Effect of Rehabilitation Program on Quality of life for individuals with prosthesis limbs

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Abstract: **Prosthesis is simply a tool which is an artificial replacement for a missing limb or part of a limb that can help person to be independent after missing body parts. This study aimed to evaluate the effect of a rehabilitation program on quality of life for individuals with prosthesis limbs. A research design was quasi-experimental study conducted at the Physical Medicine and Rehabilitation and Rheumatology Center. A purposive sample consisting of 51 of individuals with prosthesis limbs. One tool was used for data collection; it was a structured interviewing questionnaire to assess: the socio-demographic characteristics of an individual with prosthesis limbs; medical history, knowledge about prosthesis, reported practices related to residual limb and prosthesis care and assess the quality of life for an individual with prosthesis limb. Results: This study proved that there is a statistically significant difference between pre/post implementation of the rehabilitation program regarding total satisfactory knowledge, total adequate reported practices, and also quality of life of studied sample between pre/post implementation of the rehabilitation program. Conclusion: The study concluded that, rehabilitation program has a positive effect on the individuals with prosthesis limbs knowledge, practices and their quality of life. Recommendations: The study recommended that, regular awareness program should be conducted regarding prosthesis limb.**

Keywords: **Rehabilitation, Quality of life, prosthesis limbs.**

1. INTRODUCTION

Limb loss is a life-changing event that can cause significant disruptions in many important areas of existence. They have to face many physical, psychological, economic and social problems in their life due to amputation. Hence, it's a life changing experience. Although individuals with limb loss regardless of the type of disability are confronted daily with the positive and negative impact of their abilities, there are certain ramifications when individuals can never choose to feel invisible or take a break from their difference. Even positive attention focused on how they are able to operate within their disability can be emotionally taxing over time [1].

Globally, limb loss has become one of the common problems in the present society, a number of people who have one or both limbs are amputated increase worldwide. Currently, the United States accounts for greater than 110,000 persons who lose their limbs through amputation annually, with approximately 101,000 (91.7%) of them involving the lower extremity [2].

Prosthesis is simply a tool which is an artificial replacement for a missing limb or part of a limb that can help person to be independent after missing body parts. Choosing to use one, or not, depends on personal goals. Prosthesis is used to provide an individual who has an amputated limb with the opportunity to perform functional tasks, particularly ambulation (walking) which may not be possible without the limb [3]. There are four main types of artificial limbs, these include the transtibial, transfemoral, transradial, and transhumeral prostheses, and the type of prosthesis depends on what part of the limb is missing [4].

Quality of Life (QOL) defined as an individualized concept, but it generally refers to an individual's psychological, social, physical and spiritual health domains. The QOL is important in maintaining self esteem and sense of wellbeing and in

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 5, Issue 3, pp: (202-217), Month: September - December 2018, Available at: **www.noveltyjournals.com**

experiencing the pleasure of life. Quality of life is a very important domain in amputated individuals. QOL is highly related to both physical and social aspects of an amputee's life. Therefore, QOL is an important issue for the large number of persons who may need to adapt to severe and chronic disability due to trauma [5, 6].

Almost all developing countries have some rehabilitation services, but that such services generally reach less than 5% of the people with disabilities in the community. These services are frequently based in hospitals in centralized urban areas, which results in prohibitive costs and limited accessibility for the general population. In response, the WHO recommended the integration of rehabilitation services into community-based primary health care systems [7].

Rehabilitation includes all measures available to reduce or limit disability as treatment of complication. The goal of rehabilitation program for adults with prosthetic limb is to improve their mobility and to assist integration back into the community as independent and productive members [8]. Success of rehabilitation can be measured in many ways but a common outcome measure is successful fitting of prosthetic limb as use of prosthesis improves functional mobility and independence [9].

Rehabilitation of amputees represents a complex process during the course of which an amputee receives professional aid and support, so as to adapt to the use of prosthesis, the process aims at achieving an independent performance of the amputee in all areas of everyday life and as high quality of life as possible. Rehabilitation strives to achieve the maximal possible physical, emotional, social, vocational and financial independency of an amputee and his/her maximal efficiency in all aspects of life [10]. The aim of community health nurse in rehabilitation is to aid the individuals with limb loss to gain independence at the highest level they can, with the most efficient gait possible. The assessment must take into account the physical capabilities, level of amputation, psychological status, pre-amputation function, existing medical conditions and the patient's expectations [11].

A nurse with rehabilitation nursing training, knowledge, and experience is the healthcare professional who is best able to coordinate, support, and facilitate the discharge transition process to promote quality outcomes and cost-effective care for individuals with disabling conditions. The Association of Rehabilitation Nurses (ARN) recommends that nurses with this specialty training are utilized to facilitate care transitions for individuals with disabling conditions, to educate and inform families on options and services available [12].

Significance of the study:

In the last years, the rate of causes which lead to loss of limbs (lower & upper) increased in all ages. According to statistics of Armed Force Rheumatoid Rehabilitation Center (ARRC), the total number of attendance in the last 3 years was approximately 3000 persons, 90 % from them are adults and 10% children and this rate increases each year [13].

The community health nurse plays the central role on the rehabilitation team, she gives support and education, coordination of team activities, liaison between the team and prosthetic user, and resource person for the prosthetic user in locating services. This role serves individuals with limb loss and their families by encouraging them to utilize the skills and talents of other team members. The nurses have specific prosthetic role they learn the prosthetic user at the beginning how choosing appropriate prosthetic device, then identify them the fitting process, then learn them how to use prosthetic device, how to care it, how to care residual limbs and at the end give them health education about the importance of follow up to achieve maximum independence [14].

Aim of the Study:

This study aimed to evaluate the effect of a rehabilitation program on quality of life for individuals with prosthesis limbs. This aim was achieved by:

- Assessing individuals with prosthesis limbs' knowledge and practices regarding prosthesis.

- Assessing the aspects of QOL (physical, social, psychological, and spiritual) for individuals with prosthesis limbs.

- Designing and implementing a rehabilitation program for individuals with prosthesis limbs according to their identified needs.

- Evaluating the effect of the rehabilitation program on knowledge, practices and quality of life for individuals with prosthesis limbs.

Hypothesis:

A Rehabilitation program has a positive effect on the individuals with prosthesis limb's knowledge, practices and their quality of life.

2. SUBJECT AND METHODS

The subject and methods of the current study will be discussed under the following four (4) designs: Technical design, operational design, administrative design and statistical design

Technical Design:

It included research design, setting, subjects and tools for data collection.

Research design:

A quasi- experimental design was adopted to conduct the study

Setting:

This study was conducted at the Physical Medicine and Rehabilitation and Rheumatology Center affiliated to Armed Force, located in Al-Geza Governorate of Egypt, in Al Agoza district. The center includes a factory for artificial limbs and rehabilitation accessories. This rehabilitation center established in 1954, it occupies the first place in Middle East for manufacture of prosthetic devices, serves all governorates in Egypt and provides rehabilitation program for persons with prosthesis limbs. The rehabilitation center provides services to all military and civilian persons.

Research subjects:

A purposive sample consisting of 51 of individuals with prosthesis limbs who were attending in the previously mentioned setting over a 6 month period was recruited under the following inclusion criteria: Individuals with upper and lower prosthesis limbs, their age from 20 years old and wearing prosthesis limbs at least from 6 months to one year ago.

Tool of data collection:

One tool was used for data collection (Pre/post rehabilitation program):

Structured Interviewing questionnaire, It was designed by the researchers based on the recent literature review and experts' opinions. It is composed of five parts;

Part I: Designed to assess the socio-demographic characteristics of an individual with prosthesis limbs, it is composed of 7 closed- ended questions such as age, gender, residence, educational level, marital status, occupation and monthly income.

Part II: Designed to assess an individual with prosthesis limbs' medical history it includes 6 closed-ended questions as regards chronic disease, causes, site and number of limb loss, types of prosthesis and problems with prosthesis.

Part III: Designed to assess an individual with prosthesis limb knowledge about prosthesis which included meaning, causes of limb loss, importance, types, parts of lower and upper prosthesis, factors affecting success of prosthesis, cases of change and stop wearing prosthesis and prevention for occurrence of complication from prosthesis limbs.

Scoring System for knowledge:

For knowledge items, the correct answers were pre determined according to literature review, a correct answer was scored two and the incorrect answer was scored one.

The total score of knowledge about prosthesis was 20 points, classified into: satisfactory $\geq 50\% = $ (10-20 points) and unsatisfactory $< 50 = $ (0-<10points).

Part IV: Designed to assess an individual with prosthesis limb reported practices related to residual limb and prosthesis care, it was adopted from [15, 16]. It covered the following practices included daily cleaning, examination of prosthesis and residual limb, wearing and taking off prosthesis, exercise and correct position for residual limb and dealing with problems.

Scoring system for practices:

It was concerned with individuals with prosthesis limb practices regarding:

- Daily cleaning; it consisted of 13 items.

Scoring system: Each item has been scored as 2 grades = always reported, 1 grade = sometimes reported, and zero= never reported. Total optimal score = 26 grades.

- Examination of prosthesis and residual limb; it consisted of 3 items.

Scoring system: Each item has been scored as 2 grades = always reported, 1 grade = sometimes reported, and zero = never reported. Total optimal score = 6 grades.

- Wearing and taking off prosthesis; it consisted of 7 items.

Scoring system: Each item has been scored as 2 grades = always reported, 1 grade = sometimes reported, and zero = never reported. Total optimal score = 14 grades.

- Exercise and correct position for residual limb; it consisted of 10 items.

Scoring system: Each item has been scored 2 grades = always reported, 1 grade = sometimes reported, and zero= never reported. Total optimal score = 20 grades.

- Dealing with problems; it consisted of 10 items.

Scoring system: Each item has been scored 2 grades = always reported, 1 grade = sometimes reported, and zero= never reported. Total optimal score = 20 grades.

Total score of practices was evaluated and compared with the ideal action in the list; accordingly it was categorized as follows:

Adequate reported practice, 50% or more.

In adequate reported practices, less than 50%

Part V: It was constructed to assess the quality of life for an individual with prosthesis limb. This tool was adapted from [17] and modified by the researchers. It was concerned with an individual with prosthesis limb reported quality of life regarding 5 domains, physical domain, psychological domain, social domain and spiritual domain.

Scoring system for quality of life:

Each question had 3 levels of answers: "always", "sometimes", and "never". These were respectively scored 3, 2, and 1. The scores of the items were summed–up and the total divided by the number of the items. These scores were converted in to a percent score.

They were evaluated as follows:

- Poor reported quality of life referred to score < 50.

- Average reported quality of life referred to score from 50 < 75.

- Good reported quality of life referred to score from 75 - 100.

Validity and reliability:

The tools were tested for their content validity by a jury of five experts in the Community Health Nursing specialty and two colonels from the rehabilitation center. The required modifications were carried out accordingly. Then, test – retest reliability was applied. The tool proved to be strongly reliable (r=0.8222).

Operational Design:

Preparatory Phase

During this phase, a review of the literature was done through reviewing the available national and international related literature to be oriented with various aspects of the research problem and to develop the study tool.

Pilot study:

A pilot study was carried out before starting the data collection, it was done on 5 individuals with prosthesis limb and was carried out to assure the applicability of the developed tool, the clarity of the included questions, as well as to estimate the average time needed to complete all questions. Some changes were done accordingly. Those who shared in the pilot study were excluded from the main study sample.

Ethical considerations:

All the individuals with prosthesis limbs' rights were secured; each one was informed about the nature of the expected outcomes of the study. They were assured that all data will be treated confidentially and information will be used only for the research purpose and for their benefits and each study subject was allowed enough time throughout the study. They were also informed about their right to withdraw at any time without giving any reasons.

Field work:

- The actual field work was carried out over a period of 6 months from beginning of April up to the end of September 2017.

- The researchers were available in the study setting 2 days/week from 10.0 a.m. to 2.00 p.m.

- Data were collected from the individuals with prosthesis limb by individual interviews at the factory of prosthesis limbs in the Physical Medicine and Rehabilitation and Rheumatology Center using the pre constructed tool. Each interview took about one hour.

- Preparation for assessment took one month for developing the data collection tool obtained from literature review. Data collection and filling in of questionnaire and application of the rehabilitation program took 3 months. Follow up of individuals with prosthesis limb took 2 months. The follow up was started immediately after finishing baseline assessment for all individuals with prosthesis limb.

- Individuals with prosthesis limb were informed to be in contact with the researchers by telephone for any guidance at any time, and for reporting any health problems with the prosthesis.

Rehabilitation program development included 3 phases:

Phase (1): Preparation for assessment (1 month): It was based on the preparatory phase for developing the data collection tool obtained from the interviewing questionnaire, as well as literature review (pre/post test).

Phase (II): Design and implementation (5 months): the rehabilitation program was designed based on analysis of the actual needs of individuals with prosthesis limb in pre assessment by using the pre constructed tool. The rehabilitation program was developed through determining the general objective, contents, teaching methods and aids used.

The general objective: was to improve the knowledge, practices and quality of life of individuals with prosthesis limb.

Contents: Contents were designed to meet needs of individuals with prosthesis limb and to fit into their interest and levels of understanding. Teaching methods used in theoretical part were lectures presentation and group discussions, while in practical part they were conducted through demonstration and re-demonstration. Teaching aids included: data show and available real materials from the factory of prosthesis limbs (e.g., prosthesis limbs "leg or arm").

Sessions: The sessions took place at the reception in the factory of prosthesis limbs. The total number of sessions' hours was 10 (4 hours theoretical & 6 hours practical). The duration of each session was 1-2 hours. The sessions included the following parts:

Part I: Promotion of individuals with prosthesis limb knowledge about prosthesis limb, the researchers are providing information about meaning, causes of limb loss, importance, types, parts of lower and upper prosthesis, factors affecting success of prosthesis, cases of change and stop wearing prosthesis and prevention for occurrence of complication from prosthesis limb. At the beginning of the first session, an orientation about the program and its purposes was given. From the second session, each one started by a summary about what was given through the previous session and objectives of the new one, taking into consideration using simple and clear language to suit the level of all individuals with prosthesis limb.

By the end of each session a summary was made, and time was allocated for questions and answers, and a plan for next session was presented. The researchers adjusted with the individuals with prosthesis limb a day for the next session according to follow up time of each individual. Except for the last session, a termination of sessions through feedback was done.

Part II: Practices for the individuals with prosthesis limb included many activities, like daily cleaning and examination of prosthesis and residual limb, wearing and taking off prosthesis, exercise, correct position and dealing with problems. The individuals with prosthesis limb were given a rehabilitation illustrated booklet, designed by the researchers in Arabic language, to serve as a referral guideline for individuals with prosthesis limb. The rehabilitation illustrated booklet was evaluated for its content validity and clarity by a panel of experts, professors in the field of Community Health Nursing and colonels from the rehabilitation center. In the light of their comments, the necessary modifications were carried out and the final form of the rehabilitation booklet was administered.

Phase III: Evaluation of the rehabilitation program: evaluation of the program was done by using the post test questionnaire which was the same formats of pre-test in order to compare the change in individuals with prosthesis limbs' knowledge, practices and quality of life. It was assessed immediately post implementations of the rehabilitation program to evaluate the outcome.

Administrative design:

An official permission to carry out the study was obtained through an issued letter from the Dean of the Faculty of Nursing, Ain Shams University to the Colonel of the factory of prosthesis limbs in the Physical Medicine and Rehabilitation and Rheumatology Center. The letter included the title, aim and the expected outcomes of the study to obtain their approval to conduct the study.

 Statistical analysis:

The collected data were organized, revised, scored, tabulated and analyzed using the number and percentage distribution. Statistical analysis was done by computer using statistical package for social sciences (SPSS). Qualitative variables were compared using Chi-square test and quantitative variables were compared using Pearson correlation coefficient (r) for continuous parametric variables, and Spearman rank correlation for ordinal nonparametric variables. The significance of the results was considered as follows: When $P > 0.05$: it is a statistically insignificant difference, while $P < 0.05$ or $P < 0.001$: it is a statistically significant difference.

3. RESULT

Table I: shows that the mean age of studied sample with prosthesis limbs was 42.27 ± 10.59 years and 64.7%, 56.9% and 62.7% of them were male, from rural area and married respectively. Regarding educational level 37.3% of them had secondary level of education. As regards job, 39.2% and 31.4% of them had government employee and don't work. Meanwhile 66.7% of them had insufficient income.

Table II: demonstrates that the highest percent of studied sample with chronic disease was 46.8% had hypertension, for 58.8% of them the cause of lost limb was accident and for 72.5% of them loss was the lower limb. As regards types of prosthetic limb, 84.3% of them were functional prostheses. This table also reveals that 62.7% and 52.9% of studied sample had inflammation (redness/itching) and swelling as problems of wearing the prosthetic limb respectively.

Table III: elaborates that there are statistically significant differences (p<0.001), in all items of studied sample knowledge regarding prosthesis limbs between pre/post implementation of the rehabilitation program.

According to the research hypothesis, figure I: illustrates that there is a statistically significant difference (X2 =28.99 at p<0.001) between pre/post implementation of the rehabilitation program regarding total knowledge of studied sample, where 29.4% of studied sample had satisfactory total knowledge pre-implementation of the rehabilitation program compared to 82.4% of them had satisfactory total knowledge post implementation.

Table IV: displays that there are statistically significant differences (p<0.001) in all items (daily cleaning, examination of prosthesis and residual limb, wearing and taking off the prosthetic limb, Exercise and correct position for residual limb and dealing with problems) of studied sample according to their adequate reported practices about care and use of prosthesis and residual limb between pre/post implementation of the rehabilitation program.

According to research hypothesis, figure II: illustrates that, there is a statistically significant difference (X2 =27.36 at p<0.001) between pre/post implementation of the rehabilitation program regarding adequate reported practice score level about care and use of prosthesis and residual limb pre/post implementation of the rehabilitation program, where 33.3% of studied sample had adequate total practice score regarding care and use of prosthesis and residual limb pre implementation of the rehabilitation program compared to 84.3% of them had adequate total practice score post implementation.

Table V: displays the studied sample according to their total physical, psychological, spiritual and social aspects of quality of life. There were clear improvements in all aspects of quality of life after implementation of the rehabilitation program with statistically significant differences (X2 = 41.12, 31.43, 22.34 & 23.74) respectively at p<0.001.

According to research hypothesis, figure (3) shows that, there is a statistically significant difference in quality of life between pre/post implementation of the rehabilitation program regarding total quality of life, where 11.8% of studied sample had poor total quality of life post implementation of the program compared to 52.9% of them pre implementation.

Table VI: indicates that, there are positive correlations (r = 0.389, & r = 0.635 at p<0.05) between total studied sample's quality of life scores and their total knowledge score as well as total practice score respectively regarding prosthesis post implementation of the rehabilitation program. However, there are no correlations (p>0.05) between them pre implementation.

Table VII: shows that, there are positive correlations (r = 0.872 &r = 0.763 at p<0.05) between gender and education respectively of studied sample's and their total practices regarding prosthesis post implementation of the rehabilitation program. Moreover, there are positive correlations (r = 0.561& r = 0.563 at p<0.05) between age and marital status respectively of studied sample's and their total quality of life regarding prosthesis post implementation of the rehabilitation program. Meanwhile, there are no correlations between studied sample's work and residence and their total knowledge, practices and total quality of life regarding prosthesis post implementation of the rehabilitation program.

Table (1): Distribution of Studied Sample According to Their Socio-Demographic Characteristics (n =51).

Characteristics	No	%
Age:(in year) 20 -	9	17.6
30 -	15	29.4
40 -	14	27.5
>50	13	25.5
Mean 42.27± SD 10.59 years		
Gender: Male	33	64.7
Female	18	35.3
Residence : Rural	29	56.9
Urban	22	43.1
Marital status: Single	16	31.4
Married	32	62.7
Widowed	3	5.9
Educational level: Don't read and write	6	11.8
Basic education	17	33.3
Secondary education	19	37.3
University education	9	17.6
Job : Government employee	20	39.2
Private Employee	9	17.6

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 5, Issue 3, pp: (202-217), Month: September - December 2018, Available at: **www.noveltyjournals.com**

Retirement	6	11.8
Don't work	16	31.4
Income:		
Sufficient	17	37.3
Insufficient	34	66.7

Table (2): Distribution of Studied Sample According to Their Medical History (n =51).

Items	No	%
* **Chronic disease: (n = 32)**:		
▪ Hypertension	15	46.8
▪ Diabetes mellitus	19	59.4
▪ Cardiac diseases	9	28.1
▪ Hepatic diseases	11	34.4
Causes of lost limb		
▪ Accident	30	58.8
▪ Act of terrorism	13	25.5
▪ Diseases		
-Diabetes mellitus	8	15.7
Site of limb loss :		
▪ Upper	14	27.5
▪ Lower	37	72.5
Numbers of limb loss:		
▪ Single	49	96.1
▪ Bilateral	2	3.9
Types of prosthetic limb		
▪ Passive prostheses (cosmetic)	8	15.7
▪ Functional prostheses	43	84.3
***Problems of wearing the prosthetic limb:**		
▪ Inflammation (redness/Itching)	32	62.7
▪ Swelling	27	52.9
▪ Sensitivity in the skin	7	13.7
▪ Abscess	4	7.8
▪ Skin ulcer	3	5.8

Table (3): Distribution of the Studied Samples According to Their Satisfactory Knowledge about Prosthesis limbs Pre /Post Implementation of the Rehabilitation Program (n=51).

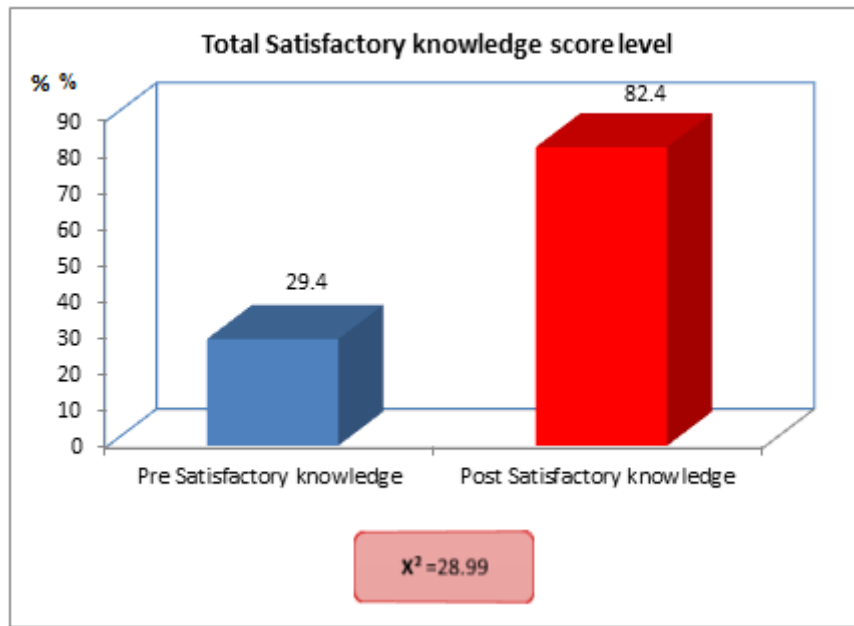| Individuals with prosthesis limbs' satisfactory knowledge regarding prosthesis limbs	Pre Satisfactory knowledge		Post Satisfactory knowledge		X^2	p value
	No.	%	No.	%		
Meaning of prosthesis limb	26	50.9	43	84.3	12.95	**0.000***
Causes of limb loss	12	23.5	39	76.5	28.59	**0.000***
Importance of prosthesis limb	9	17.6	46	90.2	54.02	**0.000***
Types of prosthesis limb	24	47.1	43	84.3	15.70	**0.000***
Parts of upper prosthesis device	17	33.3	35	68.6	12.71	**0.000***
Parts of lower prosthesis device	23	45.1	39	76.5	10.53	**0.000***
Factors affecting success of prosthesis limbs	10	19.6	38	74.5	30.85	**0.000***
Cases of changing prosthesis limb	13	25.5	46	90.2	43.78	**0.000***
Cases of stop wearing prosthesis limb	12	23.5	47	92.1	49.25	**0.000***
Prevention for occurrence of complication from prosthesis limb	3	5.9	43	84.3	63.35	**0.000***

*Statistically significant difference

Figure (1): Distribution of the Studied Samples According to Their Total Satisfactory Knowledge about Prosthesis Limbs Pre/Post Implementation of the Rehabilitation Program (n=51).

Table (4): Distribution of Studied Sample According to Their Adequate Reported Practices about Care and Use of Prosthesis and Residual Limb Pre/Post Implementation of the Rehabilitation Program (n=51).

Individuals with prosthesis limbs' adequate reported practices regarding prosthesis limbs	Pre rehabilitation program		Post rehabilitation program		X^2	p value
	No.	%	No.	%		
Daily cleaning	17	33.3	47	92.1	37.75	**0.000***
Examination of prosthesis and residual limb	9	17.6	43	84.3	34.35	**0.000***
Wearing and taking off the prosthetic limb	24	47.1	49	96.1	30.11	**0.000***
Exercise and correct position for residual limb	3	5.9	43	84.3	63.35	**0.000***
Dealing with problems	8	15.7	39	76.5	37.92	**0.000***

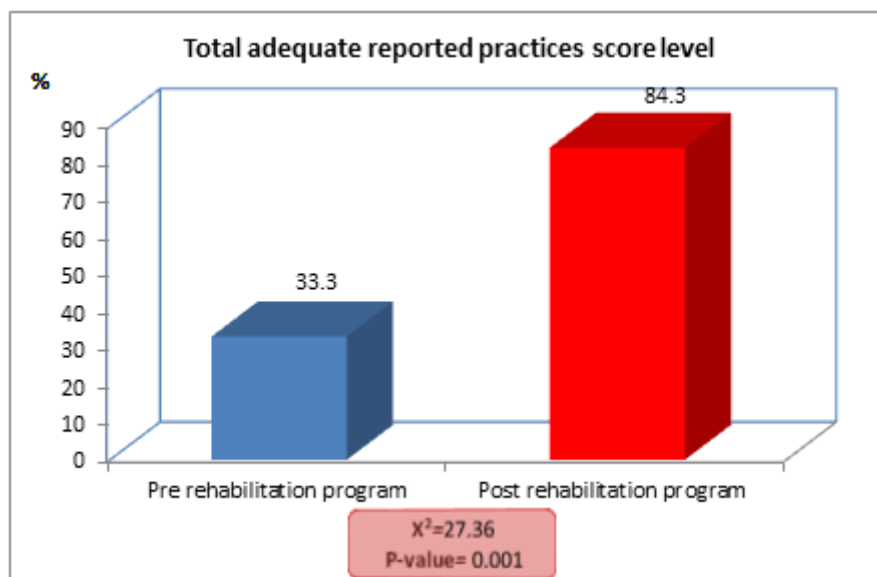*Statistically significant difference

Figure (2): Distribution of Studied Sample According to Their Total Adequate Reported Practices about Care and Use of Prosthesis and Residual Limb Pre /Post Implementation of the Rehabilitation Program (n=51).

Table (5): Distribution of Studied Sample According to Their Total Physical, Psychological, Spiritual and Social Aspects Quality of Life Pre /Post Implementation of the Rehabilitation Program (n=51).

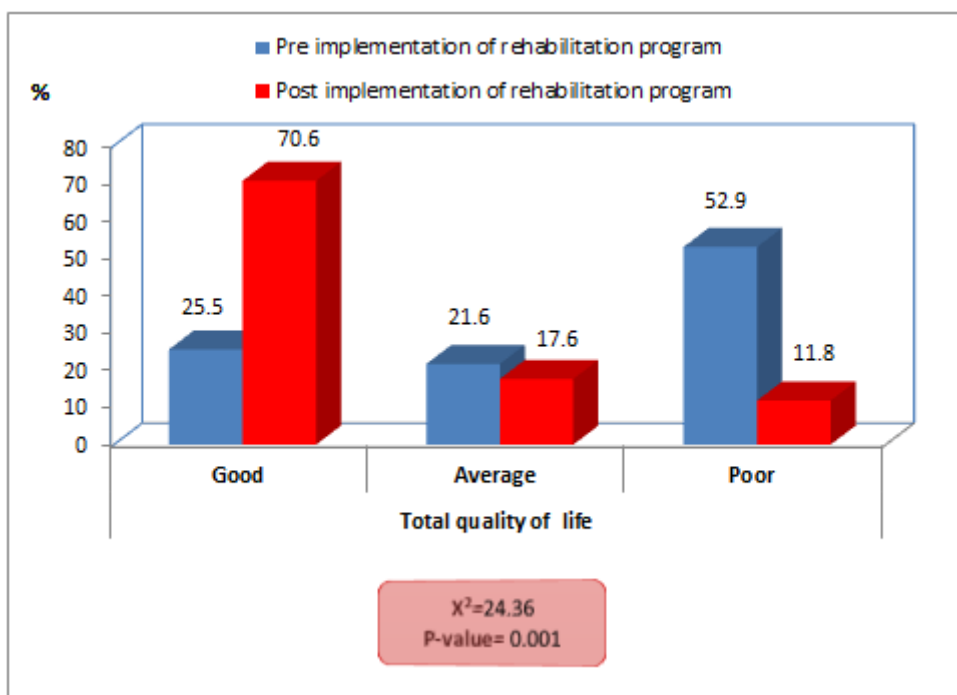| Quality of Life Domains	Pre implementation of rehabilitation program						Post implementation of rehabilitation program						X^2	p value
	Good		Average		Poor		Good		Average		Poor			
	No	%	No	%	No	%	No	%	No	%	No	%		
Physical	9	17.6	10	19.6	32	62.8	37	72.5	11	21.6	3	5.9	41.12	0.000
Psychological	7	13.7	11	21.6	33	64.7	25	49.1	20	39.2	6	11.7	31.43	0.000
Spiritual	18	35.3	9	17.6	24	47.1	34	66.6	14	27.5	3	5.9	22.34	0.000
Social	8	15.7	15	29.4	28	54.9	28	54.9	16	31.4	7	13.7	23.74	0.000

Figure (3): Distribution of Studied Sample According to Their Total Quality of Life Pre /Post Implementation of the Rehabilitation Program (N=51).

Table (6): Correlations between Total Studied Sample's Quality Of Life and Their Total Knowledge, Practices Regarding Prosthesis Pre/Post Implementation of the Rehabilitation Program

Items	Total studied sample's quality of life			
	Pre rehabilitation program		Post rehabilitation program	
	r	p	r	p
Total studied sample's knowledge -Pre rehabilitation program -Post rehabilitation program	0.057 -	0.561 -	- 0.389	- 0. 05*
Total studied sample's practices -Pre rehabilitation program -Post rehabilitation program	0.155 -	0.116 -	- 0.635	- 0.02*

*Correlation is significant at p< 0.05

Table (7): Correlations between Studied Sample's Characteristics and Their Total Knowledge, Practices and Quality of Life Regarding Prosthesis Post Implementation of the Rehabilitation Program

Individuals with prosthesis limbs' characteristics	Studied sample's knowledge		Studied sample's practices		Studied sample's quality of life	
	R	p	r	p	r	P
Age	0.096	0.497	0.130	0.243	0.561	0.032*
Gender	0.561	0.135	0.872	0.025*	0.023	0.889
Education	0.208	0.125	0.763	0.045*	0.147	0.299
Work ©	0.105	0.307	0.123	0.182	0.208	0.148
Marital status	0.101	0.481	0.043	0.155	0.563	0.034*
Residence	0.102	0.483	0.043	0.155	0.206	0.146

*Correlation is significant at $p < 0.05$ ©Spearman rank correlation

4. DISCUSSION

One of the primary goals of rehabilitation following limb loss is the successful fitting of a prosthesis and use of the prosthesis to achieve functional mobility. Greater prosthesis use has been associated with higher levels of function and independence via improved self-care and mobility as well as improved perceived quality of life **Tintle et al.** [2]. Persons with a new limb loss face a complex set of tasks to return to an adaptive mobility status limb **Demet et al.** [18].

The present study revealed that the mean age of study sample with prosthesis limbs was 40.27±10.59 years (table 1). This result is in agreement with that of **Mohammed and Shebl** [19], who conducted a study about "quality of life among Egyptian patients with upper and lower limb amputation, sex differences", they found that the mean age of their study sample was 47.6 ± 11.85 years. As well, these findings are supported by that of **Sinha et al.** [20], who conducted a study about "Adjustments to amputation and artificial limb in lower limb amputees" in Mumbai, which showed that the mean age of their studied sample was 43.05 ± 10.96 years. In contrast to the previous results, **Carolyn et al.** [21], found that the mean age of their studied sample was 62. .05 ±10.59 in their study about "Quality of life in patients with prosthetic legs: A comparison study" in Untied States.

As regards to gender, slightly less than two third of them were male and more than one third were female (Table 1). This result matched with, **Mohammed and Shebl** [19], who reported that 59% of the study sample was male and 41% were female. As well, these findings are in agreement with study carried out entitled "Prosthetic usage in major upper extremity amputations" in the Untied States by **Wright et al.** [22], who found that 84% of the studied samples were male. This result may be due to that males are more exposed to work injuries, accidents and they are recruited in the army so they are more exposed to acts of terrorism which may lead to limb loss, then require to wear prosthesis limb.

Concerning residence more than half of the studied sample was from rural areas (Table 1). This result is in agreement with **Mohammed and Shebl** [19], as they found that, 53.6% of their studied sample was from rural areas. This result may be due to most of studied sample in the rural community use more transport for their work, education and army setting so they are at higher risk for traffic accidents which may expose them to loss of limb.

In relation to job more than two fifth of them were retired and don't work (Table 1). As well, this finding is supported by that **Sinha et al.** [20], who found that, 41% of their study sample were not working. Although the studied sample didn't reach to the retirement age this result might be related to, some of them retired early due to loss of their limbs.

Regarding monthly income, two third of this study sample had insufficient income (Table 1). This result is congruent **Mohammed and Shebl** [19], as they found that 61.0% had insufficient income. This result may be related to that more than two fifth of study sample either don't work or retired, in addition to financial burdens of prosthesis limb.

The current study findings revealed that, diabetes mellitus was the commonest and represents almost three fifth of the study sample followed by hypertension which represents less than half of study sample, then hepatic diseases accounting for slightly more than one third of the study sample, while cardiac diseases were more than one quarter of study sample (Table 2) These results are in agreement with those **Godlwana and Stewart** [23], who conducted a study about the impact of lower limb amputation on quality of life, in Johannesburg, South Africa which showed that 66.2% had diabetes and 63.0% had hypertension in their studied sample.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
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According to cause of limb loss, the present study result showed that for more than half of them, loss of their limb was related to accidents while for one quarter, it was related to acts of terrorism and for less than one sixth of them loss of their limb resulted from disease (diabetes mellitus). These results are congruent with those of **Marzen and Bartman** [24], who conducted a study about "Building a successful support group for post-amputation patients" in Pennsylvania and reported that, the main cause of limb loss was accident, while **Desmond** [25], in his study entitled "Coping, affective distress, and psychosocial adjustment among people with traumatic upper limb amputations", stated that diabetes mellitus was the leading cause of amputation. As well, **Ida et al.** [10] found in their study about "Rehabilitation of lower limb amputees" in Zagreb that, diabetes poses as one of the major risk factors seen in 67 % of amputees. The result of the present study might be related to that, more than half the study sample reside the rural community so they are more exposed to accidents.

As regards site of limb loss, the present study finding revealed that less than three quarter of the studied sample lost their lower limb, while more than one quarter lost their upper limb (Table 2). Consistent with the findings of the present study, the study conducted, in Egypt, by **Mohammed and Shebl** [19], showed that most of limb loss was in the lower limb. According to the **International Amputee Statistical Database** [26], the lower limb amputation is significantly more common than amputation of the upper limb. Similarly, **Tseng et al**. [5] mentioned that amputations of lower limbs occur in significantly greater numbers than do amputations of upper limbs. This study result might be related to, that for more than half of the sample suffer from diabetes mellitus leading to diabetic foot, and limb loss.

Regarding to skin problems with prosthesis limb, the present study result found that less than two third of study sample with prosthesis limb had inflammation problems (redness/itching) with prosthesis limb and more than half of them had skin swelling (Table 2). These results are in disagreement with those of **Sinha et al**. [20], who found that only 18% had skin problems. These study results might be related to that more than half of the study sample was from rural areas, which lead to no compliance to follow up with the specialists of the medical center, which is considered far away from them and require more costs for transportation.

In relation to Individuals with prosthesis limbs' satisfactory knowledge regarding prosthesis limbs, the results of the current study indicated that there are statistically significant differences in all items of study sample's knowledge post implementation of the rehabilitation program compared to pre implementation (Table 3). These differences showed also a statistically significant improvement about total knowledge score level after implementation of rehabilitation program (X^2 = 28. 99 at p<0.001) (Figure 1). This improvement in study sample's knowledge pointed to the positive effect of the rehabilitation program. These results were consistent with those of **Francesca et al**. [27], who reported in a literature review on needs of upper limb prosthesis users, that knowledge about prosthesis is a significant need for limb prosthesis users. The results of the present study might be related to that the studied sample with prosthesis limb were interested to know all general and specific knowledge about prosthesis limb such as; types, causes, complications and factors affecting the choice of prosthesis limb.

As regards reported practices of the study sample with prosthesis limb about care and use of prosthesis limb, the results of present study revealed statistically significant differences between pre/post implementation of the rehabilitation program regarding to all items; daily cleaning, examination of prosthesis and residual limb, wearing and taking off the prosthetic limb, exercise and correct position for residual limb and dealing with problems post implementation of the rehabilitation program compared to pre implementation rehabilitation program (Table 4).

Concerning total reported practices of the study sample, the finding of the present study revealed that there was a statistically significant improvement post implementation of the rehabilitation program (Figure 2). This improvement reflected the importance of rehabilitation program for the study sample with prosthesis limb, this could be due to that the study sample with prosthesis limb became exhausted from the problems and complications of prosthesis limb, so they have the desire to overcome these problems and complications.

Considering the studied sample according to their total quality of life pre/post implementation of the rehabilitation program, the result of the present study clarified that, there are statistically significant difference between pre/post implementation of the rehabilitation program regarding study sample's physical, psychological, spiritual and social domains related to quality of life (Table 5, Figure 3). The improvement post rehabilitation program implementation of study sample with prosthesis limb pointed to the research hypothesis, having the positive effect of the rehabilitation program on the study sample with prosthesis limb on their quality of life.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 5, Issue 3, pp: (202-217), Month: September - December 2018, Available at: **www.noveltyjournals.com**

The results of the present study were supported by, **Marzen and Bartman** [24], in their very recent study entitled "Building a successful support group for post-amputation patients", in Pennsylvania that the use of prosthesis can have a significant impact on mobility, participation and psycho-social functioning of the amputees, there by influencing their quality of life. The support and encouragement of medical staff, friends and family can have a very powerful effect on the ability to heal from the consequences of limb loss and finalize the stages of grieving. In spite of the challenges with amputation, many people with limb loss do adapt to lead normal, productive, happy lives, working, enjoying hobbies, and raising families.

Consistent with the findings of the present study, **Tousignant et al.** [28], in their study about "Assessment of the feasibility of the Nintendo Wii Balance Board as an intervention method For balance rehabilitation with lower-limb amputees" in Canada found that all participants demonstrated a high perceived quality of life in the three domains measured (psychological adjustment, higher satisfaction regarding the prosthesis and lower activity restriction) post-intervention. This result also matched with that the study conducted in Pennsylvania, by **Rehab** [12], about "Amputee treatment and rehabilitation program" found that support and prosthetic training from the rehabilitation team can make a dramatic improvement to a patient's progress after amputation. As well, **Ida et al.** [10], found in their study about "Rehabilitation of lower limb amputees", in Zagreb that, the advancements made in the rehabilitation of lower limb amputees also come as a result of close collaboration with every health care professional which the prime task for them is to help the amputee to embrace his/her prosthesis as an artificial supplement for the lost limb part both in its aesthetic and functional sense and to eventually cope with it so as to be able to lead as high-quality life as possible.

These results could be related to a better understanding of the knowledge and practices regarding prosthesis limb, which leads to improvement of physical aspect of the daily life activity which helped them to depend on themselves which leads to improvement of psychological and social aspects that might be lead to improvement of quality of life.

Concerning correlations between the total studied sample's quality of life and total knowledge and practices, the results of the present study revealed that there are positive correlations (r = 0.389, & r = 0.635 at p<0.05) between total studied sample's quality of life and their total knowledge as well as total practices respectively regarding prosthesis post implementation of the rehabilitation program (Table 6). Consistent with the findings of the present study, **Ida et al** [10], reported that rehabilitation for prosthetic population should be comprehensive and of high quality, and should provide education and training that ultimately capacitate the patient for an all day long-use of prosthesis with all vocational, sporting-recreational and other activities, in order to allow for a proper physical, social and psychosocial reintegration.

Similarly, the results of the present study were supported by those of **Marzen and Bartman** [24], who recently reported that, on top major concern of the rehabilitation process of amputees is to embrace complex procedures, mastering of prosthesis-aided activities and mastering of proper prosthesis donning and doffing in order to achieve as independent daily performance as possible and to reassume amputees professional duties so as to maintain their financial and social standing, and to be able to continue with their hobbies and recreational activities. Successful rehabilitation is perceived as an opportunity to improve the chances for regaining "normal" ambulation. In this context, looking up to role models of successfully rehabilitated amputees further facilitates the process and increases patient motivation.

As well, **Amosun et al.** [29], found in their study about "Health promotion needs of physically disabled individuals with lower limb amputation" carried out in Rwanda that, the greatest barrier facing disabled individuals with lower limb amputation to participation in physical activity is a lack of knowledge of where to exercise. Lack of knowledge is a barrier to participate in the physical daily activity for disabled individuals.

The present study result was also congruent with **Tantua et al.** [8], who conducted a study about "Reduction of residual limb volume in people with trans-tibial amputation" in Netherland, the amputee patient must learn to manage his/her prosthesis in order to achieve a gait pattern as much physiological as possible, and optimize his/her quality of life. Many basic prosthetic skills must be learned before and during early weight-bearing activities in the prosthesis. These include donning/doffing the various parts of the prosthesis, changing footwear, volume management techniques, getting dressed, maintaining the prosthesis, and most importantly inspecting and managing skin/residual limb.

Improvement in quality of life of the studied sample with prosthesis limb who were informed by the rehabilitation program, might have enabled stimulated and trained them to use of prosthesis. Providing an in-depth knowledge about prosthesis led to dealing with problems that helped improvement of quality of life.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
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Concerning correlations between the studied sample's characteristics and their total knowledge, practices and quality of life regarding prosthesis post implementation of the rehabilitation program, the present study results revealed that there are positive correlations (r = 0.561 & r = 0.563 at p<0.05) between age and marital status of the studied sample respectively and total quality of life regarding prosthesis post implementation of the rehabilitation program. Consistent with the findings of the present study, the study conducted by **Mohammed and Shebl** [19], found positive correlations between age and marital status (married) and quality of life. The present study results were also supported by **Sinha et al.** [30], who reported that age was the most important factor associated with positive quality of life of prosthesis users, being younger have been found to negatively influence the quality of life. As well, **Demet et al** [18], found in their study about "Health related quality of life and related factors in persons with amputation of upper and lower limb", carried out in France that younger amputees are significantly more at risk of poor quality of life than older amputees on account of activity restriction. Similar to the present study result **Zidarov et al** [31], found in their study about "Quality of life of persons with lower-limb amputation during rehabilitation and at 3-month follow-up", conducted in Canada that, when amputation occurred in young person, all components of QOL are influenced, younger amputees are significantly more at risk for worse QOL than older amputees on account of activity restriction.

The results of the present study revealed a positive correlation between marital status and QOL of individuals with prosthesis this may be attributed to that husband/family provided social support for individual with prosthesis limb. In addition, the present study finding revealed a positive correlation between the age of individuals with prosthesis and their total QOL. This may be related to that younger individuals with prosthesis limb significantly had increased psychological symptoms and increased rate of depression which negatively affected their QOL.

5. CONCLUSION

Based on the results of the present study, and research hypothesis, it is concluded that, the rehabilitation program revealed a significant improvement in the individuals with prosthesis limbs total satisfactory knowledge post-test from 29.4% to 82.4% ($X^2 = 28..99$ at p<0.001). As well, there was statistically significant improvement in post-test compared to pre-test (p< 0.001) related to individuals with prosthesis limb' adequate practices level. Regarding QOL, significant differences were detected in individuals with prosthesis limbs good level of QOL post-test compared to pre-test.

6. RECOMMENDATION

Based on the findings of this study, the following recommendations can be suggested:

- Distributing different illustrated instructional booklets and simplified brochures for prosthesis users using simple health related information

- Regular awareness program should be conducted regarding prosthesis limb, its newest types, parts, complications and prevention of problems.

- Guidelines or simplified booklet containing basic information about prosthetic limb should be designed and available.

- Appropriate intervention to decrease stress levels and anxiety to enhance quality of life among individuals' prosthesis limb.

- Further researches are required involving larger study sample of individuals with prosthesis limb and their families at different study settings, throughout Egypt, in order to generalize the results.

- Further researches are needed to study the different factors of this category of prosthesis users ' burden and complaints to find out the suitable solutions for a large number of clients.

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