Knowledge of Coronary Heart Disease and Risk Factors Among Type 2 Diabetes Mellitus at Outpatient Department of Kasr Alainy Hospital

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ABSTRACT
Background: The leading cause of morbidity and mortality among diabetic patients is cardiovascular disease (CVD)**.** It is highly preventable with sustainable knowledge-based practice. **Objectives:** The aim of the current work was to assess CVD knowledge and associated factors among type 2 diabetic patients.
Patients and Methods: Cross-sectional study design conducted at the outpatient department at Kasr–Alainy Hospital. Systematic random sampling method included 200 type 2 diabetic patients interviewed using questionnaire consisting of demographic characteristics, behavioral variables, and 28 items assessing key aspects of CVD knowledge.
Results: seventy three percent of the patients had poor knowledge. Mean knowledge score was significantly higher among females, high educational level, non-smokers, active practicing exercise once or twice weekly and consuming fruits three or more times weekly (p<0.01). **Conclusions:** Patients had insufficient CVD knowledge which can lead to unfavorable health consequences. The study highlights the urgent need of effective efforts and strategies for patients' counseling and health education. This can lead to sustainable adoption of preventive behavior.
Keywords: Cardiovascular disease, Diabetes, Risk factors

INTRODUCTION

Diabetes mellitus (DM) is a chronic dramatically increasing disease worldwide. Egypt is among the world's top 10 countries according to the number of diabetic patients. The prevalence of type 2 DM is about 15.56% among adults aged between 20 and 79 years old leading to morbidities and mortalities [1].

The main cause of morbidity and mortality is CVD which is a high risk among diabetic patients when compared with general population [2, 3]. The burden of CVD is rising as a result of the effect of low socioeconomic status and catastrophic health expenditure. It can lead to compromising the state of poverty in many settings [4]**.**

Cardiovascular diseases are highly preventable. Their potential negative impact can be minimized through the initiation of sustainable knowledge-based practice mainly for preventive measures. It will lead significantly to the reduction of CVDs attributable morbidity and mortality [5]. Yet, it is largely dependent on the level of knowledge towards CVD, causes/risk factors, clinical manifestations, and prevention [6].

It depicted from previous studies that there was a lack of CVD knowledge and awareness among patients with type2 diabetes [7, 8]. A survey type 2 diabetic patients in North Africa and the Middle East reported that most of the patients had not receive CVD and risks information from their healthcare providers [9].

Health facilities are of the best opportunities for doctor–patient interactions and provision of CVD health education to diabetic and other at-risk patients. Such interaction is a cost-effective and practical way for enhancing knowledge of CVDs and promoting the sustainable practice of preventive measures [10]. Unfortunately, the logistics and other challenges limit the effective delivery of health education especially in the developing countries [11].

Assessment of level of knowledge of CVD and the associated factors among diabetic patients is a crucial step for effective design and implementation of tailored evidence-based health educational and other preventive measures.

This study was aimed at bridging knowledge-gap, by assessing CVD knowledge and its associated factors among type 2 diabetic patients.

PATIENTS AND METHODS

This descriptive cross-sectional study was conducted between April 2019 to January 2020 at the Diabetes Outpatient clinic, Kasr Alainy University Hospital.

The sample size was estimated as 200 using Dhand and Khatkar online Sample Size Calculator for Estimating Single Proportion [12]. It was calculated assuming the prevalence of diabetes 15.6% [1], 95% confidence, and 5% margin of error. A systematic random sample technique was used. The number of diabetes out-patient attendance in the previous 6 months was taken as the population size, to calculate the sampling interval, where every sixth patient in the clinic appointment list was selected. Patients in the age of 18 years old and above were included.

A structured questionnaire was used to measure patients' CVD knowledge. The first section of the questionnaire consisted of socio-demographic and behavioral characteristics which included smoking,

practicing physical activity, and consumption of fresh fruits. Section two consisted of a 28-item set of pretested questions that was adapted from of Heart Disease Fact Questionnaire (HDFQ) which measures coronary heart disease risk knowledge among people with diabetes. It was also adapted from questionnaires used in previous studies which have previously been validated [13].

Content validity was performed by experts to ensure the questions clarity and their focus on the study objectives. This section assessed four subheadings including dietary knowledge, knowledge of basic meaning and epidemiology, knowledge of risk factors, and knowledge of symptoms. The answer potions were of true, false, or I don't know for every item. The correct response of each of the 28 items contributed a point score to the total knowledge score.

The reliability of the variables was checked against Nunnally's recommended standards (Cronbach's alpha ≥ 0.70) to make sure that they are reliable indicators of the constructs. The Cronbach's alpha calculated for all items was 0.84. This confirms that the items are cohesive enough to represent adequately a single concept.

The questionnaire was translated into Arabic language and then retranslated into English to ensure validity. It was pilot tested on 40 participants to check the clarity of the questions, estimate the time needed to be completed, and detect any difficulty. Results of the pilot test were only used for further development of the questionnaire as regards the simplicity and clarity and were not included in the results.

Ethical consideration:
The study was approved by Research Ethical Committee, Cairo University. The patients were informed about the purpose of the research, the time taken for completion of the survey, which was around 20 minutes, and ensuring the confidentiality of the data.

Statistical analysis
The data was processed in SPSS (SPSS Statistics for Windows, version x.0 (SPSS Inc., Chicago, Ill., USA) program version16. Initially, there were descriptive statistics. Socio-demographic and behavioral characteristics were compared with the knowledge level using chi-square, independent t-test, and Analysis of Variance ANOVA.

RESULTS
As shown in **table 1,** the majority of the studied patients 86% were females, more than half 56% aged more than 40 years. Most of the participants 72% were university graduates or had post graduate studies. Sixty two percent were married and the minority 10% was divorced.

Table (1): Socio-demographic characteristics of the patients

Socio-demographic characteristics		Frequency	Percent
Sex	Males	28	14
	Females	172	86
Age (year)	<25	18	9
	25 to less than 30	24	12
	30 to less than 40	46	23
	more than 40	112	56
Education	University or higher	144	72
	School or low	56	28
Social status	Married	124	62
	Single	56	28
	Divorced	20	10

Most of the studied patients 60% were smokers. Sixty five percent never practiced active physical exercise and only 2% practice exercise three or more times weekly. Most of them 58% consume fresh fruits less than once a week **table 2.**

Table (2): Behavioral characteristics of the patients

Variable	Frequency	Percentage
Smoke		
Yes	120	60
No	80	40
Active physical exercise*		
Never	130	65
Occasionally (less than once a week)	42	21
Once or twice weekly	26	13
Three or more times weekly	4	2
Consume fresh fruits*		
Never	18	9
Occasionally (less than once a week)	116	58
Once or twice weekly	54	27
Three or more times weekly	12	6

*Sufficient physical exercise is either 30minutes of active or 50minutes of passive activity within 24hours.
**Sufficient fresh fruit consumption is consuming 3 to 5 servings within 24hours.

Fifty-six patients 28% knew of healthy nature of polyunsaturated fats **Table 3**. Nearly one third 34% of the patients knew of the relatively unhealthy nature of trans fats, while more than half 59% knew the cholesterol content of egg yolk. The minority 9 % gave correct answers about the role of dietary fiber in lowering cholesterol and 12% for the low cholesterol content of most vegetables.

Nearly three-quarters of respondents 78% did not know which of post- or pre-menopausal females were at higher risk of heart disease. The majority was not aware of elevation of blood cholesterol in diabetic patients and the chronic nature of heart disease 86%, 81% respectively. More than half 54% knew of HDL and LDL as good and bad cholesterols, respectively.

Regarding knowledge for risk factors, nearly two third 66% didn't knew the importance of physical activity in lowering risk of heart disease and the majority of the patients 88% gave incorrect answer for aspirin in reduction heart diseases.

However, more than half 59% were aware that eating red meat is a risk factor for heart disease and 57% knew about positive family history risk factor. As for knowledge about symptoms most of the patients didn't know that turning pale or gray or sudden trouble seeing in one eye are common symptoms of having heart attack 92%, 86% respectively. On the other hand more than half 53% knew that Feeling weak, lightheaded, or faint is a common symptom of having a heart attack.

Table (3): Distribution of knowledge of cardiovascular disease.

	Items	Correct response		Incorrect response	
		NO	%	NO	%
Dietary knowledge					
1	Polyunsaturated fats are healthier for the heart than saturated fats.	56	28	144	72
2	Trans-fats are healthier for the heart than most other kinds of fats.	68	34	132	66
3	Most of the cholesterol in an egg is in the egg yolk	118	59	82	41
4	Dietary fiber lowers blood cholesterol.	18	9	182	91
6	Most vegetables have low cholesterol content	24	12	176	88
Knowledge of basic meaning and epidemiology					
7	Women are less likely to get heart disease after menopause than before.	44	22	156	78
8	Diabetic patients rarely suffer from elevated blood cholesterol	28	14	172	86
9	Heart disease is better defined as a short-term illness than a chronic illness.	38	19	162	81
10	HDL refers to "good" cholesterol, and LDL refers to "bad" cholesterol.	108	54	92	46
Knowledge of risk factors					
11	Regular exercises decrease risk of heart disease	68	34	132	66
12	Only exercise in GYM decrease risk of heart disease	84	42	116	58
13	Eating a lot of red meat increases heart disease risk.	118	59	82	41
14	The most important cause of heart attacks is stress.	82	41	118	59
15	Smokers are more likely to die of lung cancer than heart disease.	56	28	144	72
16	Taking an aspirin each day is thought to decrease the risk of getting heart disease.	24	12	176	88
17	Obese people are more at risk for getting heart disease.	56	28	144	72
18	High blood cholesterol is risk factor for heart diseases	88	44	112	56
19	Elevation of blood sugar for a long period of time is a risk factor for heart disease	26	13	174	87
20	Diabetic men are at higher risk of getting heart disease than diabetic women	104	52	96	48
21	Diabetic patient can decreases risk of heart diseases if he controls blood sugar	84	42	116	58
22	High blood cholesterol is risk factor for heart diseases	44	22	156	78
23	Family history of heart disease increase risk of heart disease	114	57	86	43
24	Eating a high fiber diet increases the risk of getting heart disease.	74	37	126	63
Knowledge of symptoms					
25	Turning pale or gray is a common symptom of having heart attack.	16	8	184	92
26	Sudden trouble seeing in one eye is a common symptom of having a heart attack.	28	14	172	86
27	Feeling weak, lightheaded, or faint is a common symptom of having a heart attack.	106	53	94	47
28	The only manifestation of chest pain is ischemia	174	87	13	26

As shown in table 4 the mean knowledge score is significantly higher among female, patients aged more than 40 years old, had university degree or higher and among married.

Table (4): Mean knowledge score according to socio-demographic characteristics

Socio-demographic characteristics		Mean	SD	P value
Sex	Males	9.5	6.8	<0.01
	Females	14.2	8.53	
Age (year)	<25	6.32	4.8	0.01
	25to less than 30	5.54	7.5	
	30 to less than 40	7.4	5.3	
	more than 40	9.67	4.9	
Education	University or higher	10.1	6.9	0.03
	School or low	8.02	5.34	
Social status	Married	10.14	6.8	0.2
	Single	8.33	7.42	
	Divorced	9.2	4.3	

As shown in **table 5** the mean knowledge score was significantly high among non-smokers, Patients who practice active physical exercise three or more times weekly and those who consume fresh fruits three or more times weekly p0.01.

Table 5: Mean knowledge Score according to behavioral characteristics

Variable	Mean knowledge score	SD	p value
Smoke			<0.01
Yes	6.9	8.5	
No	12.4	10.7	
Active physical exercise*			<0.01
Never	5.5	4.2	
Occasionally (less than once a week)	3.8	4.4	
Once or twice weekly	9.0	10.8	
Three or more times weekly	4.9	5.7	
Consume fresh fruits**			<0.01
Rarely	0.6	0.9	
Occasionally (less than once a week)	2.4	2.5	
Once or twice weekly	11.7	9.5	
Three or more times weekly	14.2	13.9	

*Sufficient physical exercise is either 30minutes of active or 50minutes of passive activity within 24hours
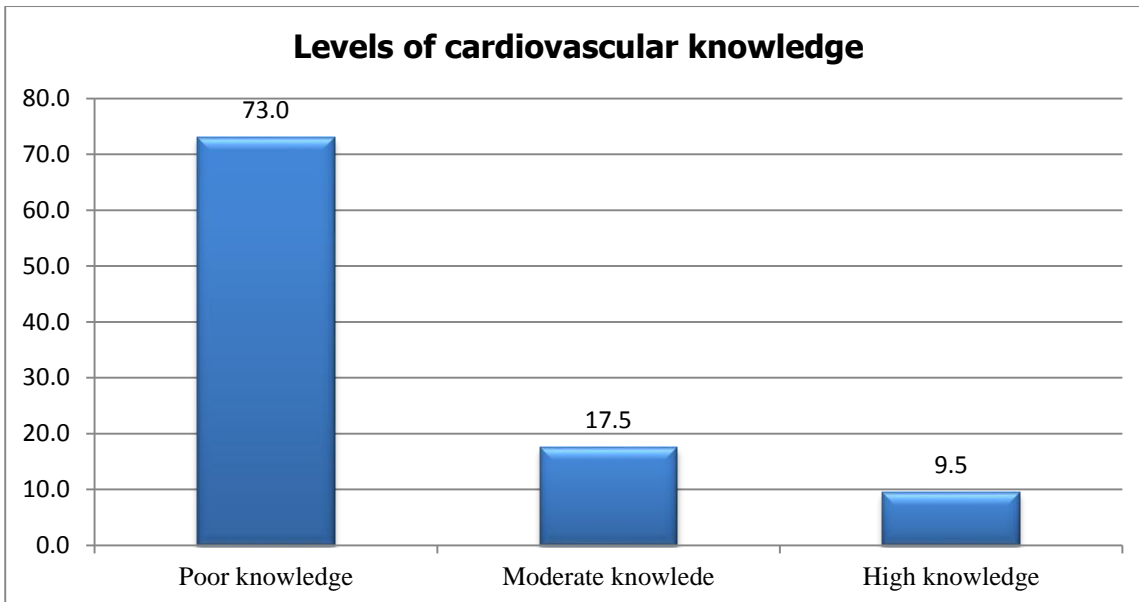**Sufficient fresh fruit consumption is consuming 3 to 5 servings within 24hours

Levels of cardiovascular knowledge

Figure (1): Levels of cardiovascular knowledge.
The patients' percent scores for Knowledge was classified as: Poor level for scores below 60%, Moderate level for scores between 60% to 80% and high levels for scores more than 80%. The majority of the patients 73% fall in the high knowledge category as shown in **figure 1.**
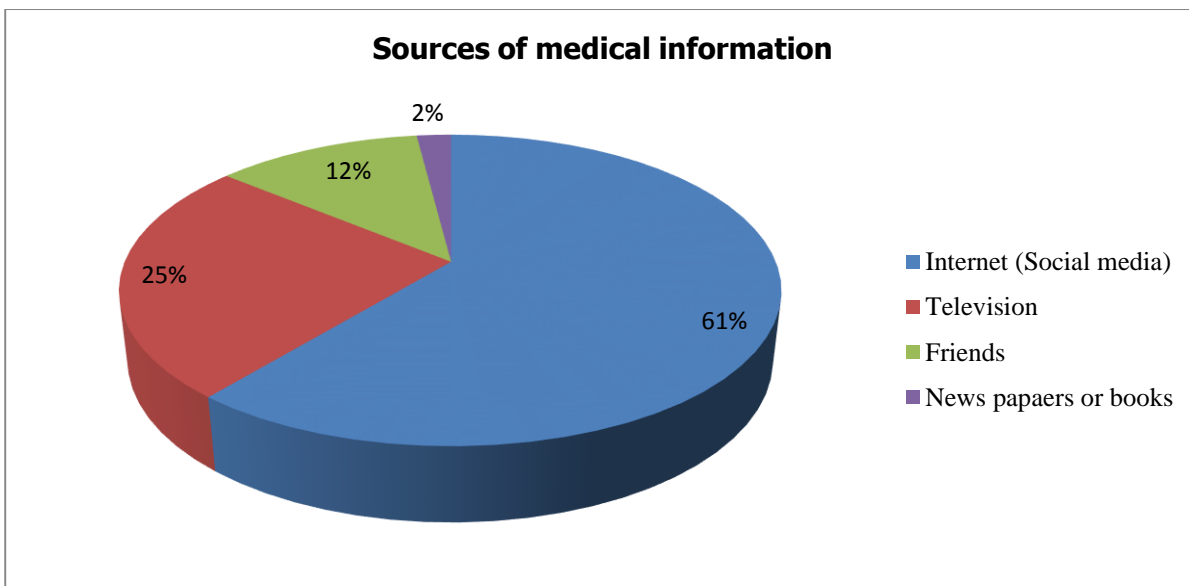

Figure (2): Sources of medical information.
Figure 2 shows that most of the patients obtain their medical information from the internet (social media mainly), quarter from television, while the minority 2% obtain their information from reading newspapers or books.

DISCUSSION

The aim of the current study was to assess the knowledge of CVD and the risk factors among diabetic patients. There was unsatisfactory knowledge of CVD among them in almost all the assessed areas. Similarly, only one in every eleven patients with type 2 diabetes was aware of CVD knowledge in a global study [14]. This unsatisfactory level of knowledge may be due to the lack of health education during clinical consultations or any other forms of contact with healthcare providers in health facilities, as none of the patients reported obtaining medical information from health care providers. Accordingly, they were not able to relate the given treatment with the desired outcomes beyond glycemic control to prevent the complications. That was obvious in their unawareness of the benefit of aspirin in decreasing the risk of CVD. A similar study showed that healthcare providers did not discuss CVD risk factors, prevention, and control measures with their patients [15].

Also, it was shown in previous studies that the providers of healthcare did not explain to patients the action and the reason of the prescribed diabetes medications [16, 17]. The International Diabetes Federation in North Africa and Middle East

performed a survey to explore the knowledge of patients with type 2 diabetic toward the CVD and its risks. It was found that nearly 30% of the patients had never discussed with their healthcare providers the risk of CVD risk [18] that can due to the overburden and high flow rates in the health facilities in developing countries. This limits the duration of doctor-patient interactions affecting the delivery of relevant CVD health education. This highlights the urgent need for enhancing health education and improving the patient interaction with health personnel [19]. That contradicts the study of Nabolsi in Jordan who found that healthcare providers were the main source of information [20].

It was emphasized that the majority of the patients obtained their medical information from social media. The easiness of Internet accessibility to the and the utilization of mobile phones disoriented the patients. It is has become an issue of spreading the health information through social media to find a reliable and professionally valid source. The information most probably inaccurate and requires verification [21]. It may have favorable or unfavorable health effects [22]. However, the literature showed that healthcare providers can use social media for improving patients' knowledge about the chronic diseases as well as self- management [23].

The participants in the present study were not aware of the common manifestations of CVD and unable to determine the warning signs or symptoms. Although it has been proved that CVD symptoms among diabetic patients may be mild or absent known as "silent ischemia" as a result of neuropathy, they knew that chest pain is the only manifestation of CVD. This can increases the risk of delay in seeking medical care and sudden cardiac death as reported in previous studies [24, 25].

Regarding demographic characteristics the study findings showed that females had significantly higher mean knowledge scores compared with males. This may be explained that they can obtain health information through diverse sources, including their frequent access to maternal and child primary health care facilities compared with males [26, 27]. Also, patients who were university graduates had significantly higher mean knowledge scores compared with lower educational level patients. Educated patients had more educational interactions and expose to various formal and informal sources of health information [28]. Health literacy is usually better among more educated patients. It is required for more understanding and applying the health information [29, 30]. That points to the crucial need for improving school enrolment and decreasing school drop-outs in the developing countries.

The current study agreed with the literature on the relationship between CVD knowledge and behavioral risk factors among diabetic patients [31, 32]. That reflects on not settling on protective behavior. A low mean knowledge score was among smokers and patients who rarely consume fresh fruits. This signifies the need to improve cardiovascular health education and counseling, especially among high-risk patients [33].

Similarly, another study depicted that the knowledge level of CVD was more among frequent consumers of fresh fruits compared with less frequent consumers. The presence of sufficient knowledge of CVD may be a motivating factor for the initiation and the maintenance of healthy lifestyles [34].

CONCLUSION

It could be concluded that diabetic patients had unsatisfactory knowledge of CVD and its risk factors. Most of them obtain their information from social media with lacking the benefit of having the information from their healthcare providers. There is a need for collaborative efforts of policymakers and healthcare providers to provide cost-effective tailored health education for the prevention and control of CVD among diabetic patients. These efforts have to consider different key factors affecting knowledge of CVDs. The advantage of social media and websites as a primary source of information can be taken as a channel for the transmission of health education messages.

Conflict of Interests: There was no conflict of interests

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