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Effect of Educational Program on Quality of Life for Critically Ill Patients having diabetic retinopathy

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Abstract: **Background:** Diabetic retinopathy (DR) is a common complication of Diabetes Mellitus (DM) which negatively affects the quality of life (QoL). **The purpose of** this study was to evaluate the effect of an educational program on the quality of life for critically ill patients having diabetic retinopathy. **Research Design:** Quasi-experimental research design was utilized in this study. **Sampling:** A purposive sample of 80 critically ill patients divided equally into study and control groups. Setting: Ophthalmology Damietta Hospital. **Instruments:** Two instruments were used. Instrument one- a structured interview questionnaire sheet. Instrument two- Vision-related quality of life questionnaire. **Results:** It was found that 72% and 78% patients in the study and control groups respectively suffered from blurred vision. Post implementing the program; patients in the study groups were more keen in performing personal hygiene, eating a suitable meal, practicing walking, adhering to treatment more than patients in the control group(62.0% Vs 34.0%), (60.0% Vs 36.0%), (66.0% Vs 36.0%) and (58.0%Vs 38.0%) consequently. **Conclusion:** Applying the educational program was effective in improving patients' quality of life. **Recommendation:** Health care providers involving ophthalmic nurses should be fully aware of their educational roles in improving the knowledge, self-care practices, and QoL of DR patients. Psychotherapy activities were urgently needed in order to improve the psychological status of DR patients.

Keywords: *Critical patients, educational program, quality of life, retinopathy.*

Introduction

Diabetic retinopathy is considered a common and specific microvascular DM complication that develops over a period of time and causes irreversible blindness (Khalaf et al., 2019). The prevalence of DR is expected to grow in both developed and developing countries because the prevalence of DM continues to increase. It is expected that the number of DR patients worldwide will increase from 126.6 million in 2010 to 191.0 million by 2030, and the number of Vision Threatening Diabetic Retinopathy is also expected to increase from 37.3 million in 2010 to 56.3 million in 2030 (Stewart, 2017).

Diabetic retinopathy results when the prolonged uncontrolled elevation in blood glucose level damages the tiny blood vessels of the eye retina. This disease is distinguished by changes in the blood-retinal barrier, which include pericyte loss and endothelial cell-cell junction breakdown. (Garcia, Isaac & Avila, 2017).

Patients may experience severe vision impairment in case of vitreous hemorrhage or when tractional retinal detachment is present (Kusuhara, Fukushima, Ogura, Inoue & Uemura, 2018).

Quality of life is a term commonly used to describe the general feeling of well-being for an individual, and it includes aspects such as happiness and satisfaction with life as a whole (Colucci et al., 2022). According to WHO, QoL is "the perception of individuals about their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" (Arianmehr, Cheraghi, Ahmadpanah, & Mohammadi, 2022).

Diabetic retinopathy can cause mild to severe visual impairment in most patients as they may have visual field defects and/or loss of central vision. The vision may appear splotchy and can vary daily from normal to blurred, distorted, or partially blocked (Purola, Ojamo, Gissler& Uusitalo, 2022) leading to decreasing in patients' ability to perform everyday tasks and consequently leading to profoundly restriction in different aspects of their life (Jani, Desai, Parikh & Shah, 2018).

Restrictions on daily living activities of patients with DR and presence of psychosocial barriers can decrease patients' compliance to treatment, worsen diabetes control, increase progression of DR, double strains on family and increase health care costs. Therefore, the ophthalmic nurse has a great role to play to improve QoL among DR patients (Zahra, 2017).

Diabetic retinopathy should be considered a priority blinding disease that should be included in the disease control strategy of our health care system and the concept of the involvement of all healthcare professionals, especially the ophthalmic nurse in process of patients' education should be introduced and supported (Khalaf et al., 2019).

Significance of the study:

In Egypt, DM is growing to be a public health problem due to many causes such as the increased prevalence of central obesity, sedentary lifestyle, health illiteracy, limited health care budget, and poor adherence to treatment. Therefore, DR as a microvascular complication of diabetes becomes more prevalent in the Egyptian population. It is estimated in 2014 that, 42 % of diabetic patients had retinopathy and 5 % of them were legally blind (Khan & Hamdy, 2016).

Very limited studies were conducted about the quality of life among critically ill diabetic patients, so this study was conducted to conduct an educational intervention and assess its effect on quality of life among patients having diabetic retinopathy.

Purpose:

To assess the effect of an educational program on the quality of life for patients having diabetic retinopathy.

Research Hypotheses:

Quality of life of patients who attended the educational program (study group) will be higher than quality of life of patients who did not attend the educational program (control group).

Methods

Design:

Quasi-experimental research design using a control and intervention group.

Setting:
This research was applied out at Ophthalmology Damietta Hospital emergency

Sampling
A purposive sample of 80 patients from the previously mentioned setting was selected. Then, they were divided equally into study and control groups.

Sample size calculation:
The sample size could be calculated using the following formula:
n = [(Zα/2 + Zβ)2 × {2(SD)2}]/ (significant mean difference)2 where
SD = standard deviation
Zα/2: This depends on the level of significance, for 5% this is 1.96 Zβ: This depends on power, for 80% this is 0.84
Therefore,
n= [(1.96 + 0.84)2 × {2(25.55)2}]/ (15)2= 46
The sample size required for each group was 46 patients with adding 10% to compensate for dropouts to become 50 patients for each group.

Instruments:
Two instruments were utilized to collect data:
Instrument one: A structured interview questionnaire sheet.: It was developed by the researcher after a review of related literature (Denniston & Murray, 2014); to collect the necessary data for the study. It consisted of two parts:

- **Part one:** Socio-demographic characteristics.
  This part included questions related to the personal characteristics of studied patients such as sex, age, educational level, occupation, and marital status.
- **Part two:** Health-relevant data.
  This part included questions relate to patients':
  - **Subpart one:** Ocular history; it was about the onset of DR, current symptoms, the prescribed treatment of DR, the occurrence of DR complications, use of eyeglasses.
  - **Subpart two:** Family history; it was about diabetes mellitus, diabetic retinopathy, and its complications.

Instrument two: - Vision-related quality of life questionnaire.
This instrument was adopted from Abosree (2017) who adapted it from National Eye Institute Visual Functioning Questionnaire-25 (Mangione et al., 2001). It assessed the QoL of DR patients in three domains; physical, psychological, and social domains. This instrument was used in the pre-& post-program phase, and at follow-up.

1. **Physical domain:** it included 6 major items such as personal hygiene, wearing clothes, eating a meal, activities, treatment and other visual abilities, and each item had sub-items.
2. **Psychological domain:** It included 6 sub-items such as feeling angry because of the disease, feeling grief, loss of motivation, etc.
3. **Social domain:** it included 3 finding it hard in interacting with family members, finding it hard in interacting with friends, and preferring to stay at home more with not attending social events.

Scoring system for the quality of life:
Each statement in this questionnaire had three types of responses (always, sometimes, and never) which were scored as (0, 1, and 2) respectively. The scores of each area of QoL were summed up to give the total score. After that, the obtained total score was divided by the final overall scores for each area, giving a mean score, and then converted to a percent score. For each area of QoL and for the total, the score was categorized as the following:

- Poor: if the score was < 50 % of the total score.
- Fair: if the score was 50 % to 75 % of the total score.

- Good: if the score was > 75 % of the total score.

Pilot Study:

Before starting data collection, a pilot study was performed on 10 patients constituting about 10 % of the total sample, and then they were excluded later from the main study sample.

Validity:

After the instruments were designed by the researcher, their content validation was evaluated by a panel of five experts; (two professors in the Ophthalmology field and three assistant professors at the Faculty of Nursing at Mansoura University).

Procedure:

An official letter was submitted from the Dean of the Faculty of Nursing, Mansoura University to the directors of selected settings.

The collection of data was conducted over a period of 18 months which started from July 2019 to December 2020. In the assessment phase, data was collected from patients about social characteristics and health relevant data through distributing the instrument between them after explaining how to answer the questions which are found in the instrument. Afterwards, instrument two was distributed between patients. The researcher started by explaining how to answer questions.

During the Planning phase (program development phase) an educational program was developed by the researcher Based on pre-test findings and relevant related literature. needs were identified, requirements, and deficiencies were the basis of setting the objectives of the program and writing the booklet.

During the Implementation phase the researcher encouraged the patients in the study group by telephone to come and meet the researcher. Basically, patients returned back to the hospital to receive their treatments whether laser therapy, vitreous injection, or just the researcher could meet them and introduce the educational program. It was given in the form of 4 sessions; each session took between 30 – 60 minutes. First session was entitled…….

Second session was about…….

Title of the third session was…….

The fourth session was entitled……. Each session contained …write the number……. patients.

Various teaching methods were used to implement the program such as; group discussion, demonstration, and brainstorming. Different teaching media were utilized like power-point presentations, videotapes, colored pictures, and illustrated booklets.

The control group:

the participants in the control group didn't receive the program, but they received the usual care from the ophthalmologists and nurses at the clinic.

In the evaluation phase

Each participant in both groups was evaluated 3 times during the study period. The first was pre-test evaluation It was done during the assessment phase. The second evaluation (post-test) was done one month post the implementation phase and the 3rd evaluation (follow-up) was done after three months of the second evaluation.

Ethical Considerations:

Each patient was assured of the anonymity of their data collection instruments. They were assured that they can withdraw from the study at any time. A formal written consent was obtained from patients regarding their acceptance to share in the study after explaining the purpose of the study and methods of data collection

Statistical Analysis:

Statistical analysis was done using SPSS for windows version 23.0 (SPSS, Chicago, IL). Categorical data were expressed in numbers and percentages. The Chi-square test was used for the comparison of variables with categorical data. A statistical significant difference was considered if P <.05

Results:

Table 1 revealed that 72% versus 58% of patients in the study and control groups respectively ranged between 50 to 60 years with a mean age ±SD (50.9 ±7.9 vs. 49.4±8.6 years). Females represented more than two-thirds (68%) of patients in the study group compared to 58% of them in the control group. 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 both study and control groups (70% & 64% respectively) came from rural areas. Furthermore, 70% of patients in the study group compared to 74% of them in the control group had sufficient monthly income.

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 current symptoms, 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-in vision. Also, it was noticed that more than half of patients (70% & 64%) in the study and control. groups respectively didn't have any complications from DR.

Regarding family history, nearly two-thirds (64% vs. 54%) of patients in the study and control groups respectively had a positive family history of diabetes. Furthermore, 21.9% vs. 14.8% of diabetic patients in both groups respectively had positive family history of DR. Additionally, 28.6% vs. 25% of DR patients in both groups respectively had a positive family history of DR's complications. Finally, there were no statistically significant differences between the two groups regarding their health-relevant data (P > 0.05), therefore, the two groups were homogenous in their health-relevant data.

Table 3 illustrated that pre-implementing the program; there was no statistically significant difference between the study and control groups in relation to physical status that included personal hygiene, wearing clothes, eating a meal, activities as walking, treatment and other visual abilities as (P= 0.663, 0.460, 0.535, 0.250, 0.387 and 0.533 respectively). Additionally, there were no statistically significant differences between both groups in their total physical, psychological and social status as (P=0.133, 0.101 and 0.146 respectively).

Table 4 showed that, post implementing the program; there were statistically significant differences between the study and control groups in relation to physical status that included personal hygiene, eating a meal, activities as walking, treatment and other visual abilities as (P= 0.019, 0.044, 0.028, 0.025 and 0.039 respectively).

As regards to total physical and social status, a statistically significant difference was found between the study and control groups as (P= 0.038 and 0.046 respectively). However, there were no statistically significant

differences between their psychological status (P=0.181).

Table 5 illustrated that at the follow-up phase; there were statistical significant differences between the physical status of the study and control groups e.g. personal hygiene, eating a meal, activities as walking, treatment and other visual abilities (P= 0.025, 0.020, 0.042, 0.040 and 0.046 respectively). However, no statistically significant difference was observed between the two groups in the domain of wearing clothes (P=0.797).

As regards to physical and social status, a statistically significant difference was found between the study and control groups (P= 0.024 and 0.009 respectively).

Figure 1 showed that at the pre-program phase; just 38% of patients in the study group compared with 26% of them in the control group had a high overall vision-related QoL No statistically significant difference was found between two groups (P > 0.05).

Figure 2 showed that at the post-program phase; 58% of patients in the study group vs. 32% of them in the control group had a high overall vision-related QoL with statistically significant difference between both groups as P = 0.025.

Figure 3 showed that at the follow-up phase; 62% vs. 38% of patients in the study and control groups respectively had a high overall vision-related QoL with statistically significant difference between both groups as P=0.038.

Table 1. Social characteristics of patients (study and control) having diabetic retinopathy

	Study-group		Control-group		Chi square test	
	N (40)	%	N (40)	%	χ^2	P
Age (years)						
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 ±SD	50.9 ±7.9		49.4 ±8.6		0.969	0.335^
Sex						
Male	11	32.0	16	42.0		
Female	29	68.0	24	58.0	1.073	0.300
Marital Status						
Single	3	6.0	2	50%		
Married	25	66.0	30	75%		
Divorced	2	4.0	4	10%		
Widowed	10	24.0	4	10%	4.059	0.255
Level of education						
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
Occupation						
Employee	7	16.0	11	28.0		
Worker	10	28.0	9	24.0		
Housewife	2	50.0	16	40.0		
Not working	3	6.0	4	8.0	2.111	0.550
Residence						
Rural	30	70.0	28	64.0		
Urban	10	30.0	12	36.0	0.407	0.520
Living condition						
Alone	2	4.0	3	6.0		
With the family	38	96.0	37	94.0	0.211	0.646
Income / month						
Insufficient	10	30.0	12	26.0		
Sufficient	30	70.0	28	74.0	0.198	0.656

(^) P value based on Student's t test
χ2: Chi- square test

Table 2. Health relevant data of patients (study and control groups) having diabetic retinopathy

A) Ocular history:	**Study group group (40)**	**%**	**Control N (40)**	**%**	**Chi square test N χ2**	**P**
Duration of DR (years)						
< 5	23	56.0	28	66.0		
5 – 10	15	40.0	9	28.0		
>10	2	4.0	3	6.0	1.669	0.434
Current symptoms						
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
Treatment of DR						
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
Complications of DR						
No	32	70.0	30	64.0		
Vitreous hemorrhage	10	20.0	12	24.0		
Retinal detachment	2	4.0	4	8.0		
Glaucoma	3	6.0	2	4.0	1.183	0.757
Currently wearing eye glasses		60.0	24	52.0	0.649	0.420
B) Family history:						
Family history of diabetes						
No	13	36.0	18	46.0	1.033	0.309
Yes	27	64.0	22	54.0		
Family history of DR						
No	25	78.1	23	85.2	0.481	0.488
Yes	7	21.9	4	14.8		
Family history of DR's complications						
No	5	71.4	3	75.0	0.016	0.898
Yes	2	28.6	1	25.0		

χ2: Chi- square test DR: Diabetic Retinopathy

Table 3. Distribution of Patients in the Study and Control Groups According to Their Levels of Quality of life Related to Physical, Psychological and Social Status on Pre-Program Phase (n= 80).

	Study group						Control group						Chi square	
	Low		Moderate		High		Low		Moderate		High		Test	
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2	P
A) Total physical status	12	28.0	11	26.0	23	46.0	13	26.0	21	44.0	14	30.0	4.036	0.133
Personal hygiene	8	18.0	16	34.0	24	48.0	12	24.0	16	36.0	18	40.0	0.821	0.663
Wearing clothes	3	8.0	13	28.0	32	64.0	8	16.0	12	24.0	30	60.0	1.552	0.460
Eating a meal	10	24.0	19	42.0	17	34.0	17	34.0	15	38.0	10	28.0	1.252	0.535
Activities as walking	8	16.0	15	30.0	27	54.0	9	18.0	18	44.0	15	38.0	2.774	0.250
Treatment	12	24.0	17	34.0	21	42.0	12	24.0	23	46.0	15	30.0	1.900	0.387
Other visual abilities	15	30.0	17	34.0	16	36.0	16	32.0	21	42.0	13	26.0	1.260	0.533
B) Total psychological status	8	16.0	16	32.0	26	52.0	3	6.0	20	50.0	17	44.0	4.582	0.101
C) Total social status	11	22.0	18	36.0	21	42.0	4	8.0	21	42.0	25	50.0	3.845	0.146

χ2: Chi- square test

Low: score < 50.0%
Moderate: score 50.0 % - 75.0% High: score > 75.0%

Table 4. Distribution of Patients in the Study and Control Groups According to Their Levels of Quality of life Related to Physical, Psychological and Social Status on Post Program Phase (n= 80).

	Study group						Control group						Chi square	
	Low		Moderate		High		Low		Moderate		High		Test	
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2	P
A) Total physical status	5	10.0	9	28.0	26	62.0	12	24.0	14	38.0	14	38.0	6.520	0.038*
Personal hygiene	5	10.0	9	28.0	26	62.0	10	20.0	18	46.0	12	34.0	7.939	0.019*
Wearing clothes	4	8.0	9	28.0	27	64.0	6	12.0	7	24.0	27	64.0	0.554	0.758
Eating a meal	5	10.0	10	30.0	25	60.0	11	22.0	16	42.0	13	36.0	6.250	0.044*
Activities as walking	7	14.0	5	20.0	28	66.0	7	14.0	17	44.0	16	42.0	7.167	0.028*
Treatment	6	12.0	10	30.0	24	58.0	13	26.0	16	42.0	11	32.0	7.335	0.025*
Other visual abilities	7	14.0	14	38.0	19	48.0	18	36.0	10	30.0	12	34.0	6.506	0.039*
B) Total psychological status	6	12.0	16	42.0	18	46.0	12	24.0	9	28.0	19	48.0	3.421	0.181
C) Total social status	1	2.0	14	38.0	25	60.0	8	16.0	13	36.0	19	48.0	6.138	0.046*

χ2: Chi- square tes
(*) P value is significant if < 0.05

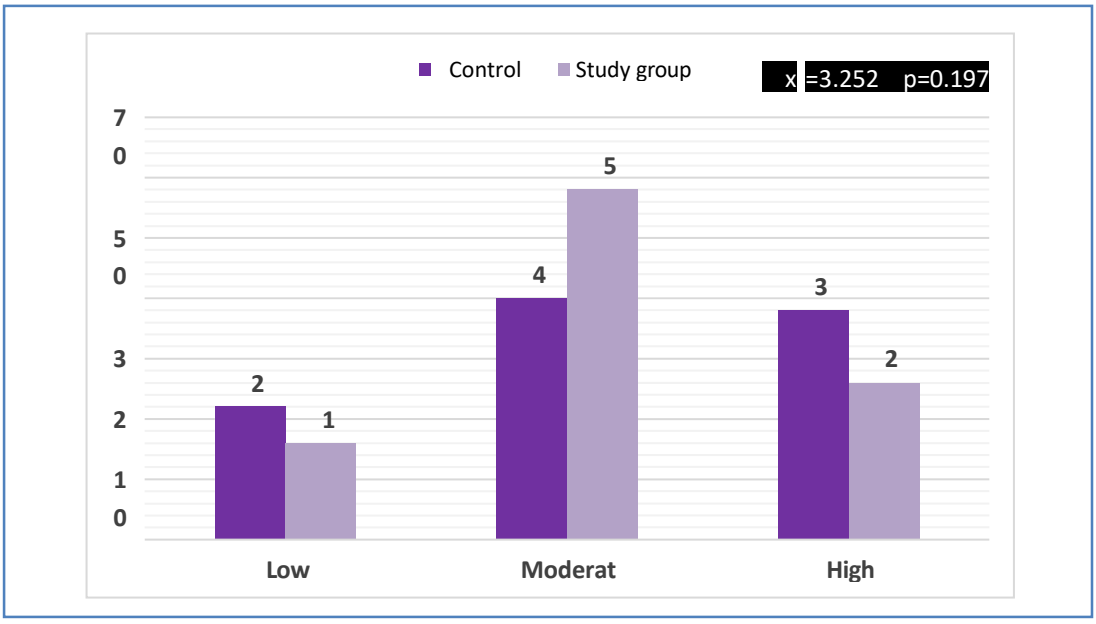
Low: score < 50.0%
Moderate score 50.0 % - 75.0% High: score > 75.0%

Table 5. Distribution of Patients in the Study and Control Groups According to Their Levels of Quality of life Related to Physical, Psychological and Social Status at Follow up Phase (n= 80).

	Study group						Control group						Chi square Test	
	Low		Moderate		High		Low		Moderate		High			
	N	%	N	%	N	%	N	%	N	%	N	%	χ2	P
A) Total physical status	5	10.0	15	30.0	29	60.0	11	32.0	8	26.0	21	42.0	7.493	0.024*
Personal hygiene	5	10.0	9	18.0	26	72.0	7	14.0	20	40.0	23	46.0	7.370	0.025*
Wearing clothes	4	8.0	12	26.0	33	66.0	6	12.0	12	24.0	32	64.0	0.455	0.797
Eating a meal	6	12.0	12	26.0	31	62.0	11	22.0	22	44.0	17	34.0	7.868	0.020*
Activities as walking	3	6.0	10	20.0	37	74.0	10	20.0	14	28.0	26	52.0	6.357	0.042*
Treatment	5	10.0	15	32.0	29	58.0	15	30.0	14	28.0	21	42.0	6.413	0.040*
Other visual abilities	10	20.0	13	28.0	26	52.0	16	32.0	19	38.0	15	30.0	6.172	0.046*
B) Total psychological status	6	12.0	13	28.0	30	60.0	12	24.0	17	34.0	21	42.0	3.879	0.144
C) Total social status	0	0.0	16	32.0	34	68.0	8	16.0	17	34.0	25	50.0	9.403	0.009*

□2: Chi- square test Low: score < 50.0%
(*) P value is significant if < 0.05 Moderate score 50.0 % - 75.0% High: score > 75.0%

Figure 1. Comparison Between Levels of Quality of Life of Patients (Study and Control Groups) on Pre-Program Phase

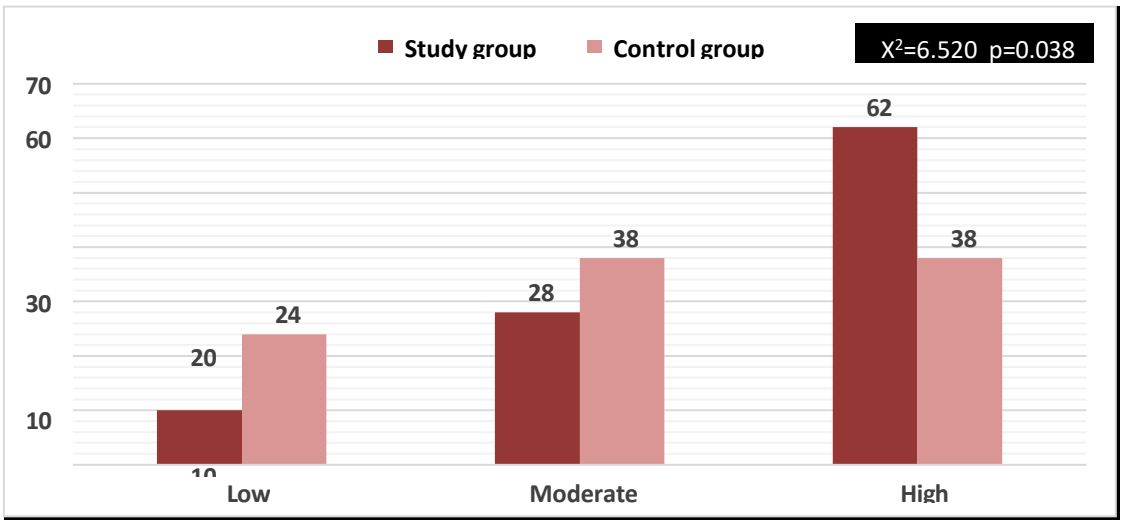


x2: Chi- square test
P value is significant if < 0.05

Low: score < 50.0%
Moderate: score 50.0 % - 75.0%
High: score > 75.0%

Figure 9. Comparison Between Levels of Quality of Life of Patients (Study and Control Groups) on Post Program Phase

Compa



x2: Chi- square test
P value is significant if < 0.05

Low: score < 50.0%
Moderate: score 50.0 % - 75.0%
High: score > 75.0%

Discussion

Before implementing the educational program; our findings revealed that just slightly more than one-third of the study group compared to around one-quarter of the control group had a high QoL. Above all. no statistically significant difference was found between the two groups. Regarding to the different domains of QoL; there were no statistically significant differences between the two groups in relation to physical domains such as personal hygiene, wearing clothes, eating a meal, walking, treatment, and other visual abilities.

Also, Kamran et al. (2017) who studied the quality of life in patients with DR, reported the same result. In the same line, Shrestha and Kaiti (2014) reported in their study, many DR patients had vision-related activity limitations due to their visual restrictions.

However, this could increase their liability for serious health problems related to poor control of diabetes mellitus Besides, those patients are more liable to mild to severe visual impairment which limits the ability of the majority of patients in the two groups to perform everyday tasks. Thereby, these patients will acquire profound restrictions in different aspects of their life that negatively affects their physical, psychological and social status (Pereira et al., 2017).

In agreement with this, a study was conducted by Abosree (2017) and another one carried out by Ejiakor, Achigbu, Onyia, Edema and Florence (2019). They reported that patients having diabetes mellitus associated with diabetic retinopathy have poor quality of life.

Post-implementing the educational program and at the follow-up phase; patients in the study group had higher quality of life than patients in the control group especially in relation to all items related to physical domain (except wearing clothes). Also, they had better quality of life in relation to

social status. This study was in line with Elsman et al. (2019) in their study entitled interventions to improve functioning, participation, and quality of life in children with visual impairment. This indicated the effectiveness of the educational program of the present study (methods of teaching, media, booklets) that was given to the study group in improving their total physical and social status. Also, during the sessions, patients, were encouraged to ask questions which were immediately answered by the researcher. Meanwhile, the researcher was providing stimulating questions and patients who were able to answer received incentives in the form of verbal compliments.

For the psychological domain, it was found that, there was no statistically significant difference between the study and control groups post implementing the educational program and at the up-follow phase. This might be due to influence of diabetic retinopathy on patients' psychological conditions. This opinion was supported by Fenwick et al. (2012) who stated that, even mild levels of visual impairment could negatively influence on psychological functions of many patients.

Conclusion

Based on the findings of this study; total knowledge, overall vision- related QoL of the study group were improved post implementing the educational program and at the follow-up phase compared with the control group, indicating the effectiveness of the educational program and achieving the ultimate goal of the present study.

Recommendations

- Health care providers involving the ophthalmic nurses should be fully aware of their educational roles in improving knowledge, self-care practices and QoL of DR patients.
- Psychotherapy activities were urgently needed in order to improve the psychological status of DR patients.

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