Effect of Functional Ability on Quality of Life among Diabetic Elderly in Basion City

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Abstract: Diabetes is one of the most frequent chronic diseases among elderly which affect their functional ability and Quality of Life (QOL). Assessment of the functional ability of the diabetic elderly is very important in determining their improvement or regression and so plans the needed care. Aim of the study: assess the effect of functional ability on the quality of life of diabetic elderly. Research design: descriptive cross sectional research design. Setting: medical outpatient clinic in Basion center for health insurance at Al Garbia governorate, Egypt. Sample: a number of 200 diagnosed diabetic elderly aged 60 years and over was selected randomly from the previous setting. Tool: a structured interview schedule for elderly functional ability and quality of life was used to collect the data for this study. The tool contained three parts: Part (1); socio-demographic data. Part (2); two instruments were used for measuring functional ability: (a) Barthel Index of Activities of Daily Living (ADLs) scale. (b) Lawton Instrumental Activities of Daily Living scale. Part (3); Older people quality of life questionnaire. Results: most of the studied diabetic elderly were independent in performing ADLs, while a high percentage of them needed help in performing instrumental activities of daily living especially females. Most of the studied diabetic elderly had moderate QOL. Quality of life had significant relation with income, duration of diabetes and blood glucose level. Conclusion and Recommendations: Significant positive relationship was found between the functional abilities of the studied elderly and their QOL. Nurses need to pay attention toward health screening of elderly for early detection of any complications that can affect their functional ability and so QOL.

Keywords: Functional ability- Quality of life- Diabetic elderly.

1. INTRODUCTION

Diabetes mellitus (DM) is one of the major and serious health problems throughout the world and its prevalence is increasing rapidly. Every 10 seconds, two people in the world will develop diabetes. According to the International Diabetes Federation (IDF) 2014, around 387 million people worldwide suffer from this disease. In the United States, about 25.8 million (1 out of every 9) adults aged 20 to 79 years have diabetes. In Egypt, about 7.593 million (1 out of every 6) adults aged 20 to 79 years have diabetes [1-3].

Early detection and management of type T2DM will reduce the disease effects and the associated morbidity and mortality. This will improve the elderly overall QOL. Quality of life is a multi-dimensional construct that represents a sum of a person's physical, emotional, psychological, and social well-being. Quality of life in old age has become of great importance because the increasing number of older people has led to international interest in the enhancement and measurement of quality of life in this age [4, 5].

Quality of life has been adopted to capture aspects of health, functional status and well-being. Functional status is one of the domains of QOL recognized by World Health Organization (WHO). Assessment of functional status includes an evaluation of an individual's ability to live independently at home and in the community. Diabetes affects the functional status of the elderly, as some diabetic elderly have functional limitations and disability [6-8].

Functional status is defined as a multidimensional concept characterizing one's ability to provide for the necessities of life, that is those activities people do in the normal course of their lives to meet basic needs, fulfill usual roles and maintain their health and well-being. Functional status focused on an individual ability to accomplish activities of daily living (ADLs) and instrumental activities of daily living (IADLs). It is central in the lives of elderly because participation in physical activities may help control chronic conditions, as diabetes, and decrease the impact of the normal changes associated with aging [9, 10].

Basic ADLs are those that are necessary to maintain personal care that individuals perform routinely or doing basic work on a daily basis such as getting in or out of a chair, going up or down stairs, eliminating (bowel and bladder management), dressing, eating, bathing, toileting, transferring, grooming and walking independently [11-13].

Instrumental activities of daily living defined as activities to support daily life within the home and community that often require more complex interactions than ADLs. IADLs are multistep activities that require a higher level of cognitive functioning than ADLs. It refers to tasks required to maintain an independent household. It assesses independence in performing these complex tasks in daily living. It includes using telephone, ability to travel alone on personal or public transport, responsibility for supervising medications, managing finances, shopping, preparing meals, doing laundry and housekeeping [14-16].

As part of a complete assessment, the nurse will need to assess the older adult's functional status. Measurement of functional ability includes measurement of the performance of basic ADLs and IADLs. Activities of daily living are basic or personal and fundamental activities of living; they enable basic survival and well-being. Instrumental activities of daily living are activities necessary to live independently in the community [17, 18].

Community- based nurse is involved in the promotion, monitoring and maintenance of health especially in elderly with chronic illness. It is a time for the nurse to assume her effective role in providing and maintaining good QOL for diabetic elderly and increasing their functioning ability to perform ADLs and IADLs. Good diabetes management can prevent or delay the development of diabetes-related complications and therefore improves quality of life of diabetic elderly. A community-based nurse has a basic role through providing special training and education for them as well as providing a high-quality service to people with diabetes [19-22].

Aim of the study:

The aim of this study is to:

Assess the effect of functional ability on the quality of life among diabetic elderly in Basion city.

Research question:

What is the effect of functional ability on the quality of life among diabetic elderly?

2. MATERIALS AND METHOD

Materials:

Study design:

Descriptive cross sectional study design was used in this study.

Setting:

The study was conducted at medical outpatient clinic for health insurance in Basion city at Al Garbia Governorate, Egypt. This is the only clinic which provides the health insurance services for retired elderly in this city.

Subjects:

A number of 200 diagnosed diabetic elderly aged 60 years and over was selected randomly from the previous setting. ***The following inclusion criteria were used for selecting the sample:*** age 60 years and over, willing to participate in the study, both sexes, able to communicate and free from mental and psychiatric diseases.

Tool of the study:

A structured interview schedule was used to collect the data for this study. This tool included the following parts:

Part (1): Socio-demographic data: It included:

- Elderly age, sex, income, number of family members, residence, hobbies and educational level.

- Medical history of the elderly as: duration of diabetes, type of treatment and last result of blood glucose level test.

Part (2): Functional ability of the elderly:

Two instruments were used for measuring functional ability:

A. *Barthel index of Activities of Daily Living scale*:

Barthel Index (BI) was developed by Mahoney & Barthel (1965) [23, 24] to assess functional ability as it evaluates performance of ADLs in patients with chronic diseases. The BI is one of the most widely used measures of self-care performance. Among all such instruments, the BI has been regarded as the best in terms of sensitivity, simplicity, communicability, scalability, and ease of scoring. This scale comprised of 10 items: feeding, bathing, grooming, dressing, bowel and bladder control, toilet use, transfers between chair and bed, mobility and stair climbing. The total score of performance of ADL was calculated by summation of the scores of all the questions related to ADLs. The higher the scale score, the higher the level of independence in the ADLs.

The total score ranges from 0 (total dependence) to 100 (total independence). Several authors have proposed guidelines for interpreting Barthel scores. Shah et al. (2016) suggested that scores of 0-60 indicate "severe" dependency, 61-90 indicate "moderate" dependency, and 91-100 indicate Independence. These categories were adopted in this study [25, 26].

B. *Lawton Instrumental Activities of Daily Living scale*:

The Lawton Instrumental Activities of Daily Living Scale developed by M. Powell Lawton & Elaine M. Brody (1969) to assess elder's ability to independently perform the more sophisticated tasks of everyday life [27, 28]. Lawton scale consisted of 8 items that screens for performance of IADL. It included questions about phone use, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own medications and ability to handle finances [29-31].

The female sheet contains all the 8 items and the total score of performance in IADLs ranges from (0-19) points. The male sheet contains 5 items only, all the previous mentioned items except food preparation, housekeeping and laundry and the score ranges from (0-11). The higher the scale scores the higher the level of independence in the IADLs. The score was calculated by summation of the score obtained in each item of IADLs [32].

Part (3): Older people quality of life questionnaire:

The Older People Quality of Life Questionnaire (The OPQOL-35 questionnaire) is short measure of quality of life in older age. It was developed by Bowling A. (2008), The questionnaire was designed to diagnose the quality of life of seniors. It is based on the assumption that quality of life is a multidimensional concept. It allows the evaluation of the quality of life related to eight domains constitute 35 statements: life overall (4 statements), health (4 statements), social relationships and participation (5 statements), independence, control over life and freedom (4 statements), home and neighborhood (4 statements), psychological and emotional well-being (4 statements), financial circumstances (4 statements), leisure, activities and religion (6 statements) [33, 34].

The scale composed of 27 positive statements and 8 negative statements. The scoring system was as follows: Strongly agree (5 points)", "agree (4 points)", "neutral (3 points)", "disagree (2 points)" and "strongly disagree (1 point)". The total score of quality of elder's life was calculated by summation of the scores of all the questions related to QOL. The total score ranges from 35 (the worst possible QOL) to 175 (the best possible QOL), so that higher scores indicate a better QOL. Score of (35≤106) indicates the worst QOL, score of (107-139) indicates moderate QOL and score of (≥140) indicates high QOL [34].

Method:

Administrative process:

Before conducting the study, official letter was issued from the Faculty of Nursing, Tanta University to the manager of health insurance center in Basion city in order to obtain his approval and assistance to facilitate the work of the researcher in data collection.

Data collection procedure:

1. The adopted study tools were translated into Arabic by the researcher.

2. The study tool was tested for face and content validity by introducing it to a five jury committee (two professors of community health nursing, one professor of medical surgical nursing department at the Faculty of Nursing and two professors of public health and preventive medicine from the Faculty of Medicine). The tool reliability and validity was calculated; The Barthel index has demonstrated high inter-rater reliability (0.95) and test-retest validity (0.87) as well as high internal consistency. The validity of Lawton IADLs was tested by determining its correlation with four scales that measured domains of functional status. All correlations were significant at the 0.01 or 0.05 level. Very high six-month retest reliability of 0.88 (range 0.80 – 0.99) has been reported to the IADLs scale. The reproducibility coefficient was 0.96 for male and 0.93 for female. The reliability of OPQOL questionnaire was 0.834, which indicated good internal consistency [35-37].

Pilot Study:

A pilot study was conducted on 20 diabetic elderly patients (10% of the study sample) to test the study tool for its applicability and clarity; these patients were excluded from the study sample. Based on the results obtained, the necessary modifications were done. Some words or sentences were retranslated and restated to suit the understanding of elderly patients.

Ethical considerations:

1. The anonymity and confidentiality of responses, voluntary participation and right to refuse to participate in the study was emphasized to all subjects.

2. The consent was obtained from the chosen elderly to participate in the study, and the objective of the study was explained to them.

Actual Study:

1. The data were collected by the researcher over a period of 4 months starting from first of January to the end of April 2016.

2. The investigator introduced herself to each patient and explained the purpose and importance of the study.

3. Anonymity and confidentiality of the elderly information were considered and emphasized at the beginning of the interview. This helped to gain the elderly cooperation.

4. The structured interview was done individually to each elderly at the waiting area of health insurance outpatient clinic which is the available and suitable place.

5. The average time spent for collecting data from each elderly was approximately 15-20 minutes.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 23. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test (χ^2). Correlation between variables was evaluated using Pearson's and Spearman's correlation coefficient r. A significance was adopted at P<0.05 for interpretation of results of tests of significance [38].

3. RESULTS

Table (1): Distribution of the studied diabetic elderly according to their socio-demographic characteristics.

It showed that the age of the majority (92.0%) of the studied diabetic elderly ranged from 60 to less than 70 years with the mean age 65.25±4.338 years. More than one half (54.5%) of the studied diabetic elderly were males while 45.5% were females. Regarding to the number of family members, 71.0% of the studied elderly belonged to families consisted of 5 to 7 members with the mean number of family members 5.8 ± 1.644.

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The table also illustrated that 99.0% of the elderly live with their families. Regarding the hobbies of the studied elderly, 74.5% of them had no hobbies. Concerning the elderly educational level, 64.0% of them were illiterates or read and write, while (18% and 11.5%) had secondary and elementary education respectively and only (6.5%) had high education.

Table (1): Distribution of the studied diabetic elderly according to their socio-demographic characteristics

Categories	The studied elderly (n = 200)	
	N	**%**
Age in years:		
• 60-	184	92.0
• 70-	14	7.0
• 80-83	2	1.0
Range **Mean ± SD**	**(60-83)** **65.25 ± 4.338**	
Sex:		
• Male	109	54.5
• Female	91	45.5
Number of family members		
• ≤4 member	30	15.0
• 5-7 member	142	71.0
• >7 member	28	14.0
Range **Mean±SD**	**(1-10)** **5.80 ± 1.644**	
Residence		
• Alone	2	1.0
• Family	198	99.0
Hobbies		
• None	149	74.5
• Reading	10	5.0
• Watching TV	17	8.5
• Other	24	12.0
Educational level		
• Illiterate/Read and right	128	64.0
• Elementary education	23	11.5
• Secondary education.	36	18.0
• University education	13	6.5

Figure (1): Distribution of income among studied elderly.

This figure revealed that the income for 46.5% of the studied elderly was just enough for their needs, while nearly one third (34%) of them had enough income and reserve from it. Only 19.5% considered their income not enough.
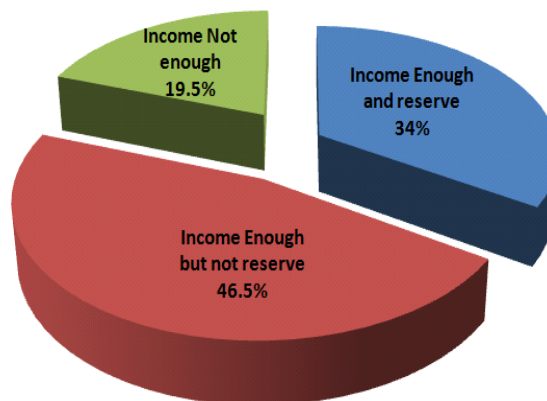

Figure (1): Distribution of income among studied elderly.

Table (2):Distribution of the studied elderly according to their medical history.

The table illustrated that the duration of diabetes for 45.5% of the studied diabetic elderly ranged from 6 to <11 years, while it was from 11 to <16 years for 31.5% of them, while 16.5% had diabetes for 1 to < 6 years and only 6.5% had it for 16-20 years .

As regards treatment type, more than one half (59.0%) of the studied diabetic elderly manage diabetes with insulin, while the rest (41.0%) manage it with oral hypoglycemic. The table also showed that more than two thirds (67.5%) of the studied elderly had a normal blood glucose level, while 32.5% of them had high blood glucose level.

Table (2): Distribution of the studied elderly according their medical history

Categories	The studied elderly (n = 200)	
	N	%
Duration of diabetes (in years)	33	16.5
• 1-	91	45.5
• 6-	63	31.5
• 11-	13	6.5
• 16-20		
Treatment type		
• Oral hypoglycemic.	82	41.0
• Insulin.	118	59.0
Blood glucose level		
• Normal	135	67.5
• High	65	32.5

Figure (2): Percent distribution of studied diabetic elderly according to their total Barthel index score of Activities of Daily Living scale.

It was observed that most (70.0%) of the studied diabetic elderly were independent in performing ADLs and 23.0% of them were moderate dependent. Only 7.0% of the elderly were severe dependent in ADLs.
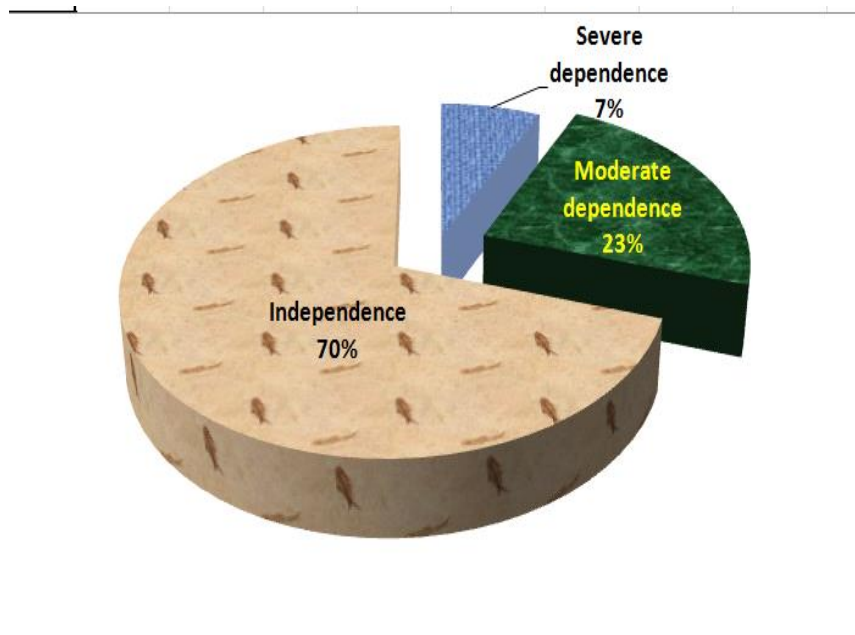

Figure (2): Percent distribution of studied diabetic elderly according to their total Barthel index score of Activities of Daily Living scale.

Table (3): Mean scores of the studied elderly according to Lawton Instrumental Activities of Daily Living scale domains.

The table showed that the highest mean score gained by the male elderly of Lawton scale items was related to mode of transportation (2.32±1.053), while the lowest mean score was related to responsibility for own medication (0.99±0.289). It was observed that the mean score of ability to use telephone (1.66±1.264) was nearly equal to mean score of ability to handle finance (1.65±0.516). Regarding shopping, the mean score was (1.25±0.696). The table also showed that the total Lawton scale scores for males ranged from (0-12), with a mean score for the male elderly (**7**.87±2.956).

Regarding the studied female diabetic elderly, the table showed that the highest mean score of Lawton scale items was related to food preparation (1.45±1.157) followed by the mean score of mode of transportation (1.23±1.165). The lowest mean score was related to Laundry (0.59±0.730). It was observed that the mean score of ability to use telephone (0.75±1.091) was nearly equal to mean score of responsibility for own medication (0.77±0.424). The table also showed that the total Lawton scale scores for female was ranged from (0-19) with a mean score gained by the female elderly (7.62±5.744).

Table (3): Mean scores of the studied elderly according to Lawton Instrumental Activities of Daily Living scale items.

Lawton scale items	Range Mean ± SD	
	Male	**Female**
A. Ability to use telephone	(0-3) 1.66±1.264	(0-3) 0.75±1.091
B. Shopping	(0-2) 1.25±0.696	(0-2) 0.82±0.783
C. Food preparation	(0-0) 0.00±0.00	(0-3) 1.45±1.157
D. Housekeeping	(0-0) 0.00±0.00	(0-3) 1.08±1.088
E. Laundry	(0-0) 0.00±0.00	(0-2) 0.59±0.730
F. Mode of transportation	(0-3) 2.32±1.053	(0-3) 1.23±1.165
G. Responsibility for own medication	(0-2) 0.99±0.289	(0-1) 0.77±0.424
H. Ability to handle finance	(0-2) 1.65±0.516	(0-2) 0.92±0.671
Total Lawton scale score	**(0-12) 7.87±2.956**	**(0-19) 7.62±5.744**

Table (4): Mean scores of older people regarding quality of life domains:

The table showed that the highest mean score of quality of life domains among the studied diabetic elderly was related to leisure and activities domain (19.87±2.949), followed by social relationships and home and neighborhood (18.04±2.472 and 16.76±1.687 respectively). It was observed that the mean score of life overall was nearly equal to financial circumstances (13.42±2.302 and 13.36±2.906 respectively). This was also true for psychological and emotional well-being and independence (12.99±2.123 and 12.52±2.635 respectively). Health was the lowest domain which had the lowest mean score of quality of life of the studied diabetic elderly (10.44±2.787).

Table (4): Mean scores of older people regarding quality of life domains:

QOL Domains	Total score	The studied elderly (n=200)	
		Range	**Mean ± SD**
• Life overall (4 statements)	20	(7-18)	13.42±2.302
• Health (4 statements)	20	(4-16)	10.44±2.787
• Social relationships (5 statements)	25	(9-23)	18.04±2.472
• Independence, control over life, freedom	20	(4-20)	12.52±2.635

• (4 statements)			
• Home and neighborhood (4 statements)	20	(12-20)	16.76±1.687
• Psychological & emotional well-being • (4 statements)	20	(8-18)	12.99±2.123
• Financial circumstances (4 statements)	20	(7-20)	13.36±2.906
• Leisure and activities (6 statements)	30	(14-29)	19.87±2.949

Table (5):Percentage distribution of diabetic elderly according to their total score of quality of life (QOL).

It illustrated that about two thirds (65%) of the studied diabetic elderly had moderate quality of life while more than one quarter (27.5%) of them had the worst quality of life and only (7.5%) had high quality of life. The total score ranges from (83-151) with the mean score 117.41 ± 14.858.

Table (5):Percentage distribution of diabetic elderly according to their total score of quality of life (QOL).

Total QOL score	studied elderly (n=200)	
	N	**%**
• ≤106 Worst quality of life	55	27.5
• 107-139 Moderate quality of life	130	65.0
• ≥140 High quality of life	15	7.5
Range	**(83-151)**	
Mean ± SD	**117.41±14.858**	

Table (6):Relationship between total Barthel index score of Activities of Daily Living scale (BI) and total QOL scores among studied diabetic elderly.

The table showed that among those who were severely dependent in their ADLs 85.7% had worst quality of life and only 14.3 had moderate QOL. Among those who were moderately dependent 54.3% had moderate QOL score while 45.7% of them had worst QOL score. About three quarters (73.6%) of those who were independent had moderate QOL score while 15.7% had worst QOL. These differences were statistically significant (P=0.00).

Table (6):Relationship between total Barthel index score of Activities of Daily Living scale (BI) and total QOL scores among studied diabetic elderly.

Total BI score	Total QOL score						Total		$x2$ P
	≤106 Worst quality of life		107-139 Moderate quality of life		≥140 High quality of life				
	N	%	N	%	N	%	N	%	
• **Severe dependence (0-60)**	12	85.7	2	14.3	0	0.0	14	100	
• **Moderate dependence (61-90)**	21	45.7	25	54.3	0	0.0	46	100	**44.43 0.00***
• **Independence (91-100)**	22	15.7	103	73.6	15	10.7	140	100	
Total	55		130		15		200		

* Significant at P < 0.05.

Table (7):Correlation between both total BI and QOL scores and socio-demographic characteristics of the studied diabetic elderly.

The table indicated that there was a negative significant correlation between the elder's age and their ability to perform ADLs where the higher age was associated with lower reported functional ability in completing the ADLs tasks. On the other hand, the elderly income was positively significant with the total barthel index scores and with the QOL scores, i.e. the higher income is the higher QOL and functional ability.

Duration of diabetes had negative significant correlation to barthel scores and total QOL. The table also showed that blood glucose level was negatively significant correlated to barthel score and QOL score. Total QOL score was positively significant correlated to barthel score.

Table (7):Correlation between both total BI and QOL scores and socio demographic characteristics of the studied diabetic elderly.

Characteristics	Total BI score		Total QOL score	
	r	P	r	P
age	-0.264	**0.00****	-0.099	0.161
Income	0.289	**0.00****	0.692	**0.00****
Duration of disease	-0.166	**0.019***	-0.151	**0.033***
Blood glucose level	-0.262	**0.00****	-0.174	**0.014***
Total QOL score	0.443	**0.00****		

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

4. DISCUSSION

The age of the general population has steadily increased throughout the last century. Aging is associated with hyperglycemic tendency and increased insulin resistance which predispose to diabetes. The development of strategies to preserve the functional capacity of the geriatric population is therefore of paramount importance in improving elderly quality of life and reducing health care cost [39, 40].

The present study showed that the age of the majority of the studied diabetic elderly ranged from 60 to less than 70 years with a mean age 65.25 years ± 4.338. This finding explains that most of the elderly in the present study were independent in performing activities of daily living (ADL), as it was reported that advanced age is associated with decreased abilities to perform ADL [41]. However, **Al harbi M et al.** (2016), studied the exercise barriers and the relationship to self-efficacy of exercise for people with heart disease and diabetes in Australia. They found that the mean age of the elderly in their study was 63.6 years ± 8.5 years but this had no effect on self efficacy to exercise [42]. This may be due to the presence of many kinds of exercise that fit with all ages. Another study by **Esmayel E M et.al** (2013), who studied the nutritional and functional assessment of hospitalized elderly: impact of socio-demographic variables at Zagazig, Egypt, found that most (82%) of the studied elderly were between 65-75 years with a significant correlation between functional ability and age, where functional activity decreased with advanced age [41].

The current study revealed that the number of the studied diabetic male elderly was slightly higher than the females. Although, number of females is greater than males in Egypt according to Egypt demographics profile, 2015 [43].This may be because the current study was conducted at the health insurance outpatient clinic, where the male elderly having insurance services more than females who were housewives and so had no health insurance services. This was also documented by **Arafa A et.al**, (2010), in Egypt about the epidemiology of DM in Egypt. The study found that most (80.4%) of the females in Egypt had no health insurance coverage [44]. This highlights the importance of having care centers for the diabetic elderly women in Egypt.

Findings of the present study revealed that the functional ability was higher among males than females. This may be due to the physique of men are generally stronger than women. This result is in line with a study done by **Riesgo A et.al,** (2011), about sex differences in the treatment of elderly with atrial fibrillation in Spain. The study illustrated that women were older than males (77.9 years ±9.2 v.s 71years ±12.1 respectively), with greater functional dependency as barthel index mean score for females was 87.6±19.1 and 91.6±17.11for males [45]. This result is also in agreement with a study done by **Mahfouz Eet.al**, (2007), about determinants of disability among elderly population in rural Minia, Egypt. The study found that female elderly were more liable to report poor health status than male elderly as more than half (54%) of the female elderly were severely disabled [46].

An important feature in determining the older person's ability to live in the community is the extent of support available. The family is the heart of elder's care [119]. The present study showed that the majority of the elderly were living with their

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families. This may be due to the dominant culture in rural area that refuses leaving elderly living alone. This finding highlights the importance of family in improving functional ability and quality of life of the diabetic elderly. This is in line with a study done by **Fouad R et.al,** (2014), in Alexandria, Egypt, about quality of life and physical functioning of the diabetic middle aged and older adults. They noted that none of the elderly was divorced or single [47]. On the other hand, a study done by **Kaambwa B et.al** (2015), about an empirical comparison of the older people quality of life in a community dwelling population of older people in Australia, reported that more than one half of the elderly were living alone, while about one quarter were living with their families [48]. This difference may be due to the different cultures. The study conducted by **Mahfouz E et.al**, (2007), found that single status was significantly related to the occurrence of both disability and poor health status [46].

Educational level may have an important role in planning care of the diabetic elderly related to disease management, adherence to dietary regimens, self injection and needing for checkup to detect any complication or defect that can impair the elder's quality of life. The current study revealed that most of the studied diabetic elderly were illiterates/ read and write or having elementary education. This may be due to the limited access to education by the elderly in the past as there was lack of schools and little money for this purpose. This is in agreement with a study conducted by **Amer M et.al** in Cairo, (2012), about quality of life in elderly diabetic patients with peripheral arterial disease. The study found that most of the participants were illiterates, about one quarter had higher education and only 10% could just read and write [49]. This is also in line with a study conducted by **Kimbler K J** (2013), in a study about everyday problem solving and instrumental activities of daily living on elderly at Florida. The study revealed that 44.1% of the subjects had elementary education, while one third had high education and less than one quarter had secondary education [50].

Income of the diabetic elderly may be an important factor in his life as it affects his intention, ability to seek medical help and making periodic checkup and so affect his health and quality of life. The present study illustrated that the income for slightly less than half of the studied elderly was just enough for their needs, while nearly one third of them had enough income and reserve from it. This may be due to that all the sample was retired and had a government pension. In the same context, **Esmayel E M et.al** (2013), mentioned that 56% of the studied elderly had low income, while 44% had moderate income [41].

Several characteristics have been shown to affect the relationship between diabetes and functional ability. The current study revealed that there was a significant relationship between the total Barthel index score of ADLs of the elderly, their income and educational level. This means that low income and illiteracy were associated with physical disability and vice versa. This may be because low income and illiteracy are associated with low access to medical care and lack of awareness about health issues. This result is in contrast with the study done by **Esmayel E M et.al** (2013), as he found that there was no association between BI and income or education [41]. This may be due to the different characteristics of the two study subjects.

The current study showed that there was a significant positive relationship between total QOL scores, elderly income and their educational level, as quality of life was higher among those with enough income and high educational level. This result is in line with a study done by **Hongthong D et.al**, (2015), about factors influencing the QOL among older people in a rural area of Thailand. The study found that there was a significant relationship between QOL, income and education [51].

Diabetic patients tend to have worse functional abilities than non-diabetic patients, which is associated with an accelerated decline in muscle function. The metabolic changes in diabetes result in changes in the connective tissue and structure of muscles [52]. The current study showed that there was a significant correlation between QOL and the functional ability (Barthel index). This may be due to that the decline in functional ability influence the elderly tendency to perform his role in life which can interferes with his health and quality of life. This is in line with the study done by **Hongthong D et.al**, (2015), as it revealed that there was a significant relationship between QOL and the functional ability, and that most of the study sample had moderate QOL [51].

Diabetes on the long run might foster disability through its complications which may impede the normal performance of everyday activities, work, sexual activities and leisure as well as social and family life [47]. As regards the duration of diabetes, the present study revealed that most of the elderly had diabetes for less than 11years. This is in line with a study conducted by **Saad M et.al** in Alexandria, (2016), about frailty index in elderly men with type 2 DM. The study found

that about two fifths of the study subjects had been diabetic for 5-10 years, while one third had it for 11-15 years and one quarter had it for more than 15 years [52].

The findings of the previous study is in agreement with the present study which revealed that there was a negative significant relationship between duration of diabetes and total score of BI as well as QOL total score, this means that longer duration of diabetes was associated with decreasing functional ability and QOL. This may be due to increasing chance of diabetic complications beside the normal body changes associated with increasing age. This draws attention toward health screening and frequent check up to elderly for early detection of any complications that might affect elder's functional ability and his QOL.

Choosing the right treatment for the diabetic elderly helping control diabetes and so prevent complications. The current study revealed that about three fifths of the studied diabetic elderly manage diabetes with insulin. This result is in agreement with the study conducted by **Pedras S et.al** (2016), about socio-demographic and clinical characteristics of patients with diabetic foot ulcer in Brasil. The study found that more than two thirds (68.9%) of the study subjects managed diabetes with insulin [53]. This is in contrast with the study conducted by **Moran Cet.al** (2013) about brain atrophy in type 2 diabetes in Australia, who found that only one fifth of the subjects managed diabetes with insulin [54].

Frequent checking up of blood glucose level may help in increasing the chance of early detection of any diabetes problem and early management. The current study showed that more than two thirds of the studied elderly had their blood glucose within the normal level. This may be due to that more than one half of the studied diabetic elderly using insulin in managing diabetes, which contributed to controlling blood glucose level. This is in line with the study done by **Amer M et.al**, (2012), as it found that most (70%) of the subjects had controlled blood glucose level [49]. This result is in contrast with the study done by **Habtewold T et.al** (2016), who found that 32.6 % of the study sample had a normal blood glucose level and 67.4 % had high blood glucose level [55].

The present study revealed that blood glucose level has a negative significant relation with functional ability and QOL. This may be due to effect of diabetic complication which increase dependency level and therefore affect the elderly quality of life. This is in line with a study conducted by **Abdel Rahman T et.al,** in Cairo, (2014), about executive dysfunction in elderly diabetic patients. The study found that there was a significant association between glycemic control and the diabetic's functional status [56].

The present study showed that most of the studied diabetic elderly were independent in performing ADLs and about one quarter of them were moderate dependent. This is in line with the study done by **Riesgo A et.al** (2011), who found that 76% were independent and 24% were dependent in performing ADL [45]. This result is in contrast with a study done by **Matzen L et.al** (2012), about functional level at admission as a predictor of survival in older patients in Denmark, who mentioned that 16.1% of the subjects were independent, 45.5% were moderate dependent and 27.4% were severe dependent [57]. This difference may be due to the difference between mean ages as it was 83.9 years compared to 65.25 years in the present study as well as the health condition or the associated problems of the elderly which made them admitted to an acute unit.

The lawton scale designed to help identify the optimum living situations for elderly patients and assess how they are functioning at the present time in performing IADLs [58]. The present study showed that the highest mean score gained by the male elderly of lawton scale items was related to mode of transportation, while the lowest mean score was related to responsibility for own medication. The mean score of ability to use telephone was nearly equal to that of ability to handle finance. These results differed among the studied females as the highest mean score was related to food preparation followed by mode of transportation while the lowest mean score was related to laundry. The mean score of ability to use telephone was nearly equal to the mean score of responsibility for own medication. The study done by **Kimbler K et.al**, (2013), found that the highest mean score was related to ability to use telephone (2.95±0.32), while the lowest mean score was related to meal preparation (2.68±0.52) and housekeeping (2.68±0.57). Mean score of shopping was nearly equal to that of ability to handle finance (2.85±0.36 and 2.83±0.50 respectively). Mean score of mode of transportation was (2.75±0.49) [50].

Promoting quality of life in older age is an internationally recognized priority which requires valid measurement. The Older People Quality of Life Questionnaire (OPQOL) was found to be a highly reliable and valid measure of quality of

life in older age [59]. Leisure and activities domain, which contain statements about religion and culture, had found to have the highest mean score of QOL in the present study. This might be attributed mainly to the practice of Islam as all participants were Muslims where there is a close link between religion and parent-children relationship. In Islam, children should look after their parents and respect older people which are considered meritorious deeds. Therefore, religion and culture have an important role in QOL among older people.

Moreover, the present study revealed that the domains of "social relationships" and "home and neighborhood" were scored relatively well. Most of the elderly said that they have someone who gives love and affection and their living environment was safe. These factors might give the feeling of safety among older people and optimize their social well-being.

The mean score of health domain was the lowest in the present study. This revealed that diabetes has obvious effect on the elderly health and on their quality of life domains as "health" and "psychological and emotional well-being" domains. The present study was in line with the study done by **Rathnayake S et.al** (2015), about QOL and its determinants among older people living in the rural community in Srilanka. The study found that financial circumstances and health had the lowest mean score (10.36 ± 3.20 and 11.18 ± 3.9 respectively) [37].

The current study revealed that QOL among nearly two thirds of the diabetic elderly was at moderate level and was worse for more than one quarter of them and the mean of older people's quality of life OPQOL scores was 117.41 ± 14.858.This was in agreement with the study conducted by **Bilotta C et.al** (2011), who studied a prospective cohort study on older outpatients living in the community in Italy, showed that the mean OPQOL scores 116.2 ± 15.4 [60]. This was in line with the study done by **Rathnayake Set.al,** (2015), as the study revealed that OPQOL mean score was 111.76 ± 14.691[37].

Finally, maintenance of functional ability of the elderly is a key element in geriatric health and is an important indicator of the elderly health. This can be determined through comprehensive geriatric assessment which aims to enable elderly achieve, maintain or restore an acceptable level of physical and social independence and therefore improve their QOL. Assessment of functional ability can help in identifying what services or programs are needed [41, 61, 62]. Therefore, community health nurses need to pay attention for assessing elderly functional status and QOL especially for those with chronic diseases.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion:

Based on the findings of the present study, it can be concluded that functional ability of diabetic elderly can affect positively their quality of life. There was a strong association between functional ability and the elderly quality of life. Most of the studied diabetic elderly were independent in performing ADLs, while a high percentage of them needed help in performing instrumental activities of daily living especially the female diabetic elderly. Age had negative influence on functional ability. Blood glucose level and duration of diabetes had a strong negative influence on functional ability and quality of life of diabetic elderly, while income had positive influence on functional ability and quality of life of diabetic elderly. The study indicated that the majority of the studied diabetic elderly experienced a moderate level of QOL. Good QOL was reported in the domains of "leisure and activities", "social relationships" and "home and neighborhood", while lower QOL was reported in the domains of "health" , "independence, control over life and freedom" and "psychological and emotional well-being". Poor health status, poor family income and uncontrolled diabetes were the determinants of poor QOL in the diabetic elderly.

Recommendations:

Based on the findings of the present study, the following recommendations are suggested:-

1. The linkage between the functional abilities of the elderly and their QOL necessitates that nurses should consider the functional capacity of the elderly when assessing, planning and providing nursing care for them.

2. Nurses need to pay attention toward health screening and frequent check up to elderly for early detection of any diabetic complication that can affect elder's functional ability and so QOL.

3. Nurses need to do their best to prevent the complications of DM through educating elderly achieve good metabolic control and self care practices.

4. There is a need for the establishment of community geriatric service at primary care settings mainly focusing on nursing care that would help older people to meet their health needs and so save expense of being hospitalized.

5. It is important to increase the coverage of health insurance services for the housewives elderly women with diabetes in Egypt.

6. Nurses need to develop educational programs for the diabetic elderly and their families about disease management, dietary regimens, insulin injection and periodic check up in order to maintain their functional status and QOL.

7. Social support system is highly needed to refer the diabetic elderly with poor income to social services to help them financially and socially to deal with life and disease expenses and maintain their QOL.

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