



Original Article

Correlation between Mobility Restriction, Body Image Perception and Prosthesis Satisfaction among Lower Limb Amputee Prosthesis Users

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ABSTRACT

Amputation is known as the surgical removal of the body part. Amputation occurs as a result of many conditions. The most common reason is poor blood circulation which results in a result of narrowing or damage of arteries. **Objective:** To determine the correlation between mobility restriction, body image perception and prosthesis satisfaction among lower-limb amputee prosthesis users. **Methods:** This cross-sectional study was conducted on 63 participants after taking consent from ethical review board of Faculty of Allied Health Sciences, The University of Lahore. The data was collected from Pakistan Society for the Rehabilitation of the Disabled (PSRD), Ghurki Trust Teaching Hospital of Lahore. Both male and female amputees were included with 18 to 60 years. Data was collected by using TAPES, Amputee Body Image Scale and Amputee Mobility Predictor Assessment Scale. **Results:** The results showed that the average age out of 63 amputees was 39.37 years. Females were 21 (33.3%) and males were 42 (66.7%). According to result people with below the knee amputation had more mobility (20.00), more satisfaction level (62.04) and less disruption of body image (18.15) in comparison with people who had above the knee level amputation (15.50, 68.50 and 16.50). The results showed that the satisfaction level and mobility were directly correlated with one another but on the other hand inverse correlated relationship was seen for body image disruption with mobility and satisfaction level ($P < 0.05$). **Conclusions:** Based on these results, it was concluded that body image perception, mobility and prosthesis satisfaction are correlated to one another in people with lower limb amputation who uses a prosthesis.

INTRODUCTION

'Amputation' came from the Latin word 'amputee' (to excise, to cut out), it is defined as removal of a region or all of a body part surrounded by skin [1]. Amputation is known as the surgical removal of the body part. Without proper circulation, proper oxygen exchange from the cell is not possible due to which affected tissue is infected or results in cell death [2]. Amputation can be of the upper limb or lower limb. The most common amputation is of the lower limb. Lower limb amputation (LLA) is divided into two parts major and minor. Major lower limb amputation is done on the ankle or above. Major lower limb amputation is defined as the surgical removal of a part or whole limb proximal to the ankle [3]. Lower extremity amputation is regarded as

an utmost health event that can adversely influence an individual's functional mobility. Lower extremity amputation impacts a person's functional, psychological and social elements. Prosthesis use after an amputation holds a beneficial influence on an individual's psychosocial position and quality of life. It plays a major role in improving and or restoring physical function and capacity, independence in ADLs, body image. A satisfactory prognosis relies on physical and mental aspects and prosthesis adaptation. Lower extremity amputation yields a considerable socioeconomic impact and reduces functional capacity, independence, and quality of life [4]. Researchers studying these challenges often depicted the

personified experience after amputation, including coping with body image stress, identity changes, the meaning of using a prosthesis, negative thoughts, reactions and emotions about their amputation, and social distress [5]. Patients with amputation normally suffer from body image problems which lead to anxiety or depression. This depression or anxiety sometimes leads to phantom pain which causes further anxiety [6]. Amputation is a life-saving procedure with a consequent change in an amputee's functional, social and psychological aspects of life. Besides the change in mobility because of prosthesis fitting and corresponding prosthesis satisfaction, an amputee may encounter psychological issues as well i.e., depression, low self-esteem due to many factors such as a change in perception of body image [7]. All of these factors alone or collectively contributes to a reduced quality of life of a lower limb amputee. So the objective of this study is to correlate mobility, body image perception and prosthesis satisfaction in amputees and to encourage further research about this topic. This will help the health care professionals in providing better care to amputees improving their quality of life and allowing them to enhance their independence. According to the researcher's knowledge, this study hasn't been done in Pakistan previously.

METHODS

This is a cross-sectional study. The inclusion criteria for this study was both genders, prosthesis users from 18 to 60 years of age, both bilateral and unilateral amputees, people who used prosthesis daily for the past 6 months and people who were amputated by peripheral vascular disease, diabetes, trauma, infection, cancer and clot cases were included. Exclusion criteria was patients who were affected by comorbidities such as induce fear of fall, bedridden people, patient not using prosthesis, patients with any neurological and cognitive problem and lastly people who were not willing to participate. This study was conducted on 63 participants. It was done as there is less chance of error occurrence in a large sample size due to skewed data in the small population data. A large sample size helps in giving more accurate results with minimum chances of the error margin. Due to less availability of the patients and less time duration data of only 63 participants were collected. The data was collected from different hospital settings. Data was collected by using the Trinity amputation and prosthesis experience scale, Amputee body image scale and amputee mobility predictor assessment scale. The amputee mobility predictor scale was used to assess the mobility of the amputee. It is scored by calculating K0, K1, K2, K3 and K4. K0 was calculated by adding questions 1, 2, 3, 4, 5, 6 and 7. K1 was calculated by

adding questions 4, 6, 7, 9, 10, 13 and 14. K2 was calculated by adding questions 7, 9, 10, 15, 16 and 17. K3 was calculated by adding question 9, 10, 12, 15, 16, 17, 19 and 20. K4 was calculated by adding questions 9, 15, 16, 17, 18, 19 and 20. The greater the score greater was the mobility [8]. TAPES was used to assess prosthesis satisfaction. This questionnaire consists of nine subscales. It psychosocial scale assesses 3 further subscales known as social adjustment, limitation adjustment and general adjustment. It activity scale assess further three subtypes which are functional activity, social activity and athletic activity limitation. Its last scale which is used to assess the satisfaction level of patient's further divide into three subscales which are functional satisfaction, aesthetic and weight satisfaction. In this study only prosthetic satisfaction was assessed based on these three subtypes [9]. Functional satisfaction was calculated by adding 5 questions whose score range is from 5 to 25. Aesthetic satisfaction was calculated by adding 5 questions ranging scores between 4 and 20. Weight satisfaction was calculated by the sum of one question. The greater the score greater was the patient satisfaction level. Amputee body image was calculated by adding all 20 item questions. Its score range from 20 to 100. Higher the score higher was the disruption of image disturbance [10].

RESULTS

Several participants who encountered the inclusion criteria were registered i.e. N= 63. Data was collected by using Trinity amputation and prosthesis experience scale, Amputee body image scale and amputee mobility predictor assessment scale for all 63 participants of both genders. The results showed that the Mean age was 40.06 years. Females were 21 (33.3%) and males were 42 (66.7%). The results showed that the average value of amputees with tumor cases out of 63 was 2 with a percentage of 3.2%, an amputee who had an accident out of 63 were 12 (19.0%), amputees who were diabetic had an average value of 48 (76.2%) and amputee who were amputated due to other causes was 1 (1.6%). The average value of amputee laterality with left side amputation cases out of 63 was 29 (46.0%), amputees who had bilateral leg amputation out of 63 were 6 (9.5%), and amputees who had right side amputation was 28 (44.4%). Amputees who had below the knee amputation had an average value of 55 (87.3%) and amputees who had amputation above the knee had an average value of 8 (12.7%). The average value of prosthetic satisfaction was 19.43, mobility was 17.94 and body image was 62.86. Above the knee amputee patients lie in k1 and k2 level of amputee mobility level and below the knee amputee patients lie in k0, k2, k3 and also k4 level of amputee mobility. According to result people with below the knee amputation had more mobility (18.14), more satisfaction

level (20.00), and less disruption of body image (62.03) in comparison with people who had above the knee level amputation (16.50, 15.5,0 and 68.50). The result of the normality test showed the data is not normally distributed as the p value was less than the significant value ($P < 0.05$). So, for this unequally distributed data non-parametric test of spearman correlation was applied. The result of this test shows that the P-value or the significant value is less than 0.05 for all three variables which shows that all three variables are correlated with one another ($P < 0.05$). The result showed that satisfaction level and mobility are directly correlated with one another but on the other hand inverse correlated relationship is seen between body image disruption with mobility and satisfaction level ($P < 0.05$). The results showed that people with below the knee amputation had more mobility (20.00), more satisfaction level (62.04) and less disruption of body image (18.15) in comparison with people who had above the knee level amputation (15.50, 68.50 and 16.50) (Table 1).

Amputation type		Satisfaction	Body Image	Mobility
Above the knee	Mean	15.5000	68.5000	16.5000
	SD	12.22410	29.30139	11.17395
	Minimum	6.00	22.00	4.00
	Maximum	34.00	93.00	33.00
Below the knee	Mean	20.0000	62.0364	18.1455
	SD	11.99691	27.05205	9.2904
	Minimum	4.00	10.00	14.00
	Maximum	43.00	98.00	35.00

Table 1: Comparison of Amputation type with Mobility, Body Image and Satisfaction Level

The results of Table 2 showed that the P-value or the significant value is less than 0.01 for all three variables which shows that all three variables are strongly correlated with one another. The table shows that satisfaction level and mobility are positively correlated with one another but on the other hand, strong negative correlation is seen of body image disruption with mobility and satisfaction level.

Amputation type		Body Image	Satisfaction	Mobility	
Spearman's rho	Body Image	Correlation Coefficient	1.000	-.886**	-.830**
		Sig. (2-tailed)	.	.000	.000
		N	63	63	63
	Satisfaction	Correlation Coefficient	-.886**	1.000	.886**
		Sig. (2-tailed)	.000	.	.000
		N	63	63	63
	Mobility	Correlation Coefficient	-.830**	.886**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	63	63	63

Table 2: Spearman's Correlation

DISCUSSION

Amputation is a lifesaving process that is impacted by an amputee's functional, social and psychological aspects of life [11]. Besides the change in mobility because of prosthesis fitting and corresponding prosthesis satisfaction, an amputee may encounter psychological issues as well depression, low self-esteem due to many factors such as a change in perception of body image [12]. This cross-sectional study was conducted on 63 participants. The data was collected from different hospital settings. Data was collected by using Trinity amputation and prosthesis experience scale, Amputee body image scale and amputee mobility predictor assessment scale. The result of this study shows that average people who went below the knee showed satisfaction of 20.00 with the level of the prosthesis. This satisfaction rate was slightly more than that of the knee patient. This is due to the increased atrophy rate at the higher level in comparison to the lower level. People with the stump at the lower knee level provide more stability and balance than stump in higher-level amputation [13]. Patient satisfaction with the prosthesis act as a major indication for the quality of life assessment. This quality of life is associated with the mobility of the prosthesis [14]. Studies have shown that this satisfaction is majorly dependent upon the mobility of the prosthesis. It is stated that if there is more mobility patients more satisfaction is achieved and if there is less mobility, there is less patient satisfaction rate [15]. It is stated that people with proximal level amputation are less satisfied than distal level amputation. This is due to the weight and decreased mobility of the prosthesis [16]. Results include that body image is more disturbed above the knee level than below the knee. This depends upon a person's satisfaction with his or her appearance. It is stated that body image appearance depends upon a person's fitness or health which entirely depends upon a person's mobility [17]. More mobility less time will take for the rehabilitation process and more satisfied a person would be with his or her appearance. Person appearance has an impact on a person's self-esteem more impacted a person's appearance and mobility is more will be his or her dissatisfaction level [18]. It is stated that the main factors of beauty, body image and self-esteem are definitely affected during amputation but its value entirely depends upon the level of amputation. The higher the amputation more impacted the self-esteem would be causing more disturbance in disrupting body image [19]. Studies have shown that disruption in body image causes depression, anxiety and many other psychological disturbances. This psychological disturbance impacts a person's quality of life leading towards reduction in mobility. This reduction

causes a person a more severe disability. This impact of disability on a person creates less satisfaction feeling towards prosthesis [20]. As below the knee, amputation shows a better result with better functional outcome in comparison to above knee level amputation [21]. Mobility in the below the knee level amputation was more (18.15) than above the knee amputation (16.50). In another study, Smith et al., stated that in the case of people where the popliteal pulse is still present below the knee level amputation is a better option than above the knee [22]. In another study, it was concluded that the higher the level of amputation, lower is the degree of rehabilitation process [23]. Below the knee, amputation works in the area between ankle and knee which provides the patient with more range for movement and can allow patient to walk this is why below the knee is a preferred choice than above the knee amputation [24]. Conflicting debate states that mobility and body image perception are not related but according to recent research findings. These results didn't support the results of our study as the results of our study indicates that the way a person perceives their body image does impact a person's ability to train which ultimately helps a person to improve their mobility. In a study, it was stated that lower body satisfaction or self-esteem results in poor body image [25]. Previous studies have shown similar findings related relationship between mobility, prosthesis satisfaction and body image. Our study on the contrary explained the relationship between body image and quality of life in terms of improving mobility along with personal satisfaction level. Hence based on all previous studies and results of this study, it is stated that there is a relationship between mobility, body image, and prosthesis satisfaction.

CONCLUSIONS

It is concluded that body image perception, mobility, and prosthesis satisfaction are correlated to one another in people with lower limb amputation who use a prosthesis.

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