

Effect of an Educational Intervention on Self Care Management of Patients with Retinopathy

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Abstract: Background: Diabetic retinopathy is considered a highly specific vascular complication for diabetes and is the most leading cause of blindness in working age which occurs in one third of diabetic patients. **Purpose:** To examine the effectiveness of an educational intervention on self-care management of patients with diabetic retinopathy. **Design:** A quasi experimental design was used. It was conducted in outpatient clinic of Kafr El-Sheikh New Ophthalmology Hospital. A convenience sample of 140 patients with diabetic retinopathy was included. **Instruments:** I- An interviewing questionnaire was used that include socio-demographic data. II- self-care Assessment Questionnaire. III- prognosis checklist of patient's blood sugar, blood pressure and vision. **Results:** The present study revealed that the educational intervention for patients with diabetic retinopathy led to a highly significant improvement ($p < 0.0001$) in the different categories of total practice about self-care practice for diabetic retinopathy. The post program' safe practice responses increased from zero% pre-intervention to > 90% for post intervention. **Conclusion:** Implementing of a designed educational intervention has a significant role in improving self-care practices among studied patients with diabetic retinopathy. **Recommendations:** Emphasizing the importance of self-care practices and describing in detail, because this can reduce the risk of DR and its subsequent complications as loss of vision

Key words: Diabetes Mellitus, Diabetic Retinopathy, Self-Care.

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Introduction

Diabetes mellitus (DM) is a metabolic disorder resulting when the body can't produce enough or respond normally to insulin, a hormone responsible for regulating glucose levels in the blood and tissues. Diabetes mellitus is one of the most important public health challenges of the 21st century and is considered by many as a global epidemic. Diabetes has emerged as one of the most serious and common chronic diseases of our times, causing life threatening, disabling and costly complications, and reducing life expectancy. Diabetic patients are reported to have a 15% increased risk of premature death, and life expectancy reduced by approximately 10 and 20 years, respectively. (Khan & Zhao, 2019; Heald & Gadsby, 2020)

The rising prevalence of diabetes has been attributed principally to the ageing of populations, as well as increases in diabetes incidence in some countries resulting from increasing prevalence of diabetes risk factors, especially obesity. Diabetes is also reported to be more prevalent in the urban population when compared to the rural population, and affects more men than women. (Chan & Gregg, 2020)

Diabetes leads to complications such as ischemic heart disease, retinopathy, neuropathy, cataract etc. Diabetic retinopathy (DR) is considered a highly specific vascular complication for diabetes. According to the American Diabetes Association (ADA), it is the most leading cause of blindness in working age (25 to 65 years old), which occurs in one third of diabetic patients. This complication occurs because of the destruction of small blood vessels feeding the retina and causes problems in receiving and sending images to the brain. The

process is painless. The natural history of diabetic retinopathy usually follows a regular and predictable pattern and long-term high blood glucose levels cause vascular endothelial dysfunction causing visual impairment. (Vasilijević, 2022)

Strict preventive measures should be followed to delay the onset of DR and its progression. The first of these preventive measures is to make patients knowledgeable about the disease, engaging them in self-care practices (Wong & Sabanayagam, 2020). Self-care practices refer to the healthy practices embraced by patients in order to manage their disease effectively by themselves (Eva et al., 2018). The active role of the patients in their own health care leads to improve perceptions of one's health condition, increase patients' satisfaction, improve compliance with prescribed treatment, reduce burden of disability and consequently lowers costs on health care systems (Drossman & Ruddy, 2020).

Visual loss can have a devastating effect on patients and their families, and is intensified by the loss of self-care management abilities that may have physical and psychosocial hazards and implications. Nurses in both primary and secondary care settings need to understand the condition as they can play a vital role in reducing its incidence and complications. Helping patients in adopting a new life style is very essential to achieve treatment goals, to keep the disease under control, and to prevent complications (Li Yang, 2017; Shaban, 2018).

The nurse should encourage patients for participation in their self-care practices by establishing a good nurse-patient relationship firstly, providing

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them with regular health education about their disease, aiding them to achieve the healthy self-care practices and improving their compliance with prescribed treatment, maintaining tight regulation of blood glucose. All of these can help in promoting patients' self-care practices and consequently improving their Quality of life (QoL) and prevent visual impairment (Wanchai& Armer, 2018).

Significance of the study

Diabetic retinopathy is a major public health problem and consider the most common cause of blindness in the world. Diabetic retinopathy has negative effects on patients' functional status and daily living activities. Visual impairment resulted from diabetic retinopathy and the costs associated with its treatment hugely impact patient's quality of life and impose a heavy financial burden on the society. Limitations arising from it can affect different aspects of patients' life and cause psychological and environmental-social problem. Decreased efficiency and quality of life, which together with depression caused by reduced vision and the stress caused by inability to perform everyday tasks reduce patient's quality of life even more. (Soleimani et.al, 2017)

Purpose of the Study:

The present study aimed to examine the effectiveness of an educational intervention on self-care management of patients with diabetic retinopathy

Research hypothesis:

The patients with diabetic retinopathy will have improvement in self-care practices after the educational intervention more than before the educational intervention.

Methods:

Research design:

A quasi experimental design was used to fulfill the purpose of the study

Study Settings:

The study was conducted in outpatient clinic of Kafr El-Sheikh New Ophthalmology

Sampling:

A convenience sample of 140 patients with diabetic retinopathy was included in the study.

Knowledge, health profile and symptoms among liver cirrhotic patients, we used Epi website (Open Source Statistics for Public Health)*. Our assumptions were :

Sample Size for Frequency in a Population

Population size(for finite population correction factor or fpc)(N): 1000

Hypothesized % frequency of outcome factor in the population (p): 40%+/-5

Confidence limits as % of 100(absolute +/- %)(d): 5%

Design effect (for cluster surveys-DEFF): 0.3

Sample Size(n) for Various Confidence Levels

ConfidenceLevel(%) Sample Size

95% 81

80% 41

90% 62

97% 94

99% 117

99.9% 153

99.99% 178

Equation

Sample size n = [DEFF*Np(1-p)]/ [(d

2

/Z

2

1- α /2

(N-1)+p(1-p)]

Results from OpenEpi, Version 3, open source calculator--SSPropor

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We used 95% confidence intervals, with a sample size of 80 liver cirrhotic patients.

Reference : *Epi website (Open Source Statistics for Public Health): <http://www.openepi.com/SampleSize/SSCohort.htm> (reviewed on 10th November,2017).

Sample size and power of the study:

In order to calculate the sample size required to study the effect of a designed nursing intervention protocol on knowledge, health profile and symptoms among liver cirrhotic patients, we used Epi website (Open Source Statistics for Public Health)*.

Our assumptions were :

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99.9% 153

99.99% 178

Equation

Sample size $n = \frac{[DEFF * N * p(1-p)]}{(d)^2}$

$\frac{1}{Z^2}$

2

$1 - \alpha/2$

$*(N-1) + p*(1-p)$

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Inclusion criteria:

The subjects were recruited based on the following criteria:

- Both sexes.
- Patients who are diagnosed with type 2 diabetes mellitus.
- Patients who are diagnosed with diabetic retinopathy at the first stage.
- Patients who have no pathologic diseases or chronic diseases in the eye.
- Patients are not diagnosed with medical disorders that affect patient's vision such as hypertension, hypotension, and hepatic disorders to avoid any pathological changes.

Data Collection Instruments:

The study included the following Instruments:

Instrument 1: A structured interviewing questionnaire prepared by the researchers which included the following parts:

- **Part one:** Socio demographic data about the patient as name, age, sex, occupation, level of education and residence
- **Part two:** Health-relevant data, this part included questions related to patients 'medical history; as the onset of diabetes, currently prescribed treatment of diabetes, duration of the disease, previous hospitalization and causes of hospitalization as diabetic foot or diabetic coma.

Instrument II: Self-care practices and prognosis checklists:

This part was developed by the researcher after extensive reviewing of the related literature and modifications were done by the researcher. It consisted of two parts:

- **Part one:** Reported self-care practices checklist: It was concerned with self-care practices of patients; It contained questions about; dietary intake, personal hygiene, controlling of stress, self-monitoring of blood glucose level, compliance with the treatment regimen, smoking status, appropriate and regular physical activities and regular health checkups.
- **Part two:** Observational prognosis checklist: It included check list to assess the prognoses of the patient's condition through assessment of prognoses of DR after eye examination conducted by physician, level of blood sugar, and measuring of blood pressure. This done before intervention as a base line assessment, and in the end of the study as an evaluation for the effect of the educational intervention and follow up on the general health of the patient

Scoring system:

The questionnaire contained, items related to the diabetic patients' socio-demographic criteria, their medical history, as well as 29 practice assessment items of self-care for DR were used, each was four points Liker scale (0 – 3) as (0) for Don't make, (1) for Rarely make, (2) for make but irregular, and (3) for Regularly make. The patients 'practice about diabetes and diabetic retinopathy were evaluated giving a score of 0- 87. The total score of each patient was categorized into "Unsafe pr." when he/she achieved 0 – 43 points of the

total score, and those who had 44 - 87 points were considered as "safe practice".

Validity of the instruments:

To determine the Face and Content validity, along with the instruments developed by the researcher, the objectives, hypothesis, definition, and scoring key and evaluation criteria were submitted to 5 Experts. Suggestions and recommendations given by the experts were accepted and necessary corrections were done to modify the instruments.

Reliability of the instruments:

Test – re test reliability was applied by the researcher for testing the internal consistency of the instruments. It was done by administration of the same instruments to the same subjects under similar condition on one or more occasions, answers from repeated testing were compared.

Administrative Approval and Ethical Consideration

- An approval of ethical commit was obtained
- Official permission was obtained from the head of Kafr El-Sheikh New Ophthalmology Hospital by submission of a formal letter from the dean of faculty of nursing, Menoufia University.
- Consent was taken from every patient before inclusion in the study.
- Patients was assured that all their own data are highly confidential
- The ethical issues consideration included explaining the purpose and natural of the study, stating the possibility to withdraw at any time.

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Pilot study:

A pilot study was carried out on fourteen patients with DR (10% of the total sample) and they were excluded from the total studied patients in order to test the applicability, feasibility, correctness, and clarity of the study tools. It also, provided an estimate of the time needed for answering the questionnaire sheets. Based on the findings of the pilot study, the necessary modifications were done. Then, the reliability of the study tools was assessed to measure the internal consistency of the study tools.

Data Collection Procedure:

- Patients were divided to small groups according to their places and time. A schedule for educational sessions was developed, and each participant selected the suitable time. At the end of the educational intervention, 10-20 minutes were allotted for discussion.
- At the initial interview in the outpatient clinic of Kafr El-Sheikh New Ophthalmology Hospital, the researcher introduced herself, to initiate the line of communication, and explain the nature and the purpose of the study to the studied patients
- After the pre-test, the researcher administrated educational intervention for subjects. The nursing intervention plan was developed and implemented by the researcher based on patients' reported practices.
- Data was collected for the current study started from November, 2020 and completed at May, 2022.
- The researcher demonstrated the contents of the designed protocol of nursing intervention in the form of small group of patients teaching sessions, three sessions in addition to preliminary session, these sessions were repeated to groups, the duration

of each session ranged from 45 – 60 minutes, including 15 minutes for discussion and feedback, each session usually started by a summary of what had been taught in the previous session and the objectives of the new session.

- The first session: started by acquiring a designed part of self-care practices related to diabetes mellitus as teaching the patient about healthy diet, personal hygiene and physical exercises.
- An open channel communication was achieved between the researcher and patients to assure understanding, answer any question and to confirm information.
- The component of a designed educational intervention was implemented to studied patients that contained an integrated package of instructions and guidelines related to health knowledge about DM and DR
- The second session: concerning with self-monitoring of blood glucose (BG) and the normal values of BG.
- The third session: concerning with controlling and measuring of blood pressure, control smoking and stress, and follow up plan for diabetes and vision status.
- Each patient obtained a copy of the designed illustrated nursing intervention booklet included all content.
- A follow up was performed monthly for patients under study by telephone, and every 3 months in the outpatient clinic of Kafr El-Sheikh New Ophthalmology Hospital. In the follow up phase, the researcher could be informed by the effect of the nursing intervention for modifying the incorrect or incomplete knowledge. In addition, to assess the change of knowledge and answer any question raised by the patients.

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- After implementation of the designed intervention the researcher collect post intervention data by using the previous mentioned instrument after one year and compared the result of pre and post-test to assess the effect of nursing intervention.

Statistical Analysis: -

Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using student t- test for comparison between two means, and ANOVA (F) test for comparison between more than two means. Level of significance was set as P value <0.05 for all significant tests.

RESULTS

Table (1) shows that, more than half of the studied diabetic patients aged between 50 to <60 years (50.7%), and more than one third of them aged 60 to 70 years(38.6%)., Approximately 65% of patients are females (63.6%), about two third (67.8 %) are intermediate educated, regard to marital status, results show that only 6% are single and 67.9% are married , 60% of them are living in rural areas, more than half of them are employees, and 45% of them have enough income. It is interesting that less than one fifth of them are smokers (17.1%).

Table (2) shows distribution of medical data among studied diabetic patients. Approximately three quarters of studied patients have family history of diabetes mellitus (74.3%), and more than half of them suffered diabetes since >15 years (53.6%). Approximately half of patients know that diabetes can cause diabetic retinopathy from ophthalmology doctor. Regarding follow up of diabetes in outpatient clinic, only 18.6

% of the total patients make regular checkup. Concerning admission to hospital due to diabetes complications, majority of patients claimed that they did not admit to hospitals due to diabetes complications (95.7%). Also, regarding the type of diabetic medications, more than half of studied patients have taking both insulin and tablets (51.4%). About half of them were trained on insulin injection by family members and only 16.4% can take insulin by themselves

Table (3) and Figure 1 revealed the efficacy of the nursing intervention program for the practice of diabetic patients. Post intervention program revealed a highly significant improvement ($p < 0.0001$) in the different categories of total practice about self-care practice for diabetic retinopathy. The post program' safe practice responses increased from zero% pre-intervention to > 90% for post intervention. In addition, the mean total practice score among patients, increases from 31.1 ± 5.2 pre intervention to 76.6 ± 0.9 post intervention and this difference is highly significant statistically ($P < 0.0001$). This result approved the hypothesis of current study which stated "The patients will have improvement in all aspects of self-care management skills after the educational intervention more than before the educational intervention".

Table (4) demonstrates the efficacy of the nursing intervention program on Blood glucose levels, BP, and eye investigation. Concerning Blood glucose levels, the post intervention good control increased from 12.9 pre intervention to 87.1% post intervention and the difference is high statistically significant ($P > 0.0001$). Concerning controlling of BP there is post intervention good control of BP as 99.3 of patients still normotensive (Good

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Control). Concerning eye investigation there is post intervention stability of ocular status as 99.3 of the patients still stable (First stage DR) and had no

deterioration to any stage as the diabetic retinopathy is a progressive disorder.

Table (1): Distribution of the studied diabetic patients according to their Socio - demographic characteristics (n = 140)

Socio demographic data		Frequency	
		NO.	%
Age (years)	< 50 Y	15	10.7
	50 -< 60 Y	71	50.7
	60 - 70 Y	54	38.6
Mean ± SD		57.1 ±4.6 Years	
Gender	Females	89	63.6
	Males	51	36.4
Education	Illtreat	18	12.9
	Primary education	9	6.4
	Moderate education	95	67.8
	High education	18	12.9
Job	Employee	71	50.7
	Technician	15	10.7
	No work or retired	54	38.6
Marital status	Single	6	4.2
	Married	95	67.9
	Widowed or divorced	39	27.9
Income	Enough and reserve	18	12.9
	Enough	63	45
	Not enough	59	42.1
Residence	urban	56	40
	rural	84	60
Smoking	Smoker	24	17.1
	Nonsmoker	116	82.9
Total		140	100

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**Table (2): Distribution of the studied diabetic patients ‘according to their
medical data (n = 140)**

Medical data	Frequency	
	N0.	%
Family History of Diabetes:		
Yes	104	74.3
No	36	25.7
Duration of diabetes:		
5-<10 Y	6	4.3
10 - < 15 Y	59	42.1
≥ 15 years	75	53.6
Way of knowing that DM. leads to DR:		
From medical doctor	35	25
From Ophthalmology doctor	69	49.2
From Media and books	18	12.9
From family and friends	18	12.9
Admission to hospital due to D. complications?		
Yes	6	4.3
No	134	95.7
Follow up of DM. in outpatient clinics?		
No follow up	18	12.9
When feel sick	96	68.5
Regular Follow up	26	18.6
Type of DM. Medication:		
Take insulin	45	32.2
Take oral tablet	23	16.4
Take insulin and tablets	72	51.4
Persons instruct you about the insulin injection:		
Take tablet and don't take insulin	23	16.4
Doctor or nurse	12	8.6
Family members	69	49.3
Watching others	36	25.7
Persons give you insulin injection:		
Take tablet and don't take insulin	23	16.4
By my self	69	49.3
Another (family member)	48	34.3
Total	140	100

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Table 3: Distribution of the studied patients regarding to practice items, and total practices about diabetic retinopathy pre, and post educational intervention (n=140).

Practice score of patients	Pre intervention				Post intervention				Test of sig.	P value
	Unsafe Practice NO.	Safe Practice NO.	Unsafe Practice (%)	Safe Practice (%)	Unsafe Practice NO	Safe Practice NO	Unsafe Practice (%)	Safe Practice (%)		
Total Nutrition practice	140	0	100	0	11	129	7.9	92.1	X ² =138.3	<0.0001 HS
Personal Hygiene pr.	95	45	67.9	32.1	0	140	0	100	143.3	<0.0001 HS
Controlled stress Pr.	128	12	91.4	8.6	0	140	0	100	162.5	<0.0001 HS
Treatment pr.	122	18	87.1	12.9	0	140	0	100	163.4	<0.0001 HS
Exercise pr.	140	0	100	0	11	129	7.9	92.1	125.1	<0.0001 HS
Smoking pr.	24	116	17.1	82.9	11	129	7.9	92.1	47.3	<0.0001 HS
Follow up pr.	128	12	91.4	8.6	11	124	7.9	88.6	107.2	<0.0001 HS
Grand total Pr.	134	6	95.7	4.3	11	129	7.9	92.1	143.0	<0.0001 HS
X ± SD	31.1 ± 5.2				76.6 ± 9.5				t= 74.5	<0.0001

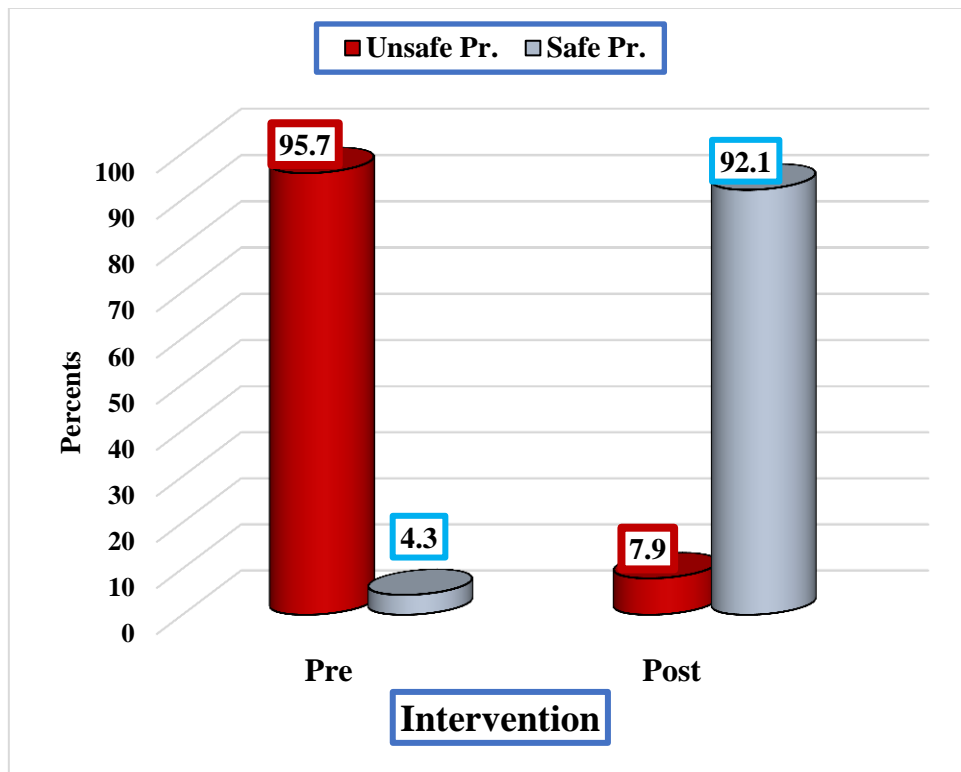


Fig.1: Levels of grand total practice among diabetic patients pre and post intervention (n=140)

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Table 4: Distribution of the studied patients regarding to follow up data pre and post educational intervention(n=140)

Investigations of patients	Intervention				Test of sig.	P value
	Pre		Post			
	N	%	N	%		
Blood glucose levels:						
Poor control (8.5 <)	79	56.4	7	5	LR=144.8	<0.0001 HS
Fair control (8.5 <7.5)	43	30.7	11	7.9		
Good control (6.5- 7.5)	18	12.9	122	87.1		
Blood Pressure (BP)						
Hypertension (More than 140/90)	0	0	0	0	157.5	<0.0001 HS
Semi normal (140/90)	0	0	1	.7		
Normal blood pressure (120/80)	140	100	139	99.3		
Eye Investigation						
Stable (First stage DR)	140	100	139	99.3	157.5	<0.0001 HS
Semi-stable (Second stage DR)	0	0	1	.7		
Deteriorated (Sever second stage DR)	0	0	0	0		
Total	140	100	140	100		

Discussion

Regarding overall self-care practices mean percent score pre intervention, it was noticed that the Mean \pm SD was low pre-intervention of educational intervention, this result was in agreement with Abid (2022) whose pre-intervention findings revealed that, majority of DR patients in both study and control groups had inadequate level in performing their self-care practices.

A similar result was reported in a study of Al-Yahya (2020) who studied "Knowledge, Attitude, and Practices (KAP) of Diabetics towards diabetes and DR in Riyadh, Saudi Arabia" and revealed that, the overall practices score of DR patients was below the accepted range. On the same line, ALHargan et al. (2019) reported in their study 'Awareness, knowledge,

and practices related to diabetic retinopathy among diabetic patients in primary healthcare centers at Riyadh, Saudi Arabia 'that, self-care practices of DR patients were found to be low.

Also, a Study conducted by Farag et al. (2020) named 'Knowledge and self-care activities among Sudanese individuals with diabetes: a cross sectional survey 'revealed that, most patients had unacceptable level of practice.

The current finding revealed the efficacy of the educational intervention for the practices of diabetic patients. The post intervention safe practice responses increased, the mean total practice score among patients, increases from 31.1 ± 5.2 pre intervention to 76.6 ± 0.9 post intervention and this difference is

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highly significant statistically. This result approved the hypothesis of current study which stated "The patients will have improvement in all aspects of self-care management skills after the educational intervention more than before the educational intervention". This finding was congruent with Baiuomy & AbouShousha (2021) who found that, the Mean \pm SD for both studied and control groups were low pre-intervention of self-care practices educational intervention; while post-intervention of self-care practices educational intervention the Mean \pm SD for study group had improved dramatically.

Moreover, this finding was congruent with Umaefulam & Premkumar (2020) who showed in a study "Impact of mobile health in diabetic retinopathy awareness and eye care behavior among Indigenous women" that, the self-care practices score of DR patients post implementation of the educational intervention was significantly increased.

Regarding the relation between patient's residence and their levels of post intervention self-care practices, the current findings showed non-significant differences between those who were living in urban or rural areas, this finding was congruent with Panigrahi et al., (2017) who reported that no statistically significant difference was found in the attitude score among studied sample from urban and rural background. But this finding not congruent with Khalaf (2019) who stated that, the overall mean score of attitudes regarding diabetic retinopathy was higher in urban participants versus rural participants and explained this by the fact that, health services are more available in urban than in rural areas,

and differences between rural and urban cultures also play a role.

Regarding the relation between patient's level of education and their levels of post intervention self-care practices, the current study revealed that the higher levels of education showed a higher significant percentage of safe practices. This finding was strongly supported by Albikawi (2015) who stated that, participants with higher levels of education reported performing of self-care for DR as exercise, blood glucose testing and foot care, more regularly than patients with less education.

In relation to their income status, there is statistically significant differences between patients who had not enough income and those who had enough income & save regarding their safe total score of practice. Also, this finding was congruent with Abid (2022) who showed that, there was a statistically significant relation between DR patients' income and their total self-care practices as it was evident that, the total self-care practices score was higher among those who had sufficient monthly income. This result also agreed with the result of Mutyambizi & Groot (2020) who conducted study entitled "Inequalities and factors associated with adherence to diabetes self-care practices amongst patients at two public hospitals in Gauteng, South Africa" and stated that, higher monthly income was significantly associated with good self-care practices.

But, in the study of Mohammed & Hamza (2016) named "Assessment of self-care activities for patients' with diabetes mellitus type II "there was no association between patients' monthly income and their self-care practices. The possible explanation for the current finding could be because patients with sufficient monthly

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income might have more exposure to health care facilities, mass media (such as internet and magazines) and higher people interaction than those who had insufficient income.

Concerning the relation between post intervention knowledge and practice among studied diabetic patients, the current study presented that, there is a high statistically significant association between post intervention knowledge levels and safe practice for DR. Patients with good knowledge only showed safe practice compared with poor or fair knowledge. This result was in agreement with Abid (2022) who showed that; there was highly statistically significant correlation between total knowledge and total self-care practices scores at the pre, post and follow-up phases, and rationalized this by the fact that, when patients acquired higher knowledge about their diseases, they engaged more in their self-care practices which could improve health outcomes.

In congruence with this, an Iranian study "Association of self-care behaviors and quality of life among patients with type 2 diabetes mellitus" by Babazadeh et al., (2017) emphasized on the importance of knowledge among diabetic patients in promoting their self-care practices. Also, Kugbey, and Adulai (2017) in their study "Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: a cross-sectional study" highlighted that, perception of illness played a vital role in engaging patients in their self-care practices.

Regarding the follow up of diabetic retinopathy patients, the current study demonstrated the efficacy of the educational intervention program on blood glucose levels, BP, and eye investigation. Concerning eye investigation there is post intervention

stability of ocular status for all except one case, the patients still stable (First stage DR) and had no deterioration to any stage as the diabetic retinopathy is a progressive disorder. The findings were in agreement with Ghasemi Shoeibi (2018) in their study "Effect of self-management educational program on vision-related quality of life among elderly with visual impairment" who indicated that, the mean vision-related quality of life score increased in the intervention group after performing self-management education.

The findings of this study are inconsistent with the results reported by Rees et al. (2015) in the study named "A randomized controlled trial of a self-management programme for low vision implemented in low vision rehabilitation services" who found that, no overall effect of the low vision self-management programme on vision-specific QoL. This discrepancy may be due to the use of different tools.

Concerning blood glucose levels and controlling of BP, the current findings showed that, the post intervention blood glucose levels good control increased post intervention and the difference is high statistically significant. Concerning controlling of BP there is post intervention good control of BP as all patients still normotensive (Good Control) except one case. This significant glycemic control and stability of blood pressure among studied DR patients revealed the effectiveness of self-care practices educational intervention.

The current findings were in agreement with Amer & Abu Shanab (2021) in their study, "Risk Factors Associated with Diabetic Retinopathy: A Cross-Sectional Study Within Palestinian Patients in Northern West Bank" found that, the risk factors associated with DR of HbA1c and HTN were associated with severe DR, and

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concluded that, “Tight glycemic and blood pressure control remains the cornerstone in the primary prevention and preventing progression of DR”.

Also, Zhou & Reaven, (2021) in their study, “Fasting glucose variation predicts microvascular risk in ACCORD and VADT” showed that, among patients with advanced T2D, fasting glucose visit-to-visit variability was associated with the development of microvascular complications (both for the composite of nephropathy and retinopathy as well as each outcome category individually) even after adjusting for other risk factors, including overall level of glucose control.

In addition, Yin, (2020) conducted a study entitled “Prevalence and risk factors of diabetic retinopathy in diabetic patients: A community based cross-sectional study” and reported that fasting blood glucose (FPG), serum total cholesterol, serum triglyceride, and HbA1c were independent risk factors for diabetic retinopathy.

Also, Zhang (2017) conducted a study entitled “Prevalence and risk factors for diabetic retinopathy in China: a multi-hospital-based cross-sectional study” and showed that, higher hemoglobin A1c, higher fasting plasma glucose higher systolic blood pressure were associated with the presence of DR. Lin & Li (2013) in their study “Risks of diabetic nephropathy with variation in hemoglobin A1c and fasting plasma glucose” demonstrated that annual variation in HbA1c and FPG measurements can predict diabetic nephropathy in 30- to 89-year-old patients with type 2 diabetes.

Moreover, Ferm (2021) in a study named “Clinical and demographic factors associated with diabetic retinopathy among young patients with diabetes” found that although the duration of diabetes and suboptimal

glycemic control have long been associated with DR, insulin pump use was independently associated with a lower likelihood of DR, which is likely owing to decreased glycemic variability and increased time in range (the percentage of time blood glucose levels remain within the 70-180 mg/dL range).

Khalaf (2022) revealed that hypertension was the most prevalent chronic condition with DR patients, with 74.5% of the study group suffering from it. Also, Giloyan A et al. in their study “The prevalence of and major risk factors associated with diabetic retinopathy in Gegharkunik province of Armenia: cross-sectional study” found that, 66.3% of participants had hypertension, which indicates that hypertension is an important risk factor for progression of DR.

Giloyan et al. in their finding concluded that, “The strongest risk factors for DR that are consistently described in the literature include diabetes duration, glycemic control and hypertension (HTN). Since some of the risk factors are modifiable, regular screenings for these factors in people with diabetic retinopathy might help to develop timely management strategies and reduce complications and vision loss. Population-based educational programs on diabetes and diabetic retinopathy and continuous medical education on diabetes management can improve diabetes care and self-management and prevent eye complications”.

This conclusion was strongly agreeing with and supporting the finding of current study which showed that, there was post intervention good control of BP as 99.3% of patients still normotensive (Good Control) for the purpose of prevent progression of DR. However, glycemic control was

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considered as the most important factor for preventing retinopathy in patients with diabetes, and intensive therapy with proper effective self-care practices effectively delays the onset and slows the progression of diabetic retinopathy, and subsequently prevent eye complications and visual impairment. Our findings appear to corroborate the results reported in other studies indicating HTN and glycemic control appear to have a direct relationship with development and progression of DR.

Conclusion:

In the light of the present study finding, it can be concluded that the implementation of the educational intervention for patients with diabetic retinopathy, emphasizing the importance and the proper technique of the deferent aspects of self-care practices lead to improvement of their reported self-care practices and subsequently lead to controlling of blood pressure, blood glucose level and prevent deterioration of vision.

Recommendations

Based on the finding of the present study, the following recommendations are proposed:

- Emphasizing the importance of self-care practices and describing in detail, because this can reduce the risk of DR and its subsequent complications as loss of vision
- Follow up program of patients with diabetic retinopathy should be applied and organized at hospitals, for the proper management, educating patients and care giver the proper self-care practices, follow prognosis of patient's condition, protecting and promoting vision of patients.

- Further researches will be needed for training of nurses the proper self-care practices for patients with diabetic retinopathy, and improving the awareness of the nurses about the nature of this disease, different forms of management, complications, and its prognosis.

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