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Original Research Article

Quality of life in persons with lower limb amputations

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ABSTRACT

Background: Large number of individuals live with various disabilities in India. Amputation is a major disability which causes irreversible changes and drastically alters everyday functioning. Quality of Life (QOL) in persons with lower limb amputations has been found to be affected. This study aimed to assess the QOL in persons with lower limb amputations using SF-36 via telephone.
Methods: This was an observational study. Individuals with lower limb amputations who were enrolled in an orthotic and prosthetic clinic in Vadodara, Gujarat, were interviewed on the telephone to assess their QOL. Individuals with lower limb amputations, 18 years and above and both genders were included and those with impaired vision, hearing, cognition and upper limb amputations were excluded. QOL was assessed using SF-36 questionnaire on the telephone.
Results: Total 140 individuals: 119 males, 21 females. 123 had unilateral and 17 had bilateral amputation. There was a significant difference found between unilateral and bilateral amputations in the Energy/Fatigue component of QOL (p=0.017) and between males and females in the Physical Functioning and General Health component of QOL (p=0.001) and (p=0.038) respectively. No significant difference was found in the QOL based on the levels of amputation in individuals with unilateral and bilateral amputation.
Conclusions: Physical Functioning and the General Health components of QOL were better in males as compared to females. Individuals with bilateral amputations had more energy compared to individuals with unilateral amputations and hence had a better QOL.

Keywords: Quality of life, Lower limb amputations, SF-36, Telephonic interview

INTRODUCTION

India is home to many individuals with disabilities living in the community.[1] In India, traumatic accidents are one of the commonest causes of lower-limb amputations.[2] Traumatic amputations can lead to lifelong functional limitations and injury in young as well as adolescents.[3] They lead to irreversible disability and can change one's life and functions immensely, which is experienced more by individuals with lower-limb amputations.[4] Additionally, challenges like learning to care, walking with an amputated leg, and adapting and coping with the loss of a limb are experienced by people with lower-limb amputations.[5] An amputation leads to several limitations in performing professional and much other leisure and social activities.[6] Due to decreased mobility, discomfort and physical integrity compromises the human body's integrity and decreases the quality of life (QOL). Patients are affected not only psychologically but also socially.[4] Individuals with lower limb amputations have experienced a variety of psychological problems. Depression is estimated to affect 28% of amputees and 3.6-10.6% of the general population. Higher levels of pain and anxiety are common in amputees.[7] In recent times, Quality of life

(QOL), has been recognized as an important outcome of rehabilitation programes.[4] The Short-Form health survey (SF-36), assesses health through 8 components which are categorized as Physical Component Summary (PCS) and Mental Component Summary (MCS) scores in which higher score implies a better QOL[4] The QOL is likely to get affected adversely in individuals with lower-limb amputations and has been reported to be lower in individuals with lower-limb amputations compared to able-bodied individuals.[7]

Objectives

The objective of the present study was to assess the QOL in individuals with lower limb amputations via telephone.

METHODS

This was an observational study. The study was carried out at REHABS clinic, Vadodara, Gujarat, which is an orthotic and prosthetic clinic. Individuals above 18 years of age, both genders, individuals with transfemoral and transtibial amputation were included in the study. Individuals with complete loss of vision, hearing, cognition, and upper limb amputations were excluded from the study. The study was carried out from July 2020 to June 2021. Convenient sampling method was used. All the individuals with lower limb amputations who came to REHABS clinic and fulfilled the inclusion criteria were approached on the telephone and given a detailed explanation of the study. Informed consent was taken over the telephone from those who were willing to participate. In addition to demographic data; employment status, type and duration of amputation, associated comorbidities, use of prosthesis and its duration, and use of any assistive device were also asked. The outcome measure SF 36 was taken over the telephone.

Statistical analysis

All the statistical analysis was performed using SPSS version 22.0 software. Descriptive statistics including mean, standard deviations, and standard error were computed for all variables. Normal distribution was assessed by the Kolmogorov Smirnov test. An independent t-test was used for comparing the bilateral and unilateral types of amputations among males and females with lower limb amputations. One-way ANOVA was used to see the difference between various levels of amputations. The level of significance was set at $p<0.05$.

RESULTS

The demographic details of amputation-related variables are presented in (Table 1). There were total of 140 individuals with lower limb amputations, 119 males and 21 females. Participants mean age was 46.77±14.9 years. A statistically significant difference in QOL between individuals with unilateral and bilateral amputations for Energy/Fatigue component of QOL (p=0.017) (Table 2).

Table 1: Descriptive statistic (n=140).

Variables	N	%	Mean (SD)
Mean age			36.76±14.89
Gender			
Male	119	85	
Female	21	15	
Employment status			
Self - Employed	25	18	
Employed	55	39	
Unemployed	19	14	
Retired	18	13	
Student	4	3	
Housewife	19	13	
Comorbidities			
Diabetes	40	28	
Hypertension	14	10	
Both	11	8	
None	15	11	
Amputation	100	71	
Duration since amputation (years)			15.25±13.13
Cause of amputation			
Trauma	95	68	
RTA	54	39	
Train accident	29	21	
Crush injury	11	8	
Diabetes/Vascular	6	4	
Congenital	5	3	
Others	35	25	
Amputation level			
Trans Femoral	39	28	
Trans Tibial	92	66	
Trans Femoral and Trans Tibial B/L	03	2	
Others	06	4	
Unilateral/Bilateral			
Unilateral	123	88	
Bilateral	17	12	
Use of Prosthesis and assistive device	123	88	
Use of assistive device	56	40	
Stick/Cane	21	15	
Axillary crutch & Elbow crutch	17	12	
Walker	15	11	
Wheelchair	03	2	

A statistically significant difference in QOL between the genders in the physical functioning and general health component of QOL (p=0.001) and (p=0.038) respectively is depicted in (Table 3). There was no statistically significant difference found in individuals with unilateral bilateral amputations depending on levels of amputations as shown in (Table 4-5).

Table 2: Difference in quality of life between individuals with unilateral and bilateral amputations.

Components of SF-36	Bilateral/ Unilateral	N	Mean	SD	SEM	Mean Difference	P value
Physical functioning	Bilateral	17	80.29	15.46	3.749	5.50	0.298
	Unilateral	123	74.80	20.90	1.884		
Role limitations due to physical health	Bilateral	17	72.06	39.41	9.559	7.75	0.410
	Unilateral	123	64.31	35.81	3.229		
Role limitations due to emotional problems	Bilateral	17	76.46	38.67	9.380	8.99	0.403
	Unilateral	123	67.48	41.70	3.760		
Energy/fatigue	Bilateral	17	86.76	16.10	3.905	13.31	0.017
	Unilateral	123	73.46	21.86	1.971		
Emotional well-being	Bilateral	17	90.82	15.92	3.862	9.52	0.090
	Unilateral	123	81.30	22.16	1.998		
Social functioning	Bilateral	17	91.91	18.19	4.412	10.61	0.088
	Unilateral	123	81.30	24.50	2.209		
Pain	Bilateral	17	91.47	18.50	4.487	12.02	0.079
	Unilateral	123	79.45	27.11	2.445		
General health	Bilateral	17	89.12	15.23	3.694	9.81	0.052
	Unilateral	123	79.31	19.78	1.783		
Health change	Bilateral	17	66.18	24.91	6.041	2.15	0.758
	Unilateral	123	64.02	27.19	2.451		

QOL-Quality of Life, SF-36-Short Form 36

Table 3: Difference in quality of life between gender.

Components of SF-36	Gender	N	Mean	SD	SEM	Mean Difference	P value
Physical functioning	Male	119	77.82	18.60	1.705	15.67	0.001
	Female	21	62.14	24.83	5.418		
Role limitations due to physical health	Male	119	67.65	35.41	3.246	15.98	0.062
	Female	21	51.67	38.51	8.404		
Role limitations due to emotional problems	Male	119	69.47	41.08	3.765	5.98	0.543
	Female	21	63.49	43.34	9.458		
Energy/fatigue	Male	119	75.63	21.90	2.007	3.73	0.469
	Female	21	71.90	20.34	4.438		
Emotional well-being	Male	119	82.96	21.58	1.978	3.34	0.517
	Female	21	79.62	22.52	4.914		
Social functioning	Male	119	82.98	24.12	2.211	2.63	0.646
	Female	21	80.36	23.90	5.216		
Pain	Male	119	82.27	26.15	2.397	9.05	0.149
	Female	21	73.21	27.56	6.014		
General health	Male	119	81.93	18.60	1.705	9.55	0.038
	Female	21	72.38	22.84	4.984		
Health change	Male	119	65.34	26.46	2.426	7.00	0.272
	Female	21	58.33	28.87	6.299		

DISCUSSION

Amputation is a major life event that is known to affect QOL many years after the event.[3] Various factors which affect the QOL are employment status, use of assistive device or prosthesis and problems associated with it, comorbidities, phantom limb pain, depression, age and societal support and social activity participation.[4,5] The number of males with lower-limb amputations in the present study was 119, which comprises more than three-fourths of the population.

Table 4: Difference in Quality of life in individuals with unilateral amputations based on level of amputation.

Components of SF-36	Levels of Amputation	N	Mean	SD	P value
Physical functioning	Trans Tibial	83	74.10	19.617	0.739
	Trans Femoral	38	76.58	23.513	
	Others	2	67.50	31.820	
	Total	123	74.76	20.900	
Role limitations due to physical health	Trans Tibial	83	64.16	36.248	0.549
	Trans Femoral	38	66.05	34.605	
	Others	2	37.50	53.033	
	Total	123	64.31	35.806	
Role limitations due to emotional problems	Trans Tibial	83	64.66	41.438	0.079
	Trans Femoral	38	76.32	40.940	
	Others	2	16.65	23.547	
	Total	123	67.48	41.702	
Energy fatigue	Trans Tibial	83	72.89	20.779	0.940
	Trans Femoral	38	74.34	24.937	
	Others	2	75.00	0.000	
	Total	123	73.37	21.893	
Emotional well being	Trans Tibial	83	80.34	23.509	0.669
	Trans Femoral	38	82.84	19.966	
	Others	2	70.00	19.799	
	Total	123	80.94	22.336	
Social functioning	Trans Tibial	83	81.02	25.405	0.947
	Trans Femoral	38	80.92	25.788	
	Others	2	75.00	35.355	
	Total	123	80.89	25.423	
Pain	Trans Tibial	83	80.12	25.438	0.964
	Trans Femoral	38	78.75	29.965	
	Others	2	81.25	26.517	
	Total	123	79.72	26.710	
General health	Trans Tibial	83	80.12	18.346	0.909
	Trans Femoral	38	78.55	21.992	
	Others	2	77.50	24.749	
	Total	123	79.59	19.456	
Health change	Trans Tibial	83	64.16	29.006	0.994
	Trans Femoral	38	64.47	22.980	
	Others	2	62.50	17.678	
	Total	123	64.23	26.987	

Several other studies [3,4,5,8] have also observed a higher prevalence of amputations among males. Nearly two-thirds of all individuals in the present study underwent amputation due to trauma, which is in line with various studies [9-12] that report trauma to be the main cause of amputation in developing countries.

It is reported that individuals with bilateral amputations walk with increasing difficulty and their gait is less efficient compared to individuals with unilateral amputations.[13] However, our study found a significant difference in the Energy/Fatigue component of QOL between individuals with bilateral and unilateral amputations, in favor of the bilateral group. The probable reason for this could be that the mean duration of amputation was 16 years in the bilateral group which shows a long duration since amputation. Individuals with lower-limb amputations must have adjusted/adapted to their condition during this long duration and hence had a better QOL. Prosthesis usage has been shown to influence QOL positively.[14] In our study 34% of individuals wore the prostheses for >8 hours a day and 19% wore for 4 to 8 hours and 23% removed the prosthesis only while sleeping which shows good compliance with prosthesis use. A study also reported that QOL and the use of prosthesis increase parallelly, as individuals get accustomed to prosthesis use and limb loss and ultimately improve the QOL.[14]

Table 5: Difference in quality of life at various amputation levels in individuals with bilateral amputations.

Components of SF-36	Levels of Amputation	N	Mean	SD	P value
Physical functioning	Trans tibial	9	81.11	18.333	0.626
	Trans femoral	1	80.00	-	
	Trans Femoral and Trans Tibial	3	70.00	15.000	
	Others	4	86.25	8.539	
	Total	17	80.29	15.459	
Role limitations due to physical health	Trans tibial	9	83.33	33.072	0.604
	Trans femoral	1	75.00	-	
	Trans Femoral and Trans Tibial	3	66.67	57.735	
	Others	4	50.00	45.644	
	Total	17	72.06	39.412	
Role limitations due to emotional problems	Trans tibial	9	81.48	37.685	0.743
	Trans femoral	1	100.00	-	
	Trans Femoral and Trans Tibial	3	55.53	38.509	
	Others	4	75.00	50.000	
	Total	17	76.46	38.673	
Energy fatigue	Trans tibial	9	91.67	12.748	0.473
	Trans femoral	1	75.00	-	
	Trans Femoral and Trans Tibial	3	88.33	10.408	
	Others	4	77.50	25.331	
	Total	17	86.76	16.099	
Emotional well being	Trans tibial	9	93.33	14.142	0.792
	Trans femoral	1	100.00	-	
	Trans Femoral and Trans Tibial	3	88.00	12.000	
	Others	4	85.00	24.953	
	Total	17	90.82	15.923	

Table 6: Difference in QOL at various amputation levels in individuals with bilateral amputations.

Components of SF-36	Levels of amputation	N	Mean	SD	P value
Social functioning	Trans tibial	9	95.83	12.500	0.719
	Trans femoral	1	100.00	-	
	Trans femoral and trans tibial	3	83.33	28.868	
	Others	4	87.50	25.000	
	Total	17	91.91	18.190	
Pain	Trans tibial	9	93.06	20.833	0.928
	Trans femoral	1	100.00		
	Trans femoral and trans tibial	3	86.67	15.275	
	Others	4	89.38	21.250	
	Total	17	91.47	18.500	
General health	Trans tibial	9	85.56	19.597	0.764
	Trans femoral	1	90.00		
	Trans femoral and trans tibial	3	96.67	2.887	
	Others	4	91.25	10.308	
	Total	17	89.12	15.231	
Health change	Trans tibial	9	63.89	30.901	0.976
	Trans femoral	1	75.00		
	Trans femoral and trans tibial	3	66.67	14.434	
	Others	4	68.75	23.936	
	Total	17	66.18	24.908	

Secondly, 15 out of 17 individuals with bilateral amputations were employed in the present study. Employment status is also a predictor of a QOL and is known to influence QOL positively.[4] Also, only 5 in the bilateral group had comorbidities like diabetes mellitus and hypertension, which are known to affect QOL negatively. There was a statistically significant difference found between males and females in the component of Physical Functioning in QOL. This suggests that males were much more active physically and had better mobility.

Traditionally, males are the family's primary breadwinners and are involved in performing moderate to vigorous activities, climbing several flights of stairs; walking several blocks, etc. One of the reasons for better physical function in males could be that out of 119, 80 (67%) were employed. So, for work purposes, they would have to go out every day, and in the process, walk some distance, climb stairs and be physically active. On the other hand, most of the females (19) were housewives who were involved in household chores and were limited to the house except for running a few errands and socializing.[4]

Our study did not find a significant difference in QOL in individuals with different amputation levels. The number of individuals with trans-tibial amputation was 92 (65.7%) and 39 (27.8%) had transfemoral amputation which included even bilateral amputation. 54 (45.3%) of them were young adults who fell in the 20 to 40 years age group and 52 (37.1%) fell in the 41-60 age group. The present study administered the SF-36 to individuals with lower-limb amputations via telephone due to the COVID-19 pandemic.

It took approximately 20-30 minutes to administer this questionnaire and some individuals were not very forthcoming and willing to answer questions. As reported by a study,[15] there was no significant difference between QOL when self-administered or administered via telephone. Telephonic administration had the advantages of better understanding, better response rates, took less time and fewer missing items over self-administration.[15]

Limitations

All the individuals with amputations were recruited from only one orthotic and prosthetic clinic. The individuals self-reported the details regarding amputation and were not derived from the medical records. Complications due to amputation, which can affect QOL, were not assessed.

CONCLUSION

Physical functioning and the general health components of QOL were better in males as compared to females. Individuals with bilateral amputations had more energy compared to individuals with unilateral amputations and hence had a better QOL.

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