Knowledge, Practice and Attitude of Diabetic Patients Regarding Prevention of Diabetic Retinopathy

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Abstract

Background: Diabetes retinopathy is a microvascular complication of diabetes which can cause vision loss and blindness. Having adequate knowledge of diabetes retinopathy is important in influencing attitude and practices regarding the disease. The study aimed to: assess patients' knowledge, practices and attitude regarding prevention of diabetic retinopathy. Research design: A descriptive exploratory design was utilized to achieve the aim of this study. Setting: This study was conducted at diabetes clinic at Al-Hussein university hospital. Sample: A purposive sample of 136were included in the study. Tools: Four tools were used and filled in by the investigator to collect data. Tool I: This tool consisted of two parts: Part I: Demographic characteristics of the diabetic patients. Part II: patient's medical history. Tool II: Patient's knowledge questionnaire regarding prevention of retinopathy. Tool III: Patient's practices questionnaire regarding prevention of retinopathy. Tool IV: Patients' attitude questionnaire regarding prevention of retinopathy. Results: Findings of the present study showed that 3.6% of the studied patients had satisfactory level of knowledge, 30.1% of them had total competent level of their practices. While, 83.1% of them had positive attitude regarding prevention of diabetic retinopathy. the results revealed that there was a high statistically positive correlation between total satisfactory level of knowledge of the studied patients and their total practices scores. As well, there was a statistically positive correlation between total practices scores of the studied patients and their attitude. Conclusion: The minority of the studied patients had satisfactory level of knowledge and competent practices regarding prevention of diabetic retinopathy. while the majority of them had positive attitude regarding prevention of diabetic retinopathy. Recommendation: Health education programs which aims to increase diabetic patients' knowledge and practices regarding the preventive measures of diabetic retinopathy should be provided in all health care services.

Keywords: *Attitude, Diabetes mellitus, Diabetic retinopathy , Knowledge, Practice.*

INTRODUCTION peripheral retina, macula, or both is a serious cause of vision loss and blindness in diabetics. Diabetic retinopathy is microvascular Vitreous hemorrhage or retinal objectivity condition that may affect each of the may cause a total or partial loss of vision. It

can be segregated into two kinds proliferative diabetic retinopathy (PDR) and nonproliferative diabetic retinopathy (NPDR). As a general, NPDR is distinguished by capillary divider deficiency, enhancement of micro aneurysm and liquid spillage, and more prominent endothelial attachment of leukocytes and monocytes. Diabetic retinopathy is characterized by endothelial cell and retinal capillary degeneration due to the incidence of ischemia and micro-aneurysm (Hammes et al., 2021).

Diabetic retinopathy doesn't usually cause symptoms during the non proliferative stages, this is because blood vessels don't always leak in these stages. Patients usually don't experience symptoms until late in the course of the disease when treatment may be ineffective. Late symptoms of diabetic retinopathy vary depending on the cause. Bleeding into the vitreous can cause sudden loss of vision and macular edema and ischemia are two other mechanisms of decreased vision. Symptoms of proliferative diabetic retinopathy also include an increased number of eye floaters, blurry vision, distorted vision, poor night vision, loss of vision, decreased field of vision and change in colors. Diabetic Retinopathy symptoms usually affect both eyes at the same time (Scanlon, 2021).

Having good knowledge of diabetic retinopathy may be more important in influencing attitudes and practice patterns regarding the disease. As patients' knowledge of the disease increases, their attitudes become positive and ultimately practices become good. Health education measures should be implemented at primary, secondary, and tertiary levels of health care, through the mass media, pamphlets, posters, and DR screening camps. Therefore, it's necessary to formulate certain strategies and implement measures to ensure good knowledge and positive attitudes can be converted into good practice (Antonetti et al., 2021).

Increasing knowledge about the disease and its complications is a powerful tool, which helps patients in developing good practice patterns that will ultimately help them in keeping the disease under good control and avoiding preventable blindness. Raising knowledge and attitude level about DR in will turn improve the compliance of the patients regarding continuous periodic clinical examination, so it could be early diagnosed and treated. Appropriate patient's education and mass health education are needed to encourage those at risk to seek appropriate and timely care (Fante et al., 2020). Significance of the study:

Global prevalence of diabetic retinopathy estimates in 2015 is nearly 2.6 million people had moderate or severe vision impairment due to DR and the numbers had increased to 3.2 million in 2020, which is approximately 1% of the total population with diabetes. In highincome countries such as the United Kingdom, there has been a significant decline in DR prevalence due to improved surveillance and effective specialist care and is no longer the commonest cause of blindness. Furthermore, it's estimated that by 2030, the number of adults with diabetes will increase by 69% in low-income and middle-income countries compared with only 20% in high income countries (Yau et al., 2021).

In Egypt Diabetic retinopathy remains a common complication of DM and a leading cause of preventable blindness in the adult working population. The prevalence of DR in Egypt is understudied and various prevalence estimates have been provided using diverse methodologies and in different populations studied. For instance, Herman et al showed that 42% of patients with diabetes in households had retinopathy (Herman et al., 2019).

Education for self care and improving the knowledge is a process with several challenges, especially in the presence of diabetes mellitus. Diabetes self management education and support is needed to help people with diabetes to navigate decisions and activities and has been shown to improve health outcomes and it's the process of facilitating the knowledge, skills and abilities necessary for diabetes positive attitude and good practices. It helps diabetic patients to have good practices on diabetic self management, watching potential risk factors and allowing them to develop a positive attitude for an early screening and timely treatment (Rema & Pradeepa, 2020). So, the aim of this study was to assess knowledge, practices and attitude of diabetic patients regarding prevention of retinopathy.

Aim of the study:

The aim of this study was to assess knowledge, practice and attitude among diabetic patients regarding prevention of retinopathy. This aim was be achieved through the following objectives:

1-   Assessing patients' level of knowledge regarding prevention of diabetic retinopathy.

2-   Assessing patients' level of practice regarding prevention of diabetic retinopathy.

3-   Assessing patients' attitude regarding prevention of diabetic retinopathy.

Research question:

The objectives of the study were achieved through answering the following questions:

1-Whatispatients'level of knowledge regarding prevention of diabetic retinopathy ?

2-What is patients' level of practices regarding prevention of diabetic retinopathy?

3-What is patients' attitude regarding prevention of diabetic retinopathy ?

Subject and methods:

The subject and methods for this study were portrayed under the four main items as follows:

 I) Technical item.   II) Operational item.

III) Administrative item.   IV) Statistical item.

I- Technical item:

The technical design included research design, setting, subjects and tools for data collection.

Research design:

A descriptive exploratory research design was utilized to achieve the aim of this study.

Descriptive design involves direct exploration, analysis and description of a particular phenomenon. Exploratory design doesn't aim to provide the final and conclusive answers to the research questions, but merely explores the research topic with varying levels of depth (Hunter   et   al.   2019). An exploratory descriptive design helps the researcher to describe and document aspects of a situation as it naturally occurs, as well; it helps to establish a database for future research (Claybaugh & Zach, 2020).

Setting:

This study was conducted at diabetes clinic at Al-Hussein University Hospital. Diabetes clinic is located at the first floor of the hospital.

At diabetic clinic, there were one doctor and two nurses. It is working 6 days weekly from 8 Am to 2 Pm. They were approximately 30 patients attended the clinic each day.

Subjects:

A purposive sample of 136 patients were included in the study.

The sample size was determined according to the statistical

$$\text{calculation which } guidedbyn = \frac{NP(1-P)}{(N-1)(\frac{d^2}{z_{\alpha 1-2}})+P(1-P)} \text{Total}$$

population size equal 386.

The power of the test = 80%.

Confidence Level =85%.

The accepted level of error =5%.

Inclusion criteria:

- Adult patients diagnosed with diabetes not diagnosed with diabetic retinopathy.

- From both genders and agreed to participate in the study. Tools of data collection:

Four tools were used and filled in by the investigator to collect data.

Tool I: Structured interview questionnaire: (Appendix Ⅰ):

This tool was developed by the investigator after reviewing the related literature (Srinivasan etal., 2017; Al Hargan et al., 2019), and consisted of two parts:

Part I: Demographic characteristics of the diabetic patients includes

(age, gender, occupation, marital status, occupation, place of residence, income and education level).

Part II: patient's medical history includes (history of chronic diseases, type of DM, duration of diabetes, blood glucose control, complications of diabetes, type of medical treatment of DM and type of DM complications.

Tool II: Patient's knowledge questionnaire regarding prevention of retinopathy :
(Appendix Ⅱ):

This tool was developed after reviewing the related literature as (Srinivasan etal., 2017 ; AL Hargan et al., 2019; Almalki et al., 2018; Farooq & Bapar, 2021) in a simple Arabic language to assess diabetic patients knowledge regarding diabetic retinopathy. It included 13 multiple choice questions with 3 main categories: patient's knowledge about diabetes mellitus (4 items), diabetes treatment and complications (3 items) and knowledge regarding diabetic retinopathy (6 items). As well, 2 items asking about source of knowledge about diabetes and time of knowing that diabetes cause retinopathy. The tool consists of 15 multiple choices questions, 8 of them have more than one correct answer.

Scoring system for patient's level of knowledge :Each correct answer had score 1 and the incorrect answer had score zero. Total score of knowledge ranged from 0 to 37 degrees and were categorized as :

•Satisfactory if the total score is 75% or more.

•Unsatisfactory if the total score less than 75 %.

Tool III: Patient's practices questionnaire regarding prevention of retinopathy: (Appendix Ⅲ):

This tool was adapted from (Srinivasan et al.,

2017; Almalki et al., 2018; Farooq& Bapar, 2021). to assess patients' practices regarding prevention of diabetic retinopathy. It included 9 questions.

Scoring system for patients' practice questionnaire:

Each step that had been done had 1 score and not done step had score zero. Total practice score ranged from 0 to 6 degrees if the patients didn't go for a periodic eye check up and from 0 to 8 if the patients went for periodic eye check up and were categorized as:

• Competent if the total score is 85% or more.

• Incompetent if the total score is less than 85%.

Tool IV: Patients' attitude questionnaire regarding prevention of retinopathy (Appendix IV):

This tool was adapted from (Sirnivasan et al., 2017; Almalki et al., 2018; Farooq& Bapar 2021). to assess patients' attitude regarding diabetic retinopathy. It included 14 questions with agree and disagree answers. The investigator adapted the questionnaire by removing some practices items that were related to care of diabetic retinopathy.

Scoring system for patients' attitude questionnaire regarding prevention of diabetic retinopathy :

The questionnaire consisted of 10 positively worded statements and 5 negatively worded statements, that were reversely scored as (0=disagree) and (1=agree). Total score ranged from 0 to 14 degrees and were categorized as :

• Positive attitude if the total score is 75% or more.

• Negative attitude if the total score less than 75%.

Validity:

The study tools were tested for validity (face and content validity). Face validity aimed to determine whether the tools measure what was supposed to measure. Content validity was conducted to determine whether the content of the tool cover the aim of the study. It was measured by a jury of 5 experts, three assistant professors and two lecturers of medical surgical nursing at faculty of nursing, Helwan university. The experts reviewed the tool for clarity, relevance, accuracy, comprehensiveness, simplicity and applicability, and minor modifications were done. Reliability:

Cronbach's Alpha was used to determine the internal reliability of the adapted tools. Reliability of the tools was tested to determine the extent to which the questionnaire items are related to each other. Cronbach's alpha reliability coefficient normally ranges between 0 and 1 with higher values (more than 0.7) denote acceptable reliability. The study tools showed good internal reliability patients' knowledge questionnaire (0.701), patients' practices questionnaire (0.759) and patients' attitude questionnaire (0.776).

Ethical considerations:

An official permission to conduct the proposed study was obtained from the scientific research ethics committee. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations were included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where they weren't be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

II- Operational item:

The operational design includes preparatory phase, pilot study and field work Preparatory phase:

It included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop the tool for data collection.

Pilot study:

The pilot study was done on 10% of the sample (8 nurses) to examine the clarity of questions and time needed to complete the study tools. Subjects included in the pilot study weren't excluded from the study sample as minor modifications were done.

Field work:

• Data were collected within 6 months in the period from the beginning of December 2021 to the end of May 2022.

• The investigator visited the diabetes clinic two days per week during the morning shifts (9:00 am to 1:00 pm). Each day the investigator interviewed2or3 patients.

• Data were collected through interviewing patients to fill data collection tools by the investigator.

• At the beginning of the interview, the aim of the study was explained to patients. • The investigator obtained the patients' IV Statistical item:

Upon completion of data collection, data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. For quantitative data, numbers, percentage, mean and standard deviation (SD) were used to describe the results.For qualitative data, frequency and percentage distribution of each category were calculated.

Appropriate significance was adopted at $p < 0.05$ for interpretation of results. The observed differences were considered as not significant if $p > 0.05$ and significant if $p < 0.05$ (siregar, 2021). Appropriate inferential statistics such as chi-square and person correlation "r" test were used as well.

Results:

Table (1): Frequency and percentage distribution of the studied patients according to their demographic characteristics (N=136).

oral consent for participating in the study.

• The study tools were completed and filled in by the investigator within an average time of 40-60 minutes as following: structured interview questionnaire for collecting data regarding demographic characteristics of patients; it took about 15-20 minutes as well patients' knowledge questionnaire; it took about 10-15 minutes and patients' practice questionnaire took about 5-10 minutes and patients' attitude questionnaire took about 1015minutes.

III Administrative Item:

After explanation of the study aim and objectives, an official permission was obtained from the Dean of faculty of nursing and the director of Al-Hussin University Hospital asking for cooperation and permission for data collection.

Patients' characteristics		No	%
Age (in years)	18>30	8	5.9
	30 >40	21	15.4
	40 >50	30	22.1
	50 ≥60	77	**56.6**
Mean ± SD	48.91 ± 10.93		
Gender	Male	46	33.8
	Female	90	**66.2**
Marital status	Single	6	4.4
	Married	84	**61.7**
	Divorced	10	7.4

|			
	Widow	36	26.5
Occupation	Governmental work	38	27.9
	Private work	13	9.6
	Don't work	77	**56.6**
	Retired	8	5.9
Place of residence	Urban	85	**62.5**
	Rural	51	37.5
Income	Sufficient for treatment expenses	48	35.3
	Not sufficient for treatment expenses	88	**64.7**

Table (1): illustrates that 56.6% of the studied patients aged from 50 to 60 years with mean age 48.91+ 10.93. 66.2% & 61.7% of the studied patients were female and married. Regarding occupation; 56.6% of the studied patients didn't work. 62.5% of them were living at urban areas and 64.7% of them didn't have sufficient income for treatment.

Table (2): Frequency and percentage distribution of the studied patients Table(2): reveals that 69.1% of the studied patients had history of chronic disease and 57.3% of them had hypertension.

Regarding to type of DM, 91.2% of the studied patients had type 2 DM with a duration of diabetes less than 10 years of 75.7%. As well, 59.6% of the studied patients had controlled their blood glucose level and 87.5 of them had complication of diabetes.

Figure (1): Percentage distribution of the

| Patients ' characteristics	No	%
History of chronic disease		
Yes	94	**69.1**
No	42	30.9
Type of chronic diseases *		
Hypertension	78	**57.3**
Kidney disease	18	13.2
Heart disease	22	16.1
Chronic obstructive pulmonary diseases	4	2.9
Type of diabetes mellitus (DM)		
Type 1 DM	11	8.1
Type 2 DM	124	**91.2**
Gestational DM	1	0.7
Duration of diabetes mellitus		
10 years$\geq$	103	**75.7**
11<20 years	27	19.9
$\geq$20 years	6	4.4
Control of blood glucose level		
Yes	81	**59.6**
No	55	40.4
Complications of DM		
Yes	119	**87.5**
No	17	12.5
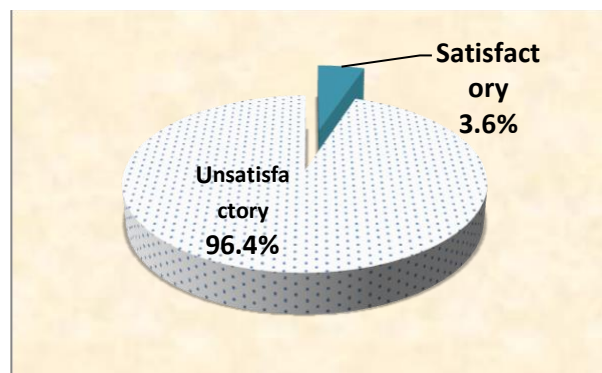
according their history (N=136 medical).
satisfactory level of knowledge (N=136).

Figure (1): indicates that 96.4% of the studied patients had unsatisfactory level of knowledge regarding diabetes and diabetic retinopathy, while, 3.6% of them had satisfactory level of knowledge regarding diabetes and diabetic retinopathy.

Figure (2): Percentage distribution of the studied patients according to their total competent practices regarding prevention of diabetic retinopathy (N=136).

*This variable isn't mutually exclusive
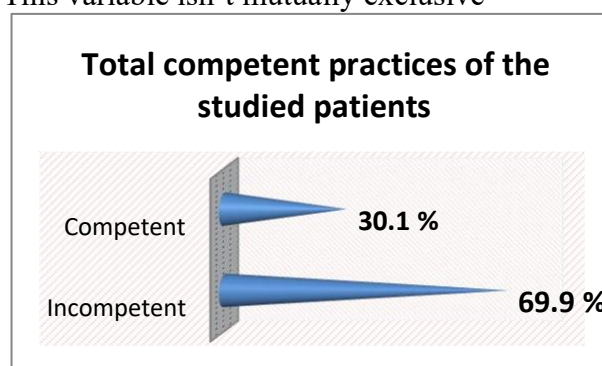
studied patients according to their total

Figure (2): indicates that 69.9% of the studied patients had total incompetent level of their practices regarding prevention of diabetic retinopathy, while, 30.1% of them had competent level of practice.

Figure (3): Percentage distribution of the studied patients according to their total attitude scores (N=136).
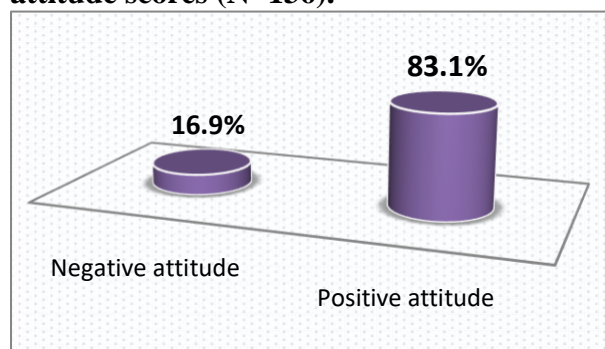

Figure (3): reveals that 83.1% of the studied patients had positive attitude regarding prevention of diabetic retinopathy, while, 16.9% of them had negative attitude.

Table (3): Correlations between total satisfactory knowledge of the studied patients, their practices and attitude (N=136).

Items	Correlation coefficient	P value
Total knowledge and practices	0.297	0.000**
Total knowledge and attitude	0.088	0.308
Total practices and attitude	0.211	0.014*

* Significant(S)p>0.05* * Highly significant(S)p>0.001

Table (3): indicates that there was a high statistically positive correlation between total knowledge of the studied patients and their total practices with p value (0.000). As well, there was a statistically positive correlation between total practices of the studied patients and their attitude with p value (0.014).

Discussion

Regarding the characteristics of the studied patients, the present study revealed that more than half of the studied patents were between the age of 50 to 60 years. This results may be owed to the higher incidence of diabetes mellitus occurred in old age (Nanayakkara et al., (2021). This result is in an agreement with Achigbu et al., (2021), in their study entitled" knowledge, attitude and practice of patients with diabetes regarding eye care" they reported that most of the age ranged from 51 to 60 years.

In the same context, the present study findings indicated that about two thirds of the studied patients were female and married. The study results are supported by Geethadevi et al., (2021), in their recent study titled " A study of knowledge, attitude and practice in diabetic retinopathy among patients attending a primary health care center" mentioned that about two thirds of the studied patients were female. Additionally this findings also supported by Al-Yahya et al., (2020), in their study about "knowledge, attitude, and practices of diabetics towards diabetes and diabetic retinopathy in Riyadh, Saudi Arabia" they mentioned that about two thirds of the studied patients were married.

As regards to the occupation of the studied patients, the present study illustrated that more than half of the studied patients didn't work. This results may be related to more than one third of the them didn't read or write. The study results are similar to Alzaylae et al., (2022), in their study entitled "patients knowledge, attitude and practice towards diabetic complications in Saudi Arabia" they reported that around more than half of the studied patients didn't have any job.

Concerning the place of residence of the studied patients, the results revealed that about two thirds of the studied patients were lived in urban

area. The study results are consistent with Sen et al., (2020), in their study about "Knowledge, attitude and practice patterns and the purported reasons for delayed presentation of patients with sight threatening diabetic retinopathy at a tertiary eye care facility in Central India " they found that about two thirds of the studied patients were lived in urban area.

Regarding the income of the studied patients, the present study showed that about two thirds of the studied patients didn't have sufficient income for treatment expenses. This results may be interpreted by more than half of them didn't work. The study results agree with Hussain et al., (2021), in their recent study titled "knowledge and awareness about diabetes mellitus and diabetic retinopathy in suburban population of a South Indian state and its practice among the patients with diabetes mellitus" indicated that two thirds of the studied patients didn't have source of income.

As regards to the medical history of the studied patients, the results revealed that more than two thirds of the studied patients had a history of chronic disease. This findings are supported by Shamshirgaran et al., (2021), who stated that the old age people are more susceptible to chronic diseases. The study results are in accordance with Al-Maskari et al., (2020), in their recent study titled "knowledge, attitude and practices of diabetic patients in the United Arab Emirates" they indicated that more than half of the studied patients reported history of chronic disease.

In the same context, the present study showed that more than half of the studied patients had hypertension. This results may be owed to hypertension is twice as frequent in patients with diabetes compared with those who don't have diabetes (Midha et al., 2019). The study results are in agreement with Duan et al., (2020), in their study entitled "knowledge and practices regarding diabetic retinopathy among

diabetic patients registered in a chronic disease management system in eastern China" they reported that more than half of the studied patients had hypertension.

Concerning the type of diabetes mellitus, the present study findings indicated that the most of the studied patients had type 2 diabetes mellitus. This findings may be explained by Type 2 diabetes is by far the most common, affecting about 95% of all people with diabetes (Ali et al., (2022). The results are going in line with Alhamoud et al., (2022), who carried out a study "awareness of diabetic retinopathy among diabetic patients in King Khalid eye specialist hospital, Riyadh, Saudi Arabia" they mentioned that the most of the studied patients had type 2 diabetes mellitus.

In the same context, the present study showed that the majority of the studied patients had diabetes since years or less. The study results are similar to Bambamba et al., (2022), in their study entitled "knowledge, attitude and practice about diabetic retinopathy among diabetic patients attending the department of endocrinology at Nampula central hospital in Mozambique during 2022" they reported that the majority of the studied patients had diabetes mellitus since 10 years ago.

Concerning the control of blood glucose level of the studied patients, the results revealed that more than half of the studied patients controlled their blood glucose level. The study results are consistent with Albalawi et al., (2021), in their study about "awareness of diabetic retinopathy among type II diabetic patients attending at king Salman armed forced hospital primary health care, Tabuk 2021" they found more than half of the studied patients controlled their blood glucose level.

In relation to complications of diabetes mellitus, the present study findings indicated that the majority of the studied patients had complications. This results may be related to the

long duration of diabetes mellitus among the studied patients. The study results are congruent with Acharya et al., (2019), who carried out a study "knowledge and practice on prevention of complications of diabetes mellitus among patients with diabetes in a tertiary hospital" they mentioned that the majority of the studied patients had complications of diabetes mellitus.

Concerning the total satisfactory level of knowledge of the studied patients, the results revealed that the minority of the studied patients had satisfactory level of knowledge regarding diabetic retinopathy. This findings may be interpreted by more than one third of the studied patients didn't read or write. The study results are consistent with Al Zarea, (2021), in their study about "knowledge, attitude and practice of diabetic retinopathy amongst the diabetic patients of Al Jouf and Hail province of Saudi Arabia" they found that the minority of the studied patients had satisfactory level of knowledge regarding diabetic retinopathy.

In relation to the total competent practices regarding prevention of diabetic retinopathy, the present study findings indicated that more than two thirds of them had total incompetent level of their practices while about one third of them had total competent level of their practices regarding prevention of diabetic retinopathy. This findings may be related to an unsatisfactory level of knowledge among the studied patients. The study results are going in line with Thirunavukkarasu et al., (2021), who assessed "knowledge, attitudes, and practices towards diabetic retinopathy among primary care physicians of Saudi Arabia" they revealed that more than two thirds of the patients had total incompetent level of their practices regarding prevention of diabetic retinopathy.

In relation to the total attitude scores of the studied patients regarding prevention of diabetic retinopathy, the results revealed that the majority of the studied patients had positive attitude while the minority of them had negative attitude regarding prevention of diabetic retinopathy. The study results are congruent with Abdelmouty& Mohammed, (2022), in their study about "effect of educational sessions about prevention of retinopathy on knowledge, attitude and practice of diabetic patients" who found that the majority of the studied patients had positive attitude while the minority of them had negative attitude regarding prevention of diabetic retinopathy.

Concerning the Correlations between total satisfactory level of knowledge of the studied patients, their practices and attitude, the results revealed that there was a high statistically positive correlation between total satisfactory level of knowledge of the studied patients and their total practices scores. This can be explained by knowledge level of the patients affect their practice. As well, there was a statistically positive correlation between total practices scores and attitude. The study results are consistent with Thirunavukkarasu et al., (2021), who examined" knowledge, attitudes, and practices towards diabetic retinopathy among primary care physicians of Saudi Arabia" who demonstrated that there was a high statistically positive correlation between total satisfactory level of knowledge of the studied patients and their total practices. As well, there was a statistically positive correlation between total practices scores of the studied patients and their attitude.

Conclusion

On the light on the finding of the current study, it can be concluded that:

The minority of the studied patients had satisfactory level of knowledge and competent practice regarding prevention of diabetic retinopathy. While the majority of them had positive attitude regarding prevention of diabetic retinopathy. Additionally there was a high statistically positive correlation between

total satisfactory level of knowledge of the studied patients and their total practices scores. As well, there was a statistically positive correlation between total practices scores of the studied patients and attitude scores.

Recommendations

Based on the current study findings and research questions the following recommendations were proposed:

•	Health education programs which aims to increase diabetic patients' knowledge and practice regarding the preventive measures of diabetic retinopathy should be provided in all health care services.

•	Simple educational pamphlets and/or posters about diabetic retinopathy preventive measures should be provided for patients with diabetes in outpatient clinics.

•	Further studies are required to assess risk factors for developing diabetic retinopathy among patients with diabetes.

•	Further studies are needed to assess factors affecting compliance of patients with diabetes with diabetes treatment follow up and periodic eye check up.

•	Further researches are needed on a larger sample size to generalize the study findings.

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