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Knowledge, attitude, and practices towards diabetes and diabetic retinopathy among diabetic patients at Medical Palestinian Complex, Ramallah

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ABSTRACT

Diabetes Mellitus (DM) is a worldwide growing burden. Diabetes and its complications constitute a major morbidity burden among the Palestinian population**.** The main aim of this study was to document the knowledge, attitude, and practices (KAP) of diabetic patients towards diabetes and diabetic retinopathy. This cross-sectional study was conducted over two months at a Medical Palestinian Complex (PMC) outpatient clinic in Ramallah. Fifty diabetic patients were included in the study, and the KAP of patients was assessed using a verbally administered questionnaire. Patients were placed in different categories, such as "good/poor" knowledge, "positive/negative" attitude, and "good/poor" practice. The study involved 50 participants, primarily male, with an average age of 54 years. Overall, knowledge and attitude scores regarding diabetes and diabetic retinopathy were found to be poor, while practice scores were suboptimal for diabetes and poor for diabetic retinopathy. The main barrier to regular follow-up was inadequate knowledge about the importance of eye check-ups. While there was no significant difference in knowledge or attitude towards diabetes and diabetic retinopathy, participants with higher education levels and income demonstrated better practice scores. Additionally, a positive attitude towards diabetes and diabetic retinopathy was associated with better diabetes practice. KAP regarding DM and DR were generally poor among the patients. So, there is an urgent need to improve education and awareness of DM and DR among diabetics, as it is a powerful tool for controlling the disease and its complications by improving patient compliance with treatment and follow-up.

Keywords: Knowledge, Attitude, Practice, Diabetes Miletus, Diabetic retinopathy.

1. Introduction

Diabetes Mellitus (DM) is one of the most common chronic illnesses. The World Health Organization estimates that 8.5% of the population worldwide have diabetes mellitus, a rate that has grown since 1980. Moreover, an estimated number of 422 million adults over 18 years have DM (*Palestine (West Bank) STEPS Survey 2010- 2011 Fact Sheet.*, 2012; *World Health Organization Annual Report* 2016). Currently, there are more than 30 million Americans who have been diagnosed with diabetes, and by 2034, it is predicted there will be 44.1 million Americans with diabetes overall due to rising obesity rates, longer life expectancies, and other causes (*Estimates of Diabetes and Its Burden in the United States.*, 2014). Further, 422 million people worldwide suffered from diabetes mellitus in 2015; among them, 1.6 million died per year. Also, half a million Lebanese are estimated to have DM if the incidence of 11% holds in 2020 (Atlas, 2015; *Diabetes*, 2020).

Diabetic retinopathy is a common diabetic condition that affects people between the ages of 25 and 74 and can result in blindness in Americans who are working age. Retinopathy affects 28.5% of diabetic individuals in the United States who are 40 years of age or older; worldwide, the prevalence is 34.6%. Estimates indicate that as diabetes becomes more common, the 14 million Americans who already have diabetic retinopathy could double by 2050, primarily as a result of the swelling Hispanic American population (*Preferred Practice Pattern Guidelines Diabetic Retinopathy*, 2020). Early screening, correct diagnosis, and routine follow-up and treatment are approaches to reduce the new incidence of diabetic retinopathy and vision loss (Tan & Wong, 2023). One eye-related consequence of diabetes is called diabetic retinopathy, which is damage to the blood vessels in the retina. The likelihood of developing this eye problem increases with the time you have diabetes and the degree of blood sugar management (Farooq & Bapar, 2021). Diabetes mellitus (DM) and its consequences are a major source of morbidity among Saudi nationals. It is imperative to raise awareness of this prevalent disorder to enhance early detection and effective response (Al-Yahya et al., 2020).

In the Gaza Strip and the West Bank, respectively, 12.3% and 15.1% of the serviced refugee population aged 40 and over were diagnosed with diabetes mellitus in 2015 (Abu-Rmeileh et al., 2012). These rates were three times higher than those in the West and the highest among the other MoH-served regions and according to current projections, this percentage will increase to 20.8% by 2020 and 23.4% by 2030 (Mikki et al., 2017). Based on information provided by the chief of the non-communicable illnesses department, UNRWA served about 42,000 patients with diabetes in the Gaza Strip in 2016. And, eighty percent of Gaza's population is made up of Palestinian refugees, in which UNRWA clinics provide free medical care to them. In the West Bank's general population in 2008, diabetic retinopathy accounted for the second-highest percentage of instances of severe visual impairment (14% of cases) and the third-highest percentage of blindness (8% of all cases). In Ramallah clinics, 376 patients with type 2 diabetes had a 33% prevalence of Dr in 2012 (Mikki et al., 2017). Thirty percent of people with diabetes had never had an eye examination (Mikki et al., 2017).

In the US, professional foundations, associations, and Institutes of eye care have recommended the annual eye screening exam for the diabetic population, despite these instructions and recommendations, not all diabetic patients are doing the recommended retinal exam (Abu-Rmeileh et al., 2012). According to studies, the development of diabetic retinopathy is largely predisposed to high blood pressure, long-term diabetes mellitus, and high blood sugar. Diabetic retinopathy can be effectively delayed in its beginning and prevented from progressing with strict blood sugar control. In the early stages of DR, almost all patients are asymptomatic. Research suggests that early diagnosis and intervention could help patients with DR avoid losing their vision. As a result, early identification and intervention are critical to avoiding blindness as a major side effect of the illness (Mikki et al., 2017).

This study has the potential to improve patient outcomes and diabetes care in Ramallah by assessing the knowledge, attitudes, and practices of diabetic patients regarding their condition and diabetic retinopathy. The gathered information will be used to improve targeted educational activities and public health campaigns, enabling healthcare providers to tailor treatments that address specific gaps and promote proactive self-care. Because it is crucial to determine the knowledge, attitudes, and

practices of diabetics in developing countries, this study set out to evaluate and record the knowledge, attitudes, and practices (KAP) of diabetics on their condition and diabetic retinopathy.

2. Methodology

2. 1. Study design, settings, and population

A cross-sectional study was conducted from the first of October 2022 to the end of December, 2022 alongside our main research. The two-month investigation was carried out at the Ramallah outpatient clinic of the Palestinian Medical Complex (PMC). The study included adult patients with diabetes who were at least 18 years old and had type 1 or type 2 diabetes. Further, we disseminated a questionnaire via the PMC outpatient clinic in Ramallah, using a single person in charge. This two-month cross-sectional investigation was carried out at (PMC).

2. 2. Sampling technique and Sampling size

The study's subjects were selected randomly from the patient population with diabetes at the Medical Palestinian Complex in Ramallah. This strategy increases the sample's representativeness by ensuring that each member of the population has an equal probability of being included in the research. To calculate the sample size, a method that accounts for a 95% confidence level and a predefined anticipated correlation coefficient of 0.5 was employed. This algorithm is required for correlation analysis to offer statistical power and reliability. The study's requirements finally led to the selection of a minimum sample size of 50 participants, taking into account practical restrictions, resource availability, and the need for adequate statistical power.

2. 3. Inclusion criteria

Adults (18 years of age or older) who met the following criteria were eligible to participate in the study: they had to be regular patients at the Medical Palestinian Complex (PMC) outpatient clinics, have a documented diagnosis of diabetes mellitus (Type 1 or Type 2), and have had this condition for at least a year. These restrictions guaranteed a targeted sample for the study of attitudes, behaviors, and knowledge related to diabetes and diabetic retinopathy.

2. 4. Exclusion criteria

Those who had only recently been diagnosed with diabetes (less than a year ago), pregnant women (due to concerns about gestational diabetes), and patients with severe concomitant diseases that could restrict their participation (such as terminal illness or severe cognitive impairment) were among the exclusion criteria. These criteria allowed the study to focus on diabetic patients who would be good candidates for a detailed investigation of attitudes, practices, and knowledge regarding diabetes and diabetic retinopathy.

The first stage in working together to create the questionnaire was a thorough examination of the language. The knowledge and practice parts were created to minimize the impact of "leading questions," hence most of the questions were meant to be open-ended. Meanwhile, the questions in the attitude section were worded with a language that invited participants to agree, disagree, or remain undecided. Each member of our team gave the questionnaire to each patient orally. The demographical variables of this study were age, gender, marital status, level of education, and monthly income. Based on research by Srinivasan et *al.* (Srinivasan et al., 2017), the KAP-45, an instrument used to assess knowledge, attitude, and practice, was changed. There were eight attitude questions (four for each condition), thirteen knowledge questions (five about diabetes and eight about diabetic retinopathy), and twenty-four practice questions (six about diabetes and eight about diabetic retinopathy). An interesting observation was that several questions in the knowledge and practice sections were open-ended, yet the questions in the attitude section were given as assertions. If a participant successfully answered five of the nine "must-know" questions about diabetic

retinopathy and nine questions about diabetes, they were deemed to have "sufficient knowledge". Similarly, individuals who met the criteria for four or more "must-do" items were seen to be exhibiting "good practice" in both situations. In terms of attitudes, respondents who expressed a good opinion of diabetes and diabetic retinopathy and received three or more points for their comments were classified as having a "positive attitude." The face validity approach was used to assess the KAP-45 questionnaire's Arabic translation. Two Arabic and English bilingual speakers initially translated the English version into Arabic. A team of experts then reviewed the questionnaire and made cultural modifications. Lastly, feedback from the pilot study helped to refine the KAP-45 questionnaire's Arabic version.

2. 5. A pilot study

A pilot study was conducted to assess the questionnaire's suitability and identify any practical issues with its use. The design and readability of the instruments used to collect data were carefully scrutinized during this pilot experiment. As a result, six patients, or 10% of the total sample, took part in this preliminary investigation. The pilot study was conducted at Palestine Complex Hospital (PMC). To make the instrument better, changes were made in response to the results of the pilot study.

2. 6. Statistical analysis

SPSS version 25 was used for the analysis to determine the demographics and questionnaire responses. Frequencies and percentages were used to express categorical data. As shown, means and standard deviation (SD) were used to express continuous data. To look into the correlations between the variables, one-way ANOVA and the independent sample t-test were employed. For every analysis, a P-value of less than 0.05 was deemed statistically significant. Finally, to ascertain whether patient knowledge, attitudes, and practices about diabetes and diabetic retinopathy were associated in any way, the Pearson Correlation Coefficient was employed.

2. 7. Ethical considerations

Patients were told of the study's goal before its execution. The patient had the freedom to leave the study at any moment, and it wouldn't impact their access to medical care. They were also informed that they could choose not to participate in the study and that it would still be respected if they did not. On September 25, 2022, the Modern University Ethics Committee (Ref: muc002\2022) approved this study. Before their involvement in the trial, the patients gave their informed consent. There was assurance of anonymity, confidentiality, beneficence, and non-maleficence. The MOH gave its approval before the study got underway.

3. Results

3. 1. Demographic data of the patients

Table 1 distributes the demographic data of the patients in the study sample and shows that more than one-third of them (34%) are between 50 and 59 years old, with another 26% who are between 60 and 69 years old. Also, most of the patients (60%) are males and are mostly married (66%). Moreover, around one-third of the patients have a primary school level of education, and the highest percentage (38%) have a monthly income of less than 2000 NIS, with 20% for each with an income of 2000 to less than 3000 NIS and 3000 to less than 4000 NIS. One participant's demographic data is missing from our dataset. The absence of this data point compromises the general integrity of our conclusions about [particular elements evaluated], but it does not influence the completeness of our demographic study. Whenever possible, we have taken into consideration this missing data in our statistical analyses to ensure the validity of our findings.

Table 1. Distribution of patients' demographic data (n=50)

Variable	Values	N	%
Patient's age	18 – 30 years old	1	2.0%
	31 – 39 years old	6	12.0%
	40 – 49 years old	8	16.0%
	50 – 59 years old	17	34.0%
	60 – 69 years old	13	26.0%
	70 years and older	5	10.0%
Gender	Male	30	60.0%
	Female	19	38.0%
	Missing	1	2.0%
Marital status	Married	33	66.0%
	Divorced	4	8.0%
	Widowed	7	14.0%
	Single	5	10.0%
	Missing	1	2.0%
Educational level	Illiterate	8	16.0%
	Primary school	17	34.0%
	Secondary school	11	22.0%
	Bachelor's degree	13	26.0%
	Post-graduate	0	0.0%
	Missing	1	2.0%
Monthly income	Less than 2000 NIS	19	38.0%
	2000 - < 3000 NIS	10	20.0%
	3000 - < 4000 NIS	10	20.0%
	4000 - < 5000 NIS	5	10.0%
	5000 - < 6000 NIS	3	6.0%
	6000 - < 7000 NIS	2	4.0%
	7000 NIS and more	0	0.0%
	Missing	1	2.0%
Data were based on frequencies (N) and percentages (%)			

3. 2. Patients' level of knowledge about diabetes mellitus and diabetic retinopathy

The distribution of patients' satisfaction with the knowledge of diabetic retinopathy (DMR) and diabetes mellitus (DM) is shown in **Table 2**. Seven patients (14.0%) had a score of nine or above, indicating an excellent degree of knowledge. Forty-three patients (86.0%) had a score of less than nine, indicating a low level of knowledge. Thirty patients (60.0%) received a score of five or above, indicating an excellent level of knowledge. Twenty patients (40.0%) had a score of less than five, indicating a low degree of knowledge. It was clear from these statistics that a greater percentage of patients had inadequate knowledge of both DMR and DM than did those who had adequate knowledge. In particular, DM (14.0%) had a lower percentage of patients with

a good degree of knowledge than DMR (60.0%). This suggested that there could be differences in the patient's knowledge of the two variables.

Table 2. Distribution of patients' level of knowledge of DM and DMR (n=50)

	Value	N	%
Level of knowledge of DM	Good level of knowledge (9 or above)	7	14.0%
	Poor level of knowledge (below 9)	43	86.0%
Level of knowledge of DMR	Good level of knowledge (5 or above)	30	60.0%
	Poor level of knowledge (below 5)	20	40.0%

3. 3. Attitude of patients toward diabetes mellitus and diabetic retinopathy

The distribution of patient attitudes about diabetic retinopathy (DMR) and diabetes mellitus (DM) is shown in **Table 3**. Positive attitude was categorized in 22 patients (44.0%) (Scoring 3 and above). A negative attitude was categorized in 28 patients (56.0%) (Score below 3). A positive attitude was categorized in 23 patients (46.0%) (Scoring 3 and above). A negative attitude was categorized in 27 patients (54.0%) (Score below 3). According to the statistics, a greater percentage of patients had a negative attitude about DMR and DM than did those who had a favorable perspective. Compared to DM (44.0%), the percentage of patients with positive attitudes was somewhat greater for DMR (46.0%). Nonetheless, in both cases, the gap between positive and negative opinions was very similar.

Table 3. Distribution of patients' attitudes towards DM and DMR

	Value	N	%
Level of attitude of DM	Positive attitude (3 and above)	22	44.0%
	Negative attitude (below 3)	28	56.0%
Level of attitude of DMR	Positive attitude (3 and above)	23	46.0%
	Negative attitude (below 3)	27	54.0%

3. 4. Patients' practice regarding diabetes mellitus and diabetic retinopathy

The distribution of patient practices about diabetes mellitus (DM) and diabetic retinopathy (DMR) is shown in **Table 4**. Thirty patients (60.0%) who had a score of 4 or above were classified as having good practice. Twenty patients (40.0%) had a score of less than four, indicating inadequate practice. Twenty patients (40.0%) received a score of four or above, indicating good practice. Thirty patients (60.0%) had a score of less than four, indicating inadequate practice.

This data suggested that there were differences in the patient practice level distribution between DM and DMR. In particular, a higher percentage of patients (60.0%) than DM (40.0%) showed inadequate practice toward DMR. In contrast, a larger proportion of patients (60.0%) demonstrated good practice for DM in contrast to DMR (40.0%). This implies that patients' practice levels for the two diseases differ from one another.

Table 4. Distribution of patients' practice towards DM and DMR (n=50)

	Value	N	%
Level of the practice of DM	Good practice (4 and above)	30	60.0%
	Poor practice (below 4)	20	40.0%
Level of practice of DMR	Good practice (4 and above)	20	40.0%
	Poor practice (below 4)	30	60.0%

3. 5. Analytical results

This part investigates the relationship between patients' demographic data (as independent variables) and their level of knowledge, attitude, and practice toward diabetes and retinopathy (as dependent variables). As the variables of demographic data are categorical and all of the dependent variables are at scale type, an independent sample t-test was conducted to investigate the relationship according to dichotomous (2-option) demographic data (gender), while a one-way ANOVA was used to investigate the relationship according to the rest of the demographic data (as non-dichotomous variables), taking into consideration that the number of values for the following demographic factor has been diminished for a more reliable analytical test. There was no significant difference in the level of knowledge about diabetes mellitus and retinopathy among patients according to all of the demographic factors. None of the demographic factors are related to any significant differences in mean attitude level between the patients. Regarding patients' demographic factors and their level of practice towards DM and DR, results revealed that patients with bachelor's degrees in education had significantly the highest practice scores (mean = 86.15) compared to others like illiterate people (mean = 65, p-value = 0.032), as well as the patients with an income level of 4000 to less than 6000 NIS, having the highest practice scores (mean = 85) compared to others like who have less than 2000 NIS of income (mean = 63.16, p-value = 0.034).

Table 5. level of knowledge, attitude, and practices based on demographic characteristics (n=50)

Factor	Value	Knowledge		Attitude		Practice	
		DM Mean	DR Mean	DM Mean	DR Mean	DM Mean	DR Mean
Age	< 50 years old	35.29	36.36	45.00	55.00	78.67	58.67
	50 – 59 years old	37.72	43.85	61.76	61.76	75.29	54.12
	60 years and older	36.93	38.27	54.17	51.39	63.33	48.89
	p-value	0.906	0.730	0.315	0.580	0.088	0.675
Gender	Male	36.7	40.68	55.30	52.50	76.00	53.33
	Female	38.39	40.19	54.55	61.84	65.26	55.78
	p-value	0.612	0.951	0.595	0.286	0.090	0.791
Marital status	Married	37.25	41.87	55.00	57.58	75.15	56.97
	Divorced/widowed	36.90	42.79	55.30	59.09	67.27	45.45
	Single	35.29	22.73	54.55	50.00	68.00	56.00
	p-value	0.966	0.394	0.997	0.835	0.501	0.573
	Illiterate	28.68	30.68	50.00	53.12	65.00	37.50
	Primary school	42.21	43.20	57.35	54.41	64.71	54.12

Education	Secondary school	33.16	39.67	52.27	63.63	72.73	50.91
	Bachelor's degree	38.01	40.56	55.76	55.76	86.15	63.08
	p-value	0.170	0.773	0.946	0.845	0.032	0.343
Monthly income	< 2000 NIS	36.53	36.36	55.26	59.21	63.16	53.68
	2000 - < 4000 NIS	37.35	48.08	48.75	55.00	77.00	53.00
	4000 - < 6000 NIS	36.03	30.68	68.75	53.13	85.00	60.00
	6000 NIS and more	41.18	40.91	50.00	37.50	80.00	50.00
	p-value	0.978	0.391	0.479	0.786	0.034	0.954

Table 6 shows the correlations between all subscales and shows that a more positive attitude towards DM is significantly associated with better practice toward DM (Pearson = 0.420, p-value = 0.002) and that a more positive attitude towards DM is significantly associated with a more positive attitude towards DR (Pearson = 0.524, p-value < 0.001), with a significant increase practice towards DM with more positive attitude towards DR (Pearson = 0.274, p-value = 0.046), and a significant increase in patients' practice towards DR correlated with more positive attitude towards DR (Pearson = 0.300, p-value = 0.034), while no other subscales are significantly correlated.

Table 6. The correlations between all subscales (n=50)

Factor	**Diabetes mellitus (DM)**						**Diabetic retinopathy (DR)**					
	Knowledge		**Attitude**		**Practice**		**Knowledge**		**Attitude**		**Practice**	
	(r)	**P**	**(r)**	**P**	**(r)**	**P**	**(r)**	**P**	**(r)**	**P**	**(r)**	**P**
DM know			- 0.06	0.66	-0.19	0.18	0.23	0.11	- 0.11	0.46	0.11	0.47
DM attitude	- 0.06	0.66			0.42	0.002	- 0.06	0.69	0.53	<0.001	0.23	0.11
DM practice	- 0.19	0.18	0.420	0.002			0.14	0.36	0.274	0.046	0.22	0.13
DR know	0.23	0.11	- 0.06	0.69	0.14	0.36			0.15	0.32	0.19	0.19
DR attitude	- 0.11	0.46	0.52	<0.001	0.27	0.046	0.16	0.32			0.30	0.03
DR practice	0.11	0.47	0.23	0.11	0.22	0.13	0.19	0.19	0.3	0.03		

Generally, results showed that patients had a poor level of knowledge of DM and DR, as well as a negative attitude towards DM and DR, with poor practice towards DM and DR. Also, only higher levels of education and income were associated with improved practice towards DM. In contrast, no other significant difference in DM knowledge and attitude or DR knowledge, attitude, and practice was found according to patients' demographic factors. Also, a more positive attitude towards DM was significantly associated with better DM practice and a more positive DR attitude, with a more positive DR attitude and better DM practice.

4. Discussion

The KAP patterns of diabetic patients concerning diabetes and diabetic retinopathy were recorded in this cross-sectional investigation. Fifty patients who visited the PMC outpatient clinic were included in the study. The study's average knowledge score for DM was low, which is in line with a different study by John et al. that was carried out in India and found that 58% of the sample had little knowledge (Srinivasan et al., 2017). Furthermore, our participants' expertise in DR is lacking. Even though 62% of participants said that patients should undergo yearly eye exams, just 42% said that checkups should be done frequently.

This outcome is in line with another Turkish study by Cetin E et *al*., which discovered that just 41.9% of participants thought yearly eye exams were essential (Çetin et al., 2013). Just 20.7% of Jordanians said that yearly eye exams should be performed (Alali et al., 2022). However, the majority of respondents (78.0%) were aware that diabetes might impact various eye structures, which was in line with findings from two prior Saudi Arabian studies. The first study found that 82.6 percent of respondents were aware that diabetes can affect the eye (Mikki et al., 2017). The second survey, conducted by Al Zarea B in the Al Jawf region of Saudi Arabia, found that 75.6% of respondents were aware of ocular issues (Al Zarea, 2016).

Additional research from Jordan and Oman showed that 88.2% and 72%, respectively, were aware that DR is a complication of DM (Bakkar et al., 2017; Khandekar et al., 2010). Comparable studies carried out in India showed that just 27% and 17.01% of the patients knew that diabetic retinopathy (DR) was an eye consequence of the disease (Hussain et al., 2016; Stratton et al., 2001). Thus, to inform newly diagnosed DM patients about potential visual problems and the value of routine ocular screening and follow-up, we recommend that they be sent to a diabetes educator.

Glycemic management affects the prevalence of diabetic renal disease (Pescosolido et al., 2014), as well as blood pressure control (Stratton et al., 2001). However, according to 70.0% of our participants, inadequate glycemic management is a significant risk that exacerbates diabetic kidney disease. Another significant component linked to DM is hypertension. Studies have indicated that strict blood pressure management in people with diabetes and hypertension can postpone the onset of diabetic retinopathy (DR). High blood pressure raises the risk of both the development and progression of DR (Hussain et al., 2016).

There was a bad attitude regarding DM and DR. Regardless of their blood sugar level, the majority of our participants (82.0%) concurred that it is crucial to follow up with an ophthalmologist. Furthermore, the majority of them (74.0%) think that when their vision is good, it's not necessary to follow up. Conversely, a study conducted in Saudi Arabia by Abdulrahman Al Yehya et al. found that 62.9% of the participants did not think it was necessary to follow up when their vision was good. Consequently, the patient should be informed that diabetic patients with DR have a silent blinding condition and that "good vision" is not a reliable measure of retinal health. It is the responsibility of ophthalmologists to provide these fundamental facts to their diabetic patients in their clinics (Zimmer-Galler et al., 2015).

Additionally, our study's subjects displayed inadequate DM and DR practices. This makes sense given our sample's poor knowledge and attitude levels. Over two-thirds (78.0%) of the sample follow up regularly for a funduscopic screening exam (Raza et al., 2019). A similar result revealed that 73% of his sample underwent routine funduscopic screening exams. Twenty-two percent of our participants don't follow up. A similar conclusion has been made by (Pescosolido et al., 2014). It revealed that although 82.6% of his group knew they had DM problems in their eyes, only 65% of them underwent frequent eye exams. Several factors, besides ignorance, could be to blame for this, like insufficient funds, insufficient time, insufficient family support, and challenges with transportation. According to our survey, 31.3% of respondents indicated they couldn't afford it or weren't aware that it was necessary. A potential obstacle to adherence to routine follow-up is lack of time, which comes in second at 12.5% with 18.8%. Accordingly, we recommend that diabetes patients have the funduscopic screening examination performed at the same time and location as their routine follow-up in addition to patient education.

The similarities and differences between this research and others can be attributed to differences in healthcare systems, cultures, and geographic areas. These factors have an impact on how patients perceive and manage diabetes and diabetic retinopathy (DR), which in turn affects patient awareness levels and adherence to medical recommendations. Healthcare policy and economic conditions have an impact on patient behaviors and outcomes over time, and methodological choices and sample characteristics can have an impact on study results. Effective therapies should consider these various qualities to enhance diabetes care and patient outcomes in a range of settings.

5. Limitations

Restricting the sample size so that it is not representative of the entire population. Other treatment centers were not included in the study, and the study was limited to one medical center (PMC) clinic. It was restricted to a questionnaire and omitted information on the severity of diabetic retinopathy or the glycemic control level.

6. Conclusion

This study does not represent the entire Palestinian community or residents of Ramallah City, but it provides an overview of the awareness, attitudes, and practices of diabetics concerning diabetes mellitus (DM) and diabetic retinopathy (DR). The results indicated that patients had poor knowledge and negative attitudes towards both DM and DR, with poor practices regarding DM but good practices towards DR. Higher education and income levels were linked to better DM practices. A positive attitude towards DM was associated with better DM and DR practices. Lack of knowledge was a major barrier to regular DR screening. The findings highlight the importance of diabetic education to improve patient knowledge, control diabetes, and reduce complications, particularly through regular ocular screening for DR.

7. Recommendations

A diabetes educator should be consulted by patients who have just been diagnosed with diabetes mellitus (DM) to discuss possible ocular problems and the significance of routine eye exams and follow-ups. Our results highlight the importance of diabetic education; patients who are aware of diabetes mellitus (DM) and its consequences are more equipped to adopt healthy behaviors, which helps them better manage their condition. All stages of care—primary, secondary, and tertiary—should incorporate health education. Making use of the media, leaflets, and posters, and planning diabetic retinopathy screening camps on events like World Diabetes Day can greatly increase awareness, especially among those with less education and financial resources.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Author Contributions

All authors participated in the drafting, revising, and critical review of the article; they agreed on the journal to which the work will be submitted; they reviewed and agreed on all versions of the article before submission, during revision, the final version accepted for publication, and any significant changes introduced at the proofing stage; and they all made a significant contribution to the work reported, whether that be in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas.

Disclosure

The authors report no conflicts of interest for this work.

List of Abbreviations

WHO	World Health Organization
CDC	Center for Disease Control
PMC	Palestinian Medical Complex
DM	Diabetes Mellitus
DR	Diabetic Retinopathy
KAP	Knowledge, Attitude, Practice
F	Frequency
%	Percentage
NIS	New Israeli Shekel

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