

Students' Perception Regarding Diabetic Retinopathy at El Badrashin Technical Nursing Institute

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Abstract

Back ground: Diabetic retinopathy, pose significant public health concern as the leading cause of vision loss in patients with diabetes. Approximately one-third of all diabetics have some form of retinopathy, with over 100 million cases of DR worldwide of the diabetics, about one-third have a vision-threatening form of this disease. **Aim:** The current study aimed to assess students' perception regarding diabetic retinopathy at El Badrashin Technical Nursing Institute. **Design:** Descriptive research design was used in this study. **Setting:** This study was conducted at El Badrashin Technical Nursing Institute. **Subjects:** A convenience sample consisted of 180 students at El Badrashin Technical Nursing Institute. **Tool:** Tool was used, Structural Interviewing Questionnaire including three parts: **Part I:** Students' demographic characteristics. **Part II: (A)** Students knowledge regarding diabetes mellitus and diabetic retinopathy **Part III:** Students attitude toward diabetes mellitus and diabetic retinopathy prevention. **Results:** 28 % of the studied students had average total knowledge regarding diabetes mellitus and diabetic retinopathy, and 30% of the studied students had a positive attitude toward diabetes mellitus and diabetic retinopathy prevention. **Conclusion:** There was a positive correlation between total knowledge, and total attitude. **Recommendation:** Implementing health educational programs to improve knowledge, and attitude regarding diabetic retinopathy among technical nursing institute students.

Key words: Diabetic retinopathy, students' perception, and technical nursing institute

I. Introduction

Diabetes Mellitus (DM) is a global epidemic with prominent morbidity. According to the 2021 report from the International Diabetes Federation (IDF), approximately 537 million adults worldwide are affected by DM, and this number is projected to reach 783 million by 2045. Among DM patients, about 20% present with diabetic retinopathy (DR) at the time of diagnosis, and an additional 40-50% will develop DR as the disease progresses (Zhu et al., 2024).

Diabetic retinopathy develops strongly correlates with a longer duration of diabetes, greater hyperglycemia, and hypertension. A higher HbA1c level is significantly associated with the progression of diabetic retinopathy and intensive glycemic control reduces the incidence and deterioration of retinopathy. In recent studies, glycemic variability was found to be strongly associated with diabetic retinopathy in type 2 diabetes. Other risk factors include nephropathy, dyslipidemia, smoking, and higher body mass index, which are also modifiable to prevent the progression of diabetic retinopathy (Lin et al., 2021).

Nursing students' perceptions regarding diabetic retinopathy often reflect a mix of their theoretical knowledge, clinical exposure, and personal attitudes towards chronic disease management. Strengthening education and providing more hands-on experiences can help enhance their confidence and competency in managing patients with DR. Nursing students may be aware of the importance of early screening (e.g., regular eye exams) but may not fully understand the specific screening techniques like fundus photography or fluorescein angiography (Alsolais et al., 2023).

Community health nurses have a vital role regarding prevention and management of DR through education, screening, and support for patients with diabetes. One of the most important goals of nursing management for diabetic



patients is to increase awareness, improve practice, and prevent complications. Nurses can obviously help encourage diabetic patients to actively participate in health check-ups. Also, the nurse has a very important role in patients' education, good control of glycemic status, blood pressure, serum lipids, etc. With the use of pharmacological therapies, lifestyle modification and behavioral change, early diagnosis of subclinical cases and preventing the progression of the patient's state with DR (Aly et al., 2021).

II. Significance of the study:

Diabetic retinopathy is considered one of the most common and serious complications of DM, is the fifth most common cause of visual impairment in the world, and the 4th most common cause of blindness. As a result of DR, productivity decrease, quality of life deteriorate, and socio-economic burden increase. The worldwide prevalence of DR for the duration of 2015–2019 was 27% at the same time as with inside the Egyptian capital, Cairo, the superiority of DR become determined in 20.5% of diabetic patients (Aly et al., 2021).

The global prevalence of DR was 103 million in 2020 and is expected to reach 161 million by 2045, which is primarily due to the exponentially growing population of diabetics across the globe, especially in Africa, the Middle East. A considerable prevalence of DR was reported in Africa (35.90%) and North America (33.30%) as well as the Middle East and North Africa (32.90%). Globally, visual impairment has decreased, but the number of people who are blind as a result of DR grew from 0.2 to 0.4 million (Zegeye et al., 2023).

Nursing students are involved in providing direct care to patients with diabetes during their clinical rotations. Hence, nursing students must be equipped with adequate knowledge. Therefore, it is imperative to investigate student nurses' level of knowledge of diabetes complications to identify areas that need attention to ensure a high level of diabetes knowledge (Alsolais et al., 2023). Therefore, this study will be conducted to assess students' perception regarding diabetic retinopathy at El Badrashin technical nursing institute.

Aim of the study:

This study aimed to assess students' perception regarding diabetic retinopathy at El Badrashin technical nursing institute through the following

- 1-Identify students' knowledge regarding diabetic retinopathy.
- 2-Determining students' attitude toward diabetes mellitus and diabetic retinopathy prevention

Research questions

- 1-What are the students' knowledge regarding diabetic retinopathy?
- 2-What are the students' attitude toward diabetes mellitus and diabetic retinopathy prevention?
- 3-Is there relation between students' knowledge and their demographic characteristics?
- 4-Is there relation between students' attitude and their demographic characteristics?

Subject and Methods

Research design:

A descriptive research design was used in this study.

Setting:

The study was conducted at Technical Nursing Institute at El Badrashin hospital, which is affiliated to the Directorate of Health Affairs in Giza and the Health Technical Institute in Imbaba.

Sampling:**Type of the sample:**

A convenience sample included 180 students taken as the following: -

Academic year	Total numbers of students
Frist year of school	30
Second year of school	30
Third year of school	30
Frist year of institute	45
Second year of institute	45
Total	180

Tool for data collection:**Data was collected by one tool as the following:**

Structured interview questionnaire; it was devolved by the investigator after reviewing the related literature to cover the following parts:

Part 1: Demographic characteristics of the student's include 8 questions such as (Age, academic year, residence, father's educational level, father's job, mother's educational level, mother's job, monthly family income

NB: One question about source of information about diabetic retinopathy.

Part 2: (A) Students' knowledge regarding diabetes mellitus include 11 questions such as (Meaning of DM, types of DM, the normal range of blood sugar, causes of DM, signs and symptoms of DM, diagnosis of DM, complications of diabetes, factors that lead to high DM, prevention of DM, healthy diet of DM, and importance of flow up of diabetes patients)

(B) Students' knowledge regarding diabetic retinopathy includes 9 questions such as (Meaning of DR, types of DR, signs and symptoms of DR, causes of DR, diagnosis of DR, risk factors for DR, complications of DR, prevention of DR and treatment of DR)

Scoring system for knowledge items:

The knowledge items included 20 questions, the tool scores of the knowledge was 40 grades, complete correct answer was scored two grade and incomplete correct answer was scored one grade and don't know was scored zero. These scores were summed up and converted into a precent score ranged from 0-40 **as the following:**

-Good knowledge $\geq 75\%$ (≥ 30 grades).

-Average knowledge 50%- < 75% (20 -< 30 grades).

-Poor knowledge <50% (< 20 grades)

Part (3): Students attitude Likert scale regarding diabetes mellitus and diabetic retinopathy prevention include 6 major items such as nutrition, exercises faulty habits, investigations, adherence to treatment, and follow up. **Such as the following:**

- **Nutrition:** It consisted 4 items such as: Eating balanced, and small diet, drink plenty of fluids, eat foods rich in fiber, and eat low-fat foods it leads to control of blood sugar level.

- **Exercises:** It consisted 3 items such as: Doing exercises and walking for thirty minutes improves blood circulation, protects against diabetes, and preserves the retina.
- **Faulty habits:** It consisted 6 items such as: Smoking, fast food, drinking a lot tea and coffee, excessive consumption of sugar and soft drinks, salty foods, and lack of knowledge it leads to diabetes, high blood pressure and diabetic retinopathy.
- **Investigations:** It consisted 2 items such as: Regular eye examination is necessary to assess the condition of blood vessels and detect diabetic retinopathy early.
- **Adherence to treatment:** It consisted one items such as: Taking diabetes medication regularly helps maintain eye health and prevent complications.
- **Follow up:** It consisted 3 items such as: By regular monitoring of blood pressure, blood sugar, and cholesterol level helps in early detection of diabetes and diabetic retinopathy.

Scoring system for attitude items:

The total score of scale was 38 grades for 19 items, each item was evaluated as Agree was taken two grades, neutral was one grades and disagree was zero grade. These scores were summed up and converted into a percentage score. it ranged from 0-38 as the following:

- **Positive attitude** $\geq 60\%$ (≥ 23 grades).
- **Negative attitude** $< 60\%$ (< 23 grades).

Tool validity:

The developed tool was formulated and submitted to three experts in Community Health Nursing, Faculty of Nursing, Helwan University to assess the content validity, needed modification was don as paraphrasing of some items.

Reliability:

Cronbach's Alpha was used to determine the internal reliability of the tool.

Tool	Cronbach's Alpha
Students' knowledge	0.82
Students attitude	0.890

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethical Committee, Faculty of Nursing, Helwan University. 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 included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where they were not be accessed by any other party. Ethics, values, culture and beliefs were respected.

II- Operational Item:

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 tools for data collection.

Pilot study:

The pilot study was done on 10% of the sample (18) students of the sample to examine the clarity of questions and time needed to complete the study tools. Based on the pilot study results, no modification was done. So, subjects of the pilot study were included in the main study sample.

Field work:

- An approval to carry out this study was obtained from Dean Faculty of Nursing Helwan university to Director of El Badrashin Technical Nursing Institute for conducting the study.
- The investigator introduce herself to students and briefly explain the nature and purpose of the study to each student before participation.
- The interviewing questionnaire was completed by the investigator from each student.
- Data pertinent to the study were collected through structured face to face interview, it took about 20-30 minutes to be fully filled.
- Data were collected during academic year (2023-2024) over a period of three months from beginning of November 2023 to the end January 2024).
- Data were collected 3 days/ weekly (Sunday, Tuesday, and Wednesday) from 9:00 am to 1:00 pm ,5 students were interviewed per day.

III- Administrative item:

After explanation of the study aim and objectives, an official permission was obtained from the Dean of Faculty of Nursing and directed to the General Manager of El Badrashin Technical Nursing Institute asking for cooperation and permission to conduct the study.

IV- Statistical item:

The Statistical analysis of the data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Sciences (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentages for categorical data, the arithmetic mean ($\bar{X}$) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (χ^2). In addition, t-test were used to identify the correlation between the study variables.

Degrees of significance of results were considered as follow:

- Not significant (NS) at $P > 0.05$.
- Significant(S) at $P < 0.05$.
- Highly statically significant (HS) at $P \leq 0.001$.

IX.Results

Table (1): Shows that, the mean age of studied students were 18.4 ± 4.7 years. Also, 40.0 % of the student's father's educational level were university education or more and 42.2 % of the students' father occupation were employee. Moreover, 55.6 % of the students' mother occupation were house wife. Additionally, 44.4 % of the students' monthly income was enough.

Figure (1): Presents that, 60 % of the studied students had poor total knowledge regarding diabetes and diabetic retinopathy. Also, 28 % of them had average total knowledge. While, 12 % of them had good total knowledge regarding diabetes and diabetic retinopathy.

Figure (2): Illustrates that, 30 % of students had positive total attitude toward diabetes mellitus and diabetic retinopathy prevention. While, 70 % of them had negative total attitude.

Table (2): Reveals that, there were highly statistically significant relation between students' total knowledge and all items of demographic characteristics, where ($P < 0.001$).

Table (3): Shows that, there was highly statistically significant relation between students' total attitude and all items of demographic characteristics, where ($P < 0.001$).

Table (4): Illustrates that, there was strong positive correlation between total knowledge and total attitude.

Table (1): Frequency Distribution of the Studied Students according to their Demographic Characteristics (n=180).

Demographic Characteristics	No.	%
Age (Years)		
15- < 17	60	33.3
17 - < 19	75	41.7
19 - < 21	42	23.3
≥ 21	3	1.7
Mean ± SD	18.4 ± 4.7 years	
Academic year		
First of school	30	16.7
Second of school	30	16.7
Third of school	30	16.7
First year of the institute	45	25.1
Second year of the institute	45	25.1
Place of Residence		
Urban	80	44.4
Rural	100	55.6
Father's educational level		
Not read and not write	11	6.1
Read and write	25	13.9
Basic education	23	12.8
Secondary education	49	27.2
University education or more	72	40.0
Father's occupation		
Employee	76	42.2
Worker	63	35.0
Craftsman	25	13.9
Not working	16	8.9
Mother's educational level		
Not read and not write	16	8.9
Read and write	30	16.6
Basic education	28	15.6
Secondary education	84	46.7
University education or more	22	12.2
Mother's occupation		
Worked	80	44.4
House wife	100	55.6
Monthly income		
Enough	80	44.4
Not enough	60	33.3
Enough and saved	40	22.3

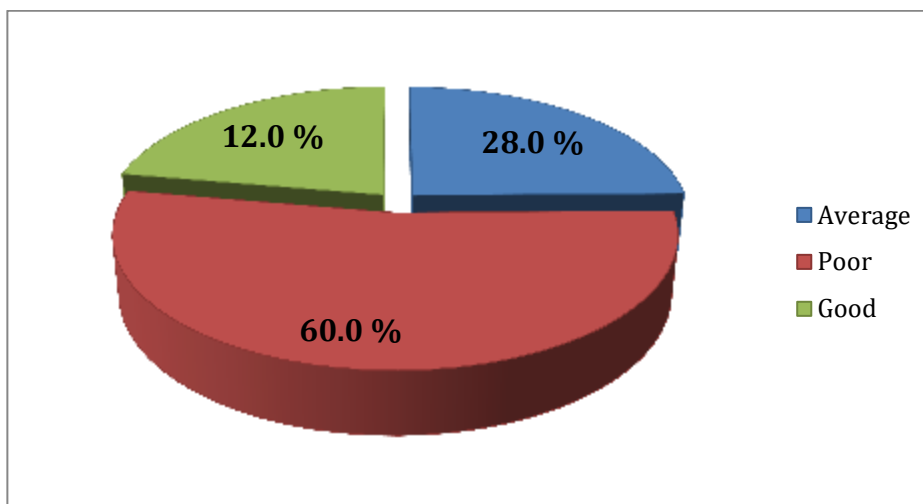


Figure (1): Percentage Distribution of Studied Students' Total Knowledge regarding Diabetes and Diabetic Retinopathy (n= 180).

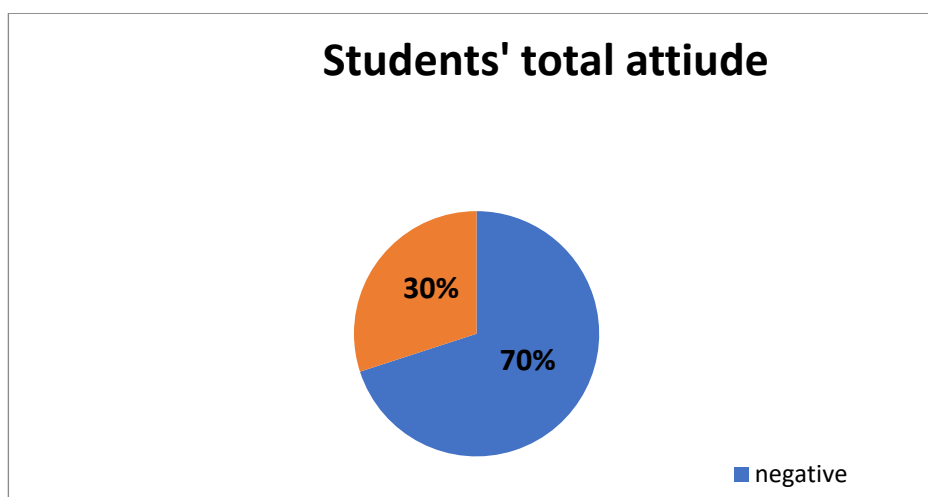


Figure (2): Percentage Distribution of the Studied Students' Total Attitude toward Diabetes Mellitus and Diabetic Retinopathy Prevention (n=180).

Table (2): Relation between Studied Students Demographic Characteristics and their Total Knowledge (n=180).

Demographic characteristics	Total Knowledge						X ²	P – value
	Poor n=108		Average n=50		Good n=22			
	No.	%	No.	%	No.	%		
Age (year)								
15- < 17	40	66.7	15	25.0	5	8.3	11.391	0.000**
17 - < 19	35	46.6	35	46.6	5	6.7		
19 - < 21	31	73.8	0	0.00	11	26.2		
≥ 21	2	66.7	0	0.00	1	33.3		
Academic year								
First of school	21	70.0	6	20.0	3	10.0		

Second of school	23	76.7	5	16.7	2	6.6	15.558	0.001**
Third of school	21	70.0	8	18.7	1	3.3		
First year of the institute	8	17.8	23	51.1	12	26.1		
Second year of the institute	35	77.8	8	17.8	2	4.4		
Place of residence								
Urban	33	41.2	37	46.2	10	12.6	17.239	0.000**
Rural	75	75.0	13	13.0	12	12.0		
Father's educational level								
Not read and not write	7	63.7	3	27.3	1	9.0	16.274	0.000**
Read and write	18	72.0	4	16.0	3	12.0		
Basic education	17	73.1	5	21.4	1	4.5		
Secondary education	36	73.5	8	16.3	5	10.2		
University education or more	30	41.7	30	41.7	12	16.6		
Father's occupation								
Employee	40	52.6	30	39.5	6	7.8	18.199	0.000**
Worker	43	68.4	10	15.8	10	15.8		
Craftsman	16	64.0	5	20.0	4	16.0		
Not working	9	56.3	5	31.2	2	12.5		
Mother's educational level								
Not read and not write	9	56.2	5	31.2	2	12.6	19.177	0.000**
Read and write	23	76.7	5	16.7	2	6.6		
Basic education	21	75.0	5	17.8	2	7.2		
Secondary education	38	45.2	31	36.9	15	17.9		
University education or more	17	77.27	4	18.18	1	4.55		
Mother's occupation								
Worked	61	76.5	12	15.0	7	8.5	18.199	0.000**
House wife	47	47.0	38	38.0	15	15.0		
Monthly income								
Enough	36	45.0	27	33.8	17	21.2	22.239	0.000**
Not enough	49	81.7	11	18.3	0	0.00		
Enough and saved	23	57.5	12	30.0	5	12.5		
Source of information about diabetic retinopathy								
Seminars	7	70.0	3	30.0	0	0.00	16.365	0.001**
Lectures	22	62.6	10	28.7	3	8.7		
Internet	23	57.5	12	30.0	5	12.5		
Television	8	80.0	2	20.0	0	0.00		
Scientific books and journals	21	70.0	6	20.0	3	10.0		
Others (Family and Friends)	27	49.1	17	30.9	11	20.0		

**Highly statistically significant at p-value <0.001

Table (3): Relation between Studied Students Demographic Characteristics and their Total Attitude (n=180).

Demographic characteristics	Total Attitude				X ²	P – value
	Negative n= 126		Positive n=54			
	No.	%	No.	%		
Age (year)						
15- < 17	45	75.0	15	25.0	14.332	0.000**
17 - < 19	43	57.3	32	42.7		
19 - < 21	35	83.3	7	16.7		
≥ 21	3	100.0	0	0.00		
Academic year						
First of school	25	83.3	5	16.7	20.522	0.001**
Second of school	23	76.7	7	23.3		
Third of school	21	70.0	9	30.0		
First year of the institute	21	46.7	24	53.3		
Second year of the institute	36	80.0	9	20.0		
Place of residence						
Urban	66	82.5	14	17.5	25.211	0.000**
Rural	60	60.0	40	40.0		
Father’s educational level						
Not read and not write	6	54.5	5	45.5	19.235	0.000**
Read and write	18	72.0	7	28.0		
Basic education	20	86.6	3	13.4		
Secondary education	38	77.5	11	22.5		
University education or more	44	61.1	28	38.9		
Father’s occupation						
Employee	45	59.2	31	40.8	19.368	0.000**
Worker	50	79.7	13	20.3		
Craftsman	18	72.0	7	18.0		
Not working	13	81.5	3	18.5		
Mother’s educational level						
Not read and not write	11	68.5	5	31.5	17.152	0.000**
Read and write	23	76.7	7	23.3		
Basic education	20	71.3	8	28.7		
Secondary education	54	64.2	30	35.8		
University education or more	18	81.2	4	18.8		
Mother’s occupation						
Worked	66	82.5	14	17.5	19.299	0.000**
House wife	60	60.0	40	40.0		
Monthly income						
Enough	55	68.5	25	31.5	20.254	0.000**
Not enough	40	75.0	20	25.0		
Enough and saved	31	77.5	9	22.5		
Source of information about diabetic retinopathy						
Seminars	8	80.0	2	20.0	17.205	

Lectures	27	77.4	8	22.6	0.001**
Internet	29	72.5	11	27.5	
Television	8	80.0	2	20.0	
Scientific books and journals	23	76.7	7	23.3	
Others (Family and Friends)	31	56.3	24	43.7	

****Highly statistically significant at p-value <0.001**

Table (4): Correlation between studied students' total knowledge, and total attitude (n= 180).

Variables	Knowledge	
	R	P-value
Attitude	0.715	0.000**

****Highly statistically significant at p-value <0.001**

X. Discussion

Diabetic retinopathy is a diabetes-related eye condition that affects the retina, the light-sensitive tissue at the back of the eye. It occurs when high blood sugar levels damage the tiny blood vessels in the retina, leading to leakage, swelling, or the growth of new, abnormal vessels. This can result in vision problems, including blurred vision, dark spots, and even blindness if left untreated. Early detection through regular eye exams is crucial, as the condition often progresses without noticeable symptoms in its initial stages. Management involves controlling blood sugar levels, blood pressure, and cholesterol, along with possible treatments like laser therapy or injections to preserve vision and prevent further damage (*Cai et al., 2023*).

Students' perceptions of diabetic retinopathy are shaped by their understanding of diabetes and its complications, often influenced by personal experiences. Many students recognize that diabetic retinopathy can lead to serious vision problems, yet there may be a lack of awareness about its prevalence and the importance of regular eye examinations. Some students may associate the condition primarily with older adults, underestimating the risk for younger individuals with diabetes (*Li et al., 2023*).

Part (I): Demographic characteristics of the studied students.

The present study findings related that mean age of the studied students was 18.4 ± 4.7 years (**Table 1**). This result was similar to a study conducted by *Du et al., (2024)* who conducted a study in Madrid (n= 133) about "The effect evaluation of continuous nursing intervention in patients with type 2 diabetic retinopathy". They found that, the mean age of studied samples was 18.11 ± 3.23 .

Concerning father's educational level, the current study revealed that, two fifths of the studied student's fathers had university education or more. This result in the same line with *Dareshani et al., (2022)* who carried out a study conducted in Pakistan (n= 133) about "Knowledge, Attitude and Practice about Diabetic Retinopathy among Medical Students", they found that 41.2 % of the studied samples had university education or more.

From the investigator point of view, fathers with university education or higher often have several advantages that contribute to their educational attainment. These can include access to resources as supportive family environments, financial stability, and a network of connections that can facilitate higher education.

Regarding father's occupation the current study showed that, more than two fifths of the studied student's fathers were employee. This result in the same line with *Reilly et al., (2023)* who carried out a study conducted in America (n= 42) about " Nurse Practitioner Students' Knowledge Assessment and Perceived Preparedness to Triage Ophthalmology Complaints in a Primary Care Setting: An Educational Intervention ", they found that 43.4 % of the studied samples had employee.

From the investigator point of view, fathers of the studied students often hold employment for several reasons that can positively influence their families. Having a job provides financial stability, which is crucial for supporting household needs and funding education-related expenses.

Concerning monthly income, the current study revealed that, less than half of the studied students had enough monthly income. This result in the same line with *Alhazimi, (2024)* who carried out a study conducted in Riyadh, Saudi Arabia (n= 84) about " Knowledge, Attitude, and Practice on Diabetic Retinopathy among Final-Year Medical Students in Riyadh ", they found that 46.3 % of the studied samples had enough monthly income.

From the investigator point of view, that result students' fathers with university education or higher and employed. Families with educated parents often possess greater social capital, which can lead to more opportunities and support systems for their children.

Part (II): Studied students' knowledge regarding diabetic retinopathy. Answered research question number (1): What are the students' knowledge regarding diabetic retinopathy?

Regarding studied students' total knowledge, the current study showed that, three fifths of them had poor total knowledge, more than quarter had average knowledge and more than tenth of them had good knowledge (**Figure 3**). This result was in agreement with *Alamri et al., (2024)* in Abha, Saudi Arabia (n= 635) about "Awareness, knowledge, and practice regarding to diabetic retinopathy among King Khalid University (KKU) students besides medical students in Abha, Saudi Arabia", they found that, 60.0 % of the studied sample had good total knowledge. Also, 35.0 % had poor knowledge and 5.0 % of them had average knowledge.

From the investigators point of view, any school health education might emphasize management strategies for diabetes rather than raising awareness about potential complications like diabetic retinopathy.

Part (III): Students' attitude toward diabetes mellitus and diabetic retinopathy prevention. Answered research question number (2): What are the students' attitudes toward diabetes mellitus and diabetic retinopathy prevention?

Regarding studied students' total attitude, the current study showed that, more than quarter had positive total attitude toward diabetes mellitus and diabetic retinopathy prevention and more than two thirds of them had negative total attitude (**Figure 4**), this result agrees with *Ahmed et al., (2023)* who conducted a study in Egypt (n= 136) about "Knowledge, practice and attitude of diabetic patients regarding prevention of diabetic retinopathy", they found that, 31.9 % of the studied sample had positive total attitude toward diabetes mellitus and diabetic retinopathy prevention. Also, 68.1 % had negative total attitude.

From the investigators point of view, cultural beliefs and societal norms can significantly impact attitudes toward health conditions. Some individuals may prioritize traditional remedies or hold misconceptions about diabetes management, leading to a negative attitude.

Part (IV): Relation and correlation between the studied variables. Answered research question No (3): Is there relation between students' knowledge and their demographic characteristics?

Regarding relation between studied students' demographic characteristics and their total knowledge, the current study revealed there were highly statistically significant relation between students' total knowledge and all items of demographic characteristics (**Table 2**). This result agrees with the study done by *Lestari et al., (2023)* who conducted a study in primary health centers in Jakarta, the capital of Indonesia (n= 92) about "Knowledge, attitude, and practice pattern towards diabetic retinopathy screening among general practitioners in primary health centers in Jakarta, the capital of Indonesia", they found that, there were highly statistically significant relation between students' total knowledge and all items of demographic characteristics.

From the investigator point of view, understanding which demographic factors correlate with knowledge can help identify gaps in education or access to information, allowing for more tailored and effective health education strategies.

Answered research question No (4): Is there relation between students' attitude and their demographic characteristics?

Concerning relation between studied students' demographic characteristics and their total attitude, the current study revealed there was highly statistically significant relation between students' total attitude and all items of demographic characteristics (**Table 3**). This result agrees with the study done by *Pardhan et al., (2024)* who conducted a study in India (n= 400) about "Knowledge, attitude, and practice of diabetes in patients with and without sight-threatening diabetic retinopathy from two secondary eye care centers in India", they stated that, there was highly statistically significant relation between students' total attitude and all items of demographic characteristics.

From the investigator point of view, if certain demographic groups exhibit negative attitudes toward a subject, understanding these correlations can help design strategies to address misconceptions or barriers to positive attitudes.

Regarding correlation between total knowledge and total attitude, the current study revealed there was strong positive correlation between total knowledge and total attitude (**Table 4**). This result agrees with the study done by *Alhazimi et al., (2024)* in Riyadh Saudi Arabia (n= 84) about "Knowledge, Attitude, and Practice on Diabetic Retinopathy among Final-Year Medical Students in Riyadh", they found that, there was strong positive correlation between total knowledge and total attitude.

From the investigator point of view, a strong positive correlation implies that increasing knowledge can potentially influence behavior positively. For example, if students understand the risks of diabetes better, they may adopt healthier lifestyle choices.

XI. Conclusion

On the light of results of the current study and answered of research questions, it concluded that, more than three fifths of studied students had poor total knowledge, more than quarter had average total knowledge and more than tenth of them had good total knowledge regarding diabetes and diabetic retinopathy, more than two thirds of them had negative total attitude and more than quarter of them had positive total attitude toward diabetes mellitus and diabetic retinopathy prevention.

There was highly statistically significant positive correlation between the studied student's total knowledge level and total attitude regarding diabetic retinopathy. There was a highly statistically significant relation between students' knowledge, attitude and all items of demographic characteristics.

XII. Recommendations

On the light of finding of the current study, the following recommendations are suggested:

- Implementing health educational programs to improve knowledge, and attitude regarding diabetic retinopathy prevention for nursing students.
- Periodic educational campaigns, seminars or workshops should be regularly organized to students regarding diabetic retinopathy prevention.
- Dissemination of colored booklets, posters, brochures and pamphlets to increase student's awareness regarding diabetic retinopathy at El Badrashin technical nursing institute.
- **Further researches** should be done on large sample of students regarding diabetic retinopathy and in other settings.



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