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Research Article

Effect of Instructional Educational Programme on Diabetic Patients' Awareness Regarding Diabetes and Diabetic Retinopathy

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Abstract: Background: One of the most common complications of diabetes mellitus is diabetic retinopathy, which is preventable and treatable if it has early been detected. This study aimed to evaluate the effect of the educational program on diabetic patients' knowledge and attitude regarding diabetes and diabetic retinopathy (DR).Methods: pre- test and post-test design was used at El rebat Center and Soba Diabetic Clinic. The participants were interviewed using structured questionnaire, and educational program. Forty seven patients completed the study. Data was collected and analyzed using SPSS version 16, (confidence level 0.95, and error margin 0.05). **Results**: Most of the respondents (63.8%) were females. The majority (53.19%) were in the age group 40-50 years. Housewives represented 63.8% and 39.13 of the participants had primary level of education. The duration of illness was 3-5 years in 44% of the participants and 90% of the participants have begun to develop diabetes complications. 66.6% of the participants had family history of diabetes mellitus.The test given two weeks after the educational program showed significant improvement in patients' knowledge regarding diabetes (P_value 0.00) and diabetic retinopathy (P_value 0.00). Patients' attitude towards eye examination significantly improved when evaluated two weeks after the educational program (P_value 0.00).during follow up a significant decrease in patients' knowledge regarding diabetes and diabetic retinopathy was noted (P_value 0.00), and the attitude towards eye examination became significantly negative (P_valu 0.00). **Conclusion**: The instructional educational program brings positive change in diabetic patients' knowledge and attitude regarding diabetes and diabetic retinopathy for short duration. For long term, adoption of worldwide educational programs and strategies will insure better outcome.
Keywords: Educational program, diabetic retinopathy, diabetic patients.

INTRODUCTION:

Diabetic retinopathy (DR) is the most common cause of blindness in diabetic adults in America. This visual ailment is found in individuals who suffer from diabetes for many years. It is caused when blood vessels in the eye swell, bleed or undergo abnormal new growth (Melloni, J.L. 2006).

In the UK, diabetic retinopathy remains the main cause of visual impairment showing blindness cases in people under 65 years of age (Thiruvelan. 2011).

Diabetic retinopathy remains the most common cause of blindness in the working population of the western world. It corresponds with the screening criteria of the world health organization (WHO) (Castor, T. D., & Carter, T. L. 1995).

In another study done in Sudan, it has been found that diabetic retinopathy and diabetic nephropathy represent 56.6% and 27% of the patients respectively, concluded that substantial proportions of Sudanese patients with diabetes remain far from achieving their glycemic goals.

Multidisciplinary set-up for screening and management of diabetes remains essential (Bunce, C., & Wormald, R. 2006).

A quality of visual acuity and common causes of low vision in Khartoum is a study done to determine the quality of vision, reveal the major causes of conditions leading to low vision and to identify the effectiveness of the prescribed low vision devices in visual acuity. This study has revealed that the main causes of low vision in Khartoum are retinitis pigmentosa, diabetic retinopathy and other causes

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(Diabetic, M. 1990). This means that the second cause of low vision in Khartoum is diabetic retinopathy.

To prevent this serious complication of diabetes mellitus, it is important to educate diabetic patients to control their diabetes because good control reduces the prevalence of diabetic complications (Shigidin, M. *et al.*, 2001).As Saeed concluded in his study, the management of diabetic patients in Sudan is poor and adherence to guide lines is missing, so intensive health education is needed (Aatif, B., & Lackho, A. 2011).

Practice nurse has an important role in educating patients about retinopathy to insure that all their patients attend annual retinopathy screening, provide diabetes management support and prevent complications of developing diabetes (Elmahdi, E. M. A. *et al.*, 1991).

SUBJECT AND METHOD

Study design and Setting:
This study is an interventional pretest-post-test study carried out at diabetes educational clinic at El Rebat University Hospital and Diabetes Center at Soba University Hospital from March to October 2014.

Sampling and Sample Size:
Sampling Techniques:
The sample of the subjects was selected by convenience sample from the diabetic patients attending diabetes centers in El rebat and Soba Hospitals.

Target Population:
Adult diabetic patients who attended health care centers during the study period and who corresponded with the inclusion criteria.

Inclusion Criteria:
Type 2 diabetic patients.
- The duration of the disease range between 0 to 5 years.
- Adult patient ≥18 -60 years old.
- Patient agreement to participate in the study

Exclusion Criteria:
- Diabetic pregnant women
- Diabetic patient with known renal failure.
- Diabetic patient with known diabetic retinopathy.

Data Collection Tool:
Data was collected by pre-constructed and pre-tested questionnaire that was designed to include the following:
- Personal data (age,sex,marital status)
- Socio-demographic data (occupation, education, residence, duration of diabetes, the preferred food)
- Type of medication
- The effect of diabetes on daily life activity

- The problems that arise from diabetes
- History of diabetes
- Questions about knowledge of different aspects of diabetes (general knowledge) such as of definition of diabetes, control of blood sugar level, measurement of sugar level, knowledge about hypertension and anemia.

Questions about diabetic retinopathy (DR):
- definition of DR, duration of eye follow up , incidence and occurrence of DR, the affected eye, the most affected age group, the result of DR, signs

Attitude of Patients:
- Attitude towards eye follow-up: positive or negative.

The Educational Program:
The educational program developed for this study was based on the review of the related studies literature and the objectives stated –

Procedure for Data Collection:
➢ Informal permission was obtained from the subjects after explaining the purpose of the study.
➢ A planned questionnaire was administered.
➢ Using printed booklets, the respondents were given 4 sessions of teaching program in two days. Post-test was conducted after 2weeks and 3months later. The duration of data collection was 8 months.

Plan of Data Analysis:
The data obtained was analyzed in terms of the objectives of the study using descriptive and analytic statistics. The plan of data analysis was as follow:
- Data was organized in a master sheet on computer.
- Personal data was analyzed in terms of frequency and percentages.
- Testing the difference between paired groups: T-test was used for knowledge Friedman test was used for testing the differences between means of related groups
- H0: there is no significant difference, p-value >0.05;RejectH0.
- The difference between independent groups was tested by Mann Whitney test for 2 groups (male and female). Kruskal Wallis H test was for K groups (age, level of education and occupation)H0: there is no significant different, p-value >0.05; reject H0.Cochran test which was approved by Mc Nemarwas used to test the differences regarding eye follow up. Chi square was used for testing the association between variables (sex) and eye follow up.
- Fisher's exact test was used for testing the association between variables (age, level of education and occupation) and eye follow up

Ethical Considerations:-

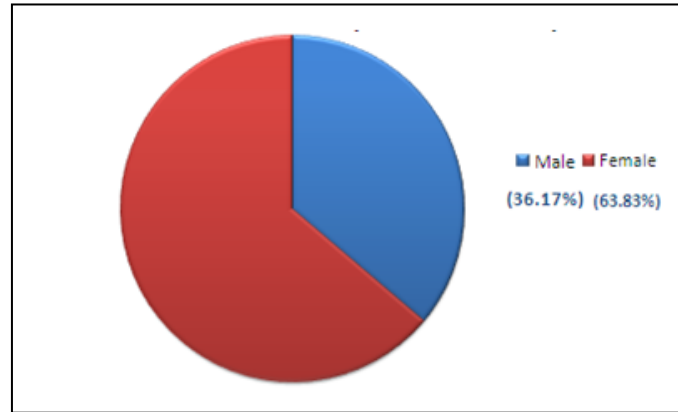• The necessary official permissions were obtained from the director of Soba Hospital, the Head of the Internal Medicine Department and from the Head of Diabetes Clinic at El rebat Hospital.

• The research was approved by the Research Committee at Faculty of Nursing Sciences, University of Khartoum.
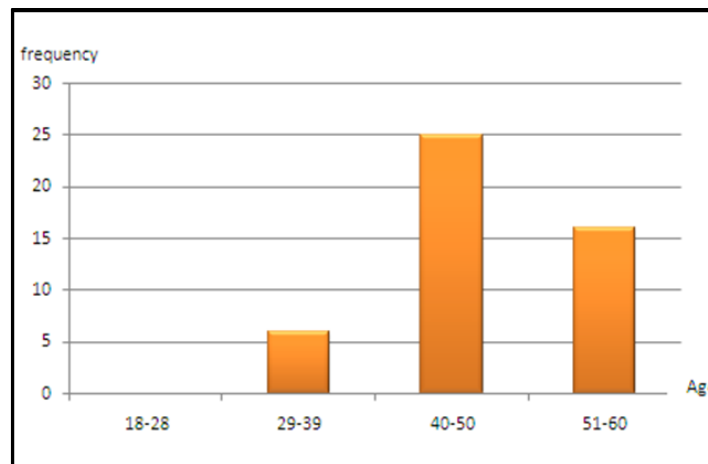
THE RESULTS

Figure 1: Sex

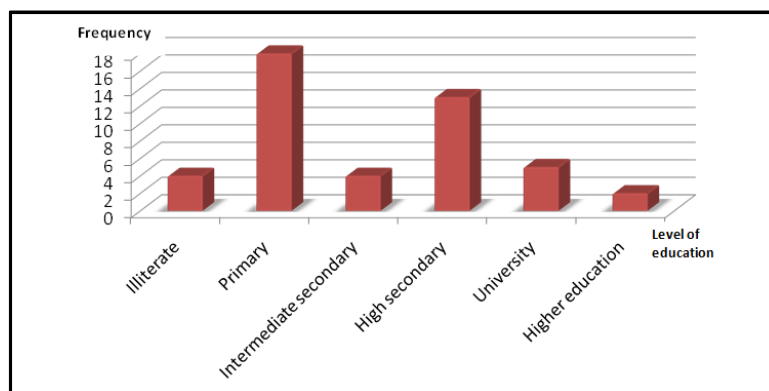
Figure 2: The Participants 'Ages

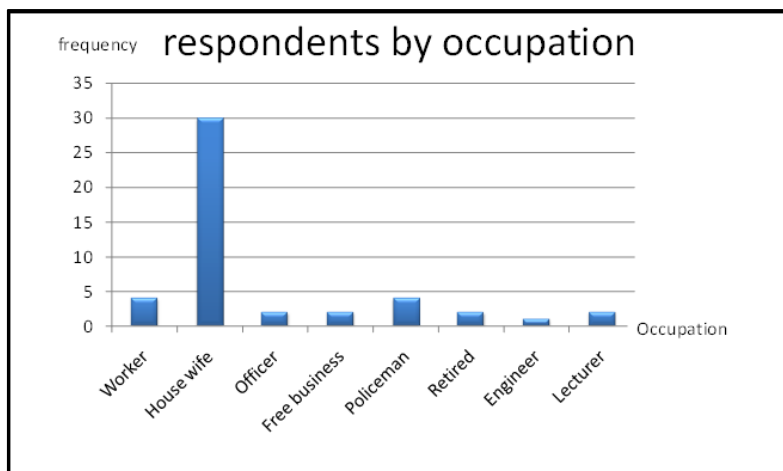**Figure 3:** The Educational Levels of the Participants

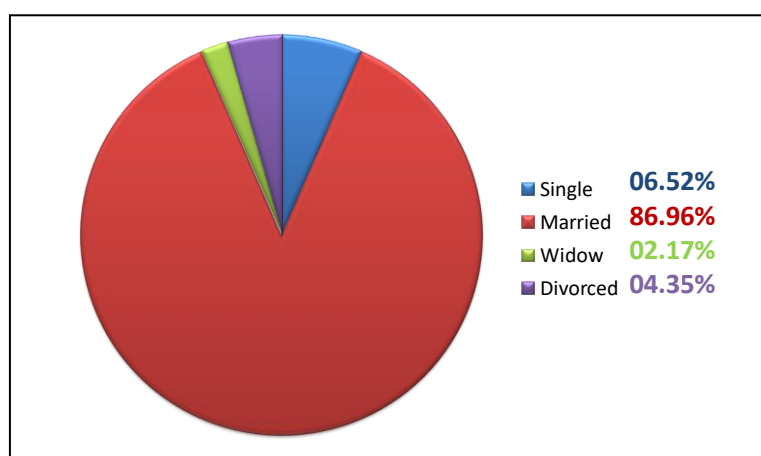**Figure 4:** The Occupations of the Participants

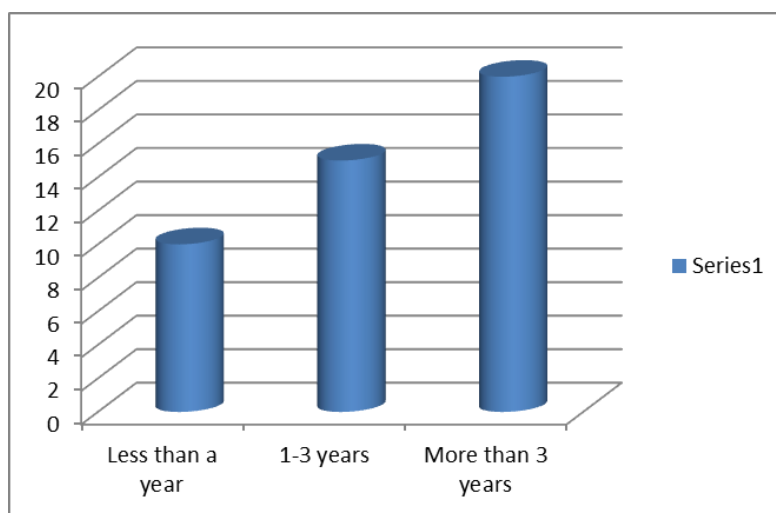**Figure 5:** The Participants 'Marital Status

Figure 6: Duration of the Illness

Table (1): Eye Follow-up before the Implementation of the Program, after the Implementation and 3 Months Later

Eye Follow Up	No	Yes
Before	26	18
After	17	27
3 Months later	1	43
P-value	0.00	

Table 6(2): Independent Groups' Difference in Knowledge Acquisition Concerning Sex before and after the Implementation of the Program

Sex	Before the Program				After the Program			
	General knowledge		DR knowledge		General knowledge		DR knowledge	
	Mean	Sd	Mean	SD	Mean	SD	Mean	SD
Male	23.82	3.75	8.47	3.37	33.41	2.15	16.47	2.37
Female	19.67	6.02	7.90	4.53	32.13	3.10	16.80	2.99
P-value	0.01		0.56		0.21		0.43	

Table 8(3): The Educational Level of the ParticipantsConcerning Knowledge Acquisition

Level of Education	Before the Program				After the Program			
	General knowledge		DR Knowledge		General knowledge		DR Knowledge	
	Mean	Sd	Mean	SD	Mean	SD	Mean	SD
Illiterate	17.25	9.18	4.75	3.77	30.67	1.53	17.33	0.58
Primary	18.67	4.39	6.56	4.02	32.21	2.72	16.37	2.59
Intermediate secondary	22.25	2.36	9.00	3.74	34.00	2.71	14.50	6.45
High secondary	22.54	5.39	9.85	3.13	33.29	1.98	17.43	1.95
University	26.40	4.28	10.20	3.96	33.40	4.16	17.80	1.10
Higher education	23.00	4.24	11.50	7.78	29.50	6.36	15.00	2.83
P-value	0.02		0.09		0.27		0.60	

Table 11(4): Association between Sex and Eye Follow-up:

Pre			Have you ever been to the opthalmogist?		
			Yes	No	Total
Sex	Male	Frequency	3	13	16
		Percentage	6.82%	29.55%	36.36%
	Female	Frequency	15	13	28
		Percentage	34.09%	29.55%	63.64%
	Total	Frequency	18	26	44
		Percentage	40.91%	59.09%	100%
	P-value		0.02		

DISCUSSION:

Out of 51, 47participants completed the study. As shown in figure 1, the majority of them (63%)were women. This finding indicates that most of the patients attending diabetes clinic are females. It is supported by Godwin study in Ghana which has found that most of the patients have been female (Saeed, M. K. 2006).While Emma Love Man found that diabetes was slightly more common in men. The mean age in people with family history was 51 yrs (Kumar, M. A. 2011).

This is not the case in our study which has found that the mean age of the participantsis47.34 years ranging between 40-50 years (fig.2).This finding is supported by another study conducted in Ghana. It has found that the mean age of diabetic people has been over the fourth decade (Kathlen, L. *et al*., 2011). In Malaysian diabetic people, the mean age has been found tobe 56.79 (Ovenseri-Ogbomo, G. O. *et al*., 2013) This finding may be a result of environmental factors. In the same study, the participants were mostly women, employed and married, attended secondary school. On the other hand, the current study indicates that most of the female participants are housewives attended primary school (fig.3.).This means that most of the women in the study are not educated and not employed. This finding is supported by Awad Ahmed study which has found that in Sudan women have had a lower social status than men (Lovenman, E. 2002).

Similar to what has been found in the previous studies, most of the participants (86%) are married (Ovenseri-Ogbomo, G. O. *et al*., 2013). There are no patients between 18-28 years which means that the current study does not include type 1 patients. This absence maybe due to the special clinic that was recently initiated in Jaber abo Elaez for the youth. Another reason explaining the absence of 18-28 diabetic people may be the increased number of type2 diabetes, which represents 95% diabetic people in Sudan and worldwide (Ahmed, A. M. 2006; Lovenman, E. 2002).

The duration of diabetes for most of the participants is more than 3 and less than 5 years. They

have been punctual following up with specialists because they have coped with their disease.50% of them have been experiencing daily difficulties and problems living their life.

Self-monitoring of blood glucose was impaired because most of the participants had no personal glucometer and urine test strips. Personal glucometer is important for the diabetic patients for self-management. As stated by Banerji self ,monitoring blood glucose can be used to prevent hypoglycemic or hyperglycemic episodes and to identify the impact of life style and medication changes on glucose levels (Ghana. 2008-2011).

Most of the diabetic patients' favorite food is meat. This is related to the cultural factors as Sudanese people always prefer meat. However, after the education program, the participants state they prefer both, meat and vegetable. Most of the participants (31.91%) consume euglycemic agent which is metformin.Thisis because all of them were newly diagnosed. That is, 10 participants have had diabetes for less than one year and 15 participants have had it for 1-3 years. More than 3 years and less than 5 years is the duration of diabetes for 20 participants. The first medication given to the diabetic patients is usually metformin. The problems that diabetic patients suffer from are foot ulcer representing 2%, feet numbness and tingling representing the highest percentage (N=15, 31.91%), followed by ocular problem (N=9, 19.15%), loss of weight (19.15%), infections (2.13%), chest pain(8.51%), hypertension(2.13%), sexual dysfunction(4.26%) and burning feet and pain(10.64%). 10%of the participants do not have problems. All these problems are considered as early signs of diabetes complications. The purpose of the educational program is to educate and help the patients to avoid these complications.

Most of the participants (66.76%)have family history of diabetes mellitus. This finding is supported by Valdez R study which has found that family history of diabetes has been a suggested screening tool for assessing the risk of diabetes for it signifies the genetic susceptibility of an individual, especially first degree levels (Valdez, R. 2009; Daher, A. M. *et al.*, 2015).Several studies indicate that people having relatives suffering from diabetes are more susceptible to develop diabetes (Diabetes Education Study Groups (DESG). 2002; Ahmed, A. M. 2006). This finding corresponds with the findings of the current study because the highest percentage of the subjects participated in the study, which is N=14, 29.79%, have either mother, father or a sibling suffering from DM.

Concerning knowledge and attitude before the application of the program, most of the participants seem to have moderate general knowledge (N=27, 57.45%). This indicates that the general knowledge of the participants regarding the disease is relatively good. In spite of their small number, the knowledge of the male participants is better than that of the female (mean 23.82,SD=3.75 , P-value 0.01). Concerning the relationship between general knowledge, age and occupation, no significant differences have been found. The educational level on the other hand has shown significant differences in the participants' general knowledge. As for diabetic retinopathy knowledge, most of the participants have shown poor knowledge (N=38,80.85%).Regarding sex, no difference has been traced in DR knowledge,these findings show that the participant's knowledge of DR is poor regardless of age, sex, occupation or the educational level.

Regarding eye follow up, table (5)1 shows that the majority has not sought eye screening before (N=29, 61.7%).

In testing the difference between paired groups, there is significant difference in all the items of knowledge and attitude before and after the educational program. The general knowledge mean before the educational program was 21.17 SD=5.64. After the program, the mean of general knowledge is 32.60(SD=2.84, P-value= 0.00).,there has been a significant difference in all the items of knowledge and attitude before and after the program(p-value=0.00). This means that the participants' knowledge concerning all the items of knowledge has improved. Also an improvement in their attitude has been traced which indicates that the participants benefit from the educational program. The result of this improvement as the participants reported is empowerment and health promotions. This point is supported by Meetoo study where people with diabetes are empowered when they have necessary knowledge, skills, attitudes and self-awareness to influence their behavior and that of the others in order to improve the quality of their lives. The act of empowerment therefore begins with information and education (Banerji, M. A. 2007).

The results obtained after the implementation of the program and 3 months later, are significantly different in all the items of knowledge and attitude. The general knowledge and DR knowledge have decreased after three months. The mean of the general knowledge after the program32.60 SD=2.84andafter three months28.51 SD=3.30, p-value = (0.00).

Table 3 shows statistically significant difference results before and 3month later in all the items of knowledge and attitude. These results mean that the participants have got much benefit from the educational program,

As shown in table (5)1, there was a significant difference regarding eye follow up in the three periods (P-value =0.00),before the program(N=18 percent=40.9),after the program(N=27 percent=61.4)

and three months later (N=43 percent 97.7). In the current study, the participants 'knowledge about diabetic retinopathy was poor before the program. This point corresponds with what Ovensero-Ogambo *et al* have stated, that is, diabetic patient's knowledge about ocular manifestation and attitude towards eye examination is poor (Saeed, M. K. 2006). As shown in table 5, after the implementation of the program, there has been improvement in knowledge and attitude regarding DR and eye examination. This improvement means that diabetic patients fear from eye complications. This finding is supported by Meltzer and Egleston who have found that patients with diabetes fear blindness more than any other complications of disease (Valdez, R. 2009). Lack of patient education and knowledge about diabetes are the most significant hindrance for eye examination uptake (Diabetes Education Study Groups (DESG). 2002). However, the high score of the participants regarding eye follow up means that they have got the message and their awareness regarding diabetic retinopathy has increased. As a result of this progress, the participants are encouraged to seek medical help and eye examination. This finding is supported by AL-Shakarchi study about blindness in Iraq which has found that lack of awareness has been the most serious barrier to treatment. The study has recommended active health promotion programs for early detection and treatment (Meetoo, D. 2004).

Practice nurse has an important role in educating patients about retinopathy.to insure this role, all diabetes patients attend annual retinopathy screening and also diabetes management support is provided to prevent diabetes complications (Kumar, M. A. 2011; Elmahdi, E. M. A. *et al.*, 1991).

In testing the difference between the independent groups in general knowledge before the implementation of the program, there was a significant difference between male and female (P-value=0.01). Table(6)2shows that in DR there was no significant difference between male and female (p-value=0.56), that is both male and female had the same in knowledge concerning DR.

Regarding the educational level, there has been a significant difference between male and female (p-value=0.02). The highest level of knowledge has been found in the university level (mean 26.40, SD=4.28).As for DR knowledge, the higher level of education has been found in higher education. This finding indicates that the educational level is an effective factor before the implementation of the program..

Concerning eye follow up before the program, sex has had significant association where female participants have shown better concern better than male (p-value=0.02),as shown in table 11(4). This concern shown by the female participants indicates that females

are keener to protect their eyes. As for age, educational level and occupation, no significant association after the program or 3 months later, after the implementation of the program, has been detected.

CONCLUSION:

There has been statistically significant difference in general knowledge between male and female before the program, but there is no significant difference in knowledge regarding diabetic retinopathy.

Concerning the educational level, there has been statistically significant difference in general knowledge, but no significant difference in knowledge regarding DR has been found. As for occupation, no significant difference in all the items of knowledge has also been traced.

After the program, there has been significant difference in knowledge and attitude in all the items.Three months later after the implementation of the program, there has been significant difference in all the items of knowledge and attitude, especially differences in eye follow up and knowledge regarding diabetic retinopathy. The study concludes that diabetic patients lack awareness of diabetic retinopathy.

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