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ORIGINAL ARTICLE

Association of Quality of Life with Body Mass Index in Patients Using Trans femoral Prosthesis after Amputation

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Author`s Contribution

[1-3]Conception and design, [2-3] Collection and assembly of data, [2-5]Analysis and interpretation of the data, [3-4]Critical revision of the article for important intellectual content, [2-1] Statistical expertise,[1-5]Final approval and guarantor of the article.

Article Info.

Received: February 12, 2022
Acceptance: 2022-11-23

Conflict of Interest: None
Funding Sources: None

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Cite this article as: Rehman SU, Ahmed A, Khurram M, Saqulain G, Idreees N. Association of Quality of Life with Body Mass Index in Patients Using Trans femoral Prosthesis after Amputation. JRCRS. 2023;11(1):40-46.
DOI: 10.53389/JRCRS.2023110109

ABSTRACT

Background: Trans-femoral amputation (TFA) is an undesirable transaction of lower limb at the femoral level necessitating the use of a prosthetic device essentially requiring prolonged rehabilitation to ensure ambulation of the patient and integration into daily routine

Objectives: The objective of the study was to find the association of quality of life with body mass index in patients using trans femoral prosthesis after amputation

Methodology: Current Cross-Sectional study using convenience sampling recruited N=400 trans-femoral prosthesis users from PIPOS. Sample included both genders with age range of 12-60 years, using prosthesis > 1 year while orthosis users were excluded. SF-36 Health Survey tool & Lower Extremity Functional Scale (LEFS) were utilized for collection of data & analyzed utilizing SPSS Version 21.

Results: LEFS items revealed association ($p<0.05$) with BMI including get in & out of bath, walk from rooms to room, squatting, heavy activities, sit for 1 hour & hopping. There was association ($p<0.05$) between BMI and SF-36 items of emotional wellbeing, social function and pain. General Health of the participants revealed association ($p=0.000$) with highest total LEFS score for those with good and very good health. While as regards individual items most items revealed ($p<0.05$) association with LEFS. General Health also revealed association ($p<0.05$) with all subsclaes of SF-36 with higher scores for those having very good health except domain of limitation because of emotional & social health. Etiology of amputation also revealed association ($p<.001$) with total mean LEFS score with highest score when etiology was fracture. Etiology also had association ($p<0.05$) with most items of LEFS & SF-36.

Conclusion: BMI, General Health and Etiology have significant association with status of ambulation and social performance of Trans-femoral amputees using prosthetic devices.

Key Words: Amputee, ambulation, quality of life, trans-femoral prosthesis.

Introduction

Amputation is the surgical loss of an unrecoverable extremity with lower limb amputation (LLA) having a variable incidence of 78-704/ 100,000 individuals-years in diabetics with lower incidence in non-diabetics.[1] In the United States there is an incidence of 92% above knee amputations per 1 million per year, with incidence of amputation caused by peri-prosthetic joint inflection (PJI) increased, while it has decreased for dysvascular and other etiologies.[2] A higher percentage of traumatic amputations were reported in a local study with transtibial amputation being commonest followed by trans-femoral.[3] Similarly Gebreslassie B et al. also reported trauma as the commonest etiology (37.7%), followed by malignancy (24.1%) and peripheral vascular disease (20.7%).[4]

Trans-femoral amputation (TFA) is an undesirable transaction of lower limb at the femoral level necessitating the use of a prosthetic device essentially requiring prolonged

rehabilitation to ensure ambulation of the patient and integration into daily routine.[5]

An artificial limb which is used to replace a missing lower extremity, up to the level of above the knee is known as trans-femoral prosthesis and equipped with a socket, knee, pylon and foot[5] however it is not easy to regain normal ambulation and amputees have to spend around 80% more energy to walk with a prosthesis though newer light weight devices are now available which are more user friendly.[6]

Sinha R et al. has reported significantly reduced physical & mental scores as regards SF 36 scale in comparison to general public due to challenges of employment status; need of assistive devices & prosthesis; phantom & residual stump pain; and comorbidities, which affect the quality of life.[7] Similarly according to Holzer LA et al. amputees' self-esteem is not significantly affected however, body image as well as quality of life (QoL) is significantly impaired by lower extremity amputation.[8] Less than 50% of amputees are able to achieve ambulation which in the prosthetic practice is the effective Post amputation mobility on daily basis.[9]

Research into factors affecting ambulation as well as targeting factors which can be modified to improve outcome is essentially required [10]. Also amputees have a peak of weight gain at 2 years post amputation, and studies are need to see the cause and its deleterious effects.[11] According to Faraji E et al, focus on health dimensions is essential in high lower limb amputees.[12] Also better knowledge of causes of weight changes in lower limb amputees (LLA) will better help rehabilitation.[13]

With a high prevalence of trans-femoral prosthetic users with different etiologies with traumatic etiology being common in Pakistan[3], and dearth of local literature, current study was conceived with the objective to find the association of quality of life with body mass index in patients using trans femoral prosthesis after amputation. This study is important because it will help fill gap in the local literature thus encouraging further research in the field and help clinicians better rehabilitate trans-femoral prosthetic users.

Methodology

Current Cross-Sectional research utilizing 400 amputees with trans-femoral prosthesis was conducted using non-probability convenience sampling. Study was carried out at PIPOS from 1st July 2019 & completed by 31st December 2019. Sample comprised trans-femoral prosthesis users aged between 12-60 years, of both genders, who were using prosthesis for a period of one year before inclusion in the study. Orthosis users were excluded from this study. Using Raosoft online calculator, a sample of N=414 was calculated with a confidence level of 96%, margin of error of 5%, taking population size of, 20000. Cases in which data was not complete left behind a sample of N=400 cases which was utilized for analysis.

Short Form-36 (SF-36) [14] questionnaire and Lower Extremity Functional Scale (LEFS) [7] were utilized for collection of data in addition to basic demographics.

SF-36 is a 36 question valid instrument for the assessment the QoL utilizing eight domains which include role limitations because of physical issues (RP), physical functioning (PF), bodily pain (BP), vitality (VT), general health (GH), social function (SF); role limitations emotional issues (RE), and mental health (MH). It can be divided into physical component summary (PCS) to determine the physical status and mental component summary (MCS) to determine the mental status. Its score varies from 0- 100 with higher score showing higher QoL. LEFS is a 20 items valid tool with test and retest reliability of 0.94, used for assessment of individuals with lower extremity disorders including amputees' capability to carry out every day functions and has a maximum score of 80 with least significant difference being 9.

Study was initiated following ethical approval of Institutional Research Board of IIRS, ISRA University Islamabad, with Ref # 1709 M-Phil P&O-005 (17th June 2019) and informed consent of all the participants.

Researcher collected the data himself and following data collection, it was entered on MS Excel worksheet, coded and analyzed using SPSS Version 21. Descriptive statistics were utilized. T-test, One-way Anova were used to see any associations. P-value of <0.05 was considered significant.

Results

Population in the current study was mostly [188(47%)] healthy with BMI 18.5 to <25, while 107(26.8%) were overweight and only 88(22%) were obese (Table I). Total LEFS item score is significantly associated with BMI item 3 (getting into & out of bath) with p=0.003 and highest scores (2.93±0.99) for obese participants; item 4 (walking between rooms) with p=0.01 and highest scores (2.99±1.02) for obese; item 6 (squatting) with p=0.001 and highest scores (2.18±1.01) for those underweight; item 9 (heavy activities) with p=0.037 & highest scores (2.45±0.90) for those who were healthy; item 15) (sit for 1 hour) with p=0.000 and highest score (2.89±1.07) for the obese; & item 19 (hopping) with p=0.007 & highest scores (1.96±0.97) for those in healthy range of BMI. No significant association with other items was noted.

Table I: LEFS & SF-36 items versus Basal Metabolic Rate. Cross Tabulation & ANOVA Statistics. (n=400)

Tool	Items	Body Mass Index (BMI)					ANOVA
		Underweight <18.5 [17(4.3%)]	Healthy 18.5 to <25 [188(47%)]	Overweight 25 to <30 [107(26.8%)]	Obese ≥30 [88(22%)]	Total [400(100%)]	F, P-Value
		17	188	107	88	400	
Lower Extremity Functional Scale	Usual work	2.12±0.93	2.17±1.09	2.14±0.99	2.48±0.73	2.23±0.99	2.43,.065
	Usual hobbies	2.06±0.97	2.10±1.06	2.11±1.03	2.19±0.87	2.12±1.01	.198,.898
	Getting into or out of bath	2.12±1.22	2.50±1.08	2.49±1.14	2.93±0.99	2.58±1.10	4.71,.003
	Waling between rooms	2.59±1.18	2.53±1.06	2.62±1.10	2.99±1.02	2.66±1.08	3.823,.010
	To Putt on shoes/ socks	2.18±1.01	2.46±1.05	2.36±0.92	2.53±0.90	2.44±0.98	.922,.430
	Squatting	2.18±1.01	2.04±0.96	1.75±0.80	1.61±0.81	1.87±0.91	5.98,.001
	Lift object from floor	2.06±0.66	2.35±0.97	2.13±0.84	2.16±0.81	2.24±0.89	1.988,.115
	Light activities	2.18±0.64	2.45±0.90	2.27±0.72	2.24±0.80	2.34±0.83	1.975,.117
	Heavy activities	1.82±0.95	2.19±0.92	2.01±0.75	1.92±0.79	2.07±0.85	2.856,.037
	Getting in and out of car	2.12±0.99	2.30±1.07	2.40±0.94	2.28±1.05	2.32±1.03	.497,.685
	Walking 2 blocks	1.82±0.88	2.24±0.97	2.21±0.83	2.13±0.87	2.19±0.91	1.304,.273
	Walking a mile	2.06±0.75	2.15±0.99	1.96±0.81	2.03±0.84	2.07±0.90	1.029,.380
	Going 10 stairs up or down	2.00±1.06	2.12±0.92	1.95±0.83	1.94±0.94	2.03±0.91	1.179,.317
	Stand 1 hour	1.94±1.14	2.11±0.94	2.11±0.85	2.24±0.86	2.13±0.91	.723,.538
	Sit for 1 hour	1.82±1.01	2.24±1.09	2.45±1.01	2.89±1.07	2.42±1.09	9.22,.000
	Running on even ground	1.82±1.07	1.92±0.93	1.83±0.97	2.08±1.12	1.93±0.99	1.092,.352
	Running on unlevelled surface	1.59±1.00	1.82±0.92	1.65±0.98	1.58±0.87	1.72±0.93	1.746,.157
	Running with sharp turning	1.88±0.93	1.86±0.95	1.81±1.13	1.70±0.97	1.82±1.00	.514,.673
	Hopping	1.65±1.11	1.96±0.97	1.70±1.13	1.51±1.02	1.78±1.04	4.141,.007
	Rolling in bed	2.35±1.22	2.22±1.19	2.27±1.15	2.39±1.08	2.28±1.15	.425,.735
	Total score	50.44±14.57	54.71±16.91	53.03±11.12	54.77±12.38	54.09±14.49	.732,.534
Short Form-36 Health Survey Questionnaire	Physical function	48.24±14.68	51.14±22.76	50.37±18.15	45.03±19.65	49.46±20.71	1.85,.137±
	Role limitation due to physical health	39.71±34.30	38.90±38.20	45.79±40.41	41.76±41.30	41.42±39.31	.709,.547
	Limitation due to emotional health problem	43.14±36.83	43.14±39.65	54.27±42.02	51.52±39.12	47.97±40.24	2.10,.100
	Energy/Fatigue	47.94±13.70	52.17±13.70	55.09±14.29	54.89±14.24	53.37±14.04	2.20,.087
	Emotional Well Being	55.76±14.25	54.02±15.45	61.03±15.25	62.41±16.56	57.82±16.00	7.85,.000
	Social Function	50.74±13.60	58.16±16.96	64.95±14.61	65.85±16.01	61.36±16.50	9.08,.000
	Pain	58.82±18.88	64.64±18.17	72.24±20.13	70.99±20.38	67.83±19.57	5.63,.001
	General Health	50.29±11.25	50.78±14.34	54.32±14.04	52.39±15.83	52.06±14.52	1.45,.228

In connection QoL, significant association of BMI was noted with SF-36 item 5 (emotional wellbeing) with p=0.000 & highest scores (62.41±16.56) for those who were obese; item 6 (social function) with p=0..000 & highest scores (65.85±16.01) for obese; item 7 (pain) with p=0.001 & highest scores for those overweight (72.24±20.13) followed by those who were obese (70.99±20.38) (Table I). However no significant association was noted with other items of SF-36.

General health status of most of the participants 173(43.3%) was good and only 25(6.3%) had poor health status (table 2). General Health of the participants overall was significantly (p=0.000) related with top total score of LEFS (57.25±13.90) for those with good health and (56.63±11.32) for those with very good health. While as regards individual items most items revealed significant (p<0.05) association with LEFS score with high scores for good and very good health, except question 6, question 14, and question 15 with no significant association (p>0.05).

Table II: Anova Statistics: LEFS & SF-36 items versus Health Cross Tabulation. (n=400)

Tool	Tool Items	Health						ANOVA
		very poor [4(1%)]	Poor [25(6.3%)]	Fair [103(25.8%)]	Good [173(43.3%)]	very good [95(23.8%)]	Total [400(100%)]	F, P-Value
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Lower Extremity Functional Scale	Usual work	1.50± 1.00	1.60± 0.87	2.01± 0.97	2.24± 1.06	2.63± 0.76	2.23± 0.99	8.84,.000
	Usual hobbies	2.00±0.82	1.60± 0.82	2.02± 0.90	2.17± 1.06	2.28± 1.04	2.12± 1.01	2.734,.029
	Getting into or out of bath	2.50± 1.73	2.12± 1.09	2.23± 1.05	2.61± 1.12	3.00± 0.93	2.58± 1.10	7.619,.000
	Waling between rooms	1.50± 1.29	2.36± 0.95	2.25± 0.98	2.71± 1.13	3.13± 0.90	2.66± 1.08	10.739,.000
	Putting on shoes or socks	1.75± 0.96	2.28± 0.74	2.09± 0.85	2.57± 1.01	2.65± 1.02	2.44± 0.98	6.187,.000
	Squatting	1.50± 0.58	1.56± 0.58	1.76± 0.83	1.94± 0.93	1.98± 0.99	1.87± 0.91	1.883,.113
	Lift object from ground	2.25± 0.50	1.72± 0.68	2.00± 0.85	2.39± 0.88	2.35± 0.93	2.24± 0.89	5.860,.000
	Light activities	1.50± 0.58	1.76± 0.60	2.14± 0.83	2.46± 0.82	2.55± 0.75	2.34± 0.83	8.67,.000
	Heavy activities	1.75± 0.96	1.76± 0.88	1.85± 0.86	2.17± 0.84	2.21± 0.82	2.07± 0.85	3.922,.004
	Getting in and out of car	1.75± 0.96	2.08± 0.86	2.07± 0.98	2.42± 1.07	2.48± 0.98	2.32± 1.03	3.309,.011
	Walking 2 blocks	1.50± 1.29	2.00± 0.65	1.97± 0.99	2.31± 0.89	2.29± 0.86	2.19± 0.91	3.432,.009
	Walking a mile	2.00± 0.82	1.68± 0.80	1.80± 0.97	2.27± 0.84	2.12± 0.87	2.07± 0.90	5.902,.000
	Going 10 stairs up or down	2.25± 0.96	1.80± 0.87	1.79± 0.86	2.21± 0.92	2.03± 0.89	2.03± 0.91	4.105,.003
	Stand 1 hour	2.50± 1.29	2.04± 0.98	1.97± 0.93	2.27± 0.90	2.06± 0.82	2.13± 0.91	2.151,.074
	Sit for 1 hour	2.25± 0.96	2.52± 1.26	2.26± 1.15	2.56± 1.03	2.33± 1.08	2.42± 1.09	1.515,.197
	Running on even ground	3.00± 1.15	1.60± 1.04	1.52± 1.05	2.12± 0.91	2.05± 0.89	1.93± 0.99	8..811,.000
	Running on unlevelled surface	1.75± 0.96	1.52± 1.12	1.50± 1.05	1.94± 0.92	1.60± 0.67	1.72± 0.93	4.664,.001
	Running with sharp turns	2.25± 0.96	1.88± 1.33	1.56± 1.12	1.96± 0.97	1.79± 0.78	1.82± 1.00	2.795,.026
	Hopping	2.25± 1.50	1.92± 1.26	1.51± 1.08	1.97± 1.08	1.66± 0.77	1.78± 1.04	3.736,.005
	Rolling in bed	2.75± 1.26	2.68± 1.22	2.09± 1.15	2.42± 1.19	2.11± 1.02	2.28± 1.15	2.849,.024
	Total score	50.63± 17.98	48.10± 14.84	48.05± 15.72	57.25± 13.90	56.63± 11.32	54.09± 14.49	9.067,.000
Short Form-36 Tool	Physical function	42.50± 13.23	42.00± 21.11	43.59± 23.11	50.40± 18.25	56.44± 20.18	49.46± 20.71	6.04,.000
	Role limitation physical health	12.50± 14.43	21.00± 32.82	30.34± 35.47	45.95± 38.95	51.86± 41.35	41.42± 39.31	6.89,.000
	Limitation due to emotional health problem	33.33± 38.49	33.33± 40.82	45.05± 40.27	52.60± 38.93	47.16± 41.88	47.97± 40.24	1.69,.152
	Energy/Fatigue	47.50± 2.89	41.00± 15.88	51.02± 11.17	54.39± 14.20	57.61± 14.16	53.37± 14.04	8.74,.000
	Emotional Well Being	46.00± 10.58	48.08± 17.59	54.72± 14.21	58.66± 15.39	62.78± 16.87	57.82± 16.00	6.55,.000
	Social Function	48.75± 10.51	56.50± 16.19	61.17± 15.55	61.13± 16.15	63.83± 18.10	61.36± 16.50	1.67,.155
	Pain	60.63± 11.25	55.10± 18.19	63.79± 17.76	68.89± 19.33	74.02± 20.20	67.83± 19.57	6.72,.000
	General Health	50.00± 4.08	38.60± 14.54	46.73± 13.13	53.67± 13.38	58.62± 14.07	52.06± 14.52	16.39,.000

General Health of the participants also revealed significant association ($p<0.05$) with all domains of SF-36 with higher scores for those having very good health except domain 3 and domain 6 which did not reveal any significant association.

Etiology of amputation has significant ($p=0.000$) association with total mean score of LEFS with highest score (61.25±.0) for when etiology was fracture. Etiology also revealed association ($p<0.05$) with majority of items of LEFS except question 6, question 14, question 15, question 19 and question 20. Etiology also revealed significant ($p<0.05$) association with all items of SF-36 except item 1 (Physical function). (Table III)

Discussion

Kamran M et al in a study revealed that low self-esteem and psychological issues are associated with

Table III: LEFS & SF-36 items versus Etiology. Cross Tabulation & Anova Statistics. (n=400)

Tool	Tool Item	Etiology behind of Amputation										
		bomb blast [84(21%)]	Tumor [19(4.8%)]	Diabetes [87(21.8%)]	electric shock [12(3%)]	RTA [132(33%)]	TRAUMA [58(14.5%)]	Burn [3(0.8%)]	Snakebite [4((1%)]	Fracture [1(0.3%)]	Total [400]	f,p
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Lower Extremity Functional Scale	Usual work	2.42±0.93	1.95±0.91	1.80±0.96	2.58±0.67	2.42±0.92	2.16±1.15	1.00±1.00	3.00±0.00	1.00±.0	2.23±0.99	4.68,.000
	Usual hobbies	2.23±1.03	1.89±0.88	1.74±0.87	2.08±0.90	2.30±1.01	2.31±1.06	1.33±0.58	1.25±0.96	3.00±.0	2.12±1.01	3.486,.001
	Getting into or out of bath	2.81±0.92	1.53±1.07	2.24±1.17	3.08±0.67	2.80±0.97	2.53±1.23	1.33±0.58	2.50±1.73	3.00±.0	2.58±1.10	5.589,.000
	Waling between rooms	2.96±0.92	1.74±1.05	2.30±1.15	2.92±0.79	2.86±0.98	2.52±1.16	2.00±1.00	3.00±1.41	3.00±.0	2.66±1.08	5.173,.000
	Putting on shoes or socks	2.86±0.91	1.89±1.05	2.23±0.90	3.00±0.74	2.49±0.92	2.16±1.09	1.33±0.58	2.50±1.29	2.00±.0	2.44±0.98	5.175,.000
	Squatting	2.08±0.96	2.16±0.76	1.66±0.85	1.67±0.78	1.86±0.83	1.91±1.10	1.33±0.58	1.75±0.96	2.00±.0	1.87±0.91	1.690,.099
	Lifting object from floor	2.44±0.83	2.11±0.88	1.84±0.79	2.42±0.51	2.39±0.89	2.21±1.06	2.00±1.00	2.25±0.50	2.00±.0	2.24±0.89	3.539,.001
	Light activities	2.44±0.75	2.00±0.82	2.03±0.83	2.58±0.51	2.50±0.76	2.40±0.97	2.00±0.00	2.25±1.50	2.00±.0	2.34±0.83	3.040,.003
	Heavy activities	2.20±0.79	2.11±0.99	1.76±0.81	1.75±0.45	2.14±0.79	2.26±1.07	1.67±0.58	1.75±0.50	3.00±.0	2.07±0.85	2.760,.006
	Getting in and out of car	2.32±1.00	2.11±1.05	2.02±1.08	2.92±0.79	2.48±0.98	2.26±1.04	3.00±1.00	2.50±1.29	3.00±.0	2.32±1.03	2.262,.023
	Walking 2 blocks	2.25±0.82	2.42±1.07	1.85±0.95	2.67±0.49	2.25±0.83	2.28±1.01	2.33±1.53	2.25±1.50	3.00±.0	2.19±0.91	2.430,.014
	Walking a mile	2.26±0.87	2.21±0.71	1.70±0.94	2.17±0.58	2.12±0.86	2.16±0.93	1.67±1.53	2.25±1.50	3.00±.0	2.07±0.90	2.80,.005
	Going 10 stairs up or down	2.11±0.78	2.05±0.97	1.69±0.91	2.17±0.72	2.13±0.89	2.14±1.03	1.67±1.15	2.75±0.96	3.00±.0	2.03±0.91	2.532,.011
	Stand 1 hour	2.14±0.79	2.16±1.01	1.90±1.03	2.33±0.49	2.16±0.86	2.33±0.93	1.67±1.53	2.75±0.50	2.00±.0	2.13±0.91	1.515,.150
	Sit for 1 hour	2.52±1.08	2.11±1.05	2.30±1.30	2.25±0.62	2.47±1.00	2.52±1.10	2.33±1.53	2.25±0.50	2.00±.0	2.42±1.09	.582,.793
	Running on even ground	2.07±0.80	2.00±0.82	1.68±1.14	1.83±0.94	1.92±1.02	2.12±0.94	2.00±1.00	1.50±1.29	2.00±.0	1.93±0.99	1.319,.232
	Running on uneven ground	1.79±0.76	1.84±0.90	1.55±1.11	1.50±0.90	1.64±0.94	2.03±0.86	2.00±1.00	1.50±0.58	2.00±.0	1.72±0.93	1.575,.130
	Running with sharp turns	2.13±0.88	2.05±0.97	1.72±1.22	1.42±1.08	1.59±0.94	2.00±0.84	2.00±1.00	1.75±0.96	2.00±.0	1.82±1.00	2.671,.007
	Hopping	1.92±0.91	2.11±1.20	1.59±1.21	1.50±1.17	1.70±1.01	1.93±0.95	2.33±1.15	2.25±0.50	2.00±.0	1.78±1.04	1.370,.208
	Rolling in bed	2.56±1.11	2.16±1.34	2.37±1.31	2.17±1.11	2.20±1.07	1.95±1.03	3.00±1.00	2.25±0.96	2.00±.0	2.28±1.15	1.586,.127
	Total score	58.14±12.58	50.72±15.37	47.46±15.94	58.33±10.66	55.52±12.92	55.30±15.65	47.50±7.81	55.31±19.54	61.25±.0	54.09±14.49	3.892,.000
Short Form-36 Health Survey Questionnaire	Physical function	52.02±19.70	44.21±18.35	43.76±26.39	56.25±8.29	52.03±17.82	48.42±20.51	61.67±10.41	50.00±8.16	30.00±.0	49.46±20.71	1.84,.068
	Role limitation due to physical health	37.80±38.71	39.47±36.62	27.30±35.49	56.25±40.06	48.48±41.30	49.12±37.79	33.33±28.87	56.25±31.46	25.00±.0	41.42±39.31	2.72,.006
	Limitation due to emotional health problem	42.80±41.73	40.35±34.39	34.14±40.63	61.11±37.15	60.29±38.83	48.83±36.71	22.22±19.25	58.33±31.91	33.33±.0	47.97±40.24	3.64,.000
	Energy/Fatigue	52.68±14.43	52.63±9.77	48.45±13.98	50.42±7.82	57.23±14.60	53.86±12.89	55.00±10.00	52.50±10.41	50.00±.0	53.37±14.04	2.80,.005
	Emotional Well Being	57.58±17.65	49.89±10.27	53.03±15.35	67.00±12.89	63.46±14.75	54.23±15.13	46.67±6.11	54.00±17.44	44.00±.0	57.82±16.00	5.17,.000
	Social Function	62.41±13.66	51.71±15.25	60.49±16.16	67.71±17.24	65.74±17.90	53.82±14.16	58.33±19.09	53.13±11.97	50.00±.0	61.36±16.50	4.21,.000
	Pain	68.01±19.23	59.47±10.88	60.63±17.17	71.88±18.28	73.31±21.34	68.60±18.75	59.17±12.33	60.63±11.25	77.50±.0	67.83±19.57	3.63,.000
	General Health	53.99±14.01	50.26±9.64	43.46±13.09	56.25±12.99	56.53±14.67	51.05±13.68	53.33±2.89	61.25±13.77	50.00±.0	52.06±14.52	6.64,.000

prosthesis use [15] through 80% of prosthesis users have good quality of life as reported in a local study.[16] Also satisfaction with image of body, activity and prosthesis & psychosocial adjustment, has positive correlated with cognition.[17] In the current study most 188(47%) participants were healthy with BMI 18.5 to <25, while 107(26.8%) were overweight with BMI 25 to <30 and only 88(22%) were obese. According to Roberts TL et al. obesity can affect patient's ambulation.[18] Hence, BMI is an important factor predicting non ambulatory status following amputation.[19] Similarly in the current study total sum score of LEFS items has association with BMI item with obese participants having high score activities including get in & out of bathroom, walk from one to the other rooms while squatting revealed highest scores for those underweight; heavy activities with highest scores for

those who were healthy; sit for 1 hour with highest score for the obese; & item hopping with highest scores for those in healthy range of BMI. However, no significant association with other items was noted. According to Ghazzali MF et al. postural stability is also affected by BMI and structure of body.[20] Similarly the BMI categories, underweight, overweight and obese are significantly associated is slow gait speed in both genders.[21] In a study by Burke DT et al. reported functional independence measurement (FIM) per day gain was maximum in in class 1 obesity, class III & the underweight in decreasing order, hence FIM is not associated with BMI.[22] Also according to Burke DT et al. ambulation does not have association with BMI and the obese can have normal ambulation.[23]

In connection with QoL, significant association of BMI was noted with SF-36 items emotional wellbeing, & social function highest scores for obese; item pain with highest scores for those overweight and obese. However no significant association was noted with other items of SF-36.

Sudden alteration in health status can also affect usage of prosthesis and get the socket back on.[24] In current study general health status of most of the participants was good and there was significant association with highest total LEFS score of for those with good health and & very good health. While as regards individual items most items revealed significant ($p<0.05$) association with LEFS score with high scores for good and very good health, except item of squatting, stand 1 hour, and) sit for 1 hour with significant association.

General Health of the participants also revealed association ($p<0.05$) with all domains of SF-36 and hence higher scores for those having very good health except domain-3 (Limitation because of emotional issues) and domain-6 (SF) which did not reveal any association. In a study by Hawkins AT et al, Amputees with low social integration have significantly low ambulatory status with no walking in 39% and slow walking in 59% and fast wakening in 74%, while high social integration revealed positive association with better quality of life and ambulation.[25] Functional ability reported by patient and attitude towards prosthesis are significantly correlated with satisfaction following amputation. [26]

In the present study, etiology of amputation also revealed significant association with total mean LEFS score with highest score for when etiology was fracture. Etiology also revealed significant association with most items of LEFS except squatting, stand 1 hour, sit for 1 hour, hopping and rolling in bed. Etiology also revealed significant ($p<0.05$) association with all items of SF-36 except Physical function.

According to Wurdeman SR et al. past history indicating CVA, vascular pathology of peripheral origin, anxiety have correlation with decreased ambulation with prosthesis, while other comorbidities including arthritis, COPD, congestive cardiac failure and diabetes do not predict reduced mobility [27]. Etiology and BMI are also predictive factor for determination of walking ability has been reported.[28] Diabetic amputees face higher level of mobility related disability.[18] According to Paxton RJ et al, Ambulation level and its intensity is lower in cases with Diabetes mellitus and thus quality of life is lower.[29] Comorbidities are prevalent representing health status of amputees in lower limb amputees with prosthesis mainly in females including individuals with vascular etiology of amputation.[14]

Limitations: Since study was conducted in only one part of Pakistan, its results cannot be generalized.

Conclusion

BMI has significant association with ambulatory status to the extent of getting in & out of bath, walking from room to room, squatting, heavy activities, sitting for 1 hour & hopping; & quality of life domains of emotional wellbeing, social function and pain.

General health has significant association with ambulatory status except LEFS items of squatting, standing 1 hour and sitting 1 hour. While general health has significant association with all domains of quality of life.

Etiology of amputation has significant association with ambulatory function except squatting, standing 1 hour, sitting 1 hour, hopping and rolling in bed. Etiology also has significant association with quality of life except its physical function domain.

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