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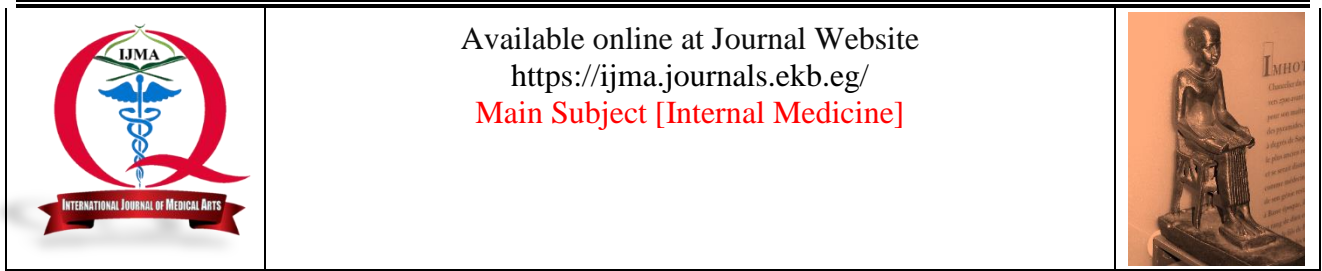
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Original Article

Knowledge, Attitude and Practice of Diabetes Management among Patients with Type II Diabetes

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ABSTRACT

Background: Type 2 diabetes mellitus [T2DM] in Egypt is a fast-growing problem for health and health care resources. Good knowledge, attitude and practices [KAP] of DM disease are necessary in the prevention and management of DM.

The aim of the work: To assess KAP in adult patients with T2DM and correlate it with socio-demographic factors. And also to evaluate different factors affecting KAP among the studied population that would help in the development of prevention programs in Egypt.

Patients and Methods: A total of 400 T2DM patients attending the endocrinology department, at the Specialized Medical Hospital, Mansoura University were interviewed. Questionnaires were completed to determine the demographics and KAP of the participants about DM. Anthropometric measurements were obtained by standard techniques.

Results: The levels of KAP for T2DM disease were poor. Good knowledge, attitude and practices were among 35.5%, 22% and 49.2% of the participants, respectively. A significant weak positive correlation is detected between knowledge and practice [r=0.248] and between attitude & practice [r=0.273]. Young age of the participants, housewives, rural residence and negative family history for DM were associated with poor knowledge. Young participants age <40 years, less than university education, and private work were associated with poor attitude. Rural residence and obesity were associated with poor practice.

Conclusion: The overall level of KAP concerning diabetes is poor. Rural residence is associated with poor knowledge and poor practice, while obesity is associated with poor practice. Levels less than university education are associated with poor attitude .the present study suggests the need of structured educational campaigns with a prioritized focus on poorer, rural and less educated groups to prevent diabetes and its complications.

Keywords: Type 2 diabetes mellitus; Morbidity; Mortality

INTRODUCTION

Type 2 diabetes mellitus [T2DM] is a global clinical and public health problem. T2DM has very high morbidity and mortality rates. The chronic hyper-glycemia of diabetes is associated with various organs failure, especially the eyes, kidneys, nerves, heart, and blood vessels [1]. T2DM represent the majority of DM disease burden in Africa, with less than 10% of DM cases being type 1 DM [2].

The International Diabetes Federation [IDF] listed Egypt among the top 10 countries in the world in the number of patients with diabetes .The prevalence of DM in Egypt has increased rapidly from approximately 4.4 million in 2007 to 7.5 million in 2013. It is expected that this number will jump by 2035 to 13.1 million patient with diabetes [3]. Girls are 1.3 to 1.7 times more than boys to develop T2DM during adolescence; it may be related to an increased risk of insulin resistance [IR], as seen in adolescent girls with polycystic ovary syndrome [PCOS] [4].

Fat tissue is a real endocrine organ with a huge importance in the pathogenesis of IR [5]. Obesity has been found to contribute to approximately 55% of T2DM cases. The increased rate of childhood obesity between the 1960s and 2000s is believed to have led to the increase in T2DM in children and adolescents [6].

Known modifiable risk factors can be reduced and controlled by patients themselves through effective education and enhanced knowledge. Studies from both developed and developing countries have reported that knowledge related to diabetes among patients is generally poor [7]. DM proper knowledge can prevent the occurrence of DM complications, which significantly influence their quality of life [8]. Patients with diabetes should have positive KAP whose elements are closely related to each other and are dependent on each other. KAP are dependent on socioeconomic background, habits and cultural beliefs [9].

THE AIM OF THE WORK

The present work aimed to assess KAP in adult patients with T2DM and correlate it with socio-demographic factors. To evaluate different factors affecting KAP among the studied population which will guide to the development of prevention programs in Egypt.

PATIENTS AND METHODS

This study is a descriptive cross-sectional study with analytic components included 400 patients with T2DM [115 male and 285 female] selected from the Outpatient Clinics of Mansoura University Hospital, Faculty of Medicine, Egypt, from April 2017 to March 2018. Informed consent was obtained from all participants and approval was given by the ethics committee of our institution.

DM was diagnosed according to the American Diabetes Association criteria [10]. Patients who were unable to speak, patients with major problem in the hearing, mentally ill patients, pregnant women, and patients with type 1 DM were excluded.

Height and weight were measured to the nearest centimeter and kilogram, respectively and body mass index [BMI] was calculated using the Quetelet Index = body weight [kg] divided by height squared [m^2] [11].

Sample size calculation was based on a pilot study that has been carried out on 20 cases before carrying out the study. These 20 cases were excluded from the study. The pilot study illustrates that 45% has poor knowledge. Using Epi info version 7.2.4.0 to calculate sample size based on 45 % prevalence of poor knowledge, 95% CI with acceptable margin of error =5 then the total sample size was380 and by adding 5% to compensate for possible attrition then total sample size 400. Sampling was done using simple random sample with all cases that met the inclusion criteria were included until fulfillment of the needed sample size.

Questionnaire

A structured interviewer-administered questionnaire modified from other related studies was used to collect the data. The first part of the questionnaire covered the respondent's demographic information as: name, age, sex, level of education and occupation.

Knowledge questionnaire composed of 12 questions with 5 questions asking about; causes of type 2 diabetes which have 4 answers, factors that increase the risk of diabetes which have 5 answers, organs affected by diabetes have 4 answers, actions that should be taken in case of hypoglycemia have 3 answers and 7 questions answered as [yes /no] and [correct/incorrect]. Among the 5 previously mentioned questions; every answer is coded as 1 for correct answer and 0 for incorrect; then the total questions coded for knowledge domain is 30. Every correct response is coded as 1 and incorrect as zero and total score for every case was calculated; median score was calculated for all cases and then taken as an arbitrary cut off point with cases have total score of ≤13 will have poor knowledge and cases with total score > 13 have good score.

Attitude questionnaire is composed of 7 questions each is described as no, yes and not sure and then questions response were combined to be no and yes, no coded as zero and yes coded as 1 [for the first 2 questions the scoring system was reversed]. Median score [6] for all responses was used as an arbitrary cut off point with cases respond to less than or equal to median score is considered poor attitude and more than or equal to median [6] is good attitude.

Practice questionnaire is composed of 10 questions each is evaluated as good practice =1 and poor =0. Median practice score is 3 that was used as an arbitrary

cut off point with cases respond to less than or equal to median score is considered poor practice and more than or equal to median [3] is good practice.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 22.0. Qualitative data were described using number and percent. Quantitative data were described using mean, standard deviation for normally distributed data and median [range] for non-normally distributed data after testing normality using Kolmogrov-Smirnov test. Significance of the obtained results was judged at the [0.05] level.

RESULTS

The study included 400 patients with T2DM with a mean age of 52.71±10.8 and 58.3% of the studied sample aged >50 years .The majority of the participants were females [71.2%]. Approximately 52.5% had intermediate education, 13.2% with some primary and preparatory school education, 7.2% had university education and above, and 27% had no formal schooling. Urban residence present in 51.8% of the participants and 84.8% were married. The majority of both men and women were either overweight or obese. The mean ± SD BMI of the total study subjects was 33.92 ±6. Positive family history of diabetes present in 63.8% of the studied sample. Oral hypoglycemic drugs were received in 68.8% of the studied sample for treatment of diabetes as shown in table [1].

Most of the participants were knowledgeable regarding questions asked about the duration of diabetic medications intake [99.8%], importance of exercise for diabetic patient [98%], systematic effects of diabetes [94.2%] and measures taken in case of hypoglycemia [89.8%]. Most of the participants were unsure about the effect of diabetes on blood vessels 7.2% [table 2].

The most frequent positive attitude was obtained for periodic consulting doctor for diabetic treatment [99.0] and periodic measuring of blood pressure [92.2]. About 11% of them felt ashamed suffering from diabetes and 7.0% of them felt little hope for normal life [table 3].

The highest frequency of correct practice was compliance to take drugs during last week [65.8%], eating vegetables from 2-3 times per week [49.2%]. However frequency of exercise, frequent consulting doctor, having examination and laboratory investigations were the least to adopt as shown in table [4].

Poor knowledge, negative attitude and poor practices with regard to diabetes present in a very high percentage of the participants. The median knowledge score was 13, the median attitude score was [6] and the median practice score was [3]. Good knowledge, attitude and practice were among 35.5%, 22% and 49.2%, respectively. A statistically significant weak positive correlation is detected between knowledge and practice [r=0.248] and between attitude and practice [r=0.273] as shown in figures [1-3].

Participants aged less than40 years, housewives, rural residence and negative family history of DM were associated with poor knowledge among the studied group. About 72.8% of poor knowledge can be predicted by the previous four risk factors. Similarly, young participants aged less than40 years, less than university education and private work were associated with poor attitude among the studied group. About 78.8% of poor attitude can be predicted by the previously mentioned risk factors. Rural residence and obesity [grade II and morbid obesity] were associated with poor practice among the studied groups. About 65.8 % of poor practice can be predicted by the previously mentioned risk factors as shown in table [5].
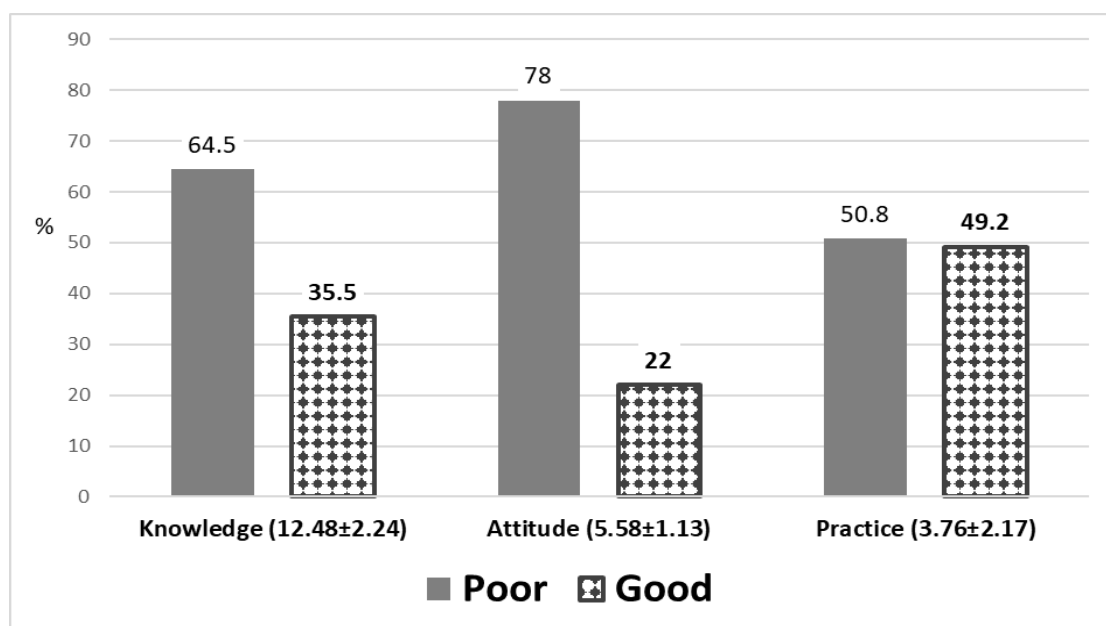

Figure [1]: Knowledge attitude and practice distribution among studied sample

Table [1]: Socio-demographic characteristics of the studied samples

Variables		Number [n=400]	Percentage
Age [years]	Mean ± SD	52.71± 10.8	-
	<40	42	10.5
	40-50	125	31.2
	>50-60	143	35.8
	>60	90	22.5
Sex	Male	115	28.8
	Female	285	71.2
Educational level	Do not read and write	108	27.0
	Primary & preparatory Intermediate education	53	13.2
		210	52.5
	University education and above	29	7.2
Occupation	Governmental employee	122	30.5
	Private work	40	10.0
	Manual worker	33	8.2
	Housewife	201	50.2
	Not working	4	1.0
Residence	Rural	193	48.2
	Urban	207	51.8
Marital status	Single	4	1.0
	Married	339	84.8
	Divorce	3	0.8
	Widow	54	13.5
BMI [Kg/m^2]	mean ± SD	33.92 ±6	-
	Normal	15	3.8
	Overweight	97	24.2
	Obese grade I	130	32.5
	Obese grade II	93	23.2
	Morbidly obese	65	16.2
Family history of diabetes	Positive	255	63.8
	Negative	145	36.2
Number of family members suffering from DM [n=255]	1	144	56.5
	2-3	100	39.2
	>3	11	4.3
Treatment taken for diabetes	Oral hypoglycemic drugs	275	68.8
	Insulin	125	31.2

Table [2]: Knowledge of the studied sample regarding diabetes

Knowledge about		Number [n=400]	%
Fasting blood glucose		212	53.0
Causes of type 2 diabetes	Increase weight and obesity	211	52.8
	Hereditary	173	43.2
	Some medications	59	14.8
	Insulin resistance	3	0.8
Factors increase risk of diabetes	Obesity	163	40.8
	Smoking	65	16.2
	Muscular effort	0	0.0
	Pregnancy	52	13.0
	Old age	91	22.8
	Bad psychological state	84	21.0
Common symptoms of hyperglycemia	Frequent urination	293	73.2
	Excess hunger	17	4.2
	Thirsty	195	48.8
	Skin problems	2	0.5
	Numbness of limbs	145	36.2
	Nausea	12	3.0
Knowledge about actions taken when blood sugar is low	Take juices or any source of sugars	359	89.8
	Take diabetes medications	4	1.0
	Don 't Know	37	9.2
Knowledge about systemic effect of diabetes	Yes	377	94.2
	No	23	5.8
Organs affected by DM	Eye	280	70.0
	Kidney	70	17.5
	Blood vessels	29	7.2
	Heart	132	33.0
	Nerves	295	73.8
Knowledge about Diabetic medications			
Diabetic medications taken for life	yes	399	99.8
	Not sure	1	0.2
Diabetic medications stopped in case of tiredness	Yes	18	4.5
	Not sure	12	3.0
	No	370	92.5
Poor diabetic control increases chance of the emergence of complication	Yes	298	74.5
	Not sure	98	24.5
	No	4	1.0
Diabetic medications cause feet swelling	Yes	16	4.0
	Not sure	174	43.5
	No	210	52.5
Exercise important for Diabetics	Yes	392	98.0
	Not sure	5	1.2
	No	3	.8

Table [3]: Attitude of the studied sample towards diabetes and regular checkup related to diabetes

Attitude about	Number [n=400]	%
Feeling ashamed suffering from diabetes	45	11.2
Feeling little hope for normal life	28	7.0
Think that periodic follow up of blood sugar is useful	388	97.0
Think that regular eye examination is useful	307	76.8
Think that periodic measuring of blood pressure is beneficial	369	92.2
Think that referral to more specialized hospitals is important	278	69.5
Think that consulting the doctor periodically about diabetic treatment is beneficial	396	99.0

**Table [4]:** Practice of the studied sample for diabetic control and regular checkup related to diabetes

Practice about		Number [n=400]	%
Frequency of eating vegetables	Daily	156	39.0
	2-3 times/week	197	49.2
	Weekly	43	10.8
	Irregular	4	1.0
Frequency of eating fruits	Daily	120	30.0
	2-3 times/week	138	34.5
	Weekly	135	33.8
	Irregular	7	1.8
Frequency of taking medications during last week	Never forget	263	65.8
	Once	131	32.8
	≥ 2 times	6	1.5
Frequency of physical activity	Daily	35	8.8
	2-3 times/week	64	16.0
	Weekly	105	26.2
	Irregular	196	49.0
Frequency of consulting the doctor about diabetes	Monthly	141	35.2
	Every3 months	103	25.8
	Every 6months	106	26.5
	When feeling tired	49	12.2
	Irregularly	1	.2
Frequency of measuring fasting blood glucose	Monthly	127	31.8
	Every 3 months	96	24.0
	Every 6 months	102	25.5
	Yearly	1	.2
	Upon doctor request	69	17.2
	Every 2 weeks	1	.2
	Every 3 days	1	.2
	Daily	1	.2
	Weekly	2	.5
Frequency of measuring HBA1C	Every 3 months	38	9.5
	Every 6 months	44	11.0
	Yearly	2	.5
	Upon doctor request	202	50.5
	Don't Know	92	23.0
	Never do it	22	5.5
Frequency of measuring blood pressure	Monthly	139	34.8
	Every 3 months	100	25.0
	Every 6 months	99	24.8
	Yearly	1	0.2
	Upon doctor request	55	13.8
	When feeling tired	3	0.8
	Every 2 weeks	1	0.2
	Weekly	2	0.5
Frequency of having fundus examination	Monthly	7	1.8
	Every 3 months	3	0.8
	Every 6 months	15	3.8
	Yearly	25	6.2
	Upon doctor request	169	42.2
	Don't Know	147	36.8
	When feeling tired	2	0.5
	Never do it	32	8.0
Frequency of having foot examined	Monthly	115	28.8
	Every 3 months	81	20.2
	Every 6 months	66	16.5
	Yearly	2	.5
	Upon doctor request	48	12.0
	Don't Know	74	18.5
	Never do it	14	3.5

Table [5]: predictors of poor knowledge, attitude, and practice among studied sample

Predictor[s]	Predictors of poor knowledge		Predictors of poor attitude		Predictors of poor practice	
	P value	AOR [95% CI]	P value	AOR [95% CI]	P value	AOR [95% CI]
Age/years **<40** **40-50** **>50-60** **>60 [r]**	0.005* 0.36 0.02*	6.34 [1.74-23.09] 1.59 [0.59-4.29] 3.14 [1.18-8.36] reference group	0.001* 0.08 0.18	15.66 [3.02-81.13] 2.03 [0.92-4.47] 1.63 [0.79-3.34] reference group		
Sex **Male [r]** **Female**	0.45	reference group 1.34 [0.63-2.84]			0.83	reference group 1.06 [0.96-1.36]
Educational level **Do not read and write** **primary & preparatory** **Intermediate education** **University education & higher [r]**	0.19 0.59 0.83	2.13 [0.68-6.62] 1.36 [0.44-4.27] 1.10 [0.45-2.72] reference group	0.01* 0.001* 0.03*	4.14 [1.28-13.39]* 10.69 [2.54-45.03]* 2.79 [1.09-7.15]* reference group		
Occupation **Governmental employee [r]** **Private work** **Manual worker** **Housewife** **Not working**	 0.24 0.41 <0.001* 0.75	reference group 1.78 [0.69-4.61] 1.51 [0.56-4.05] 3.55 [1.78-7.06] 0.68 [0.06-7.77]	 0.02* 0.11 0.12 0.92	reference group 3.27 [1.14-9.36]* 2.40 [0.82-7.07] 1.78 [0.86-3.69] 0.89 [0.11-7.44]	 0.06 0.15 0.44 0.12	reference group 2.41[0.95-6.12] 2.04 [0.77-5.39] 1.26 [0.71-2.23] 6.73 [0.60-75.08]
Residence **Rural** **Urban [r]**	0.02*	1.80 [1.09-2.97] reference group			0.02*	1.66 [1.06-2.61] reference group
Family history of DM **Positive [r]** **Negative**	 0.02*	reference group 1.82 [1.11-2.98]*				
Marital status **single** **married [r]** **divorce** **widow**					0.99 0.99 0.99	Undefined
BMI[Kg/m2]** **Normal [R]** **Overweight** **Obese grade I** **Obese grade II** **Morbidly obese**					 0.34 0.33 0.02* 0.004*	reference group 1.80 [0.53-6.18] 1.81 [0.54-6.09] 4.88 [1.40-16.95]* 6.83 [1.87-24.99]
Overall percent predicted	72.8%		78.8%		65.8%	
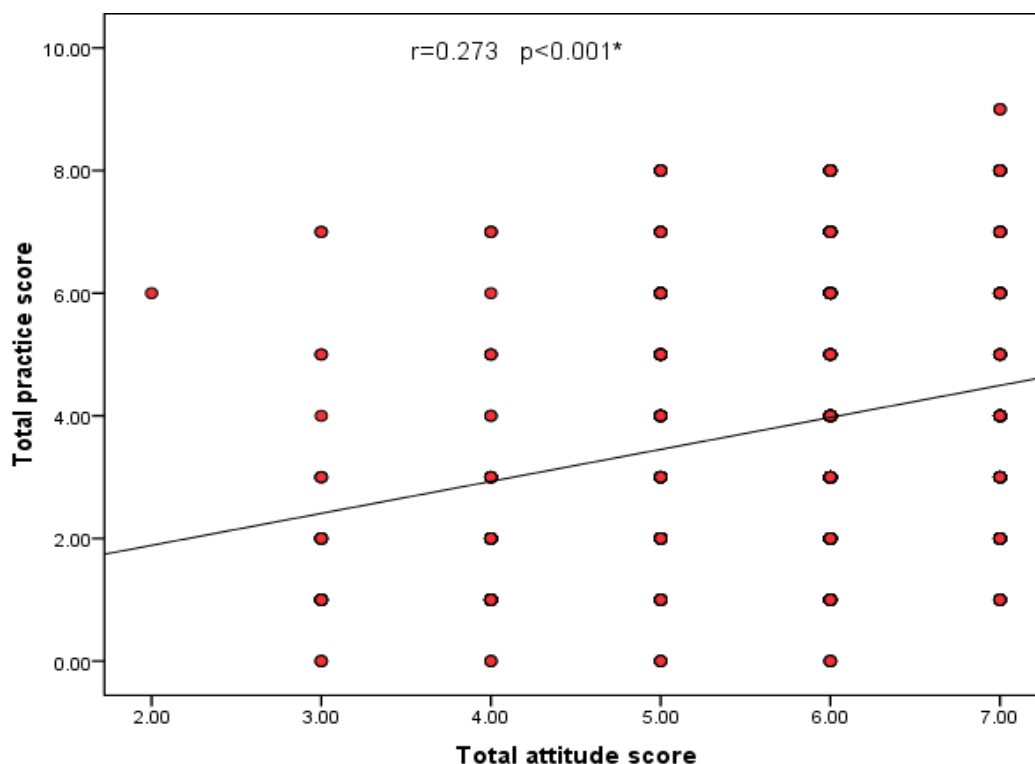
Figures [2]: correlation between attitude and practice among studied sample

r=0.248 , p<0.001*
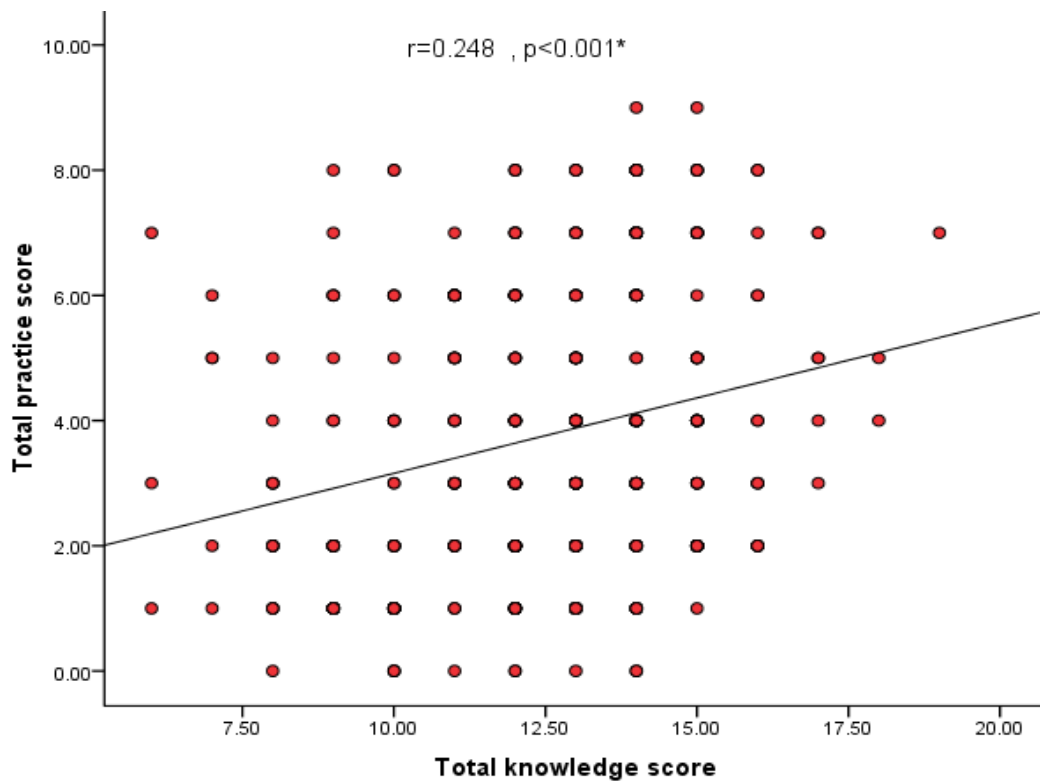
Figures [3]: correlation between knowledge and practice among studied sample

DISCUSSION

DM plays a vital role in causing morbidity and mortality through its continued clinical consequence. Most patients with diabetes suffer from its complications due to the lack of awareness about it [12].The DM prevalence all over the world has been increasing steadily. In the next decade, the number of people affected by diabetes expected to double due to increase in aging population, thereby adding burden for healthcare providers, especially in poorly developed countries [13].

Better glycemic management in patients with DM requires not only the physician to prescribe an appropriate nutritional and pharmacological regime but also intensive patient education. Studies have shown that patients, who are knowledgeable about the self-care of DM have better long-term control of blood sugar [14]. Patient education is the most constructive way that could assist in the early detection, lessen the complications and assist in diabetes management [15]. Therefore, good KAP of DM is necessary in the prevention and management of diabetes complications.

In the current study, we aimed to assess KAP in adult patients with T2DM using a structured questionnaire.

The mean age of the participants was 52.71 years, which is near to the result by **Gul** [16] as the mean age of the participants was 50±9.32 years. Also, the study by **Shah *et al.*** [17] showed that the mean age of participants was 55 years. Elderly group are vulnerable population, generally suffering from multiple disease and may have compromised self-care activities.

The predominance of females [71.2%] in the present study agreed with **Erasmus *et al.*** and **Belsti *et al.*** [18, 19]

as the majority of the participants in their studies were females. The possible explanation might be due to higher visceral fat in the females than in the men and men tend to be more physically active. This result disagrees with the study carried out by **Mekonnen *et al.*** [20] as the majority of the participants in their study were males.

In the current study, the majority of the participants [64.5%] had poor knowledge about DM. The low schooling levels of the participants might be a factor that contributed to the poor knowledge. This finding is supported by many studies from both developed and developing countries, which have reported that diabetes knowledge is generally poor among patients with diabetes [14, 21-23]. In contrast, this result disagrees with **Mekonnen *et al.*, Asmelash *et al.*** and **Alsous *et al.*** [20, 24, 25] as 59%, 62% and 53.3% of the participants, respectively had a good knowledge about DM. The possible explanation might be due to the fact that there are sociodemographic variations across the countries, the difference in health education, sample size and access to sources of information like television, radio and newspaper.

Most of the participants [78%] had poor attitude to T2DM. The challenges of adhering to a healthier lifestyle and taking medication to prevent complications were contributory factors to negative attitudes among patients with diabetes. This result agrees with **Alsous *et al.*** [25] as 53.7% of the participants had a poor attitude toward the disease. This result disagrees with **Belsti *et al.*** [19] who stated that about two-thirds of the respondents had good attitude levels. Also, disagrees with the studies done by **Mekonnen *et al.*, Rahaman *et al.*** and **Assaad Khalil *et al.*** [20, 26, 27] as 53%, 66.4% and 89.3 % of the participants, respectively had a good attitude toward lifestyle modification. The possible explanations for this variation might be due to the difference in health beliefs, demographic characteristics,

diabetes education programs, cultural differences and the scoring system variation.

Lack of adherence to lifestyle interventions seems to be a common challenge amongst patients with T2DM. Although intensive lifestyle interventions and behavior changes are key components in the T2DM management, the practices related to T2DM in our study was low [50.8% of the participants had poor practice]. This might be explained by the low income of the patients, as the majority of the patients belonged to the middle socioeconomic class, inadequate health education toward self-care practice and educational level of the study participants. This finding is supported by the studies done by **Mekonnen** *et al.* **Assaad Khalil** *et al.*, **Rahaman** *et al.* and **Belsti** *et al.* [20, 27, 26,19] as [59%-84.7%-79.9%-51.2%] of the participants, respectively had poor practice to DM.

Although the majority of the participants were knowledgeable about the benefits of exercise, only 8.8% of the participants in this study performed it daily, which is near to the study conducted in Pakistan by **Ahmed** *et al.* [28] as 8.6% performed exercise daily. The participants' poor practices were also reflected in the high rate of overweight and obesity, which may be resulted from a lack of physical activity and a sedentary lifestyle. People instead of walking tend to make use of public transport and spend a large percentage of their time watching television.

The present study found that young patients age [<40 years] associated with poor knowledge and poor attitude to the disease. This suggests that as age increase, individuals become more conscious and aware of their health, and adjust their lifestyle. Also, suggest that younger patients need greater motivation from their family and physician. This finding is supported by **Das** *et al.* [29] as he reported that older age group [40–49 years] had better knowledge.

In our study, unemployment was a significant predictor of poor knowledge, as housewives had poor knowledge about DM. This might be explained by that unemployed has low physical activity, have free time to eat more [unhealthy eating habits]. Low income and lack of resources could be a barrier as those who have money could have access to information in different ways. This finding is supported by **Asmelash** *et al.* [24] who reported that occupation was significantly associated with knowledge of participants.

The present study found that rural residence was a significant predictor of poor knowledge and poor practice among the studied group. It might be that urban residents had more access to information about life style modification compared to the rural residents through mass media, books and the internet. This is in line with the results by **Mekonnen** *et al.* [20] as urban residents were more knowledgeable.

In our study, less than university education was associated with poor attitude among the studied group. This may be explained by their inability to get enough information through reading from different written documents. Participants who had higher educational status have more awareness about DM. As the level of education increases, the chance of attending different conferences and seminars on DM increase. This coincides with **Belsti** *et al.* and **Das** *et al.* [19, 29] who had found a significant association between higher education and high level of KAP.

In the present study, obesity [grade II and morbid] was associated with poor practice among the studied group. This may be explained by the lack of physical activity and a sedentary lifestyle. As most of them are unemployed and had free time to eat, also they are with low academic status and have low awareness about diabetes self-care.

In the present study, negative family history of DM was a significant predictor of poor knowledge among the studied group. This may be explained by the fact that a positive family history of diabetes had a positive influence on patient's knowledge, as the close relatives with chronic disease may be a good source of health information. This finding is supported by **Al-Maskari** *et al.*, **Harrison** *et al.* and **Ezenwaka** *et al.* [14, 30, 31].

In the present study there was a significant weak positive correlation between knowledge and practice, as well as between attitude and practice among the studied group. Better knowledge is associated with a better attitude and better attitude is associated with better practice. These findings agree with the findings of other studies as **Fatema** *et al.* and **Al- Maskari** *et al.* [32, 14] who stated that there was a weak, but statistically significant correlation between the level of knowledge and practice and also between attitudes and practice. Also, **Asmelash** *et al.* [24] found that knowledge and practice scores of the participants had statically shown a significant positive correlation, in addition, attitude and practice scores showed a positive correlation.

Limitation of the study, female percentage was higher than the percentage of male participants and the two genders data were not analyzed separately. In addition, the findings are based on self-reported data from participants which limits the data validity. As our study was outpatient hospital based, the results may not be truly representative of all DM patients in Egypt

Conclusion

KAP regarding DM were poor. Lifestyle modification has a great role in the prevention and the control of the disease. DM management depends not only on drug therapy but also on physical exercise, diet and other lifestyle changes. Education plays an important role not only in the prevention of diabetes itself but also in preventing its complication. Younger age group and rural habitats need greater attention in educational campaigns and physicians counseling.

Recommendation

Conducting awareness program regarding lifestyle modification and diabetes management among diabetic subjects in both clinical and community settings to increase patients' awareness about DM, improve their understanding, compliance and their ability to cope with the disease. Multidisciplinary hospital-based intervention program including a well-trained community doctor, dietician, diabetic nurse and a community-based education program must be applied to improve the KAP of patients regarding their disease.

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None

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