social-financial support mechanisms adopted by developed countries. The age group of lower limb amputees is generally above 65 years in these countries. For that reason, they might receive a retirement pension plan and have no economic and family problems. A study conducted

among the Indian population reported that the unemployment status of amputees had a direct implication on the family income and living standard<sup>24</sup>. Unemployment may be distressing and potentially affect the mental status of the individual. So, employment plays a major role in determining the QoL of lower limb amputees<sup>25</sup>. A study conducted by Asano et al. reported a significant impact of employment on individual health-related quality of life<sup>26</sup>.

Participants were selected from the prosthetics and orthotics department of the IP&MR, thereby excluding others in the community who did not utilize facilities of the specific center. Lower Limb Amputees who availed services from public and private sector rehabilitation centers other than IP&MR were excluded from the study, research involving the Lower limb amputees taking services from another rehabilitation center must be conducted. The duration of the study was short, hence the data collection was difficult because only a smaller number of lower limb amputees appeared to the study site daily. There is a need to conduct prospective studies to systematically follow the changes in the QoL of individuals with lower limb amputation over time and its determinant.

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## Conclusion

QoL of lower limb amputees with prosthetic legs was moderate. Certain demographic factors affected QoL of lower limb amputees' prosthetic users. As we found that females were having poor QoL than males, lower limb amputees had a significant effect on their QoL concerning their working status. However, there should be a special focus on QoL of lower limb amputees along with physical disability assessment in the rehabilitation center. For improving the QoL of lower limb amputees with prosthetic legs, support and attention from family, community, rehabilitation center and government agencies in Karachi, Pakistan.

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## Conflicts of Interest

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None.

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