Variables Affecting the Amputees' Reactions Artificial Limbs in the Kingdom of Jordan

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Abstract

Amputee reaction to artificial limb is an important issue faces amputated individuals and the team who delivers services to these individuals. Although some individuals using artificial limb accept it, some others do not. There are several factors that may make it difficult to accept the artificial limb for a long time. The aim of this study is to investigate some variables associate with reaction to prosthesis, the relationship between these variables, and the quality of response to the artificial limb by some amputees who own an artificial limb. Data were collected through self- administered questionnaire developed by the researcher, validated by a group of expertise from the University of Jordan, and then handed to individuals with amputation who visited artificial limb centers in Jordan. There are different levels of relationships between the studied variables (gender, age, site of amputation, level of amputation, and type of prosthesis) and reaction to prosthesis. There is a correlation between age and reaction to the prosthesis (r= 0.44) (p<.001) and there is a strong positive relationship between the type of prosthesis and the reaction of the amputee to the prosthesis (r= 0.99) (p<.001). A negative relationship is found between, site of amputation, and level of amputation (r=-.39,-.01, and -.30, respectively. There are several factors that affect the reaction to prosthesis. Some variables affect the relationship positively such as tenderness and level of amputation, and some others affect the relation negatively such as age and the location of amputation. Based on the results of the current study, further investigation is needed regarding the relation between acceptance of amputation and other variables, such as social class. It is also suggested to investigate the inferential correlation between variables and the experience with the amputation. The results of the study should be employed in developing rehabilitation programs for individuals with amputation including synthesis for the artificial limbs, and counseling.

Keywords: variables, amputee, artificial limb, reaction to prosthesis

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Introduction

The Artificial Limb (AL) is a type of prosthesis which replaces a missing extremity. Its' use is determined largely by the extent of an amputation, and its location. It is used by the amputee to achieve a variety of purposes including overcoming the cause of amputation, cosmetic purposes, functional purposes, and social purposes (Michelle et al., 2013) .Generally, the artificial limbs are of four main types. They include are transtibial (TTAL), transfemoral, (TFAL), transradial, (TRAL) and transhumeral (THAL) (Katherine et al. 2002),

A transtibial artificial replaces the missing part below the knee. Patients with transtibial amputation are usually able to regain normal movement compared to those with transfemoral amputation, because those with transtibial have amputation below the knee and they still may use it compared to those with transfemoral amputation who do not have a knee (Catherine et al., 2002). Individuals with transfemoral artificial usually face difficulties regaining normal movement as they need 80% more energy to walk compared to a normal person with two normal legs. This is because of the complexities of limb movement that are associated with the knee movement. (Jame V. et al., 2005).

The transradial artificial limb replaces an arm missing below the elbow. There are two types available. The first one is a cable operated limb, which works by attaching a harness and cable around the opposite shoulder of the damaged arm. The other type is a myoelectric arm and it works by sensing via electrodes while the muscles in the upper arm moves, causing an artificial hand to open or close.

The transhumeral artificial limb replaces the part of the arm that is missing above the elbow. Transhumeral amputees face some of the same problems as transfemoral amputees, due to the similar complexities associated with the movement of the elbow. This makes it difficult for demonstrating the correct motion with an artificial limb.

As we mentioned, range of options and technical expertise available, it is important to find out how the recipients react to their artificial limbs, the purposes for which they use their artificial limbs, the extent of such use, and what variables related to the reaction. This knowledge will permit the available technology to be used to the best advantage to help those people to adapt to their problems and needs.

Previous studies have defined the reaction to the artificial limb as avoidance - acceptance, or a non-use or minimal use versus use or maximal use of the artificial limb which has been fitted to the individual and examined the question of rejecting the artificial limb among wearers (Burroughs & Brook, 1985).

Wilson Jr (1970) observed that the acceptance rate of artificial limbs is low. The factors that have been detected are function capabilities and technical difficulties of the artificial limb. In other words, the problems are presented in joints and the poor fitting of the artificial limb to the stump (residual limb).

Phillips et al. (2012) stated that some of their patients reported that although they own one or more artificial limbs, they do not actually use them in their daily activities. Others reported that their artificial limbs remain in the closet because the bother of the donning and doffing of the artificial limbs and the discomfort of wearing them outweigh the functional gains that they provided. Some previous studies reported on the high rate of abandonment of upper artificial limb in comparison with the lower rate of abundance in lower limb. This proves the importance of the artificial limb in transportation and movement. Also, abundance is usually in favor of heaviness of the artificial limb (Biddis & Chau, 2007 & 2008).

Mckenzie (1970) stated that the rejection rate by unilateral upper limb amputee is too high for complacency and it was much worse than for both upper limb amputees. His views on the cause of high rejection rate among the individuals with unilateral limb are based on the development of one handedness which removes the functional need for the artificial limb, lack of sufficient training or skill in using the artificial limb, poor comfort of the prosthesis, the unnatural look or profile of the artificial limb, and the reaction the wearer gets from other people.

None of the above researchers provided figures which demonstrated the extent of rejection, but Herbert et al. (1979) provided such a measure for that. In their study they were indirectly concerned with the problem of rejection but they were evaluating a clinical rehabilitation program for amputees .Their measure of rejection was a simple count of the number of individuals using different kinds of artificial limb, and one of their categories happened to be none (prosthesis not used at all). In their study, thirty eight (38) of the participants surveyed were between one and twelve years of age after receiving artificial limb. It was reported that (26.3%) of the participants indicated that they did not use it. This response demonstrated the existence of a problem, but over all a lack of research into rejection and particularly into the factors behind failure to use artificial limb.

A study by Wagner et al. (2007) consisted of children and young adults aged between 2 and 20 years with unilateral congenital transverse forearm total deficiency (UCTFTD) and their parents were tested for satisfaction, quality of life, and function. (34%) of those tested had chosen not to wear an artificial limb. The children and their parents were asked the following open-ended question: "What are the reasons for not wearing prosthesis?" and were allowed to give more than one response. It was reported that (53%) of those who responded to the question stated that they did not wear the prosthesis because it did not help function, and 49% reported they stopped wearing it because the prosthesis was uncomfortable. Currently, upper-extremity prosthetic management for children with UCTFTD is controversial issue, with some clinicians advocating the need for prostheses to accomplish bilateral hand tasks, particularly in the scheme of normal development. Responses from children who do not wear prosthesis may aid practitioners in re-evaluating the prosthetic role and potentially improve prosthetic options.

A study conducted by McFarland et al. (2010) on artificial limb satisfaction among wounded service members and veterans with unilateral upper-limb loss has been conducted on 47 participants from the Vietnam conflict and 50 from Operation Iraqi Freedom/Operation Enduring Freedom (OIF/ OEF) with combat-associated major unilateral upper-limb loss. Upper-limb prosthetic devices were used by 70% of the Vietnam group and 76% of the OIF/OEF group. Mechanical/body powered upper-limb devices were favored by the Vietnam group, while a

combination of myoelectric/hybrid and mechanical/body-powered devices were favored by the OIF/OEF group. Upper-limb devices were completely abandoned in 30% of the Vietnam and 22% of the OIF/OEF groups. Abandonment rate was more frequent for trans- humeral and more proximal levels (42%) of Vietnam and 40% of (OIF/OEF) than more distal limb-loss levels. Upper-limb prostheses were rejected because of dissatisfaction with the device by significantly fewer (23%) members of the Vietnam group than the OIF/OEF group (45%) ($p < 0.001$). The most common reasons for rejection included pain, poor comfort, and lack of functionality. A significant paradigm shift has been noted in the OIF/OEF group, who use a greater number and diversity of upper-limb prostheses than the Vietnam group.

A review article presented an analytical and comparative survey of upper artificial limb acceptance and abandonment as documented over 25 years (Elaine et al.,2006) detailing areas of consumer dissatisfaction and ongoing technological advancements.

English-language articles were identified in a research of Ovid, PubMed, and ISI Web of Science (1980 until February 2006) for key words upper limb and prosthesis. These articles focused on upper limb prostheses and addressed variables as factors associated with abandonment, rejection rates, functional analysis patterns of wear; and consumer satisfaction, were extracted with the exclusion of those detailing tools for outcome measurement, case studies, and medical procedures. Approximately (200) articles were included in the review process with 40 providing rates of prosthesis rejection. Quantitative measures of population characteristics, study methodology, and prostheses in use were extracted from each article. The mean rejection rates of (45%) and (35%) were observed in the literature for body-powered and electric prostheses respectively in children, whereas the rejection among adults was significantly low for both body-powered (26%) and electric (23%). As for the non-wears, the average incidences were similar for pediatric (16%) and adult (20%) populations.

A study by Gailey et al. (2010) on rehabilitation goals following major combat associated limb loss in World War II and the Vietnam War focused on treatment of the injury and a return to civilian life. The goal for Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) service members was to restore function to the greatest possible degree and, if they desire, return them to active duty by providing them with extensive rehabilitation services and a variety of prosthetic devices. The study determines the usefulness of these diverse types of prosthetic devices for restoring functional capability and documents prosthesis use and satisfaction. The researchers compare service members and veterans with major combat-associated unilateral lower-limb loss: (178) from the Vietnam War and (172) from OIF/OEF conflicts. Of survey participants with unilateral lower-limb loss, (84%) of the Vietnam group and (94%) of the OIF/OEF group currently use at least one prosthetic device. Reasons for rejection varied by type of device, but common reasons were pain, prosthesis too heavy, and poor fit. Abandonment is infrequent (11%) Vietnam group (4%)(OIF/OEF group). Future efforts should aim to improve prosthetic-device design, decrease pain, and improve quality of life for these veterans and service member.

Østlie et al. (2012) estimated the rates of primary and secondary prosthesis rejection in acquired major upper-limb amputees (ULAs) to describe the most frequently reported reasons for rejection and estimate the influence of background factors on the risk of rejection.

Primary prosthesis rejection was found in (4.5%), whereas (13.4%) had discontinued artificial limb use. The main reasons reported for primary non-wear were perceived lack of need and discrepancies between perceived need and the prostheses available. The main reasons reported for secondary prosthesis rejection were dissatisfaction with prosthetic comfort, function and control. Primary prosthesis rejection was more likely in adult ULAS with proximal amputations, while the Secondary prosthesis rejection was observed in women with proximal ULAs. Østlie et al. recommends that clinicians should be aware of the increased risk of rejection in proximal ULAs, elderly ULAs and in women. Emphasizing individual needs will probably facilitate successful prosthetic fitting. Improved prosthesis quality and individualized prosthetic training may increase long-term prosthesis use.

A study conducted by Nichols et al. (1968) on 50 children with multiple congenital limb deformities who had been under continuous care for prosthetic management and general rehabilitation for four years. The study reported that children have poor recorded acceptance for the upper-limb conventional prosthesis. Of those fitted before the age of two years (14) children fitted with bilateral prosthesis rejected the prosthesis in nine occasions (64%), whereas acceptance was recorded in five cases (36%). However, it was difficult to assess correctly whether a child of this age has accepted or rejected the prosthesis, as the observer's judgment is likely to be very subjective. Also, it was noted that after the age of two years conventional prosthesis were totally rejected.

Thirty nine powered upper-limb prostheses were fitted on 13 children, and were rejected on 27 occasions. The acceptance rate of the powered –powered upper-limb was (25%) in children under the age of four years, and (38%) in children over the age of four years. Acceptance increased considerably when the powered hand was introduced. However partial rejection or acceptance) occurs for (50%) in children over 2 years of age.
Seventeen lower limb prosthetic appliances have been fitted on eight children, 13 of these were accepted, one partially rejected, and only three totally. Ultimately, lower extremity prostheses were accepted. Acceptance and partial acceptance were clearly related to increasing age. In the study it has been found the commonest cause for rejection was the mechanically inefficiency of the prosthesis (76%) and the next second common cause of rejection was the child's preference for using his or her residual limb. In few cases the lack of parents or child cooperation was a major reason for rejection.

Male patients using an upper artificial limb following amputation described themes of psychosocial and functional adjustment to minimize sense of deference. It was facilitated by participants' artificial limb and their positive coping style. Within this, participants identified the personal meanings of their artificial limb and highlighted the term of its use. The minimization of their sense of difference resulted in participants regaining a sense of worth (Saradjin et al., 2008).

Hermansson et al. (2005) studied psychosocial adjustment in Swedish children with upper- limb reduction deficiency and myoelectric prosthetic hand. Children with upper-limb reduction deficiency and myoelectric prosthetic hand showed social competence, behavioral, and emotional similar to Swedish standardized norms. However, withdrawn behavior was significantly higher in all children, social competence was significantly lower in girls, and social

activities were significantly lower in older children with upper limb reduction deficiency. There was a significant difference between prosthetic use groups. Non- users had significantly more delinquent behavior problems than full- time users. There was an interaction between gender and prosthetic use in their effects on competence and behavior/ emotional problem, yielding two contrasting patterns.

A qualitative analysis of living with an Osseo integrated prosthetic limb by Lundberg et al. (2011) showed that all participants described living with OI- prosthesis as revolutionary change. Preliminary thematic analysis revealed that factors such as self- image, social, physical and practical concerns, the meaning attributed to and the acceptance of the amputation and support among others were important to adjustment process (Gallagheretal, 2001).

The psychological adjustment to adult individuals with amputation who use prosthesis in the lower limb was studied by Atherton, (2009). Psychological Adjustment Scale of Trinity and Amputation and Prosthesis Experience Scale, hospital Anxiety and Depression Scale, The Self Consciousness and the Appearance Schemas Inventory were used. By using conservative cuff scores, the prevalence of anxiety and depression was 29.9 and 13.4%, respectively. Appearance-related beliefs were associated with both distress and psychological adjustment to difficulties. Public and not private self-consciousness was associated with distress and psychosocial adjustment difficulties.

Seventy Australian upper limb amputees responded to detailed postal questionnaire asking how often they wore their prosthesis and their level of satisfaction with both their prostheses and their functional abilities. It was reported that (56%) of amputees wore their limb once in a while, or never. Prostheses were most often worn all the time for work and social activities. The amount of time amputees wore their prostheses was moderately associated with their level of satisfaction with their prostheses. The association between the amount of time the amputees wore their prostheses and their level of satisfaction with their functional abilities was very low. Their prostheses were rated as fair or not acceptable by (64%) of amputee. Sweating was rated as not acceptable by (55%). This may be a significant contributing factor to the low prosthetic use. The amputees who did not wear prostheses did not have any greater satisfaction with their ability to do the tasks they want to do than the amputees who wore prostheses (Davidson, 2002).

The rates of rejection exhibited a wide range of variance because of the heterogeneous samples and the methodology differences between the studies (Davidson 2002).

Future research should focus on controlled multifactor studies, adopting standardized outcome measures in order to promote comprehensive understanding of the factors affecting artificial limb use and abandonment. An enhanced understanding of these factors is needed to optimize prescription practices, guide design efforts, and the demand for evidence-based measures of intervention and rehabilitation.

Research Questions

After reviewing literature related to the research subject, the following questions were formulated for the present study.

1. Is there a rejection problem in the population under the study? And if so, what is the extension of this problem?

This question involves defining a measure of rejection, identifying levels of use among the research sample according to this measure, and identifying high and low users of artificial limb.

2. What are the variables that affect the level of reaction to the artificial limb?

Research variables

The research variables involve two sorts:

Independent variables which include: Age, gender, level of amputation, kind of artificial limb, direction of amputation, site of amputation.

For the purpose of the study, these variables are subdivided as follow: Age groups (10-20 years. 21-30 years, 31- 39 years. 40-49 years, 50-59 years,60-69 years , 70-80 years), Gender (male, female), Level of amputation (lower extremity and Upper extremity), Direction of amputation (right, left), site of amputation (below knee, above knee, below elbow , above elbow). Type of artificial limb (cosmetic, body- powered, myoelectric)

Dependent variable: which includes the reaction to the artificial limb and it is measured by four levels on the scale (strongly acceptable, acceptable, strongly unacceptable, unacceptable, and poorly unacceptable.

Definition of Research Terms

Amputee reaction: It is defined as the response of amputee to artificial limb as it measured with the research tool.

Amputee: An individual who lost part or all of his or her limb whether it is in the upper or lower limb due to any cause.

Artificial limb (*prosthesis*): It is a special unit compensates the normal extremity function, whether it is on the upper part or lower part.

Methodology

Sample

The research sample was selected conveniently from the community of the research which included al the amputated individuals (patients) who attend the royal medical services and the centers managed by the ministry of health in Kingdom of Jordan during the date of the research which are around 1000 individuals; the sample consisted of (168) participants of both genders, age between 10-78 years old. Selected randomly from the community research during the date of the data collection (3/8/2015 to 30/10/2015)

Settings

Community research: All amputated patients attended Farah Rehabilitation Center / royal medical services (650 individuals) and public hospitals/ rehabilitation centers in Jordan (350 individuals) during the period from 3/8/2015 to 30/10/2015.

Data collection

Data were collected by using a special tool constructed by the researchers and validated by 10 experts related to the field. The tool consists of two sections. Section one about general information and section two consists of one statement related to acceptance level (acceptance, unacceptance, poorly acceptance and highly acceptance of prosthesis..., etc.). The tool was handed to 200 participants (178 were returned, and 10 of them were excluded due to incomplete information).

Data analysis

To achieve the purposes of the study, Statistical Package for Social Science (SPSS) version 21 was used to analyze data (Descriptive statistics (mean and Sd.), correlation, and independent samples t-test).

Results

Analyzing data revealed that amputation is more common among male (*n*=98; 58.3%) than female (*n*=70; 41.7 %). Upper limb amputation forms (67.3%; *n*=113), while lower limb amputation forms (32.7%; *n*=55). According to the level of amputation analyzing data indicates that 11.9% (*n*=20) are with above knee amputation, 29.8% (*n*=50) are with below knee amputation, 23.8% (*n*=40) have above elbow amputation, and 34.5% (*n*= 71) have below elbow amputation.

The highest percentage of amputation is among age group 21-30 years (19%) while the lowest percentage is among elderly people (14%). As for the side of amputation, 77.4% are of right – sided amputation (*n*= 130) and 22.6% are of left-sided amputation (*n*=38).

According to the type of artificial limb, 80 wear cosmetic prosthesis (47.6%), 28.6% of the recipients wear body power prosthesis (*n*=48), and 40 recipients wear myoelectric prosthesis (23.8%).

Analyzing the participants responses to the statement (reaction to the prosthesis), 25% of the participants did not accept the prosthesis (n= 42), six (3.8%) of participants answered they accepted poorly, (37) participants (22%) answered they accepted the prosthesis, while (47) participants (28.0%) answered that they highly accepted their prosthesis.

When using Spearman correlation coefficient to analyze the relationship between gender, age, site of amputation, level of amputation, location of amputation and type of prosthesis wore by the participants, the following results were found:

1-Participants responses show a significant positive correlation (r=.40) (p< .001) between amputee reaction to the prosthesis and gender.

2-Participant responses indicate a significant negative correlation (r =- .39) (p< .001) between reaction to the prosthesis and age related to the age group below 40 years.
3. Participants responses show no correlation between site of amputation and amputee reaction to prosthesis (p>0.05).
4. Participants responses show a positive correlation between level of amputation and reaction to prosthesis related to amputation below knee amputation (p=0.014).
5- Participants responses show a negative correlation between location of amputation and amputee reaction to prosthesis (p< .001) related to right limb.
6- Participants responses indicated a significant positive correlation between amputee reaction to prosthesis and the type of prosthesis (p< .001), related to myoelectric and body- powered artificial limbs. (See Table 1)

Table 1: correlations of independent variables with amputee reaction

Variables	Spearman's r	p
Gender	.40	<.001*
Age	-.39	<.001*
Site of amputation	-.01	.89
Level of amputation	.19	.014*
Location of amputation	-.30	<.001*
Type of prosthesis	.94	<.001*

* Correlation is significant at 0.05 α level

As for the differences between males and female in reaction to amputee prosthesis, there has been a significant difference in favor of females (p <0.05). with regard to the differences among age groups in reaction to amputee prosthesis, there has been a significant difference in favor of age group below 40 years (p <0.05). As for the differences among sites of amputation in reaction to amputee prosthesis, there has been no significant difference among sites of amputation (p > 0.05). Regarding the differences among levels of amputation in reaction to amputee prosthesis, there has been no significant difference among the levels of amputation (p > 0.05). As for the differences among location of amputation in reaction to amputee prosthesis, there has been a significant difference in favor of who have prosthesis in the right limbs (p <0.05). As for the differences among types of prosthesis in reaction to amputee prosthesis, there has been a significant difference in favor of who have body powered and myoelectric limb (p <0.05). (See Tables 2 & 3).

Table 2: Independent variables statistics regarding reaction to amputee prosthesis (N = 168)

Independent variable	N	Mean	Standard deviation
Gender :			
Male	98	3.12	.80
Female	70	2.21	1.28
Age:			
40 or more	130	2.70	1.11
Less than 40	38	2.80	1.14
Site of amputation:			
Upper limb	113	2.75	1.11
Lower limb	55	2.72	1.14

Level of amputation:			
Above and below elbow	148	2.7	1.12
Above and below knee	20	2.8	1.18
Location of amputation:			
Right	130	2.9	1.06
left	38	2.1	1.11
Type of prosthesis:			
Body powered	48	1.9	.4
Myoelctric	40	1.7	..39
Cosmetic	80	2.8	.00

Table 3: t-test results for independent variables regarding difference in amputee reaction (N = 168)

Variables	*t*	*p*
Gender	-5.23	<.001*
Age	-6.82	<.001*
Site of amputation	.14	.89
Level of amputation	1.95	.053
Location of amputation	3.88	<.001*
Type of prosthesis	41.15	<.001*

* correlation is significant at 0.05 α level

According to Table 4 females are more common than males in the sample

Table 5 shows that the individuals in the age group (21-40) are the highest group in the degree of acceptance the artificial limb. No remarkable difference in the mean between acceptance of artificial limb related to the site of the amputation among the individuals using prosthesis (See table 6).

Table 4: Means and standard deviation (SD) for both genders regarding reaction to artificial limbs.

Sex	Mean	*N*	*SD*
Male	2.2	70	1.3
Female	3.1	80	0.80
Total	2.7	168	1.12

Table 5: Means and SD for age groups regarding reaction to artificial limbs.

Age group	Mean	*N*	*SD*
0-20	2.81	38	0.86
21-40	3.22	81	0.96
41-60	1.89	27	1.01
>60	1.9	22	1.12
total	2.7	168	1.12

Table 6: Means and SD for site of amputation regarding reaction to artificial limbs.

Site of amputation	Mean	*N*	*SD*
Upper limb	2.8	113	1.11
Lower limb	2.7	55	1.14
Total	2.7	168	1.12

The level of acceptance among individuals with amputation below the elbow is higher than the other levels of amputation (3.17) and slightly similar among the others with amputees using artificial limbs (See Table 7)

The level of acceptance among individuals with right limb amputation is higher than those with left limb amputation (See Table 8)

The level of acceptance among individuals using myoelectric is the highest (3.9) and acceptance of those using cosmetic is the lowest (See Table 9)

Table 7: Means and SD for level of amputation regarding reaction to artificial limbs.

Level of the amputation	Mean	*N*	*SD*
AK	2.9	20	1.2
BK	2.4	50	1.2
AE	2. 4	40	1.3
BE	3.17	58	0.75

*Above Knee (AK), Below Knee (BK), Above Elbow (AE), Below Elbow (BE)

Table 8: Means and SD for location of amputation regarding reaction to artificial limbs.

location	Mean	*N*	*SD*
RL	2.9	130	1.06
LL	2.1	38	1.11
total	2.7	168	1.12

*Right Limb (RL), Left Limb (LL)

Table 9: Means and SD for type of prosthesis regarding reaction to artificial limbs.

Type of prosthesis	*M*	*N*	*SD*
ME	1.0	40	0.00
CT	2.9	80	0.32
BP	3.9	48	0.28
total	2.9	168	1.12

Myo electric (ME), Cosmotic, (CT) Body- Powered (BP)

Discussion

Reaction to prosthesis is an individualized problem that is controlled by many factors such as age, sex type of prosthesis, experience, rehabilitation program, type of work performed by the prosthesis, the level of amputation, site of amputation, and social situation. In the recent study, the result revealed some variable associated with the reaction to the prosthesis (acceptance or rejection).

The study revealed that females are highly reactive positively than males. This result is congruent with the study conduct by Hermansson et al. (2005) in which they found that there was an interaction between gender and prosthetic use in their effect on competence and behavior/ emotional problem

The study indicates similar rates of acceptance among those with upper and lower artificial limb, while the previous studies reported a high rate of abandonment among individuals of upper artificial limb. (Biddis & Chau, 2007, 2008). Ultimately, lower extremity prostheses were accepted (Nichols et al. 1968).

Previous studies say that the individuals rejected the prosthesis due to its uncomfortableness and artificial limb functioning (Wager, 2007).This result is also confirmed by the study conducted by Mc Ferland et al. (2010). As for the present study, the comfortability and the function characteristics of the artificial limb are associated with its type (cosmetic, body –power, or myoelectric) artificial limb. And this is emphasized by the result of the study by McFerland et al. (2010) which indicated that Vietnam war amputees are more rejected than those who are injured in Iraqi War , this result may explained by the involution in artificial limbs.

The present study indicates that the individuals with myoelectric artificial limbs are the most accepting for the artificial limb and this result is parallel with the result of the study conducted by (Lusardi et al., 2012) which is more functional than the other types of artificial limbs. Elaine et al. (2008) found that mean rejection rates of (45%) and (35%) were observed in the literature for body-powered and electric prostheses respectively in pediatric populations. Significantly lower rates of rejection for both body-powered (26%) and electric (23%) devices were observed in adult populations while the average incidence of non-wear was similar for pediatric (16%) and adult (20%) populations.

In the present study, young individuals of age group(20-40 years) accepted the artificial limb more than that of age group (0-20 years).This result is similar to the previous study done by Nicolas et al.(1968) which stated that acceptance and partial acceptance were clearly related to increasing age.

Nicholas et al. (1968) also reported that children have poor recorded acceptance for upper-limb conventional prosthesis. Of those fitted before the age of 4 years, (14) children fitted with bilateral prosthesis rejected the prosthesis in nine occasions (64%), whereas acceptance was recorded in five cases (36%),but it was difficult to assess correctly whether a child of this age has accepted or rejected the prosthesis, as the observer's judgment is likely to be very subjective. Also, it was noted that after the age of two years, conventional prosthesis were totally rejected.

Finally, many studies have indicated that the rate of acceptance or rejection is associated with delivering rehabilitation and training programs.

Recommendations

Health care team should be aware of the increased risk of rejection in prosthesis among individuals using artificial limbs. Emphasizing individual needs will probably facilitate successful prosthetic fitting. Improved prosthesis quality and individualized prosthetic training may increase long-term prosthesis use. Further studies on the effect of prosthetic training and of the reasons for rejection of different prosthetic types are suggested. In addition, the author recommend for further studies about the factors which affect the recipient reaction to prosthesis such as level of education, social and economic status, and the culture. Investigation is also needed regarding the inferential statistics analysis within the same independent variable (gender, age, the weight of the limb… etc.)

According to the study, the sample analysis reveals high frequencies for the male than female in general and this needs to re-test the sample according to the gender. In the future, the researchers should take into their consideration the homogeneity of the sample gender should be 50% female and 50 % male and the age group should be equalized or specific age group is needed. Also the study needs to involve all sites and levels of amputation and types of prosthesis in equalized sample size.

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