

## **Effectiveness of educational intervention on self-care practices of critically ill patients with diabetic retinopathy**

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**Abstract: Background:** Diabetic retinopathy (DR) is considered a common and specific microvascular complication of diabetes mellitus that develops over a period of time and causes irreversible blindness. **Purpose:** To evaluate the effectiveness of an educational intervention for diabetic retinopathy patients on self-care practices. **Research Design:** Quasi-experimental research design was utilized in this study. **Sampling:** A purposive sample of 80 critically ill patients with diabetic retinopathy. **Setting:** Ophthalmology emergency department in Damietta hospital from emergency reception to inpatient zone from ophthalmology in Damietta Hospital was included in this study and the sample had been divided equally into study and control groups. **Instruments:** Data were collected using two tools; the first tool was a structured interview questionnaire sheet. The second tool was a self-care practices checklist. **Results :**After implementation of the program, there was an improvement of self-care practices on post and follow up tests than pretest. . For example, patients who were able to adequately perform hand washing, instilling eye drops, apply eye ointment and perform eye care were, 92%, 56%, 64%, and 60% on posttest and 90.0%, 48.0%, 44.0%, 50.0% at follow up test compared to only 70.0%, 20.0%, 22.0% and 26.9% on pretest. **Conclusion:** Applying the educational intervention was effective in improving patients' self-care practices. **Recommendation:** Ophthalmologic nurses should follow the educational intervention to prepare patients to perform their self-care practices. **Key words:** *Critically Ill Patients, Diabetic Retinopathy, Educational Intervention, Self-Care Practice.*

### **Introduction**

Diabetes mellitus (DM) is a metabolic disorder resulting when the body can't produce enough or respond normally to insulin, a peptide hormone responsible for regulating glucose levels in the blood and tissues (Rahman et al., 2022).

The International Diabetes Federation (IDF) estimated the total number of people living with diabetes is projected to rise to 643 million by 2030 and 783

million by 2045 (The International Diabetes Federation (IDF), 2021).

Diabetic retinopathy develops when uncontrolled blood glucose level damages the tiny blood vessels in the eye retina causing a variety of symptoms that varies from mild visual disturbance and can reach irreversible vision loss (Lalithadevi & Krishnaveni, 2022).

In 2020, the worldwide number of adults with Diabetic retinopathy,

VTDR, and CSME was estimated to be 103.12 million, 28.54 million, and 18.83 million, respectively; by 2045, the numbers are estimated to increase to reach 160.50 million, 44.82 million, and 28.61 million, respectively. Diabetic retinopathy prevalence was highest in Africa (35.90%) and North America and was lowest in South and Central America (13.37% F F) (Teo et al., 2021).

Therefore, strict preventive measures should be followed to delay the onset of DR and its progression. The first of these preventive measures is to maintain tight regulation of glycemia which is often considered a self-care practice carried out by the patient (Wong & Sabanayagam, 2020).

Self-care practices refer to the 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).

The nurse should enhance patients' participation in their self-care practices by establishing a good nurse-patient relationship firstly, providing them with regular health education about their disease, aiding them to change their wrong self-care practices and improving their compliance with prescribed treatment. All of these can help in promoting patients' self-care practices and consequently improving their Quality of life (QoL) (Wanchai & Armer, 2018).

#### **Significance of the study:**

In Egypt, chronic diabetes complications prevalence ranged from 8.1 % to 41.5 % for retinopathy (Bos

& Agyemang, 2016). Visual impairment secondary to diabetic retinopathy represents a major public health problem which negatively affects patients' functional status, daily living activities.

Making patients knowledgeable about the disease, engaging them in self-care practices, and helping them in adopting a new lifestyle is very essential to achieve treatment goals, keeping the disease under control, and preventing complications (Shaban, 2018). Very limited studies were conducted on how to improve the self-care practices of DR patients.

#### **Purpose**

To evaluate the effectiveness of an educational intervention for patients with diabetic retinopathy on their self-care practices.

#### **Research Hypotheses:**

- 1) Patients who receive the self-care educational intervention (study group) are expected to have higher level of self-care practices on posttest than pretest.
- 2) Patients who receive the self-care educational intervention (study group) are expected to have higher level of self-care practices than patients who did not (control group).

#### **Methods**

##### **Study design:**

A quasi-experimental research design was utilized (study and control).

##### **Setting:**

This research was conducted in the ophthalmology emergency department

##### **Sampling:**

A purposive sample of 80 patients was selected according to the following inclusive criteria 40 patients was study group and 40 patients was control group.

##### **Sample size calculation:**

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The sample size could be calculated using the following formula:

$$n = [(Z\alpha/2 + Z\beta)^2 \times \{2(SD)^2\}] / (\text{significant mean difference})^2$$
 where

SD = standard deviation

$Z\alpha/2$ : This depends on the level of significance, for 5% this is 1.96

$Z\beta$ : This depends on power, for 80% this is 0.84

Therefore,  $n = [(1.96 + 0.84)^2 \times \{2(25.55)^2\}] / (15)^2 = 46$

The sample size required based on the above formula, per group was 46 patients with adding 10% to compensate for dropout to become 50 patients per group. A simple random sample was used to assign patients into a study (received health education program) and control groups (received routine hospital care only).

### **Inclusive criteria:**

- Diagnosed with diabetic retinopathy.
- Mentally oriented adult patients.
- Free from communication problems (speech & hearing problems).
- Availability of telephones for follow-ups.

### **Exclusive criteria:**

The exclusive criteria were confirmed by a retina subspecialist:

- Any significant grade of cataract, or advanced glaucoma.
- Ocular ischemic syndrome.
- Retinal artery or retinal vein occlusion.
- Optic neuritis.
- Age-related macular degeneration.
- Vision-threatening uveitis.
- Any previous eye injury that could affect retinal function.
- Completely vision loss.

### **Instruments:**

Two instruments were used to collect data:

**Instrument one: A structured interview questionnaire sheet:** It was

developed by the researcher after extensive reviewing of the related literatures (begin with the eldest Denniston & Murray, (2014); Nordquist, (2017); Pouncey & Frith, (2013); Sayin, Kari & Pekel, (2015) It consisted of two parts:

#### **1. Part 1:** characteristics of patients.

This part contained questions related to the personal characteristics of patients such as sex, age, educational level, occupation, and marital status.

#### **2. Part 2:** Health-relevant data.

This part included questions related to patients':

- **Ocular history;** It contained the onset of DR, current symptoms, the prescribed treatment of DR, the occurrence of DR complications, and use of eyeglasses.
- **Medical history;** It included the onset of diabetes, currently prescribed treatment of diabetes, complaints of other chronic diseases, previous hospitalization, and its causes.

#### **Instrument two: Self-care practices checklist:**

This instrument was used to assess the self-care practices of patients in pre and post-intervention phases, and at follow-up. It consisted of two parts:

**1. Part 1:** This part was adapted from Shaban (2018) and the necessary modifications were done by the researcher. It was concerned with self-care practices of patients; It contained self-monitoring of blood glucose level, regular health checkups, compliance with the treatment regimen, appropriate dietary intake, and regular physical activities.

**2. Part 2:** This part was developed by the researcher after extensive reviewing of the related literature (Judith & McCann, 2009 and Shaw, 2016. It included observation of self-care practices of DR patients;

(e.g. hand washing, instilling eye drops, applying eye ointment, and performing eye care.

### **Scoring system for self-care**

#### **practices:**

Each statement or step of patients' self-care practices was given a score (1) for done correctly or given a score (0) for done incorrectly or not done. The scores of each area of practice were summed up to give the total score. Then, the total score was divided by the number of area's items, and then converted into a percent score. Total scores were categorized as follows: -

- Inadequate: if the score was  $\leq 60\%$  of the maximum score.
- Adequate: if the score was  $> 60\%$  of the maximum score.<sup>09</sup>

#### **Pilot Study:**

Before starting data collection, a pilot study was performed on 10 patients constituting about 10 % of the sample. It was conducted to test the clarity, feasibility, and objectivity of the tools, and then they were excluded later from the main study sample.

#### **Validity:**

After the tools were designed by the researcher, their content validation was evaluated by a panel of 5 experts; 2 experts were professors in the field of Ophthalmology and the other 3 experts were assistant professors from Nursing Faculty at Mansoura University. Some modifications were done accordingly to fulfill suggestions and comments.

#### **Reliability of tools**

The reliability of patients' self-care practices checklist part 1 & part 2 was estimated using the Cronbach's Alpha (0.893 & 0.886 respectively) and they were considered "very good".

#### **Procedure:**

A letter was submitted from the Dean of the Faculty of Nursing to the director of Damietta hospital for explaining the purpose and methods of data collection. The collection of data was conducted over a period of 18 months which started from July 2019 to December 2020.

In the assessment phase, the researcher introduced himself to patients and explained the objectives of the research. Participants were asked to sign a consent form. Then, the pre-test assessment was conducted. Data was collected from patients about their characteristics and their self-care practices were observed. Data was collected two days/week (Saturday for the study group and Tuesday for the control group). This process was repeated every week until data was collected from the whole study and control groups.

The second phase was the planning phase. Based on pre-test results and in the light of relevant literature, an educational program was developed by identified needs, requirements, and deficiencies were translated into objectives of the program and set in the form of an educational booklet.

In the implementation phase, four health education sessions were planned. Each session lasted from 30 – 60 minutes. First session was about overview about essential knowledge about DR. Second session was related to an overview about essential self-care practices of DR. Third session included an overview about essential self-care practices of DR, whereas, fourth session contained Improving QoL of DR patients. Teaching days were arranged depending on the availability and coordination of the participants. Various approaches of teaching methods were used by the researcher to carry out the program as; interactive lectures, group discussions, questionnaires, demonstration, and

brain storming. Different teaching media were used (e.g. power-point presentation, video tapes, colored pictures and illustrated booklets) were used

Regarding evaluation phase,

Post-test was done one month post the implementation phase for the study group and immediately post the after receiving routine hospital care for the control group. Follow-up was done three months following posttest. The same data collection instruments were used.

### **Ethical Considerations:**

Before collecting the data, the researcher obtained an official permission from the Ethical and Research Committee of the Faculty of Nursing, Damietta University. An official written approval to conduct the study was obtained from the studied patients after explaining the purpose and methods of data collection. They were assured of the anonymity and privacy of collected data. Also, the privacy of their information was protected

### **Statistical Analysis:**

Data were expressed in the form of number and percentage. Chi-square test was used for the comparison of variables with categorical data. The Student's t test was used. Correlation co-efficient test was used to test for correlations between two variables with continuous data. A statistical significant was considered if  $P < 0.05$ .

### **Results:**

**Table 1:** revealed that 72% versus 58% of patients in the study and control groups respectively were between 50 to 60 years with a mean age ( $50.9 \pm 7.9$  vs.  $49.4 \pm 8.6$  years). The female sex represented more than two-thirds (68%) of patients in the study group compared to (58%) of them in

the control group. More than half of patients in the study and control groups (66% & 70% respectively) were married. Regarding education level, 36% of patients in the study group compared to near to half (46%) of them in the control group were illiterate.

In relation to occupation, half (50%) of patients in the study group compared to 40% of them in the control group were housewives. Regarding residence, most of patients in the study and control groups (70% & 64% respectively) came from rural areas and it was found that the highest percentage of them (96% & 94%) in both groups respectively were living with their families. Furthermore, 70% of patients in the study group compared to 74% of them in the control group had sufficient monthly income. Finally, there was no statistically significant difference between the study and control groups regarding their characteristics. Therefore, the two groups were homogenous in their characteristics.

**Table 2** showed that more than half (56%) of patients in the study group versus 66% of them in the control group had DR for less than 5 years. In relation to the current symptoms, the table showed that 72% and 78% of patients in the study and control groups respectively suffered from blurred vision, while less than one-quarter (20% & 24%) of them in both groups respectively had a drop of vision. Most of patients (70%) in the study group compared to 56% in the control group had laser therapy to treat DR. Also, it was noticed that most of patients (70% & 64%) in the study and control groups respectively didn't have any complications from DR. Furthermore, vitreous hemorrhage represented less than one-quarter (20% & 24%) in both groups respectively.

Regarding wearing eyeglasses, 60% of patients in the study group were using eyeglasses vs. 52% of them in the control group. Concerning medical history, 62% of patients in the study group compared with 58% of them in the control group had DM for more than 15 years as well as near to two-thirds (64%) vs. 70% of patients in both groups respectively were using oral hypoglycemic agents to treat diabetes. The most commonly reported chronic diseases were hypertension (68.2% & 61.9%), hypercholesterolemia (40.9% & 23.8%) and kidney diseases (27.3% & 35.7%) in the study and control groups respectively. As regards to the previous admission to the hospital, 34% vs. 26% of patients in the study and control groups respectively were admitted to the hospital

**Table 3:** showed that pre implementing the intervention; there were no statistically significant differences between the study and control groups in the different domains of self-care practices (e.g. self-monitoring of blood glucose level, performing regular health checkups, compliance with the treatment regimen, appropriate dietary intake, regular physical activities, hand washing, instilling eye drops, applying eye ointment and performing eye care as (p= 0.271, 0.673, 0.130, 0.147, 0.779, 0.295, 0.629, 0.640 and 0.640 respectively).

**Table 4** showed that post implementing the intervention; there were highly statistically significant differences between the study and control groups in relation to self-care practices related to hand washing, applying eye ointment, and performing eye care as  $P < 0.001$ . Also, there was a statistically significant difference between both groups in their self-care practices related to self-monitoring of blood glucose levels, performing

regular health checkups, compliance with the treatment regimen, appropriate dietary intake and instilling eye drops (p= 0.026, 0.045, 0.003, 0.028 and 0.009 respectively). However, no statistically significant difference was observed between both groups in the domain of regular physical activities as (P=0.130).

**Table 5** showed that at the follow-up phase; there were statistically significant differences between the study and control groups in the domains of self-care practices related to self-monitoring of blood glucose level, performing regular health checkups, compliance with the treatment regimen, appropriate dietary intake, hand washing, instilling eye drops, applying eye ointment and performing eye care as (p= 0.044, 0.043, 0.028, 0.016, 0.004, 0.039, 0.035 and 0.024 respectively). However, no statistically significant difference was observed between both groups in domain of regular physical activities as (P=0.790).

**Figure (1)** showed that at the pre-intervention phase; just 18% of patients in the study group compared with 16% of them in the control group had an adequate overall self-care practices level with no statistically significant difference between the two groups as  $P > 0.05$ .

**Figure (2)** showed that at the post-intervention phase; slightly more than half (52%) of patients in the study group vs. 20% of them in the control group had adequate overall self-care practices level with highly statistically significant difference between the two groups as  $P < 0.001$ .

**Figure 3:** showed that at the follow-up phase; 46% vs. 24% of patients in the study and control groups respectively had an adequate overall self-care practices level with statistically significant difference between the two groups as  $P=0.021$ .

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**Table1. Characteristics of DR patients in the study and control groups (n=80)**

	Study group		Control group		Chi square test	
	N (40)	%	N (40)	%	$\chi^2$	P
<b>Age (years)</b>						
30 – >40	4	12.0	7	16.0		
40 – >50	6	16.0	10	26.0		
50 – 60	34	72.0	23	58.0	2.230	0.328
Mean $\pm$ SD	50.9 $\pm$ 7.9		49.4 $\pm$ 8.6		0.969	0.335 <sup>^</sup>
<b>Sex</b>						
Male	11	32.0	16	42.0		
Female	29	68.0	24	58.0	1.073	0.300
<b>Marital Status</b>						
Single	3	6.0	2	5.0%		
Married	25	66.0	30	75%		
Divorced	2	4.0	4	10%		
Widowed	10	24.0	4	10%	4.059	0.255
<b>Level of education</b>						
Illiterate	13	36.0	20	46.0		
Basic education	7	14.0	8	20.0		
Secondary education	14	38.0	10	24.0		
University education	6	12.0	2	10.0	2.811	0.422
<b>Occupation</b>						
Employee	7	16.0	11	28.0		
Worker	10	28.0	9	24.0		
Housewife	2	5.0%	16	40.0		
Not working	3	6.0	4	8.0	2.111	0.550
<b>Residence</b>						
Rural	30	70.0	28	64.0		
Urban	10	30.0	12	36.0	0.407	0.520
<b>Living condition</b>						
Alone	2	4.0	3	6.0		
With the family	38	96.0	37	94.0	0.211	0.646
<b>Income / month</b>						
Insufficient	10	30.0	12	26.0		
Sufficient	30	70.0	28	74.0	0.198	0.656

(<sup>^</sup>) P value based on Student's t test

$\chi^2$ : Chi- square test

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**Table 2. Health data of patients having DR in the study and control groups (n=80).**

A. Ocular history:	Study group		Control group		Chi square test	
	N (40)	%	N (40)	%	$\chi^2$	P
<b>Duration of DR (years)</b>						
< 5	23	56.0	28	66.0	1.669	0.434
5 – 10	15	40.0	9	28.0		
>10	2	4.0	3	6.0		
<b>Current symptoms</b>						
Blurred vision	34	72.0	34	78.0	0.480	0.488
Floaters in field of vision	27	58.0	25	54.0	0.162	0.687
Dark spots in field of vision	14	32.0	21	46.0	2.060	0.151
Drop of vision	9	20.0	10	24.0	0.231	0.622
Others	16	34.0	10	24.0	1.213	0.274
<b>Treatment of DR</b>						
Laser therapy	35	70.0	28	56.0	2.102	0.147
Vitreous injection	13	26.0	16	32.0	0.437	0.509
Follow up	8	16.0	10	20.0	0.271	0.603
<b>Complications of DR</b>						
No	32	70.0	30	64.0	1.183	0.757
Vitreous hemorrhage	10	20.0	12	24.0		
Retinal detachment	2	4.0	4	8.0		
Glaucoma	3	6.0	2	4.0		
<b>Currently wearing eye glasses</b>		60.0	24	52.0	0.649	0.420
<b>B. Medical history:</b>						
<b>Duration of diabetes (years)</b>						
<10	5	10.0	2	4.0	2.110	0.348
10 – 15	10	28.0	14	38.0		
>15	25	62.0	24	58.0		
<b>Current treatment of diabetes</b>						
Oral hypoglycemic agents	26	64.0	30	70.0	0.407	0.523
Insulin injections	14	36.0	10	30.0		

$\chi^2$ : Chi- square test

DR: Diabetic Retinopathy

**Cont. Table 2. Health-relevant data of patients having DR in the study and control groups (n=80).**

	Study group		Control group		Chi square test	
	N(40)	%	N(40)	%	$\chi^2$	P
<b>Have any chronic diseases</b>	34	88.0	32	84.0	0.332	0.564
<b>If yes, what are the diseases?</b>						
Hypertension	30	68.2	26	61.9	0.373	0.542
Hypercholesterolemia	18	40.9	10	23.8	2.861	0.091
Heart disease	3	7.1	5	11.4	0.454	0.501
Kidney disease	12	27.3	15	35.7	0.711	0.399
Liver diseases	2	4.5	2	4.8	0.002	0.962
Diseases of the digestive system	8	18.2	5	11.9	0.660	0.417
Rheumatoid arthritis	2	4.8	3	6.8	0.166	0.684
Osteoporosis	4	9.1	3	7.1	0.109	0.741
<b>History of previous hospitalization</b>	17	34.0	13	26.0	0.762	0.383
<b>If yes, what is the reason</b>						
Occurrence of a hypoglycemic coma	4	23.5	2	15.4	0.584	0.445



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Occurrence of a hyperglycemic coma	5	29.4	4	30.8	0.054	0.817
For surgery	8	47.1	7	53.8	0.278	0.598

**Table 3. Self-Care Practices at Pre-Intervention Phase Among Patients Having DR in the Study and Control Groups (n= 80).**

	Study group				Control group				Chi square	
	Inadequate		Adequate		Inadequate		Adequate		Test	
	N	%	N	%	N	%	N	%	$\chi^2$	P
Self-monitoring of blood glucose level	33	76.0	7	24.0	28	66.0	12	34.0	1.214	0.271
Performing regular health checkups	29	68.0	11	32.0	27	64.0	13	36.0	0.178	0.673
Compliance with treatment regimen	26	62.0	14	38.0	33	76.0	7	24.0	2.291	0.130
Appropriate dietary intake	23	56.0	17	44.0	30	70.0	10	30.0	2.102	0.147
Regular physical activities	36	82.0	4	18.0	38	86.0	2	14.0	0.078	0.779
Hand washing	10	30.0	30	70.0	15	40.0	25	60.0	1.099	0.295
Instilling eye drops	35	80.0	5	20.0	33	76.0	7	24.0	0.233	0.629
Applying eye ointment	34	78.0	6	22.0	32	74.0	8	26.0	0.219	0.640
Performing eye care	32	74.0	8	26.0	34	78.0	6	22.0	0.219	0.640

$\chi^2$ : Chi- square test

(\*) P value is significant if < 0.05

(\*\*) P value is highly significant if < 0.001

Inadequate: score  $\leq$  60.0%

Adequate: score > 60.0%

**Table 4: Self-Care Practices at Post-Intervention Phase Among Patients Having DR in the Study and Control Groups (n= 80).**

	Study group				Control group				Chi square	
	Inadequate		Adequate		Inadequate		Adequate		Test	
	N	%	N	%	N	%	N	%	$\chi^2$	P
Self-monitoring of blood glucose level	18	46.0	22	54.0	29	68.0	11	32.0	4.937	0.026*
Performing regular health checkups	14	38.0	26	62.0	24	58.0	16	42.0	4.006	0.045*
Compliance with treatment regimen	13	36.0	27	64.0	28	66.0	12	34.0	9.004	0.003*
Appropriate dietary intake	15	40.0	25	60.0	26	62.0	14	38.0	4.842	0.028*
Regular physical activities	26	62.0	14	38.0	33	76.0	7	24.0	2.291	0.130
Hand washing	4	8.0	36	92.0	17	44.0	23	56.0	16.840	<0.001**
Instilling eye drops	17	44.0	23	56.0	30	70.0	10	30.0	6.895	0.009*
Applying eye ointment	13	36.0	27	64.0	34	78.0	6	22.0	17.993	<0.001**
Performing eye care	15	40.0	28	60.0	33	76.0	7	24.0	13.300	<0.001**

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$\chi^2$ : Chi- square test

(\*) P value is significant if  $< 0.05$

(\*\*) P value is highly significant if  $< 0.001$

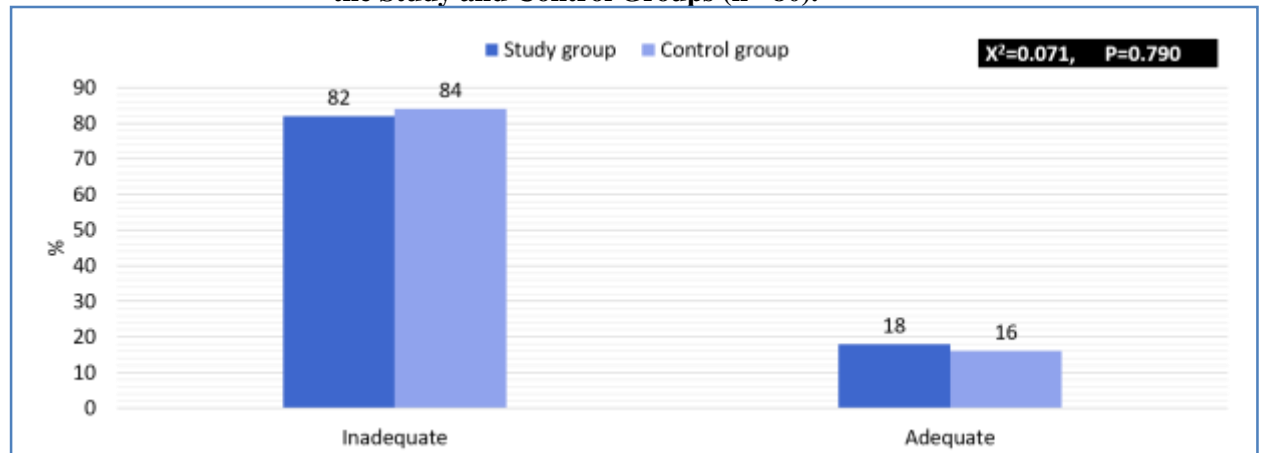
Inadequate: score  $\leq 60.0\%$

Adequate: score  $> 60.0\%$

**Table 5: Self-Care Practices at follow-up Phase Among Patients Having DR in the Study and Control Groups (n= 80).**

	Study group				Control group				Chi square	
	Inadequate		Adequate		Inadequate		Adequate		Test	
	N	%	N	%	N	%	N	%	$\chi^2$	P
Self-monitoring of blood glucose level	18	46.0	22	54.0	28	66.0	12	34.0	4.058	0.044*
Performing regular health checkups	11	32.0	29	68.0	21	52.0	19	48.0	4.105	0.043*
Compliance with treatment regimen	16	42.0	24	58.0	27	64.0	13	36.0	4.857	0.028*
Appropriate dietary intake	14	38.0	26	62.0	26	62.0	14	38.0	5.760	0.016*
Regular physical activities	36	82.0	4	18.0	37	84.0	3	16.0	0.071	0.790
Hand washing	5	10.0	35	90.0	12	34.0	28	66.0	8.392	0.004*
Instilling eye drops	21	52.0	19	48.0	31	72.0	9	28.0	4.244	0.039*
Applying eye ointment	23	56.0	17	44.0	33	76.0	7	24.0	4.456	0.035*
Performing eye care	20	50.0	20	50.0	31	72.0	9	28.0	5.086	0.024*

**Figure 1: Self-Care Practices at Pre-Intervention Phase Among Patients Having DR in the Study and Control Groups (n= 80).**



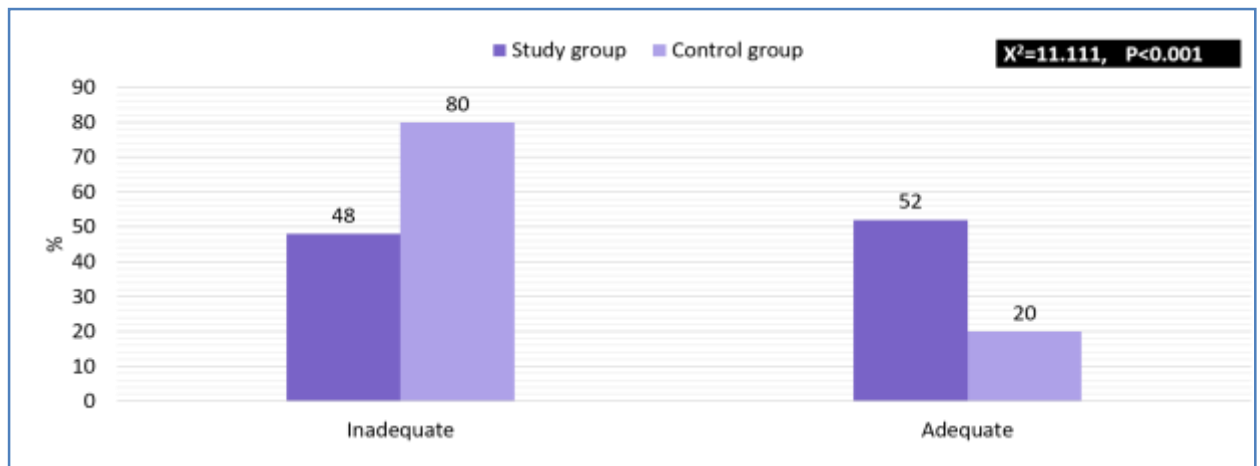
$\chi^2$ : Chi- square test

Inadequate: score  $\leq 60.0\%$

Adequate: score  $> 60.0\%$

**Figure 2: Self-Care Practices at Post-Intervention Phase Among Patients Having DR in the Study and Control Groups (n= 80).**

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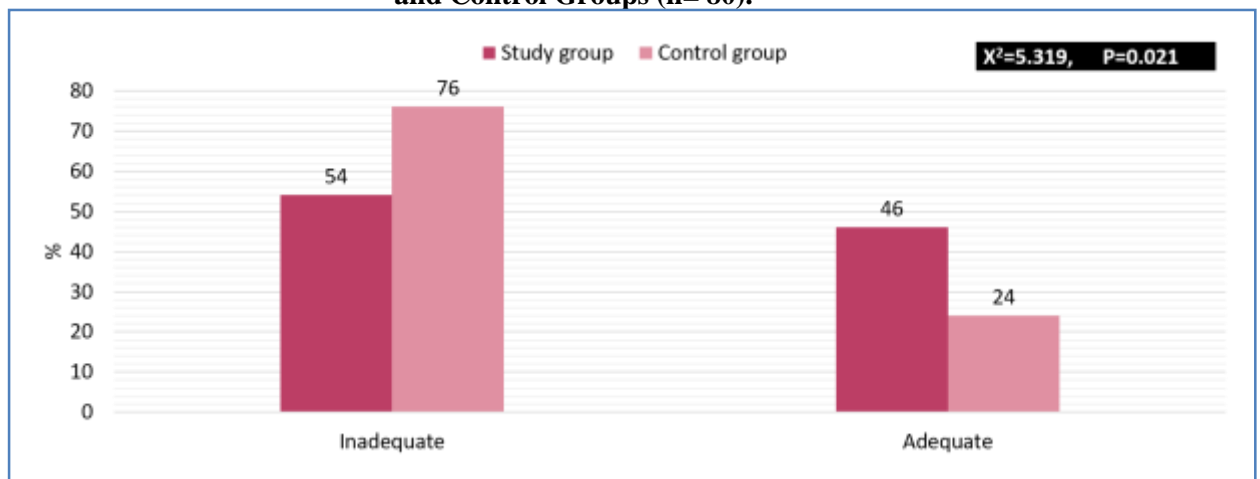


$\chi^2$ : Chi- square test

Inadequate: score  $\leq$  60.0%

Adequate: score  $>$  60.0%

**Figure 3: Self-Care Practices at follow-up Phase Among Patients Having DR in the Study and Control Groups (n= 80).**



$\chi^2$ : Chi-square test

Inadequate: score  $\leq$  60.0%

Adequate: score  $>$  60.0%

### Discussion

Diabetic retinopathy patients are at risk of developing visual impairment that negatively affects patients' functional status, and daily living activities. However, vision-threatening DR can be prevented by giving the appropriate treatment to patient's side by side by providing them with well-prepared educational program that should aim to increase their compliance to self-care practices (Li, Gu & Guo, 2019).

Regarding current symptoms, all DR patients complained of visual impairment symptoms that varied including " blurred vision, floaters in field of vision, dark spots, drop of vision and etc.". This result was in the same result of Shaban (2018) who conducted their study about "Self-

care practices among patients with diabetic retinopathy" and stated that most patients with DR had visual disturbances.

On the contrary, Aznan, Khairidzan, Razman and Fa'iza (2018) reported at their study about "Prevalence of diabetic retinopathy and its associated factors among diabetic patients in Primary Care Clinics" that the majority of their study sample had good vision and few of them had an affected vision. This difference in results might be due to the Egyptians' culture of delaying early checking and seeking treatment until symptoms occur and even worsen.

The present study also showed that most of patients having DR in both the study and control groups had fewer

complications of the disease. This might be because of the majority of patients in the two groups received treatment methods to prevent the progression of the disease involving laser therapy and intravitreal injection. This opinion was in the same line with Julius & Hopper (2019) who carried out their study about “A non-invasive, multi-target approach to treat diabetic retinopathy” and stated that the treatment modalities were effective in reducing complications of DR.

Regarding wearing eye glasses, slightly less than two-thirds of patients in the study group compared to about half of patients in the control group were using eye glasses. This result was similar with a study by Ghasemi et al., (2018) who stated at their study “Effect of self-management educational program on vision-related quality of life among elderly with visual impairment” that most of their study sample was wearing eye glasses. Also, Zahra (2017) who carried out their study about “Educational program to improve quality of life in elderly patients with visual impairment” and found that about half of the sample study was wearing eye glasses. These results might be because these assistive devices could help patients with DR to preserve the remaining vision and maintain visual independence as possible.

It was found that, most of DR patients in both study and control groups had DM for more than 15 years. This result was in agreement with a result of Valizadeh et al. (2016) who stated at their study “determining the prevalence of retinopathy and its related factors among patients with type 2 diabetes in Kerman, Iran” that more than half of their DR patients had diabetes for more than 15 years. These results indicated that longer diabetes duration is a strong risk factor for the prevalence of DR.

Concerning treatment of diabetes, nearly two-thirds of patients in the study group versus most of them in the control groups had been treated with oral hypoglycemic

agents. This result was the same with Jingi, Noubiap, Ellong, Bigna and Mvogo (2014) who carried out their study about “Epidemiology and treatment outcomes of diabetic retinopathy in a diabetic population from Cameroon” and stated that most DR patients had non-insulin dependent diabetes mellitus (NIDDM).

On the contrary, Hamzeh et al. (2019) who measure awareness of diabetes and diabetic retinopathy among a group of diabetic patients in main public hospitals in Damascus, Syria during the Syrian crisis and reported that most DR patients were on insulin injection. This might be due to the degree of disease or due to most of patient fear from operation complication

In the light of the results of the current study, the most commonly reported chronic diseases in both groups were hypertension followed by hypercholesterolemia and kidney diseases. This result was similar to that conducted by Alzahrani et al. (2018) who reported at their study about “Awareness of diabetic retinopathy among people with diabetes in Jeddah, Saudi Arabia” that about two-thirds of DR patients suffered from hypertension while the half of them suffered from hypercholesterolemia.

These results might be attributed to the fact that DR is commonly associated with these diseases because DR occurs as a result of prolonged hyperglycemia that dramatically affects the overall systemic health condition leading to micro and macro-vascular diseases.

For the self-care practices of the studied groups on pre-implementing the educational intervention; our findings revealed that the majority of patients with DR in both the study and control groups had inadequate level of self-care practices. This was noticed in all the tested areas and in the overall self-care practices with no statistically significant difference between both groups.

A similar result was reported in a study of Al-Yahya, Alsulaiman, Almizel, Barri & Al Adel (2020) who revealed at study

about “Knowledge, Attitude, and Practices (KAP) of Diabetics towards diabetes and diabetic retinopathy in Riyadh, Saudi Arabia” their study that the overall practices score of DR patients was below the accepted range. On the contrary, a Sudanese study by Farag et al. (2020) revealed at their study about “Knowledge and self-care activities among Sudanese individuals with diabetes” that most patients had an acceptable level of self-care practice.

The possible explanation for inadequate self-care practices level for both groups at the pre-intervention phase could be due to low educational level of patients that lead to having deficiency of knowledge about DR and consequently about proper self-care practices. Also, according to the researcher's observation, many healthcare providers weren't completely discussing self-care practices with their patients because of work pressure and their belief that self-care practices were mostly the patients' responsibility.

Post-implementing the educational intervention and at follow-up phases; patients in the study group had higher levels of self-care practice than control group except for regular physical activities. From the researcher's point of view, this could be due to the greater effect of the educational program and because the good education methods and case study about self-practices that made study group have high level of self-practice

This opinion was supported by Ghasemi et al., (2018) who carried out their study about “Effect of self-management educational program on vision-related quality of life among elderly with visual impairment” and reported that, post implementing the educational intervention; there was marked improvement in performing physical exercise and self-care practices among the test group compared with the control group. Also the study finding congruent with Khalaf et al ., (2019) who showed at

their study about “Does a diabetic retinopathy educational program raise awareness among elderly diabetic patients?.” that the self-care practice level become best at the post program evaluation compared by pre education evaluation.

Furthermore, there was a statistically significant difference between both groups in their overall self-care practices at the post and follow-up phases, indicating the effectiveness of the educational intervention that was given to the study group in improving their self-care practices, achieving the second objective of the current study and the percentage decreased at follow up from post program but still more than preprogram level this due to the patient might forget some information or technique after some time.

A similar positive effect of an educational intervention was reported by Shaban (2018) who conducted their study about “Self-care practices among patients with diabetic retinopathy” and demonstrated that, success of the intervention in improving overall self-care practices of DR patients at follow up phase than preprogram phase.

### **Conclusion**

Based on the findings of this study, overall self-care practices of the study group improved post implementing the educational intervention and at the follow-up phase compared with the control group, indicating the effectiveness of the educational intervention and achieving the ultimate goal of the current study.

### **Recommendations**

- Collaboration between DM follow-up clinics and eye clinics for screening for DR was strongly recommended for early detection of DR, not depending on patients until the visual disturbances occur.
- Rehabilitation programs were strongly recommended to DR patients with visual disturbance to help them to cope with their limitations and acquire independence in daily life activities.

- This study should be replicated on a large sample to generalize its results.

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