

Impact of BASNEF Model Educational Program on Eye Care among Non-Insulin Dependent Diabetic Patients

Esraa Nabil Mohammed¹, Manal Salah Hassan², Ghona Abd El-nasser Ali³,
kholoud Mohammed Mahmoud⁴

¹ Assistant Lecturer in Medical-Surgical Nursing Department, Faculty of Nursing, Sohag University.

² Professor of Medical-Surgical Nursing, Faculty of Nursing, Ain Shams University.

³ Professor of Medical-Surgical Nursing, Faculty of Nursing, Sohag University.

⁴ Assistant Professor of Ophthalmology Department, Faculty of Medicine, Sohag University

Abstract: to determine the impact of BASNEF model educational program on eye care among non-Insulin dependent diabetic patients. **Setting:** The study was conducted in the internal medicine department and Ophthalmic Clinics at Sohag University Hospital. **Subjects:** A Purposive sample of 60 adult patients with Non-insulin Dependent Diabetes mellitus from both males and females aged between (40-60) years old were included in this study. **Tools of the study;** Tool (1) Patient health assessment sheet Tool (2): Patient's interview questionnaire. Tool (3): The BASNEF Model Interview questionnaire Tool (4): Patient's Health practices observational checklists. **Results:** The findings revealed that the half of both study and control group were female, married and less than half of them were illiterate. According to income, it was observed that half of study and control group did not have enough income and the mean age of study group was (53.63±5.65) and control group was (53.00±4.79). The mean of blood sugar level (A1c) in study group (pretest) is 6.23±.77, (posttest) is 5.50±.84, while in control group the mean of blood sugar level (pretest) is 5.29±.72, (posttest) is 5.52±.75 and there was statistical significant difference between study and control group pre and post BASNEF model educational program implementation. **Conclusion:** Based on findings of the present study, it can be concluded that the educational BASNEF model is effective in regard to eye care for diabetic patients and is recommended to use this model in educating patients for preventing ocular complications in non-insulin dependent diabetic patients. **Recommendations:** Health education for newly diabetic patients about the importance of the educational BASNEF model in preventing ocular complications and encourage nurses to apply different types of nursing researches in the field of ophthalmology to validate evidence-based information in this field.

Keywords: " BASNEF" Model educational program, Non-Insulin Dependent Diabetic Patients, Eye Care.

1. INTRODUCTION

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or alternatively, when the body cannot effectively use the insulin it produces. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over the time leads to serious damage to many of the body's systems, especially the nerves and blood vessels. There are three main types of diabetes mellitus type 1 diabetes known as "insulin-dependent diabetes mellitus" (IDDM), type 2 diabetes "non-insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes" and gestational diabetes (Alustiza and Elena 2020) .

Type 2 diabetes (non-insulin dependent or adult-onset) results from the body's ineffective use of insulin. Type 2 diabetes comprises 90% of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity. Symptoms are similar to those of Type 1 diabetes, but are often less marked. As a result, the disease is generally diagnosed several years after onset, once complications have already arisen. The development of type 2 diabetes is caused by a combination of lifestyle and genetic factors. While some of these factors are under personal control, such as diet and obesity, other factors are not, such as increasing age, female gender, and genetics (**Huang et al., 2017**).

Non-insulin dependent diabetes mellitus (NIDDM) causes change in all body organs and it may result in serious or sometimes dangerous complications for the patients. Increase of blood sugar alone does not lead to any problem in patients but it progresses toward its complications gradually without making any sign. The diabetes complications are very different and various, such as ocular complication and changes in blood vessels (the veins and arteries). This condition damages eye retina slowly so that patients may not realize their diseases in the first stages (**Saedi et al., 2016**).

Diabetic retinopathy also known as diabetic eye disease, is a medical condition in which damage occurs to the retina due to diabetes mellitus. It is a leading cause of blindness. Diabetic retinopathy affects up to 80 percent of those who have had diabetes for 20 years or more. At least 90% of new cases could be reduced with proper treatment and monitoring of the eyes. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy. Each year in the United States, diabetic retinopathy accounts for 12% of all new cases of blindness. It is also the leading cause of blindness in people aged 20 to 64 years (**li et al., 2020**).

Using educational program based on BASNEF model has been tried to increase diabetic patients' knowledge and improve their insight into the control blood sugar and its prophylactic activities. Also, presenting enabling factors such as sufficient information, instruction regarding the controlling blood sugar and getting the patient's family involved in the process and intervention in their subjective norms, applying "BASNEF" model educational program will help diabetic patients to apply prophylactic methods for their blood sugar and disease control (**Baqiani, 2018**).

Significance of the study

Diabetes mellitus affects more than 240 million people worldwide, and this number is expected to reach roughly 370 million by 2030. Type 2 DM is responsible for a higher percentage of patients with eye complication and visual loss. The International Diabetes Federation (IDF) listed Egypt among the world top 10 countries in the number of patients with diabetes. It is expected that the number of patients with diabetes in the Middle East and North Africa region to grow by 96% from year 2013 to 2035 or from 34.6 million to 67.9 million. (**International Diabetes Federation., 2015**). Diabetic retinopathy affecting approximately 93 million patients' worldwide, the majority of diabetic patients present late with advanced stages of DR due to the silent nature of the disease. In Egypt, it is estimated that 42% of patients with diabetes have diabetic retinopathy and 5% are blind (**Hegazi et al., 2015**).

So, from the above facts applying the BASNEF model was found to be a very effective means for developing an educational program for Non-insulin Dependent diabetic patients, in order to control their blood sugar and prevent ocular complications.

Aim of the study

This study aims to determine the impact of BASNEF model educational program on eye care among non-insulin dependent diabetes mellitus. This aim will be achieved through the followings:

1. Assess Behavioral Attitudes, Subjective Norm, and Enabling Factors of patients with insulin independent diabetic patients before and after the program.
2. Develop and implement BASNEF model educational program for eye care among patients with insulin independent diabetes mellitus
3. Evaluate the effect of BASNEF model educational program on eye complications prevention.

Research hypotheses:

The knowledge and all BASNEF Model components will significantly improved in the experimental group compared to the control group after the educational program

2. SUBJECTS AND METHODS

1-Technical design:

Research design: Quazi experimental research design was utilized to fulfill the aim of this study.

Inclusion Criteria: Patients from both male and female aged 40-60 years old, had diabetes for over 5 years and at risk to the danger of ocular complications that be evidenced with clinical investigations and physician diagnosis.

Setting: The study was conducted in Internal Medicine Department in 4th floor and Ophthalmic Clinics in ground floor in clinics building at Sohag University Hospital-Egypt. The flow rate of patients in Ophthalmic Clinics at Sohag University Hospital is about 20cases monthly.

Subjects: Purposive sample of 60 adult patients with Non-insulin Dependent Diabetes mellitus were selected according to certain inclusion criteria. The study subjects randomly divided into two groups: study group who received the educational program& routine care and control group who received only the routine care (30 patients for each group).

Sample size using power analysis:

Sample size was estimated with statistical program (Mini tab 17) and determined according to this equation: -

$$Ss = \frac{Z^2 P (1-p)}{C^2}$$

Where Z = 1.96 C = 0.08 p= 0.5

New ss = \underline{ss}

$$\frac{(1 + \underline{ss} - 1)}{\text{Pop}}$$

(Pop) is the population= 160

New ss = 53

Minimal required sample = 53

Tools:

Tool 1: Patient health assessment sheet: includes four parts:

Part I: It includes **Socio- demographic data** of the patient such as name, age, gender, level of education, marital state, income and occupation.

Part II: Medical data: It includes history of current disease, past medical diseases, surgical history, family history, smoking status, follow up and medication.

Part III: Patient's laboratory investigations to assess (Glycated hemoglobin (HbA1c), Fasting Blood Sugar (FBS) levels) and random blood sugar before and after program implementation.

Part IV: Clinical Examination: Patients were examined by an ophthalmologist to rule out any possible retinopathy: It includes (Diagnosis, ophthalmic examination and general examination). It was performed before the program and 6 months follow up the program

Tool (II): Patient's interview questionnaire:

This questionnaire was designed by the researcher based on current and international literature (**Rockefeller,2016**) to assess:

1. Patient's knowledge about type 2 diabetes such as definition, types, signs and symptoms, causes and complications and it includes 5 multiple choice questions.

2. Patient's knowledge about medication such as action, side effects precautions and complications and it includes 4 Yes or No questions

3. Patient's knowledge about preventive methods for ocular complications and disease control and it includes 5 Yes or No questions.

Scoring system:

For the knowledge items, a correct answer response was scored 1 and incorrect answer scored 0. The scores were converted into a percent score. Patient's total level of knowledge has been classified as follows, satisfactory if the percent score was 70% or more and unsatisfactory less than 70%.

Tool (III): The BASNEF Model Interview questionnaire. It was adapted by (Hazavehei, Khani, Hasanzade and Rashidi, 2010). It includes Behavioral Attitudes (10items), Subjective Norms (4items) and Enabling Factors (5items).

The scoring method of the questionnaire

The BASNEF Model includes 19 questions, each question was categorized and scored into either yes=1 or No=0 on all questions. The scores were converted into a percent score and has been classified as follows, Satisfactory if the percent score was 75% or more and unsatisfactory if less than 75%.

Tool (IV): 1: Patient's Health practices observational checklists: Checklists were designed by researcher, it was performed before the program and 6 months follow up the program This will be used to assess self-care practice as self-measuring of blood glucose level (Home Blood Glucose Test), eye care procedures (cleansing the eye- instillation of eye drops- instillation of eye ointment) and preventive behaviors for ocular complications (such as jogging at least 3 times a week and each time for 20 minutes, regular medicine consumption, visiting ophthalmologist every 3 to 4 months, having an appropriate prescribed diet program, visiting the clinic for measuring blood sugar control and consultation, and participating at educational classes).

Scoring system:

For the practice items, each item was categorized and scored into either Done=1 or Not done=0 on all items. The scores were converted into a percent score and has been classified as follows, satisfactory if the percent score was 75% or more and unsatisfactory if less than 75%.

2: Educational BASNEF Model: -

This were prepared by the researcher based on the related recent literature and patient's assessment needs (Hu.et al,2016). It was written in Arabic language and suitable for all patients regardless to their educational level. It includes two parts:

Part I: Theoretical part: it includes knowledge regarding:

(definition of diabetes, types, symptoms, causes, treatment and complications), instructions as (Diet recommendations, exercise in controlling the blood sugar and importance of follow up).

Part II: Practical part:

It concerned with self-care practices as

A-Eye care procedures (cleansing the eye- instillation of eye drops- instillation of eye ointment)

B-Self-measuring of blood glucose level

C-Preventive behaviors for ocular complications as (Jogging at least 3 times a week and each time for 20 minutes, consume regular medicine, visit ophthalmologist every 2 to 3 months, have an appropriate prescribed diet program, measuring blood sugar control and consultation.

2-Operational design

The operational design includes preparatory phase, tools validity and reliability, pilot study, ethical considerations and field work.

Preparatory phase

Patient's oral agreement for voluntary participation was obtained, the purpose and nature of the study was explained to the patient, this includes reviewing of recent related literature and theoretical knowledge of various aspects of the study using books, articles, periodicals and magazines to develop tools for data collection.

Content Validity and reliability

Testing validity of the proposed tools by using face and content validity. Face validity is the extent to which a tool appears to measure what it is supposed to measure. Content validity is the extent to which items are relevant to the content being measured. (Gravetter et al.,2015). Validity tested through by a panel of five experts 3 in the field of medical-surgical nursing and 2 experts in the ophthalmology medicine. Their opinion was elicited regarding the clarity, comprehensiveness, applicability, accuracy and prevalence of the tools and correction was carried out accordingly.

Testing reliability: Reliability is the degree to which an assessment tool produces stable and consistent results (Moskal et al.,2016). Reliability was tested statistically using Cronbach's Alpha which showed a satisfactory level for each tool as follow (0.76, 0.80, 0.72 & 0.89, respectively)

Pilot study

A pilot study was conducted on 10% of subjects to test the applicability and feasibility of the study tools, obtained results were used as a guide to reconstruct the modifications needed in the data collection tools, the data obtained from the pilot study were analyzed no modifications were done, so those patients who were involved in the pilot study were included in the study.

Ethical considerations

- Research proposal was approved from Research Ethics Committee of the Faculty of Nursing, Sohag University.
- An official permission was taken from hospital administrators to conduct the study.
- Oral consent was obtained from patients included in the study.
- The purpose and nature of the study as well as the importance was explained to the participants who met the inclusion criteria.
- Anonymity and confidentiality were assured.
- Participants were assured that participation in this study was voluntary and they have the right to withdraw from the study at any time without any penalty.
- Study subject privacy was considered during data collection.

Field work

The study was conducted through 3phases (Assessment and planning phase, implementation phase and evaluation phase)

A-Assessment and planning phase:

This phase emphasis on patient's assessment, the study sample was approached individually by the investigator to collect the data, it was done through data collection from the subjects (study and control group) through the following: socio-demographic data, medical data, patient's laboratory investigations and clinical examination of patients performed by an ophthalmologist. Patient's interview questionnaire to assess patients' knowledge. "BASNEF" Model Interview questionnaire to assess (Behavioral Attitudes, Subjective Norm, and Enabling Factors of patients). Patient's health practices observational checklists to assess self-care practice as self -measuring of blood glucose level, eye care procedure and preventive behaviors for ocular complications. The investigator conducted a structured interview for 15 to 30 minutes (with mean 22 minutes) with each patient to fill the tool(I) and tool (II)and record the patients' responses.

As regard to Tool (III) the BASNEF Model Interview questionnaire and tool (IV) Patient's Health practices observational checklists, some educated patients asked to fill the questionnaire as a self-reported questionnaire, other patients asked the

investigator to read the questionnaire for them and check their responses. The investigator conducted a structured interview for 15 to 30 minutes (with mean 22 minutes).

B-Implementation phase

The objectives of the program were established and guided by the previously determined patient's educational needs in order to improve patient's knowledge and self-care. Data were collected at in Internal Medicine Department and Ophthalmic Clinics at Sohag University Hospital, data was collected along six months period and collected from both experimental and control group, the patients of the experimental group participated in **4 educational session** classes during the **first month** of intervention. **Three months** following the educational intervention, the questionnaires and the checklists were completed again by the two groups **the experimental and control group**. Follow-up sessions were held after the three months of the educational program. Each session took about **45-60 minutes**.

Teaching sessions:

Patients (Experimental group) were divided into small groups; each group contains maximum 5 patients. Each patient chose the optimal time for receiving the teaching sessions whenever they have ready to learn.

Each session usually started by a summary of what had been taught during the previous session and the objectives of the new session. After each session there was 10 minutes for discussion and gave feedback. Reinforcement of teaching was performed according to patient's needs to ensure their understanding. Each patient in the experimental group obtains a copy of the educational BASNEF Model while the control group received only the routine care as examination and taking medications. Arabic language was used and the researcher used pictures for illustration and diagram to educate the patient.

C-Evaluation phase

It emphasized on evaluating the effect of the educational program on patient's outcomes after the implementation of educational program for the both groups through the comparison between the control and study groups.

3-Statistical design

The collected data were tabulated and statistically analyzed to the effect of the Educational BASNEF model on eye care as regards the various variables by computer program SPSS" ver. 16" Chicago. USA Data expressed as number and Percentage, using Likelihood ratio to determine significant for the group.

$P > 0.05$ non- significant.

$P \leq 0.05$ significant.

$P \leq 0.001$ highly significant.

3. RESULTS

Table (1): Comparison between study and control groups regarding demographic data (n=60)

Variables	Study		Control		P.value
	N	%	N	%	
Age by years	53.63±5.65		53.00±4.79		.642
Gender					
male	17	56.7	14	46.7	.303
Female	13	44.8	16	55.2	
Level of education					
Illiterate	11	36.7	11	36.7	.160
Read and write	4	13.3	9	30.0	
Average learning	13	43.3	6	20.0	
University	2	6.7	4	13.3	

Marital status					
Single	0	0.0	4	13.3	.013*
Married	20	66.7	14	46.7	
Divorce	1	3.3	7	23.3	
Window	9	30.0	5	16.7	
Occupation					.002**
Employee	11	36.7	4	13.3	
Farmers	2	6.7	6	20.0	
Technical work	4	13.3	15	50.0	
No employee	13	43.3	5	16.7	
Number of family					.195
less than 4 persons	11	36.7	9	30.0	
4-6 person	17	56.7	14	46.7	
more than 6 persons	2	6.7	7	23.3	
Income enough					.217
Not enough	15	50.0	19	63.3	
Enough	15	50.0	11	36.7	
Chi -Square test Non significant P=>0.05 Significant p= < .05					

Table (2): Percentage distribution of study and control groups regarding follow up (n=60)

Variables	Study =30				Control =30				p.value
	Yes N %		No N%		Yes N %		No N%		
Follow up									
Regular clinic visiting	3	10.3	26	89.7	5	16.7	25	83.3	.500
Every month	1	33.3	0	0	0	0	0	0	.135
Every 3month	2	66.7	0	0	0	0	0	0	
Times of blood glucose examination									
Every day	5	16.7	0	0	11	36.7	0	0	.025*
\week	13	43.3	0	0	4	13.3	0	0	
month	12	40.0	0	0	15	50.0	0	0	
Vision examination	0	0	30	100.0	0	0	30	100.0	--
Chi -square test non significant P=>0.05 significant p= < .05									

Table (3): Percentage distribution of study and control groups regarding blood investigation pre and post BASNEF model educational program implementation (n=60)

Items	Study case	Pretest	Post-test	P. values	
		Mean ±SD	Mean ±SD	P1.	P2
Glycated hemoglobin (HbA1c)	Study	6.23±.77	5.50±.84	.001	.923
	Control	5.29±.72	5.52±.75		
Fasting blood glucose	Study	105.73±23.57	96.60±19.49	.262	.001
	Control	111.13±11.23	108.93±15.93		
Random blood glucose	Study	231.70±43.74	189.60±18.98	.001	.011
	Control	193.73±29.77	205.43±26.84		
Test used independent t-test non significant P=>0.05 highly significant p= 0.001					

International Journal of Novel Research in Healthcare and Nursing

Vol. 8, Issue 2, pp: (234-246), Month: May - August 2021, Available at: www.noveltyjournals.com

Table (4): Percentage distribution of study and control groups regarding Clinical examination (Ophthalmic Examination) pre and post BASNEF model educational program implementation (n=60)

Variables	Uncorrected				Corrected				Chi-Square	P1 significance	Chi-Square	P2 significance
	Pre				Post							
	Study		Control		Study		Control					
	N	%	N	%								
Visual acuity												
Right eye	5	16.7	2	6.7	11	36.7	1	0	21.418	.001**	13.1831	0.001**
Left eye	2	6.7	7	23.3	1	3.3	3	0				
Both eye	22	73.3	0	0.0	17	56.7	0	0				

Test used independent t-test non significant $P > 0.05$ highly significant $p = 0.001$

Table (5): Comparison between study and control groups regarding satisfaction of knowledge (n=60)

Variable	Follow up	Study		Control		p Value
		N	%	N	%	
Satisfied	Pre	2	6.7	0	0.0	0.001**
	Post	26	86.7	8	26.7	
Unsatisfied	Pre	28	93.3	30	100	
	Post	4	13.3	22	73.3	

Test qui-Square t-test non significant $P > 0.05$ highly significant $p = 0.001$

Table (6): Total health practice of study and control group pre and post BASNEF model educational program implementation (n=60)

Variable	Study case	Pre Mean ± SD	Post Mean ± SD	P1	P2
Eye care 0-11 score	Study	2.53±1.25	8.93±1.659	.009	.001**
	Control	1.73±1.014	3.16±1.205		
Eye drop 0-13 score	Study	5.43±2.44	10.06±2.21	.001	.001**
	Control	2.96±1.75	3.20±1.68		
Eye ointment 0-12	Study	5.46±3.159	10.06±2.049	.125	.001
	Control	4.206±2.07	4.46±1.736		
Total practice 0-36	Study	13.43±5.998	29.06±5.251	.002	.001
	Control	8.827±4.071	10.83±3.206		
Blood Glucose and preventive measure					
Glucose 0-10	Study	3.40±2.37	7.13±2.19	.916	.001
	Control	3.46±2.48	3.10±2.14		
Preventive 0-6	Study	1.46±.860	5.73±.520	.039	.001
	Control	.80±1.494	.60±.968		

Independent t- test used for this comparison with p.value non significance $\geq .05$ significance $\leq .05$ Highly significance $\leq .001$.

Table (7): Correlation between knowledge, practice and BASNEF for study group (n= 30)

Variables	Pearson Correlation		
		Practice	BASNEF
Knowledge	Correlation R	.777**	.790**
	P.value	.000	.000
BASNEF	Correlation R	.790**	.869**
	P.value	.000	.000

Correlation is significant at the 0.01 level (2-tailed).

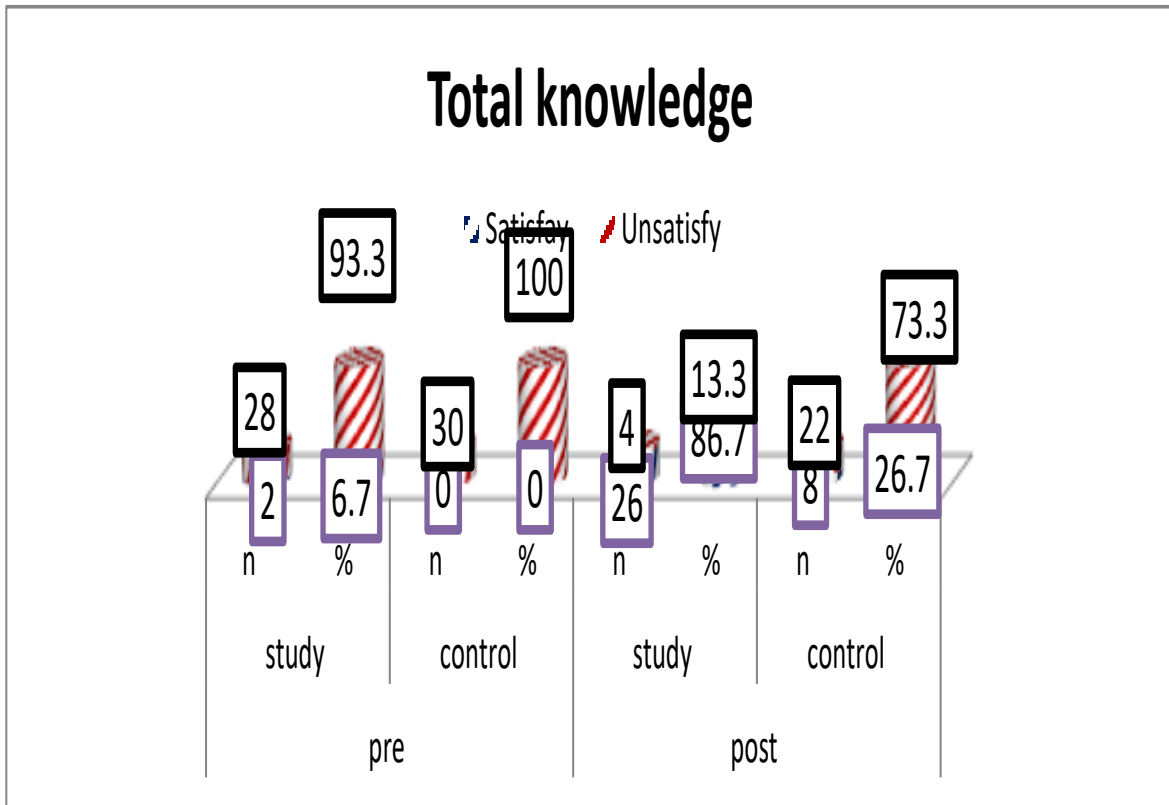


Fig (1): Comparison between study and control groups regarding satisfaction of knowledge

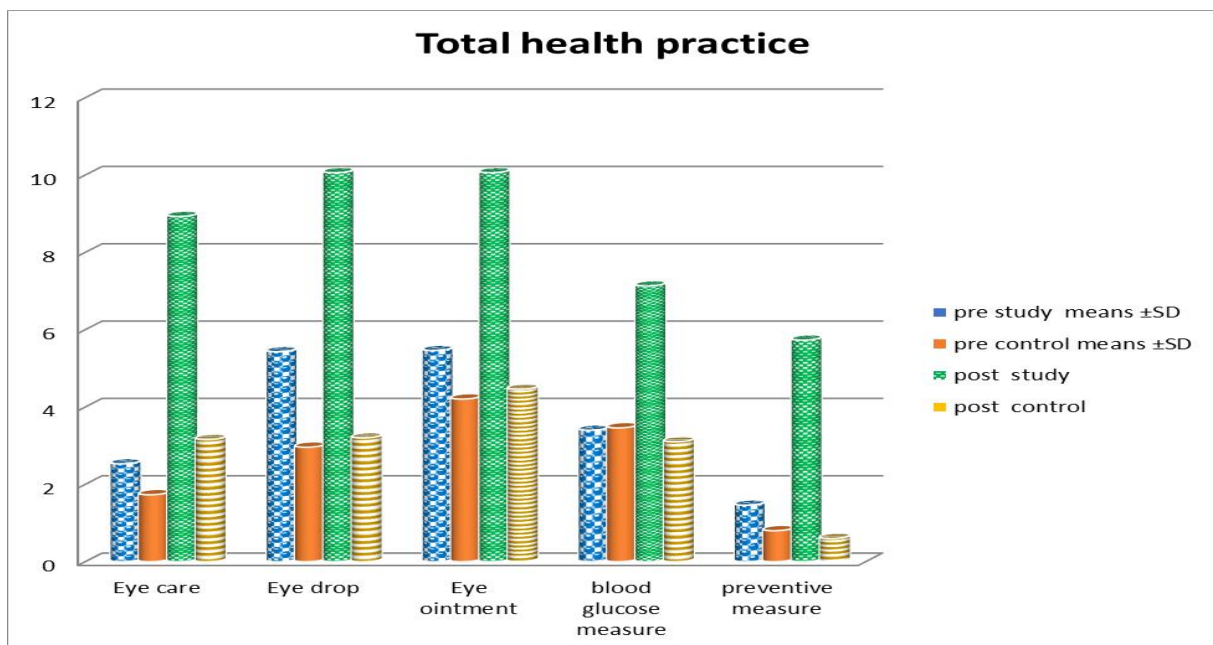


Fig (2): Total health practice of study and control group pre and post BASNEF model educational program implementation (n=60)

Table (1): This table shows the distribution of patients regarding to their socio-demographic characteristics. It was noticed that the half of both study and control group were female, 66.7% of study group and 46.7% of control group were married. According to number of family, 56.7% of study group and 46.7% of control group were from (4-6) persons and

less than half of them were illiterate, no employee. According to income, it was observed that half of study group and 63.3% of control group did not have enough income and the mean age of study group was (53.63±5.65) and control group was (53.00±4.79).

Table (2): This table shows that 16.7% of study group checked blood glucose level every day, while 36.7% of control group checked blood glucose level every day and it shows that 100% of both study and control group did not have regular vision examination.

Table (3): This table shows that the mean of blood sugar level (A1c) in study group (pretest) was 6.23±.77, (posttest) was 5.50±.84, while in control group the mean of blood sugar level (pretest) was 5.29±.72, (posttest) was 5.52±.75

Table (4): This table shows that: there was statistical significant difference between study and control group regarding clinical examination (Ophthalmic Examination) pre and post BASNEF model educational program implementation.

Table (5): This table shows comparison between study and control groups regarding satisfaction of knowledge, it reveals that 86.7% of study group had satisfactory level of knowledge after application of the educational program, while 26.7% of control group had satisfactory level of knowledge.

Table (6): This table shows that there was statistically significant difference between mean scores of total health practice (eye care- Instillation of eye drops- Instillation of eye ointment -Blood Glucose Test and Preventive behaviors of ocular complications) in study group before and after the educational program and no significant differences found in control group before and after application of the educational program

Table (7): This table shows that there was statistically significant correlation between knowledge, practice and BASNEF for study group.

Fig (1): This figure illustrates that, 86.7% of study group had satisfactory level of knowledge after application of the educational program, while 26.7% of control group had satisfactory level of knowledge. **Fig (2):** This figure show there was statistically significant difference between mean scores of total health practice (eye care- instillation of eye drops- instillation of eye ointment (blood Glucose Test - preventive behaviors of ocular complications) in study group before and after the educational program.

4. DISCUSSION

This study aims to determine the impact of BASNEF model educational program on eye care among non -insulin dependent diabetic patients.

Based on the results on the present study; the half of both study and control group were female, as regards the marital status, more than the half were married. These finding are consistent with **Chan and Yap (2016)** in the study who reported that the half of the study sample were females. These may be due to female are more susceptible for obesity as well as lack of exercise and a special diet that lead to increase risk factors for diabetes mellitus as well as diabetic retinopathy.

Regarding the level of education, 36.7% of both study and control group were illiterate. This may be due to more than half of the study samples were females with old age also due to cultural and societal differences, health illiteracy as majority of the patients lived in rural area. This result matched with study done by **Srinivasan, et al., (2017)** entitled "Diabetes and Diabetic Retinopathy: Knowledge, Attitude, Practice (KAP) among Diabetic patients in A tertiary Eye Care Centre" and with the study that done by **Islam, et al., (2018)** entitled" Factors associated with participation in a diabetic retinopathy screening program in a rural district in bangladesh" in both study and control group found that the majority of the sample was illiterate.

According to occupations the current study found that approximately less than the half of the study sample was unemployed and most patients had low income, these may be due to financial status act as a barrier and it had critical effect to access eye screening for early diagnosis of diabetic eye complication, this result was in the same line with the results done by **Foster, et al., (2016)** who indicated that the majority of the studied sample was farmers , had low income and they hadn't any type of medical insurance.

Regarding follow up, the present study reported that 100% of both study and control group do not have regular vision examination. These results are in agreement with the study of "Awareness of diabetes and diabetic retinopathy among a group of diabetic patients" which done by **Hamzeh, Almahanni & Aljaber (2019)** who mention that the majority of the patients didn't visit an ophthalmologist after the diagnosis of diabetes and only one quarter of the sample previously had regular eye examination. It may due to low family income and lack of knowledge about the importance of regular eye examination as well as more than half of the patients were females, as women commonly stated that they did not like to be a burden on other family members, even for health matters, because their role was to serve the family. Also, they were commonly not in a position to prioritize their own health care, when there were many responsibilities at their home environment.

Regarding laboratory investigations. The results indicated that the mean of HbA1c in the patients increased from $6.23 \pm .77$ before the intervention to $5.50 \pm .84$ three months following the educational intervention, but there was no significant difference between the mean of HbA1c before intervention and three months following the intervention in the control group. These results are in agreement with the study of "The effect of educational program based on BASNEF model on diabetic (Type 2) eyes care in Kazemi's Clinic" which done by **Hazavehei, M., Khani, A., Hasanzade, A., & Rashidi, M., (2010)**, who mention that HbA1c in the patients increased from 8.65 before the intervention to 7.47 three months following the educational intervention, but, there was no significant difference between the mean of HbA1c before intervention and three months following the intervention in the control group. Through proper control of blood sugar, many dangerous diabetic complications could be prevented, in a way that any 1% decrease in HbA1c leads to about 27% decrease in microvascular and 21% decrease of macrovascular diabetic complication

Regarding patient's knowledge the current study revealed that 86.7% of study group had satisfactory level of knowledge after application of the educational program. The results of the present study agree with study "The effect of educational program on diabetic patients' knowledge, attitude, and practice" by **(Parker, 2016)**, who reported that the mean score of the awareness of experimental group compared to the control group immediately after educational intervention indicate the effect of educational intervention on the improvement of patient's knowledge.

Regarding the application of the educational BASNEF Model, the current study revealed that there were no statistically significant differences found in study group and control group before application of the educational program while there were statistically significant differences found in study group after application of the educational program, these result is supported by **(Niknami, 2016)** who reported that There was no significant difference between the mean score of subjective norms in the control and experimental groups before educational intervention. However, the mean scores of subjective norms in experimental group increased immediately after intervention and three months later indicating further care of patients by family, specialists of diabetics, and ophthalmologists involved and also the effect of educational intervention.

(Niknami, 2016) also reported that there was no increase in the mean scores of subjective norms in control group immediately after intervention and three months later. The mean score of Behavior attitude and enabling factors had a significant increase immediately after intervention and three months later in the experimental group, but it did not increased significantly in the control group.

Regarding the total health practice as (eye care- instillation of eye drops- instillation of eye ointment -blood glucose Test and preventive behaviors of ocular complications), this study revealed there was statistically significant difference between mean scores of total health practice (eye care- instillation of eye drops- instillation of eye ointment -blood glucose test and preventive behaviors of ocular complications) in study group before and after the educational program and no significant differences found in control group before and after application of the educational program. This result is confirmed by **Eiser, et al. (2016)** who reported in their research that the mean score of health practice in study group increased immediately after educational intervention and three months later, but no increase was observed in that of in the control group. It also increased in the study group due to the high mean score of knowledge, behavioral attitude, subjective norms and enabling factors.

5. CONCLUSION

Based on findings of the present study, it can be concluded that, using the educational BASNEF model is effective in regard to eye care for diabetic patients and is recommended to use this model in educating patients for preventing ocular complications in non-insulin dependent diabetic patients. Furthermore, eye care education may be considered as an appropriate educational strategy to develop effective program for diabetic patients

6. RECOMMENDATIONS

On the light of the findings of the present study, the following recommendations are suggested:

Recommendations related to patients:

-Teach newly diabetic patients about the importance of the educational BASNEF model in preventing ocular complications.

-Increase patients' awareness about diabetes mellitus, diabetic retinopathy and importance of frequent eye check-up.

Recommendations related to health care services:

-Periodic eye examinations and continuous measuring of blood glucose level and blood pressure for diabetic to help early detections of DR.

Further Recommendations for researches:

- Encourage nurses to apply different types of nursing researches in the field of ophthalmology to validate evidence-based information in this field

REFERENCES

- [1] Alustiza, Elena (2020). Diabetes mellitus in adolescents: PRE-START study in Euskadi. Madrid: Anales de Pediatría.
- [2] Baqiani Moqadam MH (2018). The study of BASNEF Model effectiveness in controlling diabetic patients. Tehran: Tarbiat Modares University
- [3] Chan, R., & Yap, M. (2016). Access Barriers to Eye Care Utilization among People with Physical Disability in Hong Kong, *Procedia Environmental Sciences*, 36, 46 – 49.
- [4] Eiser JR, Eiser C, Riazi A, Taylor DJ, Hammersley S, Tooke JE. (2016). Screening for diabetic retinopathy is well received by patients and may improve self-management intentions. *Diabet Med*;18:835-841.
- [5] Foster, A., Forbes, A., Dodhia, H., Connor, C., Chemin, A., Sivaprasad, S Gulliford, M. (2016). Changes in detection of retinopathy in type 2 diabetes in the first 4 years of a population-based diabetic eye screening program: retrospective cohort study. *Diabetes Care*;36(9):2663-2669.
- [6] Gravetter, Frederick J.; Forzano, Lori-Ann B. (2015). *Research Methods for the Behavioral Sciences* (4th ed.). Belmont, Calif.: Wadsworth. p. 78. ISBN 978-1-111-34225-8
- [7] Hamzeh, A., Almhanni, G., & Aljaber, Y. (2019). Awareness of diabetes and diabetic retinopathy among a group of diabetic patients in main public hospitals in Damascus, Syria during the Syrian crisis. *BMC Health Serv Res* 19, 549 doi:10.1186/s12913-019-4375-8.
- [8] Hegazi, R., El-Gamal, M., Abdel Hady, N. & Hamdy, O. (2015). Epidemiology of and Risk Factors for Type 2 Diabetes in Egypt. *Annals of Global Health*, 81(6), 814-820
- [9] Hu FB, Manson JE, Stampfer MJ, Colditz G, Liu S, Solomon CG, et al. (2016). Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. *N Engl J Med* Sep;345(11):790-797

International Journal of Novel Research in Healthcare and Nursing

 Vol. 8, Issue 2, pp: (234-246), Month: May - August 2021, Available at: www.noveltyjournals.com

- [10] Huang, Hao; Yan, Peipei; Shan, Zhilei; Chen, Sijing;(2017) "Risk factors of type 2 diabetes: A systematic review and meta-analysis". *Metabolism – Clinical and Experimental*. 64 (11): 1408–1418. doi:10.1016/j.metabol.2015.08.019. ISSN 0026-0495. PMID 26404480
- [11] Islam, F., Kawasaki, R., & Finger, R. (2018). Factors associated with participation in diabetic retinopathy screening program in a rural district in bangladesh. *Diabetes research and clinical practice*. 144,111-117.
- [12] Parker, (2016). The effect of educational program on diabetic patients' knowledge, attitude, and practice of Abhar city [MSc thesis]. Tehran: Tarbiat Modares University
- [13] Li, Jeany Q.; Welchowski, Thomas; Schmid, Matthias;(2020)."Prevalence, incidence and future projection of diabetic eye disease in Europe: a systematic review and meta-analysis". *European Journal of Epidemiology*. 35 (1): 11–23. doi:10.1007/s10654-019-00560-z. PMID 31515657 – via PubMed.
- [14] Moskal, B.M., & Leydens, J.A. (2016). Scoring rubric development: Validity and reliability. *Practical Assessment, Research & Evaluation*, [Available online: <http://pareonline.net/getvn.asp?v=7&n=10>].
- [15] Niknami SH,(2016).The evaluation of significant factors used by BASNEF model in controlling kalazar disease [PhD thesis]. Tehran: Tarbiat Modares University.
- [16] Piyasena, M ., Murthy, G., Yip, J., Gilbert, C., Peto, T., Premarathna, M., & Zuurmond, M. (2019). A qualitative study on barriers and enablers to uptake of diabetic retinopathy screening by people with diabetes in the Western Province of Sri Lanka, *Tropical Medicine and Health* .47:34 <https://doi.org/10.1186/s41182-019-0160-y>
- [17] Rockefeller, (2016). Principal of teaching to patient about causes, symptoms and complicationsTehran: Saleminashr; p: 9-11.
- [18] Saedi, E; Gheini, MR; Faiz, F; Arami, MA,(2016) " Complications of diabetes mellitus ". *World Journal of Diabetes*. 7 (17): 412–22.
- [19] Srinivasan, NK., John, D., Rebekah, G., Kujur, E., Paul, P., & John, S.(2017). Diabetes and Diabetic Retinopathy: Knowledge, Attitude, Practice (Kap) among Diabetic Patients in A Tertiary Eye Care Centre. *Journal of Clinical and Diagnostic Research*. 11(7)1-7.