Benha Journal of Applied Sciences (BJAS) **print: ISSN 2356–9751**
Vol. (8) Issue (4) (2023), (285-294) **online: ISSN 2356–976x**
http://bjas.journals.ekb.eg

Quality of Life among Diabetic Patients with Lower Limb Prosthesis

Marwa.A. Mohammed, Doaa.M.Sobhy and Wafaa.A.Mohammed
Community Health Nursing Dept., Faculty of Nursing, Benha University
E-mail: salmjhad948@gmail.com

Abstract

Background: Diabetic foot is one of major complications of diabetes mellitus, lead to lower limb amputations. Lower limb prosthetics are devices designed to replace the function of the missing lower limb. **Aim:** of this study was to assess quality of life among diabetic patients with lower limb prosthesis**. Research design:** A descriptive research design was utilized in this study. **Setting**: This study was conducted at Rheumatology outpatient clinic at Teaching hospital in Benha City. **Sample:** Purposive sample, all patients with lower limb prosthesis attended to previously mentioned setting, total sample size was 60 patients. **Tools:** Three tools were used, I): An interviewing questionnaire was used to assess; Socio- demographic characteristics of studied patients, medical history and patients' knowledge about diabetes mellitus and prosthesis. II): Quality of life for diabetic patients with lower limb prosthesis. III): Attitude of diabetic patients toward limb prosthesis. **Results**: 41.7 % of patients aged more than 50 years old with mean age 45.63±10.28 years, 53.3 % of them were male, 56.7% of studied patients had poor total knowledge level, 40% of them were taking insulin injection and 58.3 % of them had low total quality life. Also 70 % of studied patients had negative total attitude regarding limb prosthesis. **Conclusion:** There were significant positive correlation between patient's total knowledge, their total quality of life and their total attitude. Also, there was highly significant positive correlation between patient's total quality of life and their total attitude. **Recommendations:** Conduct further studied to improve knowledge and quality of life of diabetic patients with lower limb prosthesis.

Key words: Diabetic patients, Lower limb prosthesis, Quality of life.

Introduction:

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia and glucose intolerance. The condition arises from the metabolic disturbance of carbohydrate, fat and protein caused by imperfection in insulin release or insulin action or both. People with diabetes are prone to foot complication due to neuropathy, arterial disease, and infection. Sensory neuropathy will reduce awareness of injury to the foot which can lead to Diabetic Foot Ulcer (DFU). The most worrying complication of DFU is the progression to diabetic foot amputation **[1].**

Diabetic Foot Amputation (DFA) is a surgical removal of part of toe, foot, or part of the leg. It is typically performed to prevent the spread of gangrene as a complication of diabetes. In the diabetic population, DFA amputation is often the result of ischemia or uncontrolled infection. Amputation of the foot may be indicated when neuropathy, vascular disease and ulcerative deformity have led to soft tissue necrosis, osteomyelitis, uncontrollable infection, or intractable pain **[2].**

Lower limb amputation confronts the individual with a multitude of evolving physical and psychosocial problems such as impairments in physical functioning, pain, prosthesis use, changes in employment status, and alterations in body image and self-concept. Such stressors challenge the individuals' ability to maintain emotional well-being and may produce maladaptive reactions **[3].**

Lower limb prosthetics are devices designed to replace the function or appearance of the missing lower limb as much as possible. They are designed to support, supplement, or augment the function of an existing limb or body part. The basic categories of lower limb prostheses by the amputation height are, transtibial (TT) and transfemoral (TF) prostheses. Typical TT prosthesis consists of a prosthetic foot, tube adaptor, and TT socket; TF prosthesis consists of a prosthetic foot, tube adaptor, prosthetic knee joint, and TF socket **[3].**

Quality of life is influenced in a complex way by physical health, psychological state, level of independence, social relationship. For patients with amputation, quality of life is more associated with pain, adaptation to the prosthesis and psychosocial wellbeing than with clinical or demographic variables such as age, gender, level, and cause of amputation. The ability to walk is considered central to the perception of quality of life and it is impacting the ability to live independently and to have community participation. Persons with amputation may report a reduction in their quality of life immediately after limb loss, but over time the response may change depending on their adaptation to the new condition **[4]**.

The community Health Nurses (CHNs) play an important role in education the patient through health education. Health education raises patient knowledge through helping them to establish agreed standers of care with DFA and prevention of reamputation. CHNs assist in teaching diabetic patients to receive regular blood sugar examination and daily care of the foot to prevent subsequent complications. CHNs teach patient about the ability of doffing and donning, significant data in the functional abilities such as ability to transfer, stand and sit down, amount of additional effort, balance

and coordination. The nurse should assess physical functioning in terms of ability to perform ADLs include toileting, bathing, and transferring and returning to work **[5].**

Significance of the study

Diabetes is a serious and long –term condition with a major impact on the lives and well-being of individuals, families, and societies worldwide. The DM has a significant impact on the morbidity and mortality of patient and is the third highest risk factor for premature death. The global diabetes prevalence in 2021 was estimated to be 10.5% (536.6 million) people aged 20-90–year-old, rising to 12.2% (783.2 million) in 2045. Diabetes prevalence was similar in men and women and was highest in those aged 75–79 years. Prevalence in 2021 was estimated to be higher in urban (12.1%) than rural (8.3%) areas. 60%of DFA is caused by diabetic foot ulcer **[6].**

Egypt is currently in the top 10 countries with the highest number of people with diabetes. Diabetic foot is one of major complications of diabetes. The risk of developing diabetic foot ulceration is 10-15%. Most of foot ulcers (60-80%) heal, while 10-15%of them remain active, and 5-24% of them end with limb amputation. The prevalence of all Diabetic Lower Limb Amputation (DLLA) is 85% preceded by diabetic foot ulcer. Mortality rate following DLLA ranges from 24.6% within 5 years to 45.4% within 10 years **[7] [8].**

Aim of the study:

This study aimed to assess quality of life among diabetic patients with lower limb prosthesis.

Research Questions:

1. What is the diabetic patient knowledge regarding diabetes mellitus and limb prosthesis?
2. What is quality of life of diabetic patient with lower limb prosthesis?
3. What is attitude of diabetic patient with lower limb prosthesis?
4. Is there a relation between quality of life of diabetic patient and their attitude?

Subject and Methods:

Research design: A descriptive research design was used for this study.

Setting: The study was conducted at Rheumatology outpatient clinic at teaching hospital in Benha City, because it is the only clinic for rehabilitation in Benha.

Sampling type: Purposive sample of all diabetic patients with lower limb prosthesis attended the previously mentioned setting through six months according to the following criteria aged 25- 60 years. Total number of patients were 60 patients.

Tools of data collection: Three tools were used in this study:

First tool: An interviewing questionnaire: It was developed by investigator and revised by supervisor, based on reviewing related literatures, and written in Arabic language. It consisted of three parts.

The first part: Socio-demographic characteristics of diabetic patients. It included ten closed ended questions about age, gender, marital status, educational level, occupation, monthly income, and natural of work, residence, living with family and breadwinner for the family.

The second part: It was concerned with medical history of diabetic patient with lower limb prosthesis, which consisted of 8 closed end questions (multiple choice type) about onset of disease, medication taken for diabetes mellitus, other chronic disease, onset of amputation, level of amputation, side of amputation, complications of amputation and the duration of wearing the prosthesis leg /hours.

Third part:

a. It was concerned with patients' knowledge about diabetes mellitus which consisted of 7 closed ended questions about (meaning, types, causes, manifestations, diagnosis, complications and methods of prevention of diabetes mellitus).

b. It was concerned with patients' knowledge about limb prosthesis which consisted of 7 closed ended questions about (meaning, types, advantages, disadvantages, ways to avoid complication, ways to keep on prosthesis and caring for the amputated limb).

Scoring system:

The scoring system for patients' knowledge was calculated as follows: (2) score for correct and complete answer, and (1) score for correct and incomplete answer, while (0) score for do not know. For each area of knowledge, the score of the items was summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a present score. The total scores of knowledges =28 points. The total knowledge score was considered good if the score ≥75% (≥21point) and considered average if it equals 50<75% (14<21point), while; considered poor if it equals < 50% (<14 point).

Second tool: It was concerned with quality of life for diabetic patient with lower limb prosthesis using quality of life scale adopted from **[3]** and modified by investigator to assess physical, psychological, and social domains of quality of life. It was translated into Arabic by the investigator and included 3 main domains:

1. Physical quality of life: It consisted of:

A. Pain problems: It included 3 items (suffer from pain in the amputated leg (without the artificial leg), suffer from pain in the amputated leg (when installing the artificial leg) and suffer from back pain).

B. Leg problems: It included 10 items (feel with the part of the leg that was amputated, find swelling in the remaining leg, find contraction of the size of the remaining leg, find cold sensation, find inflammation of the skin on the remaining leg, find ulcer in the remaining leg, find pus in the remaining leg, find difficult for checking the remaining leg, find skin problem in the next foot and find a slight sensation of the second foot).

C. Limb Prosthesis: it included 11 items (feel uncomfortable when standing on the prosthetic leg , need to adjust the prosthetic leg, find it difficult to wear different shoes, find it difficult to take care of the prosthetic leg, have the prosthetic leg an odor after being taken off, falling off while wearing the prosthetic leg, the artificial leg makes sound when it is used, find it difficult to wrap the compression bandage, feel uncomfortable when sitting or standing on the prosthetic leg, wear the prosthetic leg with difficulty and make more effort to use the prosthetic leg).

D. Daily living activities: it included 4 items (get dressed alone, take a shower alone, go to the bathroom and can move (walk) alone).

E. Ability to work: It included 6 items (find it difficult to be able to go to work, change the nature of the work due to the difficulty in performing its activities, take a vacation, refuse go to back to work, reduce the work hours or doing light work and afraid of losing the job).

2. Psychological quality of life:

It consisted of 16 items as (feel upset and psychologically stressed because of the amputation, afraid of repeating the loss of another part of the leg or another part of the body, feel bad for pain from the part that was amputated, feel low psychological status, feel unable to adapt to the fitting of the leg, regret that get a prosthetic leg installed, feel dissatisfied with the shape of the body after installing the prosthetic leg, worried about complication after having a leg prostheses, feel a loss of self-confidence, feel changes in the life due to amputation and prosthesis, have bouts of crying, feel aggressive towards others, feel guilty that the amputation was one fault, afraid from the lack of information on how to care for an amputated leg, have some troughs to end the life and worry about falling while wearing the prosthetic leg).

3. Social quality of life:

It consisted of 8 items as (find that prosthetic leg prevents ones from participation in the community, find that family does not understand the nature of dealing with ones after installing the prosthetic leg, find difficult to deal or meet new people, find it difficult to get emotional support from those around, refuse the exchange of roles within the family, find that embarrass situations occur as a result of the interaction with others, find it difficult to help others as before and find it difficult to carry out family responsibilities).

Scoring system:

The quality of life scale for diabetic patients with lower limb prosthesis was calculated as follows: (2) score for always and (1) score for sometimes, while; (0) score for never. Total quality of life score =116 points. The total quality of life score was considered high if equal ≥ 75% (≥87points) and considered moderate if it equals 50<75% (58<87 points) while; considered low if it equals < 50% (<58 points).

Tool III:

It was concerned with attitude of diabetic patient toward limb prosthesis which was adopted from **[9]** and modified by investigator to assess attitude of patient regarding limb prosthesis. It included 12 items (worry about the future and that of the family, feel shy that became disabled, feel hopeless to be able to live with others, think about ways to solve the problems faced after installing the prosthesis, feel annoyed by the pitying looks of others, accept and satisfied with reality, learn to live with the new reality, afraid that not be able to restore a normal life, feel different from others, feel that the person become a burden on the family after the amputation, feel that your role in the family is not important and feel afraid of isolation and social distancing).

Scoring system

The scoring system for attitude of diabetic patient toward limb prosthesis was calculated as follows: (2) score for agree, and (1) score for neutral, while (0) score for disagree. The total attitude score =24 points. The total attitude score was considered positive attitude ≥ 50 % (≥ 12% points), while considered negative attitude < 50% (<12 points).

Content validity:

The tools validity was assessed by 3 members of Faculties staff Nursing experts from the Community Health Nursing Specialists who reviewed the tool for clarity, relevance, comprehensiveness, applicability, and easiness for implementation and according to their opinion minor modification were carried out.

Content reliability:

The reliability of the developed tools was estimated using Chronbach's α test to measure the internal consistency of the tools. It was found that the reliability of knowledge was 0.849, reliability for quality of life was 0.943 and the reliability for attitude was 0.909.

Ethical consideration:

All ethical issues were assured; a formal consent has been obtained from patients before conducting the

interview and given them a brief orientation to the purpose of the study. They were also reassured that all information gathered would be treated confidentially and used only for the purpose of the study. The patients had the right to withdraw from the study at any time without giving any reasons. The study didn't have any physical, social, or psychological risks. Ethics, values, and cultures were respected.

Pilot study:

The pilot study was carried out on 6 patients who represented 10% of the total sample size (60 patients). The pilot study was made to assess the tools clarity, applicability and time needed to fill each sheet as well as to identify any possible obstacles that may hinder the data collection. The pilot study was included as no modifications were done.

Field work:

The actual field work was carried out over a period of 6 months from the beginning of January 2022 up to the end of June 2022. The investigator introduce herself to patients and explain the purpose of the study to them Patient's consent was obtained before collection of data Patient's consent was obtained before collection of data. The investigator visited the teaching hospital from 9 am to 12.30 pm, two days per week (Sunday and Thursday) to collect the data from the patient. The average time needed to fill the tool was around 25- 30 minutes; the average number of interviewed patients was 1-2 patients each time depending on understanding and response of the interviewers.

Administrative approval:

Official letter was obtained from the Dean of the Faculty of Nursing, Benha University directed to the Administrators of pre-mentioned setting where the study was conducted. After obtaining the approval from the Administrator of pre-mentioned setting for conducting the present study, the investigator started to communicate with the study subjects, and explained the aim of the study to the study subjects to obtain their approval and cooperation for data collection.

Statistical design:

All data collected were organized, tabulated, and analyzed using appropriate statistical test. The data were analyzed by using the Statistical Package for Social Science (SPSS) Version 21, which was applied to calculate number and percentages for qualitative data and mean ± S.D for quantitative data as well as test statistical significance and associations by using chi-square test and correlation test (r) to detect the associations between the variables for (p value).

1. Highly significant (HS) $P \leq 0.001$
2. Significant (S) $p \leq 0.05$
3. Not significant (NS) $P > 0.05$

Results:

Table (1): Shows that, 41.7 % of studied patients aged 50 years old and more with mean age 45.63±10.28, 53.3 **%** of them were male and 50% of them were married. Concerning education level, 35**%** of studied patients had basic education, 55% of them didn't work, only 31.7% of them were employee and their work needed cognitive effort for 60% of them. Regarding monthly income, 53.3% of them didn't have enough income and were living in rural areas with their family and 61.7% of them were the bread winner of the family.

Table (2): Illustrates that, 43.3% of studied patient had diabetes mellitus from 5 to less than 10 years, 40% of them were taking insulin injection and 48.3% of them didn't suffer from any other chronic diseases. Regarding amputation, 60% of studied patients had amputation above knee, 66.7% of them had amputation on the right side and 35% of them didn't have complications from amputation. Also; 38.3% of them were wearing prosthetic leg from more than 6 month.

Table (3): Shows that, there were a statistically significant relation between studied patients' total quality of life and their total attitude level, ($p < 0.05$).

Table (4): Shows that, there were a significant statistically positive correlation between patient's total knowledge and their total quality of life and their total attitude ($p = 0.014$, $p = 0.031$ respectively). While there was a highly statistically positive correlation between patient's total quality of life and their total attitude ($p < 0.001$)

Figure (1): Shows that; 56.7% of the studied patients had poor total knowledge level and 38.3 % of them had average total knowledge level while only 5 % of them had good total knowledge level regarding diabetes mellitus and limb prosthesis.

Figure (2): Illustrates that; 70% of the studied patients acquired their knowledge from health team and 68.3 % of them acquired their knowledge from social media.

Figure (3): Illustrates that; 58.3 % of the studied patients had low total quality of life and 26.7 % of them had moderate total quality of life, while only 15 % of them had high total quality of life.

Figure (4): Shows that; 70 % of the studied patients had negative total attitude regarding limb prosthesis, while 30 % of them had positive total attitude regarding limb prosthesis

Table (1) Frequency distribution of studied patients regarding their socio- demographic characteristics, (n=60).

Socio Demographic characteristics	**No**	**%**
Age in years		
25- 40	17	28.3
4o - <50	18	30.0
50 +	25	41.7
Min –Max	29-60	
Mean ±SD	45.63±10.28	
Gender		
Male	32	53.3
Female	28	46.7
Marital status		
Single	8	13.3
Married	30	50.0
Widow	8	13.3
Divorced	14	23.4
Education level		
Can't read or write	16	26.7
Basic education	21	35.0
Intermediate education	11	18.3
University education	12	20.0
Occupation		
Employee	19	31.7
Worker	8	13.3
Not work(house wife)	33	55.0
Natural of work need		
Muscular effort	24	40.0
Cognitive effort	36	60.0
Monthly Income		
Enough and save	7	11.7
Enough	21	35.0
Not enough	32	53.3
Residence		
Urban	28	46.7
Rural	32	53.3
Living with		
Family	60	100.0
Breadwinner for the family		
Yes	23	38.3
No	37	61.7

Table (2) Frequency distribution of the studied patients regarding their medical history (n=60).

Medical history	No	%
***Other Chronic diseases the patient suffering from**		
Hypertension	16	26.7
Heart diseases	18	30.0
Kidney disease	9	15.0
Not suffering	29	48.3
Onset of the disease		
1- <5 years	24	40.0
5 - >10years	26	43.3
≥ 10years	10	16.7
Medication taken for Diabetes mellitus		
Insulin injection	24	40.0
Tablets	23	38.3
Both	13	21.7
Onset of amputation		
< 6months	30	50.0
≥ 6months	30	50.0
Level of amputation		
Above knee	36	60.0
Under knee	24	40.0
Side of amputation		
Right side	40	66.7
Left side	20	33.3
The duration of wearing the prosthetic leg/ hours		
> 6	22	36.7
6	15	25.0
≥ 6	23	38.3
***Complications of amputation**		
Swelling	19	31.7
Numbness or tingling	13	21.7
Afoul Oder	10	16.7
Thick secretions	8	13.3
No complication	21	35.0

Table (3): Relation between total quality of life level and total attitude of studied patients (n=60).

	Total quality of life						X2	p-value
	Low (n=35)		Moderate (n=16)		High (n=9)			
Attitude	**No**	**%**	**No**	**%**	**No**	**%**		
Negative (n=42)	**27**	**77.1**	**13**	**81.3**	**2**	**22.2**	**10.69**	**0.005***
Positive (n=18)	**8**	**22.9**	**3**	**18.8**	**7**	**77.8**		

**** Highly significance p <0.001** ***Significance p < 0.05**

Table (4) Correlation between total knowledge , total quality of life and total attitude of diabetic patients with lower limb prosthesis, (n=60)

		Total knowledge	Total quality of life	Total attitude
Total knowledge	**r**	**1**	**0.532**	**0.433**
	p-value	**-----**	**0.014***	**0.031***
	N	**60**	**60**	**60**
Total quality of life	**r**	**0.532**	**1**	**.542**
	p-value	**0.014***	**------**	**0.000****
	N	**60**	**60**	**60**
Total attitude	**r**	**0.433**	**0.542**	**1**
	p-value	**0.031***	**0.001****	**------**
	N	**60**	**60**	**60**

**** Highly significance p <0.001** ***Significance p < 0.05**

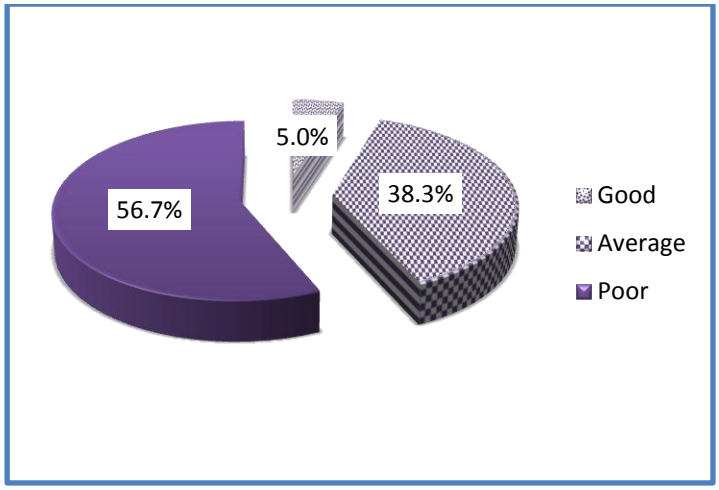

Fig. (1) Percentage distribution of the studied patients regarding their total knowledge about diabetes mellitus and limb prosthesis, (n=60).

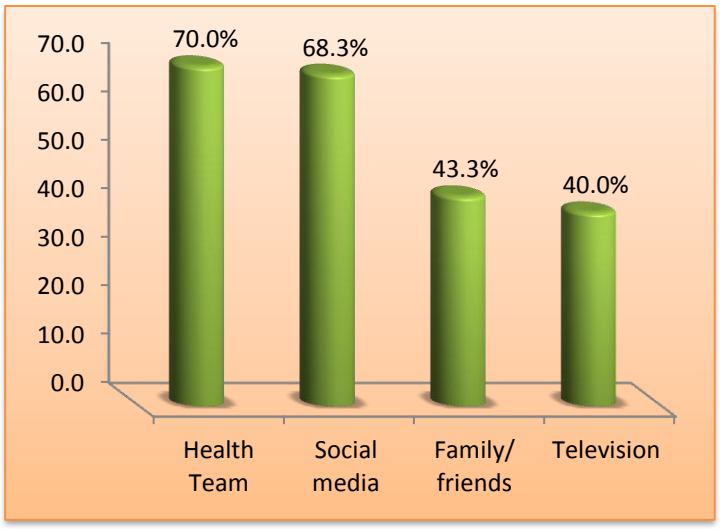

Fig. (2) Percentage distribution of studied patients regarding their source of knowledge about diabetes mellitus and limb prosthesis (n=60).

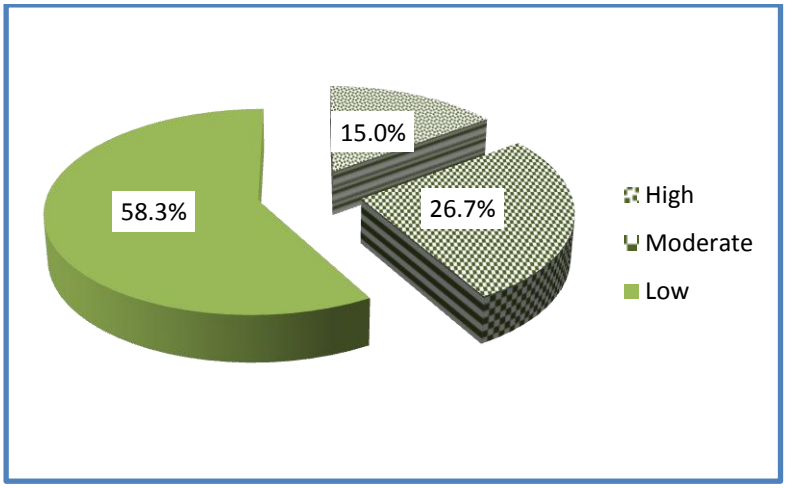

Fig. (3) Percentage distribution of the studied patients regarding their total quality of life, (n=60).

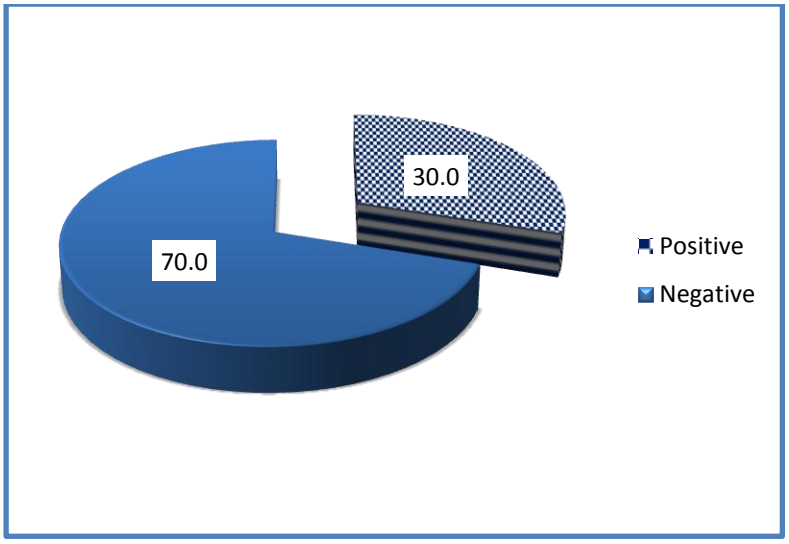

Fig. (4) Percentage distribution of the studied patient's total attitude regarding limb Prosthesis, (n=60).

Discussion:

Diabetes mellitus (DM) is a global health concern. It's the leading causes of morbidity and mortality worldwide. The complication of DM includes nerve damage and poor blood circulation. These problems make the feet vulnerable to skin sores (ulcers) that can worsen quickly and are difficult to treat. Poor glycemic control is a significant risk factor for amputation in diabetic foot patients. Diabetes mellitus is the most causes for major limb amputation. Lower limb amputation is restricting disorder which disturbs individual health and quality of life **[10].**

Prosthesis is a part of comprehensive treatment of the patient with amputations. Lower limb amputation limits the ability to move and walking. Reeducation is one of the main goals of rehabilitation. The use of appropriate prosthetic supplies in patients after amputation is an important element of therapy, because it is related to the improvement of the quality of life and the possibility of restoring the lost function **[11].**

Regarding socio- demographic characteristics of studied patients, the current study revealed that slightly more than two fifth of studied patients aged more than 50 years old with the mean age 45.63 ±10.28, more than half of them were male and half of them were married. Concerning education level, more than one third of studied patients had basic education and more than half of them didn't work. These findings were congruent with **[12],** who conducted a study about "Effectiveness of rehabilitation nursing protocol on phantom pain and lifestyle modification among patients with lower limb amputation, in Egypt" (n=100), and found that half of the studied patients aged more than 50 years old , majority of the patients were males , more than three quarters of the patients were married , slightly more than one quarter of the patients had basic education , and slightly more than half of the patients aren't working .

On the other hand, these results disagreed with **[13],** who conducted a study about "Quality of life of patients with lower limb amputation with prostheses, in Brazil" (n=49), and revealed that more than half of patients were in the age group of less than 40 years, less than half of patients were married and more than half of the patients has a high school education.

Regarding to medical history of studied patients, the current study revealed that less than half of studied patients had diabetes mellitus from 5 to less than 10 years, more than one third of them were taking insulin injection and slightly less than half of them didn't suffer from any other chronic diseases. Regarding amputation, approximately two thirds of studied patients had amputation above knee and on the right side and more than one third of them were wearing prosthetic leg from more than 6 month and didn't have complications from amputation.

These results were supported by **[14],** who conducted a study about "Assessment of quality of life in type II diabetic patients using the modified diabetes quality of life (MDQoL)-17 questionnaire ,in India" (n=250), and revealed that two thirds of the patients have diabetes from 6-10 years , more than one third of patients being treated with insulin injection monotherapy and slightly less than half of the patient are not suffering from any other chronic diseases .

Also, these results were agreed with **[13]** and revealed that two thirds of the patients had amputated above knee but revealed that more than half of the patients are left side amputated on the opposite side of results of the current study.

On the other hand, these results disagreed with **[9],** who conducted a study about " Quality of life after lower extremity amputation due to diabetic

foot ulcer: the role of prosthesis-related factors, body image, self-esteem, and coping styles, in Turkey" (n=65), and revealed that three quarters of the patients had amputated below knee.

Regarding to the patients total knowledge about diabetes mellitus and limb prosthesis, the current study revealed that; more than half of the studied patients had poor total knowledge level and more than one third of them had average total knowledge level. This result was in agreement with **[15]** who conducted a study about "Effectiveness of an educational program on type 2 Diabetic patients' knowledge regarding risk factors of diabetic foot, in Pakistan" (n=60), and found that most of patients have low level of knowledge about diabetes.

Regarding studied patients' source of knowledge the current study revealed that; more than two thirds of the studied patients acquired their knowledge from health team and approximately two thirds of them acquired their knowledge from social media and this may be due to the easy methods of seeking information from social media or health team.

Concerning total quality of life of studied patients, this study revealed that more than half of the studied patients had low total quality of life and more than one quarter of them had moderate total quality of life, while less than one quarter of them had high total quality of life (figure 9). This might be because of amputation and limb prosthesis on their life. Moreover, having suddenly found themselves in a state of dependency and helplessness may have stirred up deep feelings of embarrassment and low self-esteem, thereby affected the three quality of life domains physical, psychological, and social. These results disagreed with **[16]** who conducted a study about " Functional ability and quality of life of below knee amputees with prosthesis, in Pakistan" (n=300), and found that most amputees satisfied with their condition and they considered quality of life as good.

Regarding total attitude of the studied patients regarding limb prosthesis, the current study revealed that more than two thirds of the studied patients had negative attitude regarding limb prosthesis, while less than one thirds of them had positive attitude regarding limb prosthesis. This finding was supported by **[17],** who conducted a study about " Knowledge, attitude and perception towards lower limb amputation amongst persons living with diabetes in rural South Africa: A qualitative study, in South Africa" (n=55), and found that most patients had negative total attitude and their attitudes mostly fearful. This might be due to decreased correct information about limb prosthesis that the patients can obtained it.

Concerning relation between total quality of life level and total attitude of studied patients, the current study showed that there were a statistically significant relation between studied patients' total quality of life and their total attitude level ($p < 0.05$). This finding was supported by **[17],** who found that there is a significant relation between quality of life of studied patients and their attitude towards limb prosthesis. This might be due to that a positive attitude of studied patients towards amputation and limb prosthesis results in improvement of their total quality of life.

Concerning relation between total knowledge of studied patients and their total quality of life and total attitude , the current study revealed that there were a significant statistically positive correlation between patient's total knowledge and their total quality of life and their total attitude. While; there was a highly statistically positive correlation between patients' total quality of life and their total attitude ($p < 0.001$).These results agreed with **[18]** who conducted study about " Effect of rehabilitation program on quality of life for individuals with prosthesis limbs, in Egypt" (n= 51), and found that, there was a significant positive correlations between total studied sample's quality of life scores and their total knowledge score. This might be due to decrease their knowledge about diabetes and limb prosthesis which result in their poor quality of life and decrease their attitude towards limb prosthesis.

Conclusion:

More than half of studied patients had poor total knowledge regarding diabetes mellitus and limb prosthesis and had low total quality of life regarding limb prosthesis. In addition, less than three quarters of studied patients had negative attitude regarding limb prosthesis. Also, there were statistical positive correlation between patient's total knowledge and their total quality of life and their total attitude. There was a highly statistically positive correlation between patient's total quality of life and their total attitude.

Recommendations:

- Perform educational programs to improve knowledge of patients about diabetes mellitus and limb prosthesis.
- Training programs for patients with lower limb prosthesis to cope with their poor physical, social and psychological quality of life
- Preventive programs should be provided for diabetic patients to avoid diabetic foot ulcers and amputation.
- Amputees should be encouraged to maintain positive self-esteem with the help of measures such as the provision of a prosthesis, re-employment, reintegration, and psycho-social support from immediate family members, friends in the community.
- Further studies to improve knowledge and the total quality of life of diabetic patients with lower limb prosthesis are recommended.

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