Home Health Care Intervention for Diabetic Retinopathy Patients and their Caregivers to Improve Patients` Quality of Life

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ABSTRACT

The aim of this study was to evaluate home health care intervention for diabetic retinopathy patients and their caregivers to improve patients` quality of life. **Design**: A quasi- experimental design was utilized. **Setting:** The study was conducted at Ophthalmological Outpatient Clinics at Benha University Hospital and Benha Teaching Hospital, in Benha City. **The sample** of this study included 100 diabetic retinopathy patients and their caregivers were chosen systematically from total 1000 diabetic retinopathy patients. **Tools**: Two tools were used I: An interviewing questionnaire was used to 1-assess socio-demographic characteristics of diabetic retinopathy patients and their caregivers,2- health profile of diabetic retinopathy patients,3- knowledge of diabetic retinopathy patients and their caregivers 4-quality of life of diabetic retinopathy patients. II: An observational checklist was used to observe diabetic retinopathy patients ` home and practices of patients and their caregivers' about diabetic retinopathy. **Results**: all diabetic retinopathy patients had poor knowledge pre intervention then this percentage decreased to 18% and 34% during post intervention and follow up respectively, 96% of diabetic retinopathy patients` caregivers had poor knowledge pre intervention then the percentage decreased to 6% and 17% during post intervention and follow up after three months respectively, only 14% of the diabetic retinopathy patients had satisfactory practices pre intervention then this percentage increased to 82% and 75% post intervention and follow up after three months respectively, 36% of the diabetic retinopathy patient caregivers had satisfactory practices pre intervention then this percentage increased to 90% and 86% post intervention and follow up after three months respectively, 66% of the diabetic retinopathy patient had poor total scores of quality of life pre intervention then decreased to 16% and 14% post intervention and follow up after three months respectively. **Conclusion**: The home health care intervention succeeded to increase knowledge and improve practices regarding diabetic retinopathy patients and their caregivers and improve quality of life of diabetic retinopathy patients. **Recommendation:** Continuous home health care intervention for diabetic patients and their caregivers regarding diabetes and diabetic retinopathy to increase their knowledge and practices..

Introduction

Diabetes along with its fatal complications is one of the leading causes of mortality and morbidity. Chronic complications of DM include macrovascular complications like coronary artery disease, cerebrovascular disease and peripheral

vascular disease along with microvascular complications like retinopathy, nephropathy and neuropathy. Risk factors like duration of diabetes, glycemic control, systolic blood pressure, dyslipedemias, smoking and microalbuminurias have been linked with complications of DM **(Mathur, 2013).**

Diabetic Retinopathy (DR) is the most complication of diabetes is the result of changes to the blood vessels of the retina (the light sensitive tissue at the back of the eye). The blood vessels swell and leak, lead to abnormal growth of new vessels. The disease usually affects both eyes and most often occurs in individuals having diabetes for many years. Diabetic retinopathy is the leading cause of vision loss in adults of working age (20-65) **(Cuadros & Martin, 2012).**It has marked effects on patients' quality of life. Quality of life can be affected in people with diabetic retinopathy before they have visual loss, because of anxiety about the future **(Sjolie et al., 2011).**

Quality of life (QOL) is a term that is popularly used to convey an overall sense of well-being and includes aspects such as happiness and satisfaction with life as a whole. QOL relates both to the adequacy of material circumstances and to personal feelings about these circumstances with overall subjective feelings of well-being that is closely related to morale, happiness, and satisfaction .QOL has recently been scientifically defined, and it has been considered synonymous with health status, functional status, psychological well-being, happiness with life, satisfaction of needs, and assessment of one's own life **(Oparah et al., 2013).**

Home health care is a health care services provided in the home, as opposed to a medical facility on a part-time basis for the treatment of an illness or injury. The home care practitioner will help patients with their activities of daily living such as dressing, cooking and chores. Home health care may

include skilled nursing care as well as occupational and physical therapy **(American society of consultant pharmacists, 2016).**

Caregivers were defined as family members or friends who provided unpaid day-to-day care (i.e., provided assistance with basic or instrumental activities of daily living) and were familiar with the care recipient's medical and social state. Caregiver may be coordinating care for a significant patient as well as assisting with medical decision making. They may have many responsibilities including financial management, meal preparation, emotional support, household chores, and medication management, carrying out medical treatments, and arranging transportation to medical appointments **(Bethany et al., 2009).**

Community health nurses could educate diabetic retinopathy patients on adopting a lifestyle that would minimize health risks. In addition, nurses can assist them in taking preventive measures to save their eyes from damage and impairment. These nurses assist in teaching diabetic patients to receive regular eye examinations and other health measures could help to prevent the onset of diabetic retinopathy and its subsequent complications. The nurses could fill the gap that usually exists between physicians and less-trained personnel and help make tremendous improvements in the health-care system and treatment results. A nurse could then handle the case by referring the patient to an ophthalmologist and prevent the future risk of blindness or loss of vision **(Bagher et al, 2013).**

Significance of the study:

Egypt is one of the 20 countries of the International Diabetes Federation region,387 million people have diabetes in the world and more than 37 million people in the region; by 2035 this will rise to 68 million. There were over 7.5 million cases of

diabetes in Egypt in 2014. The prevalence of chronic diabetes complications ranged from 8.1% to 41.5% for retinopathy. Diabetic retinopathy is one of the leading causes of blindness in the world that increases the chance of losing the sight about 25 times higher compared with normal individuals. The more advanced the diabetic retinopathy, the greater risk of visual loss The prevalence of diabetes and diabetic retinopathy in developed and developing countries are high enough to become public health concerns **(International Diabetes Federation, 2014; Abdelghaffar et al., 2013).**

Aim of the study:

This study aims to evaluate home health care intervention for diabetic retinopathy patients and their caregivers to improve patients` quality of life through:

-Assessing the diabetic retinopathy patients` and their caregivers' knowledge and practices about diabetic retinopathy.

- Assessing the diabetic retinopathy patients `quality of life (physical, psychological, and social domains).

- Designing and implementing home health care intervention for patients and their caregivers about diabetic retinopathy according to their needs.

- Evaluating the effect of an improvement of patients `quality of life.

Research hypothesis:

Home health care intervention will improve quality of life of patients with diabetic retinopathy and their caregivers` practices.

Subjects and method:

Research design:

A Quasi- experimental design was utilized in carrying out this study.

Setting:

The study was conducted at Ophthalmological outpatient` clinics at Benha University Hospital and Benha Teaching Hospital, in Benha City to collect information about the patients followed by home visits to conduct the intervention. The researcher chose these settings because large number of diabetic retinopathy patients attended these hospitals to be treated.

Sampling:

A systematic simple random sampling for patients was taken from the above mentioned settings, every 10th diabetic retinopathy patient accompanied with caregivers, they selected according to certain criteria: diagnosed with diabetic retinopathy, age above 40 years, accepted to participate in the study. The study sample selected as the following

Hospital name	Total number of patients who attended last 2 years at 2014	Number of patients who selected at 2016
Benha University Hospital	600 patients had diabetic retinopathy	60 patients
Benha Teaching Hospital	400 patients had diabetic retinopathy	40 patients

Tools for Data Collection: Tools for Data Collection: Two tools were used to collect the data

Tool I: An interviewing questionnaire: An instructed interviewing questionnaire developed by the researcher based on literature review under supervision

of supervisors, and written in simple clear Arabic language consisted of four parts

First part: A-Socio-demographi characteristics of the diabetic retinopathy patients. It included questions about sex, age, residence, marital status, educational level, occupation, living condition, and income.

B-Socio-demographic characteristics of caregivers as; sex, age, marital status, educational level, occupation, residence, and kinship degree.

Second part: It was designed to collect data about health profile of diabetic retinopathy patients as duration of diabetes, symptoms which patients complains, diseases or other problems suffering revious from, psurgery for the treatment of diabetic retinopathy, treatments for diabetic retinopathy, and diabetes

Third part: Included questionnaire to assess patients and their caregivers` knowledge about diabetes and diabetic retinopathy as diabetes meaning, signs and symptoms and complication, and diabetic retinopathy meaning, risk factor, types, signs and symptoms, diagnosis, treatment, and prevention, this tool measured pre, post intervention and follow up.

Scoring system:

The correct answer was scored (2), the correct and incomplete was scored (1) and the incorrect one was scored (0). For each area of knowledge, the score of the items was summed- up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. The total knowledge scores were considered good if the score of the total knowledge >75 %, considered average if it equals 50-75 %, and considered poor if it less than 50%.

Fourth part: It was devoted to assess quality of life of diabetic retinopathy patients adapted from (National Eye Institute Visual Functioning Questionnaire – 25) modified by the investigator.It consisted of physical status: It included 6 items (personal hygiene, dressing, eating, activity, treatment and eye ability, psychological status: It included 4 items (Frustrated a lot of time due to illness, feel sadness and confusion and other negative emotions, feel fear from the occurrence of unexpected events, and feel a loss of self-confidence and social status: It included 5 items (Have hard in doing hobbies, find hard in visiting, Have hard time to go out to watch movies, plays, or sports events, prefer to stay at home more, and need a lot of help from others because of loss vision.

Scoring system: Each question has three levels of answers: Always, sometimes and never. These were respectively scored 0, 1, and 2. The scores of the items were summed- up and the total divided by the number of the items, giving a mean score. These scores were converted into a percent score, and means and standard deviations were computed. The total quality of life were considered good if the score >75 %, considered average if it equals 50-75 %, and considered poor if it less than 50%.

Tool II: Observational checklist: Was concerned on two parts:

First part: - Was observing and assessing diabetic retinopathy patients ` home such as(ventilation inside the house, lighting, cleanness and tidiness, furniture arrangement, the presence of carpets and carpeting covers the floors, safety stairs and roads, equipped kitchen and a separate food preparation, presence of a repellent smoke and heat source, having a healthy source of drinking, the presence of sewage disposal, the bathroom properly and has a tools ,hot and cold water, and dryness of bathroom floor.

Scoring system for the environment: The scoring system was calculated as (2) scores for good, (1) for average and (0) for the poor.

Second part: - I: Was observing diabetic retinopathy patients and their caregivers' practices about diabetic retinopathy such as hand washing, eye care, foot care, eye drop, insulin injection and diet.

Scoring system: Each step has 2 levels of answers: Done, and not done. These were respectively scored 1, 0. Each procedure has 2 levels: Satisfactory and unsatisfactory. These were respectively scored 1, and 0. The scores of the items were summed- up and the total divided by the number of the items, giving a level score. These scores were converted into a percent score. The total of practices was considered satisfactory if the score >60 % and considered unsatisfactory if it less than 60%.

II: Concerned with diabetic retinopathy patients practices through asking questions (Instruction after the laser procedure, eye checkup, physical activities, and control the level of blood pressure).

Scoring system: Each step has 2 levels of answers: Done, and not done. These were respectively scored 1, 0. The scores of the items were summed- up and the total divided. Each step has 2 levels of answers: Done, and not done. These were respectively scored 1, 0. The scores of the items were summed- up and the total divided by the number of the items, giving a level score. These scores were converted into a percent score.

Reliability and content validity of the tools:

Reliability of the tool was applied by the researcher for testing the internal consistency of the tool, by administration of the same tools to the same subjects under similar condition on one or more occasion.

Answers from repeated testing were compared (test- re- test reliability).

Content validity was done by 5 experts of Faculties Nursing Staff from the Community Specialties reviewed the tool and give their opinion.

Ethical consideration:

Permission has been obtained orally from each patient and their caregivers before conducting the interview and given a brief orientation to the purpose of the study. They were also reassured that all information gathered would be confidential and used only for the purpose of the study. No names were required on the forms to ensure anonymity and confidentially. They were also informed about their right to withdraw at any time from the study without giving any reasons.

Pilot study:

A pilot study was conducted on 10% the studied sample (10 patients and their caregivers) to test the content applicability, clarity, and simplicity of the tool using the interviewing questionnaire and the observational check list as a pre-test tool. Patients who shared in the pilot study were excluded from the studied sample based on the pilot results, the tools were modified. Modification of the tool included rephrasing and rearrangement of some questions. After refinement and modification, the final forms of the tool were developed. This pilot study was carried out in two weeks before starting the study.

Field work:

Data were collected over 8 months from the start of February 2016 to end of the September 2016; the study was conducted by the researcher for the studied sample in the selected settings at Ophthalmological outpatient clinics and their homes through home visits. The researcher visited the

Ophthalmological outpatient clinics 2 days / week (Saturday and Tuesday) from 9:00am to 12:00 mid- day to get new cases and other days of the week (Sunday, Monday, Wednesday and Thursday) to accomplish home visits to the previously selected cases.

Administrative design:

Official permission took from the Faculty of Nursing / Benha University to the director selected Hospitals followed by other official letters to the chairmen of Ophthalmological outpatient` clinics and the oral consent from the patient with DR and their caregivers. The title, objectives, study technique and tools were illustrated for cooperation, as well as to allow the researcher to prepare regular arrangement with patients and their caregivers.

Statistical design:

Statistical presentation and analysis of the present study data were carried out, using mean and standard deviation, Chi- square and linear correlation Coefficient by using the statistical package for Social Sciences (SPSS) version20

Significant levels were considered as follows:

- P- value > 0. 05. Not significance

- P- value < 0. 05. Significance

- P- value < 0.001. Highly significant

Table (1): Percentage distributions of diabetic retinopathy patients according to their socio-demographic characteristics (n=100)

Items	%
Sex	
Male	41.0
Female	59.0
Age	
40-	5.0
50-	32.0
60-	63.0
Mean ± SD	61.9±7.1
residence	
Rural	75.0
City	25.0
marital status	
Married	77.0
Widowed	23.0
educational level	
Can`t read and write	48.0
Read and write	21.0
Basic education	6.0
Secondary education	19.0
University education	6.0
occupation	
Employed	10.0
Housewife	49.0
Private work	13.0
Retirement	15.0
Not working	13.0
Living condition	
Alone	7.0
With family	93.0
Income/ month	
Sufficient and saving	15.0
Sufficient	82.0
In sufficient	3.0

Table (1): Shows the socio- demographic characteristics of the diabetic retinopathy patients. It was clear that, 59% of diabetic retinopathy patients were females, 63 % of them their aged 60 years or more with mean age was 61.9±7.1, while 75% of them lived in rural areas and 77% of them were married. Regarding to educational level, 48 % of diabetic retinopathy patients were can`t read and write. This table also shows that, 49% of diabetic retinopathy patients were housewife, while 93% of them lived with family and 82% of them had sufficient income.

Table (2): Percentage distributions of diabetic retinopathy patients` caregivers according to their socio-demographic characteristics (n=100)

Items	%
Sex	
Male	14.0
Female	86.0
Age	
20 -	22.0
30 -	52.0
40 -	26.0
Mean ± SD 33.9±7.6	
Marital status	
Single	19.0
Married	81.0
Educational level	
Can`t read and write	4.0
Read and write	20.0
Basic education	2.0
Secondary education	56.0
University education	18.0
Occupation	
Employed	16.2
Student	2.0
Private work	5.1
Not working	76.8
Residence	
With the patient	68.0
Near house	32.0
Kinship degree	
First-degree	87.0
Others	13.0

Table (2): Shows the socio- demographic characteristics of the diabetic retinopathy patients` caregivers. It was clear that, 86% of caregivers were females, 52 % of them aged 30 years or more with mean age was 33.9±7.6, and 81% of caregivers were married while 56% of them had secondary education. This table also shows that, 76% of them didn`t work, while 68% of them lived with patient and 87% of them from first-degree relatives of patients.
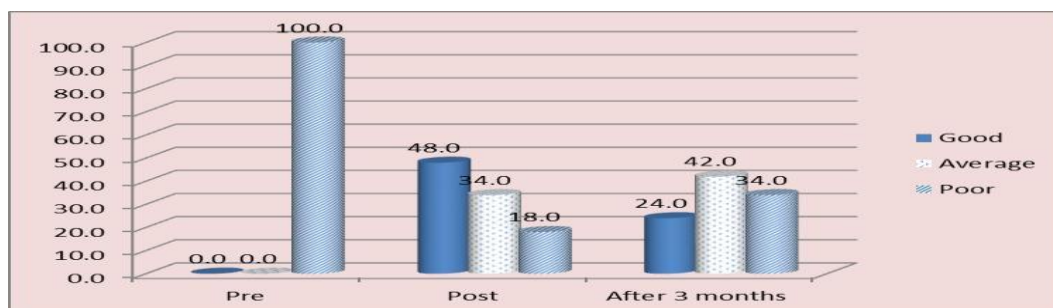
Table (3): Percentage distributions of diabetic retinopathy patients according to their health profile (n=100)

Items	%
Duration of diabetes mellitus/ years	
5-	12.0
10-	32.0
15-	56.0
***Other diseases or problems the patients suffering from**	
Hypertension	51.0
High cholesterol	16.0
Heart Disease	11.0
Other disease	7.0
There is no	19.0
Conducting surgery for the treatment of diabetic retinopathy	
Yes	69.0
No	31.0
Therapy for diabetes mellitus	
Oral tablet	28.0
Insulin injection	72.0

*Responses are not mutually exclusive

Table (3): Shows that 56% of diabetic retinopathy patients had diabetes mellitus for more than 15 years, 51% of them had hypertension and 69% of them had previous surgery to treat diabetic retinopathy. According to therapy of diabetes mellitus 72% of patients used insulin injection for treatment of diabetes.

Figure (1): Percentage distribution of the diabetic retinopathy patients according to their total knowledge score regarding diabetic retinopathy pre- post intervention and follow up after three months (n=100).
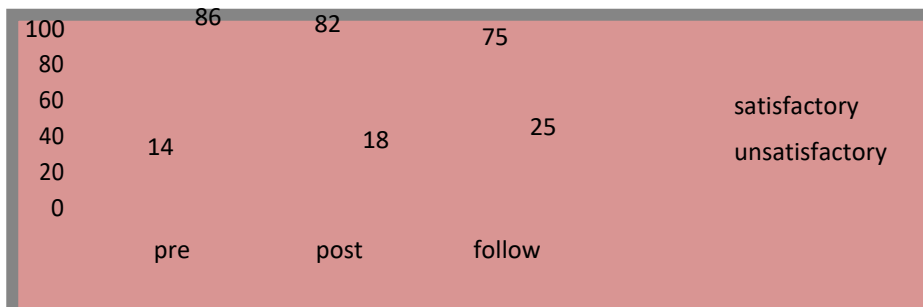

This figure shows that all diabetic retinopathy patients had poor knowledge pre intervention then this percentage decreased to 18% and 34% during post intervention and follow up respectively.

Figure (2): Percentage distribution of the diabetic retinopathy patients` caregivers according to their total knowledge score regarding diabetic retinopathy pre- post intervention and follow up (n=100).
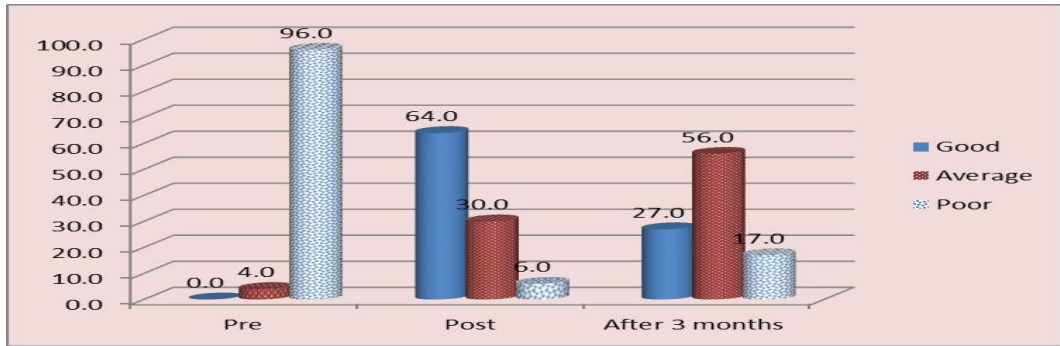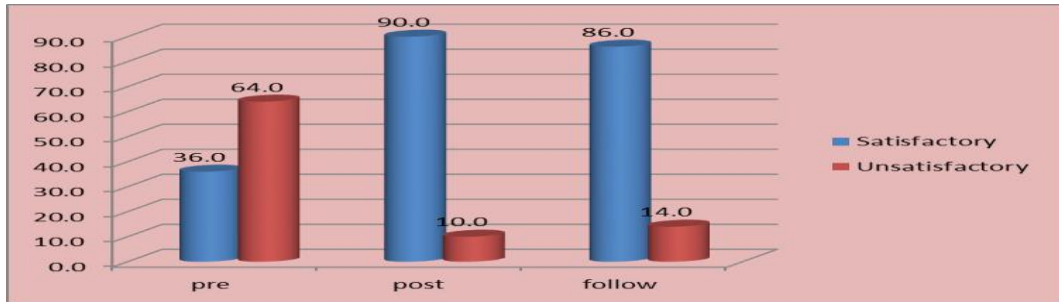

This figure shows that 96% of diabetic retinopathy patients` caregivers had poor knowledge pre intervention then the percentage decreased to 6% and 17% during post intervention and follow up after three months respectively.

Figure (3): Percentage distribution of the diabetic retinopathy patient regarding their total practices score pre- post intervention and follow up after three months(n=100).
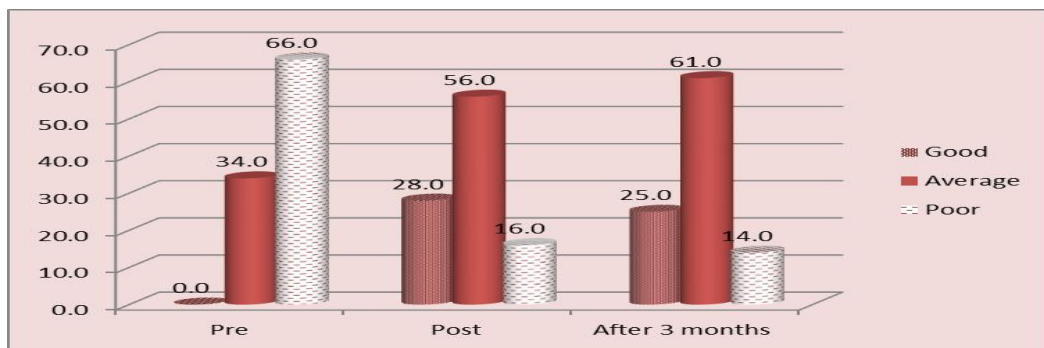

This figure shows that only 14% of the diabetic retinopathy patients had satisfactory practices pre intervention then this percentage increased to 82% and 75% post intervention and follow up after three months respectively.

Figure (4): Percentage distribution of the diabetic retinopathy patient caregivers regarding total practices score pre- post intervention and follow up (n=100).

This figure shows that 36% of the diabetic retinopathy patient caregivers had satisfactory practices pre intervention then this percentage increased to 90% and 86% post intervention and follow up after three months respectively.

Figure (5): Percentage distribution of diabetic retinopathy patient in relation to their total scores of quality of life pre- post intervention and follow up after three months (n=100).

This figure shows that 66% of the diabetic retinopathy patient had poor total scores of quality of life pre intervention then decreased to 16% and 14% post intervention and follow up after three months respectively.

Table (4): Percentage distributions of diabetic retinopathy patients regarding to their home environment

Home environment	Poor	Average	Good
- Ventilation in the house	0.0	11.0	89.0
-Existence of adequate lighting at home	0.0	18.0	82.0
- The presence of lighting in the bathroom	0.0	37.0	63.0
- Lighting available in the hallways, stairs	6.0	48.0	46.0
- Clean and tidy home	0.0	5.0	95.0
- Furniture arrangement in small groups	0.0	12.0	88.0
- Presence of carpets and carpeting covers the floors	1.0	32.0	67.0
- Stairs and road safety	0.0	45.0	55.0
- Equipped kitchen and a separate food preparation	0.0	18.0	82.0
- Presence of a repellent smoke and heat source at home	59.0	0.0	41.0
- Having a satisfactory source of drinking	0.0	0.0	100.0
- Presence of sewage	0.0	0.0	100.0
- The bathroom has tools for hot and cold water	1.0	30.0	69.0
- The bathroom hasn`t have sliping surface	1.0	30.0	69.0

Table (4): Reveals that all patients lived in an environment with good source of water for drinking and sewage, 95% of them lived in a clean and tidy home and 88% of them had good arrangements of furniture in small groups.

Table (5): Correlation between total patient quality of life score and total patient knowledge and practices through intervention phases (n=100).

Items	Total quality of life					
	Pre intervention		post intervention		follow-up	
	R	p-value	r	p-value	r	p-value
Total practices	0.31	0.002	0.54	0.000	0.50	0.000
Total knowledge	0.1	0.03	0.40	0.000	0.39	0.000

Table (5): Shows that there was a positive statistically significant correlation between patients` total quality of life scores and patients` total knowledge and practice of pre, post and follow up phases of the intervention.

Discussion:

Diabetic retinopathy is a condition occurring in persons with diabetes, which causes progressive damage to the retina, the light sensitive lining at the back of the eye. It is a serious sight-threatening complication of diabetes. Diabetic retinopathy is the result of damage caused to the small blood vessels located in the retina. Blood vessels damaged from diabetic retinopathy can cause vision loss. Fluid can leak into the macula, the area of the retina which is responsible for clear central vision. DR is one of the main causes of visual loss in individuals aged 20-64 years old and is present in more than 77% of patients with DM who survive for over 20 years with the disease. Many factors have been associated with the progression and severity of DR, such as DM duration and hypertension **(Senthilvel1 et al., 2012).**

Socio-demographic characteristics of diabetic retinopathy patients (table1).

Regarding to the socio-demographic characteristics of patients with diabetic retinopathy, this study showed that more than

half of diabetic retinopathy patients were females (table1). This might be due to females are prone to diabetes, which was the first cause of DR. This finding was in the same line with the study done by **Al-Adsani (2007),** who studied the risk factor for diabetic retinopathy in Kuwaiti type 2 diabetic patients. Who found that two thirds of studied sample were females

As regards age, the present study findings showed that less than two thirds of diabetic retinopathy patients aged 60 years or more with mean age 61.9±7.1 (table1). This might be due to DR caused by the long of duration of DM and DM common in old age. This finding was in the same line with the study done by **Son et al. (2014),** they studied the ultra-wide field angiography improves the detection of proliferative diabetic retinopathy progression they reported that the mean age of studied sample was 61.05 ± 11.04 years. Also this finding congruent with **Wang et al. (2013),** they studied the prevalence and risk factors for diabetic retinopathy in a high-risk Chinese population they reported that the a mean age of the patients was 69.84 ± 7.90. But this finding disagreed with **Memon et al. (2015),** they studied the assessment of knowledge, attitude and practices towards diabetes and diabetic retinopathy in the suburban town of Karachi, they reported that the mean age of the respondents was 46.85 ±12.75 years, with minimum age of 20 years and maximum age of 90 years.

Concerning marital status the present study revealed that, more than three quarters of diabetic retinopathy were married (table1). This might be due to more than half of diabetic retinopathy patients in the study were females. This finding was in agreement with **Alkot & Fahim (2015),** They studied the early detection of diabetic retinopathy among type 2 diabetic patients in Qaluobia Governorate, Egypt, they found that, more than three quarters of diabetic retinopathy patients were married. Also this finding congruent with **Seneviratne and Prathapan**

(2016), they studied the knowledge on diabetic retinopathy among diabetes mellitus patients attending the Colombo South Teaching Hospital, Sri Lanka they found that the majority of patients were married.

As regards educational level, less than half of diabetic patients couldn`t read and write (table1). This finding was in agreement with **Alkot & Fahim (2015),** who found that, majority of diabetic retinopathy patients were illiterate, **Memon et al., (2015),** who found that, more than half of patients were illiterate. who reported that the majority of studied sample were married.

The result of present study revealed that, less than half of diabetic retinopathy patients were housewives (table 1). This might be due to more than half of diabetic retinopathy patients in the study were females. This finding was disagreement with **Shruthi et al. (2016),** they study evaluate the awareness of diabetic retinopathy in self- reported diabetic patients attending tertiary care center in rural Telangana who reported that one third of patients were stay at home parents

According to the socio-demographic characteristics of diabetic retinopathy patients caregivers, the present study showed that, approximately the majority of diabetic retinopathy patients caregivers were females, more than half of them their age30 years or more with mean age was 33.9±7.6, while majority of them were married, and more than two third of them lived with patient (table2). These findings were agreement with the study made by **The Hormone Foundation (2010),** which studied diabetes caregivers needs assessment survey found that diabetes caregivers in this survey are mostly female, more than three quarters were married, more than half their age on average about 45.5 years and more than two quarters were living in the same household.

Concerning health profile, the present study results showed that more than half of

diabetic retinopathy patients had diabetes mellitus for more than 15 years (table 3).This might be due to two thirds of diabetic retinopathy patients in this study their aged 60 years or more and long duration of diabetes is a risk factor of DR. This finding was agreement with the study made by **Wanjiru et al. (2011),** who studied the knowledge, attitudes and practices on diabetic retinopathy among patients attending the diabetes clinic at kenyatta national hospital, Kenya they reported that majority of the participants had diabetes for more than 10 years. Also this result was congruent with **EL-Shazly et al. (2011),** they studied risk factors association with diabetic retinopathy and maculopathy in Egyptian type 2 diabetics who reported that the mean of diabetes duration was 11.798±6.282, ranged between one and 30 years.

Regarding to total knowledge score of diabetic retinopathy patients about diabetic retinopathy the present study revealed that all diabetic retinopathy patients had poor knowledge pre intervention (figure 1). It might be due to less than half of diabetic retinopathy patients couldn`t read and write and less than two thirds of diabetic retinopathy patients aged 60 years or more.This finding was in the same line with **Gilbert (2012),** who reported that the results of study suggest that knowledge and awareness of retinopathy amongst diabetic is less satisfactory. As well, the finding was supported by **Thapa et al., (2012),** who reported that lack of awareness of DR coupled with a high proportion of cases already at a sight-threatening stage of retinopathy. Also this finding congruent with **Seneviratne and Prathapan, (2016),** who found that, a significant proportion of the study population had a poor knowledge with regard to diabetic retinopathy. However, this finding was contradicting with **Wanjiru et al., (2011),** who reported that there is general awareness of diabetic retinopathy among the majority of patients

Regarding to total knowledge score of caregivers about diabetic retinopathy the present study revealed that the most of caregivers had poor knowledge pre intervention then decreased during post intervention and follow up (figure 2). It might be due to the home health care intervention help caregivers to acquire knowledge about disease to manage the patients and their level of education help them to acquire knowledge about the disease

Regarding to total practices score of diabetic retinopathy patients, the present study revealed that the minority of the diabetic retinopathy patient had satisfactory practice pre intervention (figure 3). It might be due to inadequate and irregular education and increased age of the patients lead to unsatisfactory practices among these patients. The findings were supported by **Prabhu et al. (2015)**, they made a hospital based study on awareness of diabetic retinopathy in diabetic individuals based on knowledge; attitude and practices in a tier-2 city in South India they reported that diabetic individual had a poor practice pattern and believed that keeping blood sugar under control was enough to avoid a visit to the ophthalmologist. However, this finding contraindicated with **Hussain et al. (2016),** they studied the knowledge and awareness about diabetes mellitus and diabetic retinopathy in suburban population of a South Indian state and its practice among the patients with diabetes mellitus they reported that more than half of patients had good practice patterns.

Regarding to total practices of diabetic retinopathy patients' caregivers, the present study revealed that more than one third of the diabetic retinopathy patient caregivers had satisfactory practice pre intervention, then this percentage increased for the majority of caregivers had satisfactory practices in the post intervention and follow up after three months (figure 4). This might be due to the aim of home health care intervention is

helping caregivers to improve their practices towards patients to manage diabetic retinopathy patients correctly.

Regarding to total scores of quality of life around two thirds of the diabetic retinopathy patient had poor total scores of quality of life pre intervention (figure 5). This might be due to DR may lead to vision loss that could affect on patients` activity According to **Shankar & Kaiti (2014),** they reported that patients with DR have a measurable decline in QOL early in the disease process and this decline is much greater in persons with bilateral moderately severe NPDR or worse DR compared to those with no DR or less severe DR.

Considering the diabetic retinopathy patients` environment, the present study revealed that the majority of them had good arrangements of furniture in small groups and had good lighting at home, and less than half of them had good lighting in the hallways and stairs (table 4). These may be due to the arranged environment elements and light is essential for diabetic retinopathy patients due to their impaired vision.

In the current study there was a positive statistically significant correlation between patients` total quality of life scores and patients` total knowledge and practice of pre, post and follow up phases of the intervention (table 5). This might be due to the patients had poor knowledge and unsatisfactory practices about DR which could affect on their quality of life

Conclusion

The home health care intervention succeeded to increase knowledge and improve practices regarding diabetic retinopathy patients and their caregivers and improve quality of life of diabetic retinopathy patients. There was a positive statistically significant correlation between patients` total quality of life scores and patients` total

knowledge and practice of pre, post and follow up phases of the intervention.

Recommendations:

According to results of the current study, the following suggestions are recommended:

1- Continuous home health care intervention for diabetic patients and their caregivers regarding diabetes and diabetic retinopathy to increase their knowledge and practices.

2- Emphasize the importance of providing support and appropriate follow up care for diabetic patients in outpatient clinics by a specialized team in order to prevent diabetic complications especially diabetic retinopathy.

3- Further research is proposed to explore the effect of home health care intervention on the prevention of diabetic retinopathy among large sample size.

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