

# Effect of Nursing Guidelines on Improving Knowledge and Relieve Anxiety of Diabetic Patients with Retinopathy

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**Abstract:** Diabetic retinopathy (DR) is the most common microvascular complication of diabetes, which can lead even to blindness. Aim of study: The current study aimed to evaluate the effect of nursing guidelines for improving knowledge and relieve anxiety of diabetic patients with retinopathy. Design: A quasi-experimental study design was utilized. Setting: The study was carried out in outpatient clinic of ophthalmology at Ain Shams University Hospital. It is 'the largest national referral hospital of teaching, Tools: 1) A Structured Interview Questionnaire (SIQ): it was included, the demographic data and clinical data of the studied patients. 2) Patient Knowledge Questionnaire It was used to assess patients' knowledge regarding, definition retinopathy, signs and symptoms, stages of retinopathy, causes, signs & symptoms, complications of diabetes on peripheral blood vessels, diagnosis, and treatment. 3) Taylor Anxiety Scale: It was designed to assess level of anxiety. 4) Assessment barriers regarding diabetic retinopathy check up. Results: There were also, highly statistical significant differences between pre, post and follow up of implementing the nursing guidelines in most items of knowledge (at  $P < 0.05$ ). There were a highly statistically significant differences were found between pre, post and follow-up of implementing nursing guidelines among diabetic patients with retinopathy and relieve the severity of anxiety ( $X^2 = 20.430$   $P < 0.05$  and  $66.719$   $P < 0.01$ ) respectively. There will be negative relationship between patients' level of anxiety and total knowledge of diabetic patients with retinopathy ( $r = 0.779$  at  $P < 0.01$ ). Conclusion: The implementation of nursing guidelines had a positive effect on knowledge and relieves level of anxiety among diabetic patients with retinopathy. Recommendation: - Develop more specialists in counselling services for patients with DR including an emphasis on psychosocial recovery and adaptation.

**Keywords:** Nursing guidelines, Diabetic retinopathy.

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## 1. INTRODUCTION

Diabetes mellitus is an increasing health problem that currently affects 150 million people worldwide and is expected to affect 200 million people by the year 2025. One of the most frequent complications of both type 1 and type 2 diabetes is diabetic retinopathy (DR), which is estimated to account for 80% of all cases of legal blindness in persons' age 20–74 years in the USA. (Sharon et al, 2017)

Diabetic retinopathy (DR) is the most common microvascular complication of diabetes, which can lead even to blindness. Visual function impairment can result either from local production of growth factors and the development of abnormal new vessels in the ischemic retina or from diabetic macular edema as a result of increased vascular permeability. DR is traditionally classified into two primary categories: a) non proliferative diabetic retinopathy (NPDR), and, b) proliferative diabetic retinopathy (PDR). (Praidou et al., 2011 & Bowling, 2016).

Initially, DR usually manifests as a gradual, painless progression of vision loss; however, visual loss may occur with vitreous hemorrhage or macular edema (thickening of the central part of the back layer of the eye, the retina). Symptoms

may fluctuate throughout each day and from day to day. The mainstay of treatments for severe DR and macular edema are laser photocoagulation for PDR and, in severe cases of PDR with vitreous hemorrhage and detachment threatening or involving the macula, vitrectomy. (*Mohamed et al 2007*)

Early recognition of DR minimizes visual loss. Previous studies have demonstrated that dilated fundus examinations (DFE) for patients with DR identify initial changes before patient's experience symptoms. Individuals with diabetes should have comprehensive dilated eye exams annually to check for signs of developing retinopathy. On an annual basis which translates to an opportunity to prevent vision loss and blindness. Simply increasing adherence to annual dilated fundus examinations by patients with diabetes has the potential to greatly reduce the prevalence and costs of DR (*Sloan, et al, 2005*).

There are many associated complications of diabetic retinopathy that can threaten vision. Diabetic retinopathy is the most common microvascular complication of diabetes mellitus and affects between 3% - 4% of people in Europe, while the relative risk for developing diabetic retinopathy is higher in type 1 diabetes compared to type 2 (*Deutsche et al.2010 & Prokofyeva &, Zrenner 2012*), while diabetic macular edema is more commonly found in type 2 diabetes (prevalence after 15 years of disease: type 1 vs type 2 = 15% vs 25%) (*Nentwich & Ulbig,2010*).

Some studies indicate that prolonged DM duration is indeed a well-established risk factor for DR (*Xu et al, 2012*). The major risk factors associated with retinopathy according to (*American Academy of Ophthalmology Retina Panel ,2012*) were hyperglycemia and hypertension.

The most important treatment for diabetic retinopathy is control of the underlying diabetes. Good management of diabetes can prevent the development, and slow the progression of diabetic retinopathy (relevant data are explored below). Primary care physicians and practice nurses play a key role in the regular measurement and target based treatment of modifiable risk factors. (*Broadbent, 2013*)

Patient education plays an important role in the management of retinopathy, as increased awareness and decrease complications. Practice nurses can certainly help encourage patients to actively engage with screening. They also have an invaluable role in patient education. The progression to more advanced retinopathy is related to the control of diabetes and its risk can be reduced by intensive blood sugar and blood pressure control. It is therefore important to engage with patients in optimizing their diabetic control and approach wider health issues holistically, such as weight, diet and exercise. Patients with sight-threatening retinopathy may need counselling regarding a potential loss of vision as well as a clear explanation of the treatment options. (*Khan, et al, 2010*).

#### **Significant of the study:**

Diabetes mellitus (DM) is a major emerging clinical and public health problem in Egypt with a prevalence of 5–10% in the 1990s Epidemiological studies of DM and DR in Middle Eastern countries including Egypt have shown a substantial heterogeneity in the reported prevalence of DM (3.4–29%) and its complications especially DR (7.6–60%), even within the same country. (*Alwan & King 1992, Rubino et al, 2007 & Tamer et al, 2011*). Currently, there are no documented studies that have reported the prevalence of diabetic retinopathy among diabetic outpatient clinic in Ain Shams university hospitals. In particular, there were no data regarding the prevalence of undiagnosed and sight-threatening diabetic retinopathy in this high-risk patients. The aim of current study was to evaluate effect of nursing guidelines in reducing diabetic retinopathy. In order to decrease the gaps of knowledge, and practices regarding diabetes and blindness due to diabetes is important. Hence the present study was undertaken to evaluate effect of nursing guidelines in reducing diabetic retinopathy.

#### **Aim of the study:**

The current study aimed to evaluate the effect of nursing guidelines for improving knowledge and relieve anxiety of diabetic patients with retinopathy.

#### **This aim has been achieved through the followings:**

- 1- Assess patients' knowledge regarding diabetic patients with retinopathy.
- 2- Assess level of anxiety regarding diabetic patients with retinopathy.

- 3- Identify the barriers that affect the follow up of diabetic patients with retinopathy
- 4- Develop, implement and evaluate the effectiveness of nursing guidelines for improving knowledge and relieve levels of anxiety among diabetic patients with retinopathy.

**Hypothesis of the study:**

In order to achieve the aim of this study, it was hypothesized that, the implementation of the nursing guidelines will lead to significant positive improvement on knowledge and relieve levels of anxiety among diabetic patients with retinopathy.

**Subject and Methods;**

**Design:** A quasi-experimental design was utilized in this study.

**Setting:**

The study was carried out in outpatient clinic of ophthalmology unit affiliated to Ain Shams University Hospital, which is 'the largest national referral teaching hospital.

**Subjects:**

A purposive sample included of (50) adult's patients with type two diabetes mellitus, their age ranged from 35 years to more than 50 years, the researchers was selected the type 2 diabetes for these subjects because the younger age (type 1) has more rapid progression of eye disease and diabetic complications. The participants were eligible, able to read and write, have a clinical diagnosis of DR (with or without macular edema), willing to be interviewed and able to provide verbal or written informed consent in this study. The researchers explain the purpose of the study and invited them to attend scheduled focus group sessions.

**Exclusion criteria:**

- Critically ill or seriously ill patients not able to take the interview.
- Patients having other ocular diseases apart from diabetic retinopathy which could contribute to blindness were excluded from the study.
- Mental retardation or patients with mental illness

**Tools of data collection:****I. A Structured patients' interviewing questionnaire:**

It was designed by the researchers from several published articles, and recent and relevant literatures. It was written in a simple Arabic language and included the following two parts:

**a) Demographic characteristics of the patients;** for descriptive purposes, all participants were asked to complete a brief questionnaire of demographic information (age, gender, marital status, educational level, and employment status).

**B) Medical data of diabetic patients with retinopathy** (e.g. diabetes status: control or uncontrolled, duration of illness, comorbid disease and diabetic eye examination vision check up).

**II. PATIENTS' KNOWLEDGE ASSESSMENT QUESTIONNAIRE**

A closed ended questionnaire was administered to the diabetic patients with retinopathy, it was derived from reviewing, recent and relevant literatures from (*Harris et al, 2013, Sun et al, 2015 & Menezes et al, 2016*). It was used to assess patients' knowledge regarding, definition of diabetic retinopathy, causes, signs and symptoms, medical treatment, complications, importance of checkup, treatment options, prevention methods of blindness due to DM, and blood glucose controlled or uncontrolled

**Scoring system:**

One point was scored for each correct answer and zero for the incorrect one. The points were summed and converted into a percentage scoring, the total scoring system was classified as, poor (<60%), and good for (> 60%).

### III. TAYLOR ANXIETY SCALE

It was designed by Janet Taylor (1953), to assess the level of anxiety, not necessarily with generalized anxiety disorders, it addresses the various aspects of anxiety including, psychological and somatic or autonomic items.

#### Scoring system:

Taylor Anxiety Scale consists of 50 statements that have an answer of “Yes” or “No”, the answer of yes is scored 1 and zero is scored for “No” answers when items summed, raw scores for each scale showed that:

- Score below  $\leq 16$  referred to non to minimal anxiety level.
- Score from 17 to 25 referred to mild anxiety level.
- Score from 26 to 35 referred to moderate anxiety level.
- Score  $\geq 36$  referred to severe anxiety level.

### IV. BARRIERS ASSESSMENT REGARDING DIABETIC RETINOPATHY CHECKUP

A semi-structured questionnaire, was developed by researchers to assess the barriers leading to low checkup regarding diabetic retinopathy, the questions covered all potential barriers from the schedules derived from the studied sample during interviews. All questions were phrased differently in order to be appropriate for all participant.

#### Content validity:

The content of the tools was tested regarding the knowledge accuracy, relevancy and competency. It was ascertained by experts including: professors of Medical–Surgical Nursing, faculty of nursing (5) and professors of ophthalmology staff (4) Faculty of Medicine / Ain Shams University. Their opinions were elicited regarding the tool format layout, consistency and scoring system.

#### Administrative design:

The necessary official approvals were obtained from the administrators of the out patient clinic. Letters of request were issued to them from the Faculty of Nursing at Ain Shams University explaining aim of the study and its expected outcomes.

#### Ethical considerations:

In order to protect patients' rights in scope of the study, before the initial interview, an oral consent was secured from each patient after being informed about the nature, purpose and benefits of the study. Patients were also informed that participation is voluntary and about their right to withdraw at any time without giving reasons. Confidentiality” by stating that the personal information will be kept confidential after being shared with the researchers and reassured patients that the data would be used only for the research purpose.

#### Pilot study:

A pilot study was carried out on 10% of the total number of the study sample to test the applicability, clarity and efficacy of the tools, assess the feasibility of fieldwork and identification of a suitable place for interviewing the patients, and to detect any possible obstacles that might face the researchers and interfere with data collection. The pilot sample was excluded from the main study sample.

#### Implementation phase:

##### Field work:

- The study was carried out from the beginning from February 2017 until January 2018, including development of the nursing guidelines and tools. It was based on reviewing recent and relevant literatures regarding to diabetic retinopathy.
- The researchers were available in the morning shift at the clinical field for 2-days / week by rotation.
- Purpose of the study was simply explained to patients who agreed to participate in the study prior to data collection.

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- Data collection was done by the researchers at the out patients' clinic using the pre/post and follow up constructed tools.
- Filling in the tools was completed according patients' understanding and health condition.
- Before starting the the nursing guidelines, the researchers interviewed each patient individually or in small groups for 10-15 minutes and explained the aim of the study, then asked each one to fill in the previous mentioned tools, as a pre-test. Each tool took 20-30 minutes to be filled In. Determining patients' needs were based on answers of each patient to the tools.
- The the nursing guidelines were designed based on the assessment of patients' knowledge related to their illness.
- The content was written in simple Arabic language and it was consistent with the related literature. Moreover, it met patients' needs and level of understanding.
- The nursing guidelines were presented in two sessions. Patients were divided into small groups including 10 - 11 patients. In addition, each patient was guided by simple written and illustrated instructions and orientation about objectives, outlines and expected outcomes.
- **The nursing sessions** was conducted through lectures and group discussions; using data show and poster as a media. It was taken in two sessions (each session's duration was from 30 – 45 minutes
- The first session covered general information about diabetic retinopathy: definition, causes, signs and symptoms, medical treatment, and complications.
- The second session covered how to control blood glucose level, importance of checkup, treatment options, prevention methods of blindness due to DM,
- Patients were informed to be in contact with the researchers by telephone for any guidance.
- The studied patients were evaluated immediately after implementing the nursing guidelines using the same previously mentioned tools.
- Taylor Anxiety Inventory was given to the patients to be filled to determine their anxiety levels pre, immediately post and follow-up after 6 months.
- Regarding follow-up of the patients, it was done after 6 months by using the same tools, the researchers contact the patients by direct interview and by telephone.

**Statistical analysis:**

The collected data were organized, categorized, analyzed using the Statistical Package for Social Studies (SPSS). Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and standard deviations for quantitative variables. The statistical test such as chi-square test was to determine relation between qualitative data. Statistical significance difference was considered when p-value < 0.05, and high significance when p-value < 0.001 and no statistical significance difference was considered when p-value > 0.05.

**Table (1): Patients' distribution regarding to demographic characteristics in study sample of diabetic patients with retinopathy n=50.**

**Distribution of diabetic patients with retinopathy regarding to demographic characteristics n=50.**

Demographic Characteristics	No	%
<b>Age:</b>		
35 to 40 years	5	10
40 to 50 years	15	30
more than 50 years	30	60

<b>Mean ± SD</b>	<b>34.45±4.26</b>	
<b>Gender:</b>		
- male	10	20
- female	40	80
<b>Marital status:</b>		
Married	40	80
Single	10	20
<b>Educational Level</b>		
Read and write	15	30
High school education	15	30
University education	20	40
<b>Employment status:</b>		
Employed full time	15	30
Employed part time	10	20
Unemployed	25	50

Table (2): Distribution of medical characteristics data of the studied sample of diabetic patients with retinopathy n=50

Distribution of diabetic patients with retinopathy regarding to medical characteristics n=50.

Medical Characteristics	No	%
<b>Diabetes status:</b>		
Control	15	30
Uncontrolled	35	70
<b>Duration of illness</b>		
5-10 years	15	30
> 10 years	35	70
<b>Comorbid disease</b>		
Hypertension	30	60
Rheumatoid	1	2
Cardiomyopathy	4	8
thyroid	8	16
renal disorders	2	4
Others	5	10
<b>Diabetic eye examination:</b>		
<b>Vision check up:</b>		
<b>Yes</b>	<b>10</b>	<b>20</b>
-Frequency	4	40
Once per year	6	60
<b>No</b>	40	80

Table (3): Comparison between pre, post and follow-up of implementing nursing guidelines among diabetic patients with retinopathy regarding to their satisfactory level of knowledge (n=50)

Level of knowledge regarding diabetic retinopathy	Pre-implementing nursing guidelines		post-implementing nursing guidelines		Follow-up		X <sup>2</sup> (P-value)	X <sup>2</sup> (P-value)
	No	%	No	%	No	%		
Definition of diabetic retinopathy	15	30	42	84	40	80	3.704 P < 0.05	38.095 P < 0.001
Causes of diabetic retinopathy	13	26	46	92	44	88	1.528 p > 0.05	26.708 P < 0.001
Symptoms of diabetic retinopathy	18	36	48	96	41	82	1.172 p > 0.05	9.491 P < 0.05

Medical treatment considerations	10	20	43	86	40	80	2.035 p>0.05	26.708 P<0.001
Complications of diabetic retinopathy	17	34	40	80	40	80	6.430 P<0.01	50.00 P<0.001
Importance of check up for diabetic retinopathy	2	4	39	78	35	70	0.588 p>0.05	32.906 P<0.001
Treatment options for diabetic retinopathy	22	44	45	90	43	86	4.365 P<0.05	34.127 P<0.001
Prevention methods of blindness due to DM:								
Diet	15	30	45	90	44	88	2.381 p>0.05	40.741 P<0.001
Drugs	17	34	46	92	45	90	2.240 p>0.05	31.884 P<0.001
Eye check-up	18	36	42	84	41	82	5.357 P<0.05	43.386 P<0.001
Blood glucose	15	30	43	15	40	39	3.488 P<0.05	32.558 P<0.001
• Controlled	35	70	8	35	10	11	4.082 P<0.05	38.095 P<0.001
• Uncontrolled								

Table (4): Comparison between pre, post and follow-up of implementing nursing guidelines among diabetic patients with retinopathy regarding to their severity of anxiety (n=50)

Levels of anxiety	Pre-implementing nursing guidelines		post-implementing nursing guidelines		Follow-up		X <sup>2</sup> (P-value)	X <sup>2</sup> (P-value)
	No	%	No	%	No	%	Pre & post	Post & follow
Minimal anxiety ≤16	3	6	40	80	37	74	20.430 P<0.05	66.719 P<0.01
Mild anxiety 17 - 25	4	8	11	22	12	24		
Moderate anxiety 26 - 35	12	24	3	6	7	14		
Severe anxiety ≥ 36	30	60	5	10	11	22		

Table (5): Correlation between total knowledge of diabetic patients with retinopathy and level of anxiety (n=50)

Items	Total knowledge	
	r	P value
Level of anxiety	0.779	P<0.01

Table (6): Patients' related barriers for early retinal assessment among diabetic patients with retinopathy (n=50)

Barriers to diabetic retinopathy screening	No	%
<b>Patient related barriers:</b>		
• No awareness of effects of DR on vision	25	50
• Belief that one's own eyes are not damaged	5	10
• Fear of results of eye screening	20	40
• Fear of eye injury during screening	5	10
• Physical disability	15	30
• No recommendation for eye referral by health care providers.	25	50
<b>Other barriers:</b>		
• Cost of treatment	22	44
• Living faraway from hospital	12	24
• No time to attend	5	10
• Waiting time over 2 -3h	20	40
• Requiring an accompanying person	5	10



## V. RESULTS

**Table (1)** clarify that more than two third of the study sample were female's patients, regarding age group more than half of study sample were more than 50 years with  $X \pm SD$  (34.45 $\pm$ 4.26). Regarding marriage status, more than three quarter (80%) of the study sample were married. In addition, less than half (40%) of the study sample had university education. As well as less half (50%) of studied sample unemployed

**Table (2)** shows studied sample medical characteristics, which revealed that, more than two third of the sample were uncontrolled diabetes (70%) Regarding duration of illness more than two third (70 %) of the sample were > 10 years, as well as the highest percentage of the patients more than half (60%) had hypertension. In relation to diabetic eye examination and vision checkup the majority (80%) of patients were had did not eye examination.

**Table (3)** represent that, there is a highly statistically significant differences was found regarding level of knowledge among the study sample of diabetic patients with retinopathy

between pre, post and follow-up nursing guidelines in all items (definition of diabetic retinopathy , causes, symptoms, complications, medical treatment considerations, importance of checkup for diabetic retinopathy, and methods of prevention of blindness due to DM ( $p > 0.05$ ).

**Table (4)** illustrate comparison between pre, post and follow-up of implementing nursing guidelines of diabetic patients with retinopathy regarding to their level of anxiety there is a highly statistically significant differences was found between pre, post and follow-up of nursing guidelines of diabetic patients with retinopathy and relieve the severity of anxiety ( $X^2 = 20.430$   $P < 0.05$  and  $66.719$   $P < 0.01$ ) respectively.

**Table (5)** illustrate comparison between pre, post and follow-up of implementing nursing guidelines of diabetic patients with retinopathy regarding to their severity of anxiety, there will be negative relationship between patients' level of anxiety and total knowledge of diabetic patients with retinopathy ( $r = 0.779$  at  $P < 0.01$ ). i.e. when patients' level of knowledge increased, the level of anxiety decreased.

**Table (6)** shows that more than one barriers effect on early retinal assessment among diabetic patients with retinopathy. The highest percentage barriers, no awareness of effects of DR on vision, no recommendation for eye referral by health care providers, cost of treatment, fear of results of eye screening, waiting time over 2 -3h, and physical disability (50%, 50%, 44%, 40%, 40%, and 30% respectively).

## VI. DISCUSSION

Concerning the demographic characteristics, the findings of the present study elucidated that, more than two third of the study sample were female's patients, regarding age group more than half of study sample were more than 50 years with  $X \pm SD$  (34.45 $\pm$ 4.26). Regarding marital status, more than three quarter of the sample were married. In addition, less than half of the study sample were graduated. As well as half of studied sample unemployed. These findings were in consistent with (*Olokoba et al ,2017*) who reported that, the females were more than males in their studies. From the researchers view the higher number of female respondents is probably because the health seeking behavior of females tends to be better than males, and this may explain the larger population of females in current study. Regarding patients level of education less than half of the study sample were university education, this is different from what was reported by (*Mohammed and waziri 2009*) reported that, the majority of their patients (78.4%) had no formal western education, the researchers may conclude that the high level of education in this study may be due to the urban setting of the study site.

Concerning patients' level of knowledge, the pre nursing guidelines predicated marked deficiency in knowledge level among patients in the studied sample. Knowledge deficiency was detected in all information regarding causes, symptoms, and complications, it is due to unavailability of educational programs & resources of information regarding diabetes retinopathy.

However, after implementing the nursing guidelines and follow-up, among diabetic retinopathy the scores of patients in the current study sample elucidated significant improvements, this results substantiates the success of the the nursing guidelines in fulfilling the gap of patients' knowledge, which in return proved the first part of our hypothesis. This



interpretation is congruent with a similar study result carried out by (*Otero et al, 2008*) who developed group educational programs for patients with DM, using participatory teaching strategies, such as role plays, relating of experiences and walking, also found an increase in knowledge about the disease.

The finding of current study is also similar to a study in India by (*Gulabani et al, 2008*) that, the patients had insufficient knowledge on diabetes retinopathy pre interventional program, but contradicts with findings in a study done in Kenya by (*Mwangi, 2011*) which concluded that patients attending Kenyatta National Hospital were generally aware of diabetic retinopathy as a complication of diabetes.

In relation to severity of anxiety the results of the current study revealed that, there were highly statistically significant differences found between pre, post and follow-up nursing guidelines among diabetic patients with retinopathy. The results were in consistent with (*Fenwick et al 2012 and Yu et al 2013*) who mentioned that, Diabetic retinopathy causes impact on the psycho-social health of the patients due to the visual impairment and other symptoms. Psychological distress was observed in the patients having vision loss due to different eye disorders. From the researcher view this results may be attributed to the fact that the nursing guidelines had led to the improvement of anxiety level.

The results of the current study revealed that, there was a negative relationship between patients' knowledge and level of anxiety. i.e. when patients' knowledge increased the level of the patient's anxiety decreased. This could be attributed to the clarity, consistency of the nursing guidelines, contents as well as patient's interest to acquire more information regarding diabetic retinopathy. These results were in consistence with (*Mclachlan, 2014*) Patients undergoing tests can be stressful so it is important patients receive correct and consistent information from all the health professionals who are involved in their care.

Another important finding that was revealed by the current study concerning patients' related barriers for early retinal assessment among diabetic patients with retinopathy it was found that most of patient addressed that half of the patients feel no awareness of effects of DR on vision, less than half fear of results of eye examination. and also there were no recommendation for eye referral by health care providers.

The result of current study is agreement with, (*Van, et al 2012*) who stated that, more detailed information about complications might help to increase attendance of eye examination. Although a sense of duty stimulated attendance, guilt related to poor control has been shown to prevent patients from attending, implying that a positive feedback about attendance could be important.

From the researches view, this finding warrants further investigation into how to encourage patients with diabetes to routinely comply with vision examinations and retinal assessments every 12 months, as recommended by the international guidelines. Considering the fact that DR complications become more severe with prolonged duration of diabetes, it is imperative that spreading awareness on DR should be adopted by the practitioners at early stages of DM.

## VII. CONCLUSION

Based on the results of the current study, it can be concluded that:

The implementation of nursing guideline had a positive effect on knowledge and relives level of anxiety regarding diabetic patients with Retinopathy.

## VIII. RECOMMENDATIONS

- There is an imperative need to implement strategies to increase the awareness of DR and the importance of early retinal assessment among affected patients, in order to reduce the risk of visual complications.
- Guidelines program should be implemented for all patients with DR patients through collaboration of various health team members.
- Develop more specialists in counselling services for patients with DR including an emphasis on psychosocial roles recovery and adaptation.

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