Relationship between Self-Management and Depression among Elderly Diabetic Patients (Type 2)

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Abstract: This study used a descriptive correlational design aiming to identify the relationship between self-management (self-care, self-efficacy, patient knowledge & depression among elderly diabetic patients type 2. The study was conducted at the Diabetic Outpatient Clinic in Ain Shams University Hospitals. Sample of 120 elderly patients (males & females), with type 2 diabetes mellitus was recruited during their follow up at the outpatient clinic.They were chosen according to stratified random sample over a period of 11 weeks. Two tools were used to collect data:-1) A questionnaire to assess participants' demographic data and medical history (which included age, sex, marital status, educational level, occupation, duration of diabetes, BMI, and the last HBA1C level. 2) Brief Diabetes Knowledge Test (1998). 3) The HANDS depression screening tool was developed by Screening for Mental Health, Inc. and the Department of Psychiatry, Harvard Medical School (2002) .(It consists of 10 items ranged from (0-3) in which (0) reflects none or little of the time (1) Some of the time,(2) Most of the time, while (3) All of the time. 4)Chinese Diabetes Self-Efficacy Scale by. (It is a checklist with 26 items divided into 6 items for diet, 4 items about exercises, 3 items about medication taking, 4 items about blood glucose testing- 5 items about foot care- 4 items about prevention of hyperglycemia and hypoglycemia and how to treat. 5)Summary of Diabetes Self –Care Activities Scale. This study recommended that the education, counseling, skill building, and support through behavioral interventions to offered by health care providers to enable diabetic patients to manage their diabetes and recognize deal with depressive illness . Diabetic management intervention has emerged as a resource to assist patients in managing daily diabetic care through dissemination of information and facilitation of diabetic management behaviors that has effect on diabetes related self-efficacy. (Research shows that psychosocial factors such as family support play a central role in the success or failure of diabetes management regimen. A combination of medication and psychotherapy is recommended by this research for people with diabetes experiencing moderate to severe depression to alleviate suffering more quickly than either alone and may help reduce relapse and patients with depression should always be asked about suicidal ideation ,when risk is high. Cognitive behavioral therapy is frequently cited as effective in treating depression in people with diabetes. (Further research is needed to determine and evaluate integrating depression screening and treatment into comprehensive care of diabetes, including specific support for diabetes medication adherence and self-care activities, as well as systematic depression care, can help patients achieve better psychological and diabetes outcomes).

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1. Introduction

Diabetes mellitus is a multi-system disease related to abnormal insulin production, impaired insulin utilization or both ***(O'Brien et al., 2007).*** It is a chronic yet controllable disease that may affect the lifestyle of patients and their families ***(Middleton, 2003). The Center for Disease Control (2008)*** reported that diabetes now affects nearly 23.6 million Americans or 7.8% of the US. Population and more than 6 million of those people do not know they have diabetes. The International Diabetes Federation has predicted that there will be 380 million individuals with diabetes in 2025, compared with an estimated 240 million individuals in 2007, with a higher disease burden in low- and middle-income nations. (***Weinger, 2009)*** Egypt had been estimated to be the 9th country in the prevalence of diabetes. Recent changes in physical activity and dietary patterns have promoted the development of diabetes but if different preventive and control activities are not adopted by the year 2025 more than 9 million Egyptians (13% of the population above 20 years old) will have diabetes.

Self-management refers to the extent to which the person adhere to prescribed diet restriction, physical activities requirement, medication administration, testing blood sugar level and foot care. ***Redman(2004***) ***and Barker (2010)*** clarified that the concept of diabetes self-management has become popular nowadays, the people with chronic health conditions need to be able to deal with taking

medicine and maintaining therapeutic regimen, maintaining everyday life such as employment and family and dealing with the future including changing life plans and frustration, anger and depression.

Depression refers to a cluster of symptoms that include anhedonia, emotional flatness or emptiness with diurnal variation, depressed mood, changes in sleep and appetite, and the cognitive set of futility and hopelessness. These symptoms lead to reduce patient`s ability to perform even normal daily activity. ***Moore and Garland (2003).*** In a similar study ***Zakaria (2008***) added that depression could be more common in patients with diabetes for a variety of reasons. For example, the daily demands of living with diabetes or the challenges created by diabetes complications could increase a person's risk for becoming depressed. On the other hand depression could increase a person's risk for developing diabetes. Behavioral or hormonal effects of depression could have that effect, especially in the case of type 2 diabetes. Finally, some other processes, such as aging or yet an undetermined genetic factor, might increase a person's risk for both diabetes and depression.

Self-efficacy is a term based on Bandura's social cognitive theory, which suggests that an individual's confidence in his/her ability to perform health behaviors will influence which behaviors they will engage in (***Bandura, 1997).*** Studies have indicated that interventions designed to improve self-efficacy can produce improvements in self-management of chronic diseases and health outcomes **(Scherer &Schmieder, 1997; Farrell *et al.*, 2004; Sarkar, *et al* , 2006).**

Diabetes self-care is recognized as an essential component of effective glycemic control. Skills for diabetes self-care require the ability to gather information, self-monitor blood glucose levels, and adjust food intake related to activity, stress, and illness; these skills are developed via patient education which relies heavily on written materials about the disease process, medical management, and self-care instructions; yet the educational materials are often written at too high of a level for low-literate patients to understand essential information ***(Farrell, et al., 2004,Nath, 2007***)

According to (***Zhang et al., 2008)***, who clarified that as other chronic diseases, diabetes may be associated with a variety of stressors brought about by the illness and its treatment. These include; pain, disfigurement, impaired physical functioning, life threat, permanent changes in lifestyle, dependency, self-management tasks, threats to dignity, diminished self-esteem, disruption of normal life transition, decreasing resources, and changes in future perspectives. These disease-related stressors may play an important role in the development of anxiety and depression among patients.

Moreover, recovery from depression as well as relapse prevention depend on accurate nursing process which leads to increase patient`s ability to cope with their negative thinking, low self-esteem, social isolation and other depressive symptoms, and to catch early signs of relapse (***Christensen & Kassing, 2005).*** Accordingly, the aim of this study is to identify the relationship between self-management (self-care, self-efficacy & patient knowledge), and depression among elderly diabetic patients type 2

Aim of the study.

The aim of this study is to identify the relationship between self-management (self-care, self-efficacy & patient knowledge), and depression among elderly diabetic patients type 2

Research question:-

1. What is the relationship between self-management (self-care, self-efficacy & patient knowledge), and depression?
2. What is the relationship between patients' socio demographic characteristics and depression?

2. Subjects and Methods

Research design:-

A descriptive correlational design was followed in this study.

Research setting:-

The study was conducted at the Diabetic Outpatient Clinic in Ain Shams University Hospitals.

Subjects:

Sample of convenience of 120 elderly patients (males & females), with type 2 diabetes mellitus was recruited during their follow up at the outpatient clinic. Patients' inclusion criteria included: 1. being older than 50 years. 2- Diagnosed with type 2 diabetes. 3- Have no significant cognitive problems, including dementia or known psychiatric illness that would impede or influence responses to the questionnaires. 4- Have no advanced medical complications, including heart failure or end stage renal failure. 5- Able to communicate verbally. 6- Willing to participate in the study. 7- Able to complete an interview.

Tools of data collection:-

1. The socio demographic characteristics of the patients such as; (age, sex, current marital status, level of education, duration of diabetes, BMI and the last HBA1c level.
2. Brief Diabetes Knowledge Test; Developed by (**Fitzgerald *et al.*, 1998**). It is a questionnaire that consists of 14 multiple choice questions with 3 0r 4 options. It assesses knowledge about suitable and avoided diet (4 questions) ,measurements of blood glucose (3 questions) ,

management and prevention of hypoglycemia and hyperglycemia (4 questions), exercise (one question) and 2 questions for medication management. The scoring system evaluated the knowledge levels in three levels. Every correct choice takes one mark, so poor knowledge clients scores ranged from (0-<7), fair knowledge clients (7- <11) and good knowledge clients (11-14). This scale was translated by the researchers into Arabic language and it was tested for its content validity by a group of five experts from the Medical Surgical Nursing staff and a nurse specialist in diabetes mellitus. The required modifications were carried out, accordingly with Cronbach alphas = 0.70.

3. The HANDS depression screening tool was developed by Screening for Mental Health, Inc. and the Department of Psychiatry, **Harvard Medical School (2002).** It consists of 10 items ranged from (0-3) in which (0) reflects none or little of the time,(1) Some of the time,(2) Most of the time, while (3) All of the time. Mild depression ranged from (0-<8), Moderate depression ranged from (8-<21) ,while severe depression ranged from (21-30).This scale was translated by the researchers into Arabic language and it was tested for its content validity by a group of five experts from the psychiatric medicine and psychiatric nursing staff and a nurse specialist in diabetes mellitus. The required modifications were carried out accordingly. Then, test-retest reliability was applied. The tool proved to be strongly reliable (r=0.8222).
4. Chinese Diabetes Self-Efficacy Scale adapted from ***Wang et al (1998),*** it is a checklist with 26 items divided into : 6 items for diet, 4 items about exercises, 3 items about medication taking, 4 items about blood glucose testing- 5 items about foot care- 4 items about prevention of hyperglycemia ,and hypoglycemia and how to treat them. It describes what some people believe about their ability to take care of their diabetes. People rate their degree of confidence for being able to carry out their diabetes- related activities on (5) rates ranging from "Not confident at all" to strongly confident) for every item. This scale was translated by the researchers into Arabic language and it was tested for its content validity by group of five experts from the psychiatric medicine and psychiatric nursing staff and a nurse specialist in diabetes mellitus. The required modifications were carried out accordingly.
5. Summary of Diabetes Self-Care Activities Scale (SDSCA): The scale is developed by **Toobert *et al*. *(2000)*** and had acceptable reliability and validity. It contains 12 questions about diet, exercises, blood glucose test, foot care and medication. The questions ask about diabetes self –care activities during the past 7 days, so the scale was graded from 1-7 days. It was considered inadequate for less than three days while adequate for three days or more. It is widely used self-report instrument for measuring diabetes self-management in adults, and had adequate internal and test-retest reliability and evidence of validity and sensitivity to change.

Pilot study:-

A pilot study was carried out on 10 patients having been followed up through visiting the Outpatients Clinic in Ain Shams University Hospital in order to test the applicability of the tools and clarity of the included questions, as well as to estimate the average time needed to fill in the sheets. Those who shared in the pilot study were excluded from the main study sample.

Ethical Considerations:

Approval to conduct the study was obtained from the Director of the outpatient Clinics. All potential participants in this study were given written information sheets. They were informed that participation in the study is voluntary and that they could withdraw at any time without giving any reason. The privacy of all participants was respected and all collected data were kept anonymous and confidential throughout the study.

Operational Design:-

The researchers visited the Outpatient Clinic to determine patients who were diagnosed as having diabetes type 2 through checking patients' files four days per week. Then, the researchers started to explain the aim of the study to every selected patient in the study and interviewed each of them individually to collect necessary information about socio-demographic characteristics, Brief Diabetes Knowledge Test, The HANDS Depression Screening Tool, Chinese Diabetes Self-Efficacy Scale and Summary of Diabetes Self–Care Activities Scale (SDSCA). Each patient interview lasted about 20-45 minutes. The data collection covered a period of 3 months from beginning of May, 2013 to end of July, 2013.

Data analysis

The obtained data were coded, analyzed and tabulated, descriptive statistics as frequency and percentages were calculated using computer. Cross tabulation and chi-square test were used and p value less than 0.05 was considered statistically significant

3. Results

The socio-demographic characteristics showed that, subjects included 35% males and 65% females of the 120 subjects. The age range was 50-

>65 years with a mean 56.80 ± 4.279 years. Duration of diabetes × was11.70 ± 3.812 years, 70% were married and 5% were single. According to their educational level, the highest percentages were less than high school (45%).

Regarding chronic disease, 51.67% of the patients have more than three chronic with HBA1c 6.96±1.2 and their BMI mean was 28.34±1.29

Table(1) indicates that there is a highly statistically significant difference between the patients' age and their knowledge related to their disease, in which most of the patients (96 %),who had good knowledge, their age ranged between 50-55 years, while almost two thirds of the patients (64.2%),who had poor knowledge, their age ranged between 55-<60 years.

In relation to the level of education, 75.5% of poor knowledge patients were less than high school, while 71%of university graduation patients had a good knowledge with a highly statistically significant difference. Regarding HBA1c, its range decreased with improvement of level of knowledge 8.1±0.67, 7.39±0.54, & 6.9 ±0.19, in relation to poor, average and good knowledge respectively.

Inversely there was no statistically significant relation between patients' gender and their knowledge about diseases (P =0.24). While there was statistically significant slight difference between patients knowledge in relation to their years of diabetes

Table (2) reveals that patients with good knowledge about diabetes management have a high mean score of self-efficacy about diet management, exercise, medication, blood glucose monitoring, foot care, hyperglycemia and hypoglycemia management compared with patients with poor knowledge (24.29±2.35, 15.54±2.37); 14.58±1.89, 9.45±3.06; 13.37±1.44, 9.94±0.93; 13.42±1.84, 11.26±3.24; &21.83±2.58, 14.03±2.40; 15.71±1.85, 11.47±1.48, respectively), with highly statistically significant difference.

Regarding relationship between patients' knowledge and their self-care, table (3) shows that there are highly statistically significant differences between patients' knowledge and their self-care performance in areas of diet, physical activities, monitoring of blood glucose and foot care. Most of the patients with good knowledge (95.8%) adhere to their prescribed diet 5 -7 days per week compared with more than half of poor knowledge (54.7%)do not adhere at all to prescribed diet(0 day/week).

In relation to physical activity, 50% of patients who had good knowledge patients perform exercises 5-7 days/week, in comparison with 88.7% of poor knowledge patients do not practice any form of physical activity 0 day /week.

In relation to monitoring blood glucose level, the highest percentage of patients who had good knowledge (41.6%) perform monitoring of blood glucose level 1-4days/week in comparison with 64.15% of patients with poor knowledge do not practice monitoring blood glucose level 0 day/week.

In relation to foot care, it most of good knowledge of patients (95.8%) care of their feet 5-7 days/week, while more than half of poor knowledge of patients (52.83%) care of their feet 1-4 days/week.

Inversely, in relation to adhere to medication regimen most of patients with good, fair or poor knowledge (95.8%, 97.7% & 88.7% respectively) adhere to medication 7 days/week.

Regarding to the relation between patients' knowledge and their depression state ,table (4) reveals that less than three quarters of patients with good knowledge (70.8%) were non –depressed while more than half of patients with fair knowledge (53.5%) had minor depression ,and slightly less than poor knowledge patients (73.6%) had major depression, with highly statistically significant difference (P< 0.001).

Considering the relation between patients' depression status and self-efficacy, table (5) reveals that patients with major depression was have a low mean score of self-efficacy about diet management, exercise, medication, blood glucose monitoring, foot care, hyperglycemia and hypoglycemia management compared with patients with non-depression status (15.11±2.46 vs. 20.74±4.73; 9.48±3.27 vs 15.51±0.98; 9.69±0.80 vs. 12.65± 1.74; 10.62±3.13vs13.68±0.96;13.32±2.15vs18.80±3.81&1 1.32±1.37vs15.02±1.01 respectively) with highly statistically significant differences (P <0.001)

Regarding the relations between patients' depression status and their self-care performance, table (6) indicates that there are highly statistically significant differences between patients' depression status and their self-care performance in areas of diet, physical activities and monitoring of blood glucose. The majority of the patients with major depression (67.4%) do not adhere to their prescribed diet (0 day week) while 48.57% of those who are adhered to prescribed diet (5-7 days/ week) were non-depressed (P <0.001).

As regards physical activity, most of depressed patients (93%) and 61.9%of minor depressed patients did not perform exercises (0 day/week), while 48.57% performed exercises (5-7 days/week) were non- depressed **(**P <0.001).

In relation to adherence to monitoring blood glucose level, less than three quarters major depressed patients (72.1%) do not perform monitoring of blood glucose level (0 day/week) in

comparison with 80% of non-depressed patients who practice monitoring blood glucose level (1-4 days/week) ,with highly statistically significant difference (*P* <0.001).

Concerning foot care, more than half of patients with major depression (55.81%) and less than three quarters of non- depressed patients (71.43%) care for their feet (5-7days/week), with no statistically significant difference (*P* <0.113).

In relation to adherence to medication regimen most of patients with non-depression or had minor or major depression (97.1%, 97.6%, & 86.1% respectively) adhere to medication (7 days/week); with no statistically significant difference (*P* < 0.053).

Considering the relationship between patients' socio demographic characteristics and their depression status, The majority of patients (81.4%), with major depression were less than high school, while more than half of patients (51.45%), who were university graduates hadn't depression, with highly statistically significant difference. The mean age increased with increase of depression status and that the progress of depression increased with increases of years of diabetes (8.00±1.87& 14.54±3.7).

Table (7) shows also that the HBA1c increased with increase in severity of depression with statistically significant difference (*P* <0.024) and their BMI increased with increase severity of depression with statistically significant difference (*P* <0.025).

Table (1): Relationship between Socio demographic characteristics and patients' knowledge

Items	Knowledge			X^2	*P* -value
	Poor (53) No %	Average (43) No %	Good (24) No %		
Sex: Male	17 (32.1)	19(44.18)	6 (25)	2.84	0.24 NS
Female	36 (67.9)	24(55.82)	18 (75)		
Age 50- <55	7 (13.2)	24(55.82)	23 (96)	54.01	0.000 very HS
55- <60	34 (64.2)	13(30.23)	1 (4)		
61- <65	6 (11.3)	6 (13.95)	0 (0)		
65+	6 (11.3)	0 (0)	0 (0)		
Educational level					
Less than high school	40 (75.5)	13(30.23)	1 (4)	70.722	0.000 very HS
High School	12 (22.6)	24(55.82)	6 (25)		
University	1 (1.9)	6 (13.95)	17 (71)		
Marital status					
Single	1 (1.9)	0 (0)	5 (21)	42.667	0.000 very HS
Married	46 (86.8)	25(58.14)	13(54)		
Divorced	6 (11.3)	6 (13.95)	6 (25)		
Widowed	0 (0)	12 (27.91)	0 (0)		
Diabetes Duration	11.30+ 3.43	11.13+3.88	13.58+4.03	3.86	0.024 S
HBA1c	8.1+0.67	7.39+0.54	6.9+0.19	41.73	0.000 very HS

Table (2): Relation between patients' knowledge and their self-efficacy

Items	Knowledge of the patients			F	*p*. value
	Poor (n=53)	Fair (n=43)	Good (n=24)		
	Mean± SD	Mean± SD	Mean± SD		
Self-efficacy of diet	15.54±2.37	16.67±4.59	24.29±2.35	59.669	0.0001
Self-efficacy of exercise	9.45±3.06	13.28±4.18	14.58±1.89	25.654	0.0001
Self-efficacy of medication	9.94±0.93	11.25±1.29	13.37±1.44	70.556	0.0001
Self-efficacy of blood glucose monitor	11.26±3.24	12.81±1.38	13.42±1.84	8.124	0.0001
Self-efficacy of foot care	14.03±2.40	15.86±2.03	21.83±2.58	94.401	0.0001
Self-efficacy of hyperglycemia and hypoglycemia management	11.47±1.48	14.35±1.28	15.71±1.85	80.539	0.0001
Overall self-efficacy	71.71±9.52	84.23±11.03	103.21±9.29	82.115	0.0001

Table (3): Relation between patients' knowledge and their self-care

Items of Self-Care	Knowledge of the patients			X2	*p*. value
	Poor (n=53) No %	Fair (n=43) No %	Good (n=24) No %		
Adhere to Diet regimen					
0 day	29(54.7)	18(41.9)	1(4.2)		
1-4 days	23(43.4)	19(44.2)	0(0)	82.7	0.0001
5 – 7 days	1(1.9)	6(13.9)	23(95.8)		
Adhere to physical activities					
0 day	47(88.7)	19(44.2)	6(25)	50.39	0.0001
1-4 days	6(11.3)	18(41.9)	6(25)		
5 – 7 days	0(0)	6(13.9)	12(50)		
Adhere to medication regimen					
0- 3 days	4(7.5)	0(0)	1(4.2)	4.42	0.352
4- 6 days	2(3.8)	1(2.3)	0(0)		
7 days	47(88.7)	42(97.7)	23(95.8)		
Adhere to monitor blood glucose					
0 day	34(64.15)	25(58.1)	7(29.2)	18.92	0.001
1--4 days	14(26.42)	18(41.9)	10(41.6)		
5 – 7 days	5(9.43)	0(0)	7(29.2)		
Adhere to foot care					
0 day	18(33.96)	0(0)	1(4.2)	70.05	0.0001
1--4 days	28(52.83)	7(16.3)	0(0)		
5 – 7 days	7(13.21)	36(83.7)	23(95.8)		

Table (4): Relationship between patients 'knowledge and their depression state.

Depression State	Knowledge						X^2	*p*- value
	Poor (n=53)		Fair (n= 43)		Good (n= 24)			
	No	%	No	%	No	%		
None	0	0	18	41.9	17	70.8	76.624	0.001
Minor	14	26.4	23	53.5	5	20.9		
Major	39	73.6	2	4.6	2	8.3		

Table (5): Relation between depression state of the patients and items of self-efficacy

Items	**Depression State**			F	*p*. value
	Non (n=35)	Minor (n=42)	Major (n=43)		
	Mean± SD	Mean± SD	Mean± SD		
Self-efficacy of diet	20.74±4.73	17.81±4.96	15.11±2.46	17.63	0.001
Self-efficacy of exercise	15.51±0.98	11.21±4.02	9.48±3.27	37.02	0.001
Self-efficacy of medication	12.65±1.74	11.23±1.18	9.69±0.80	52.81	0.001
Self-efficacy of blood glucose monitor	13.68±0.96	12.71±2.00	10.62±3.13	18.69	0.001
Self-efficacy of foot care	18.80±3.81	17.11±2.81	13.32±2.15	36.13	0.001
Self-efficacy of hyperglycemia and hypoglycemia	15.02±1.01	14.02±2.31	11.32±1.37	51.57	0.001
Overall self-efficacy	96.42±9.07	84.11±14.48	69.58±8.33	57.50	0.001

Table (6): Relation between depression state of the patients and items of self-care

Items of self-care	Depression State			X^2	*p*. value
	Non (n=35) No %	Minor (n=42) No %	Major (n=43) No %		
Adhere to diet					
0 day	6(17.14)	13(30.95)	29(67.4)	29.81	0.0001
1-4 days	12(34.29)	18(42.9)	12(27.9)		
5 – 7 days	17(48.57)	11(26.2)	2(4.7)		
Adhere to physical activities					
0 day	6(17.14)	26(61.9)	40(93)	66.97	0.0001
1--4 days	12(34.29)	16(38.1)	2(4.7)		
5 – 7 days	17(48.57)	0(0)	1(2.3)		
Adhere to medication regimen					
0- 3 day	0(00)	0(0)	5(11.6)	9.36	0.053
4- 6 days	1(2.9)	1(2.4)	1(2.3)		
7 days	34(97.1)	41(97.6)	37(86.1)		
Adhere to monitor blood glucose					
0 day	6(17.14)	29(69)	31(72.1)	44.26	0.0001
1--4 days	28(8o)	8(19.1)	6(13.95)		
5 – 7 days	1(2.86)	5(11.9)	6(13.95)		
Adhere to foot care					
0 day	4(11.43)	7(16.67)	15(34.88)	7.465	0.113
1--4 days	6(17.14)	6(14.29)	4(9.31)		
5 – 7 days	25(71.43)	29(69.04)	24(55.81)		

Table (7): Relation between patients' socio- demographic characteristics and their depression status

Items	Depression State						X^2	*p*. value
	Non (n=35)		Minor (n=42)		Major (n=43)			
	No	%	No	%	No	%		
Sex								
Male	17(48.6)		12(28.6)		13(30.2)		4.026	0.134
Female	18(51.4)		30 (71.4)		30(69.8)			
Age (Mean ±SD)	53.71±1.51		56.67±4.62		59.44±3.75		F- test 24.01	0.0001
Less than high school	6 (17.1)		13 (30.9)		35 (81.4)		55.2	0.0001
High school	11 (31.45)		23 (54.8)		8 (18.6)			
University	18 (51.45)		6 (14.3)		0 (0)			
Chronic diseases								
< 3	24 (68.6)		19 (45.2)		15 (34.9)		9.001	0.0011
≥3	11 (31.4)		23 (54.8)		28 (65.1)			
Years of diabetes (Mean ±SD)	11.11±4.1		12.5±3.39		11.39±3.8		F test 1.49	0.23
HBA1c (Mean ±SD)	7.08 ± 0.46		7.68 ± 0.74		7.98± 0.62		20.094	0.000
BMI (Mean ±SD)	27.86±1.16		28.43±1.3		28.64±1.32		3.8	0.025

4. Discussion

In recent years, the complexities of the relationship between diabetes and depression have become well known but have been less well researched. Some studies have suggested that stressful experiences might affect the onset and/or the metabolic control of diabetes, but findings have often been inconclusive. In this article the researchers assessed the relationship between self-management (which includes self-care, self-efficacy & patient knowledge) among elderly type 2 diabetic patients, and depression.

This study results revealed that the highest score of knowledge was among the age

group 50-<55 who were the youngest group among the participants. As well; it was higher among university graduated patients compared to a little higher poor knowledge among patients who were less than high school. In addition, the range of HBA1c decreased with improvement of level of knowledge. These findings were supported by ***(*Al-Qaza*.et al 2012)*** who found significant higher scores of knowledge among those with younger age, higher educational level, higher monthly income, and a longer duration with diabetes ($P < 0.05$). The findings from this study support the suggestion that knowledge enhancement of patients with diabetes will improve their self-management activity and increase their awareness about the control of their disease.

In this study, gender was found not to affect the knowledge scores of patients, which is in contrast with ***Brown*(1999) *and McPherson, 2008*)**, who found that gender affects the scores in the knowledge test, which is supported by ***(*Al-Qaza*z.et al., 2012)*** who found similar results.

The level of education of the patients, and a longer duration of diabetes were seen to significantly affect the knowledge scores of the patients in this study, and this is well accepted and supported by other studies as those of Wharrad ***(2007) and Al-Adsani (2009)*.** More years in education could be a marker of social status, leisure time and wealth, affecting the knowledge scores in this study.

From the diabetes-related data, longer duration of the disease was associated with higher knowledge scores in this study and this indicates that diabetes knowledge might be cumulative and gained by years of experience with diabetes; similar findings about disease duration and knowledge have been found elsewhere in the study of ***Adsani ,(2009).***

The control of glycaemia represented by HbA1c was found to be significantly related with knowledge scores (Table 1). The same result was found by ***(*Al-Qaza*z.et al 2012)*** who reported that lower HbA1c (better glycaemia control) was associated with higher knowledge scores in the study cohort. This finding is accepted, as those patients with higher knowledge have more awareness about the control of their diabetes and self-management processes, and they are convinced that lack of knowledge might worsen their clinical condition. Enhancement and improvement of patients' knowledge may lead to improvement of their diabetes control.

Regarding the relation of patients' knowledge about diabetes management and their level of self-efficacy (as an indicator of self-management)the current study result revealed that there is high confidence level among good knowledge patients in areas of diet, exercises, medication, BGM, foot care, hyperglycemia and hypoglycemia management. These findings are supported by ***Norris et al. (2001)and , Glasgow et al. (2002)*** ho stated that factors beyond knowledge of diseases specific information are necessary to heighten patients self confidence in their diabetes management and to improve diabetes self-management. However the previous are inconsistent with ***Levetan(2002*) ,*Heisler et al. (2003),*** who mentioned that greater patient knowledge alone doesn't correlate with glycemic control and simply providing information is not enough to motivate patients. Also findings of the present study were congruent with ***Sarkar et al. (2006),*** who suggested that within the elderly patients' population, individuals with limited knowledge about diabetic management may be especially vulnerable to lower self-efficacy. According to ***Bandura (1997),*** perceived self-efficacy influences the choices of activities and motivational levels which contribute to the acquisition of knowledge structure on which skills are found.

Regarding relation between patients' knowledge and their self-care (as an indicator of self-management), the study result indicated highly statistically significant difference for patients' knowledge and their self-care performance in adherence to diet regimen representing most of who have good knowledge adherence to diet, i.e., 5-7 days/ week in comparison with more than two fifties of those who had poor knowledge adherence to diet, i.e., 1-4 days/week. This finding is supported by ***McCleary-Mones(2011),*** who found that diabetes' knowledge was positively associated with dietary self-care activities (r=0.299) and that participants who had higher levels of diabetes knowledge tended to have higher level of general diet self-care. This study also reveals that half of patients with good knowledge about diabetes adhere to physical activities (5-7 days/week) ,while the majority of poor knowledge patients do not adhere to physical activities at all (0 day/week).

In relation to adherence to medication regimen, this study result revealed that minorities of patients with poor, fair and good knowledge are non- adherent to medication 0-3 days/week neither nor 4 - 6 days/week, with no statistically significant difference, which is inconsistent with ***Elizabith et al. (2007)*** who found that 43.3% of patients are not adherent to medication.

In relation to adherence to monitoring blood glucose level, this study result revealed that less than two thirds of poor knowledge patients do not adhere to monitor blood glucose (0 day/week) compared with slightly more than two fifties of good knowledge patients who monitor blood glucose level (1-4 days/week). This may be

due to that they didn't have enough knowledge about complications of poor glycemic control. This results contradicted with ***Herenda and Tahirovic (2009),*** who found that only one third of patients with type 2 diabetes had done self monitoring with glucometer although their knowledge about hypoglycemia and hyperglycemia was improved during education.

In relation to adherence to foot care the present study finding showed that most of older participants who had good knowledge and the majority of those who had fair knowledge were practicing foot care (5-7 days/week), and more than half of poor knowledge participants were practicing foot care (1-4 days/ week) This obvious care about foot may reflect their fear of diabetic foot, this finding was in congruent with ***Desalu et al.(2011*)**, in their study which revealed that the poor practice of foot care may be attributed to the lack of knowledge among the respondent as 78.4% of those with poor foot care practice also had poor knowledge of foot care and that this association was further corroborated as 33% of the respondents reported lack of knowledge as greatest barrier to good foot care practice.

Regarding relation between patients' knowledge and their depression level, this study result revealed that the highest percentages representing less than three quarters of patients with good knowledge were non -depressed, while more than half of patients with fair knowledge had minor depression, and less than three quarters of poor knowledge patients had major depression, with highly statistically significant difference. These findings are supported by ***Kroenke (2007*)** who found that the precise elderly knowledge about their diabetes is a major challenge in the field of psychiatric illness especially depression. Additionally, the burden of diabetes includes managing troublesome symptoms (e.g., pain and tingling in hands and feet), as well as adhering to medication regimens, following dietary guidelines and monitoring blood glucose. The symptom burden of diabetes can significantly impair quality of life and contribute to functional disability and psychological distress as identified by ***Evette (2006).***

Considering the relation between patients' depression status and self-efficacy, this study results revealed that, patients with major depression were having low mean scores of self-efficacy about diet management, exercises, medication, blood glucose monitoring, foot care, hyperglycemia and hypoglycemia management. This was congruent with ***Sarkar et al. (2006)***, who stated that depression may reduce the ability of patients to carry out complex tasks such as those required for diabetes self-care. One the other hand this result is not consistent with **Rutter *(2010)*** in her research which demonstrated a negative relationship between depression and self-efficacy.

Regarding relation between patients' depression status and their self-care performance, results of the current study revealed that, there are highly statistically significant differences between patients' depression status and their performance in self-care toward adherence to diet, physical activities, and monitoring of blood glucose. The highest percentage of patients with major depression representing almost two thirds are not adhering to their prescribed diet (0 day/week) ,while approximately half of patients who are adhering to prescribed diet (5-7 days/ week) were non -depressed. These results are supported by ***Ronny (2010)***, who found that 24.2% of non-depressed diabetic patients are following a healthful eating plan 5-7 days compared to 16.5% of depressed diabetic patients. As well, in relation to adherence to physical activity, the current study results indicated that most of major depressed and slightly more than three fifties of minor depressed patients do not perform exercises (0 day/week) while approximately half of patients who perform exercises (5-7 days/week) were non-depressed. A previous research carried out by ***Ronny (2010)*** supported that the association of depressive symptoms with physical activity remained significant and that persons with high depression score were half as likely to report being active physically at least one day compared with those without depressive symptoms. As well, **Weinger (2005)**, who found similar result, in a sample of type 2 diabetes patients in a large health maintenance organization.

This study result revealed that, the depression state increases with age and years of diabetes, while the highest percentage of patients with major depression representing a majority were intermediate school (Table 7). This finding may be due to that the majority of studied sample are not fully oriented by the risks of diabetes, which lead to depression. This finding was supported by ***Wexler et al. (2006*),** who reported that several factors are known to influence both depressive symptoms and diabetes, including age, sex, marital status, educational level or income. These factors may confound the association between depressive symptoms and diabetes. These results were also supported by ***Egede (2005),*** who reported that increases in years of diabetes have been associated with increased risk of depression in the elderly.

The result of the present study revealed that the highest percentages of the studied sample were married. This result is contradicting with that of ***Bruc*e *(2005),*** who reported that diabetic married patients have twice risk of depression when compared with single patients.

The result of the present study revealed also that the highest percentage of the sample were females. It may be due to that the women were susceptible to burden of neglecting adult children who often do not have time to care for and don't take them to spend together vocations or even festivals, which affect psychological well-being of elderly women with diabetes and that is supported by ***Aujla et al. (2010*)**, who reported that prevalence of depression was significantly higher in females compared to males. As well ***Ronny et al.(2010)*** found that 64% of depression cases were females.

This study result indicated that the highest percentage of patients with less than three chronic diseases accounting for more than two thirds were non depressed, and a slightly less percentage of patients with major depression had three or more chronic diseases. These results are supported by ***Elizabeth. (2007)***, who clarified that depression can be viewed as an integral part of any chronic disease otherwise diabetes that is accompanied by significant physical symptoms.

In relation to BMI of patients under study, it increased with increase severity of depression with statistically significant difference .This finding is supported by ***Bell et al*** *(2006*) in his research of 696 diabetic elder participants who found that the mean BMI was 29.6+5.88. As well, **Robinson *et al.(2010*)** found that among 246 participant in his research, the mean of BMI was high (31.53±6.13), that is because diabetes type 2 is always accompanied with obesity and is considered to be the first risk factor of depression. These results are similar to that of ***Lerman (2004)***, who explained that obesity has proven to be associated with a variety of chronic diseases such as hypertension.

In relation to HBA1c, the mean for patients under study was 6.96±1.21. which is similar to that of ***Bell et al. (2006),***who reported that the mean of HBA1c was 6.8% and also, it is supported by ***Black (2011)***, who found that 57.7% of their respondents had a mean HBA1c of 8.3± 2.17. A previous research carried out by **Elizabeth (2007),** among diabetic patients has shown that patients subjective symptoms' perception is more related to depressed mood than to objective measures of blood glucose control such as hemoglobin.

Conclusion

Diabetes mellitus is a chronic disease that is expected to increase in developing countries, including Egypt, due to increased urbanization, westernization and economic development. The disease may have negative impacts not only on the patients, but also on their families, as well as the healthcare system. Being a self-managed disease, improving patients' knowledge and competencies in self-care activities is expected to have a positive impact on disease control, and consequently on patients' psychological state.

Recommendations.

-Education, counseling, skill building, and support through behavioral interventions should be offered by health care providers to enable diabetic patients to manage their diabetes and recognize and manage their depressive illness.

-Diabetic management intervention has emerged as a resource to assist patients in managing daily diabetic care through dissemination of information and facilitation of diabetic management behaviors that has effect on diabetes -related self-efficacy.

-Research shows that psychosocial factors such as family support play a central role in the success or failure of diabetes management regimen.

-A combination of medication and psychotherapy are recommended by this research for people with diabetes experiencing moderate to severe depression to alleviate their sufferings more quickly than either alone and may help reduce relapse and patients with depression should always be asked about suicidal ideation when risk is high.

-Cognitive behavioral therapy is frequently cited as effective in treating depression in people with diabetes.

-Further research is needed to determine and evaluate integrating depression screening and treatment into comprehensive care of diabetes, including specific support for diabetes medication adherence and self-care activities, as well as systematic depression care, can help patients achieve better psychological and diabetes outcomes.

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