The impact of health education program regarding practice of type 2 diabetic patients in kosti city white Nile state (Sudan) .2021-2024

Abda Ali Osman[*1] , Mohamed jabber elder Abuanja Nimer [*2] , Manal Mohamed Hassan Ahmed[*3]

1-national ribat university ,Sudan .MSc community nursing.abddaali2005@gmail.com

2-International university of Africa , Sudan .professor of community health nursing .jebro17@hotmail.com

3-alneelain university , Sudan .assistant professor of community health nursing .manalcommunitynurse@gmail.com.

Abstract :

Backe ground: Diabetes mellitus, commonly known as diabetes, is a group of metabolic disorders characterized by high blood sugar level (hyperglycaemia) over a prolonged period of time.

aim of the study: to assess the impact of health education practice of type 2 diabetic patients regarding diabetes .**methodology** :this study was conducted in kosti healthy centers .total sample of 117 pre questionnaire done and conduct health education program after 3 months the data was collected by using standardized questionnaire and the researcher use liker scale for measuring knowledge t . the data was analyzed by (spss). **Result** :As for the information of type 2 diabetics regarding diet, the percentage of those who followed a diet only to treat diabetes was about 15% before, and their number increased to 17% after . Patients who had good information about the optimal method for injecting insulin increased, their percentage increased from 43% before to 64% after. Regarding the signs and symptoms of low blood sugar, the percentage of those whose information was good increased from 66% before to 78% after. **Recommendation:** Enhancing the important and effective role of diabetic educator's and conducting training courses and workshops to increase their competence and enhance their effective role in protecting against the dangers of sugar.

Keywords : diabetic, patients , program , health education .

1.Introduction :

Diabetes mellitus, commonly known as diabetes, is a group of metabolic disorders characterized by high blood sugar level (hyperglycaemia) over a prolonged period of time. estimated that diabetes resulted in 4.0 million deaths worldwide, using modelling to estimate the total number of deaths that could be directly or indirectly attributed to diabetes[3] .

Type 2 diabetes is the most common type of diabetes, accounting for 90 to 95 percent of all diabetes patients. [9] This type of diabetes is typically associated with advanced age, obesity, genetics and family history, personal medical history (such as gestational diabetes), physical inactivity, and ethnicity. Approximately 80 percent of type 2 diabetes patients are overweight[1].

People with type 2 diabetes have a pancreas that produces enough insulin, but for unknown reasons, the body is unable to use the insulin effectively. This condition is known as insulin resistance. [12] .Type 2 diabetes patients are unable to activate insulin optimally in their bodies, which leads to the accumulation of insulin in the body over time. [7] After several years, insulin production declines, and the patient's condition becomes similar to that of type 1 diabetes, as glucose accumulates in the blood and the body is unable to use its own energy source (glucose) effectively[5] .

This type usually affects adults - after the age of thirty - but it can also affect those younger than this age. This type is closely related to obesity, and genetic factors play a major role in its occurrence. [4] . Therefore, diabetes is highly prevalent in certain families as a result of this type. If one identical twin is affected, the other is definitely affected. [10] In this type, there is resistance in the body's cells to the action of insulin, and the pancreas cannot secrete a sufficient amount to overcome this resistance. Therefore, the patient needs to take medications (pills) to help the pancreas secrete more insulin. Its symptoms appear gradually[2] .

1.2 Problem statement : It is evident from the previous studies that the incidence of diabetes mullites is increasing and that although there is evidence that complications of diabetes can be prevented. There are still patients who lack the required knowledge and skills to mange and control their continuities generally accepted that diabetics' must take responspility for their own care and treatment .patient therefore have to acquire the relevant knowledge ,skills and attitude for successful diabetes management .this aduqet diabetes education of patient as well as family members as a support group(diabetes education).this is study is an attempt to determine patients knowledge and views on diabetes mellite's to make recommendation's to words improve diabetic education which might lead to improve adherence to the diabetic treatment regimen. the diabetic patients in the area of study they suffering from lack of knowledge about the diabetes .they complain from recurrent hypoglycaemia ,uti, and infected diabetic wound .hypoglycaemia if not treated can lead to coma. And lack care of diabetic wound lead to ambution. And uncontrolled diabetes can affect the kidney (renal failure).

1.3 research question: What is the health education program for type 2 diabetes patients in Kosti?

1.4 Hypothesis: Raising the level of knowledge for patients with type 2 diabetes leads to avoiding potential diabetes complications and reduces the rate of hospitalization of patients.

1.5 Justification:The goal of efficient diabetes care can be achieved through implementing a diabetes programme. This programme should be responsible for personnel training, establishing model care centres, patients' education, availability and affordability of insulin, scientific and clinical research and primary prevention.

2.Objective

2.1 General objective: To study The impact of Health education program regarding awareness of type 2diabetic patients in kosti city-

3. Material and methods

3.1 Study design:This is a quasi experimental design. community based studay

3.2 Study period :The duration of the study from (january2021-december 2024)

3.3 Study area:

The study was conducted at kosti healthy centre's selected by simple random selection . Kosti is one of the major cities in sudan that lies south of Khartoum the capital of sudan located in western bank of the white nile river.

3.4 Study population: The study population was included all (type 2) in healthy centers was mentioned before in study area during the period time .age from 30 and above .male &female educated and non educated from different culture's ,economic status gradient from good to poor status . A pilot study was done on a sample of 10 type 2 patents in an effort to test the validity of the questionnaire instrument

3.5 Inclusion criteria: The target group of all type2 patients in healthy centre's during the study period(january2021-december 2024)

3.6 Exclusion criteria: Non diabetic patients in health centre's

3.7 Sample size and : The sample size was calculated by the(Stephen Thompson) formula :

$$n = \frac{N * z^2 * S^2}{d^2}$$

N: community size

Z: The standard score corresponding to the level of significance (0.95) and equal to (1.96)

d: error rate.

S: variance

n = sample size

$$n = \frac{168*(1.96)^2*(1.4)^2}{(3.29)^2} = n = \frac{1264.96}{10.8}$$ sample size = 117

3.8 Data collection tool:

The data were collected using :

a- interview questionnaire sheet.

it content socio demographic general characteristics of the study sample as (sex-age educational level –experience's –marital status)

. b-Chick list:-

An observational checklist was developed by the researcher to observe the actual type 2 patients practice before and after the education program ,it included all procedures needed for care .

A pilot study was done on a sample of 10 type 2 patents in an effort to test the validity of the questionnaire instrument

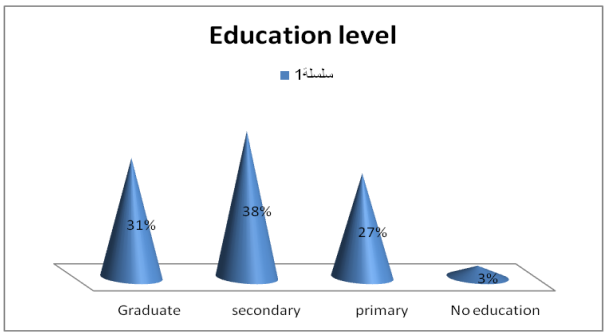
3.9 Data analysis : The descriptive data analysis was adopted which include the percentage distribution by using statistical package of social sciences (spss).and paired test,p- value)to test the association between variables .

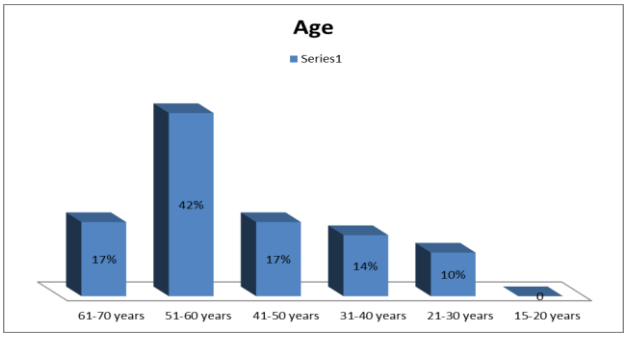
3.10 ethical consideration: before the conduction of the study first take the approval from the post graduate studies (neelain university) , written permission will obtained from the ministry of health and the managers of healthy centre's to collect the necessary data after explanation of the purpose of the study. also verbal agreement will take from every patient participating in the study. a brief explanation of the aim of the study will give to the patient.

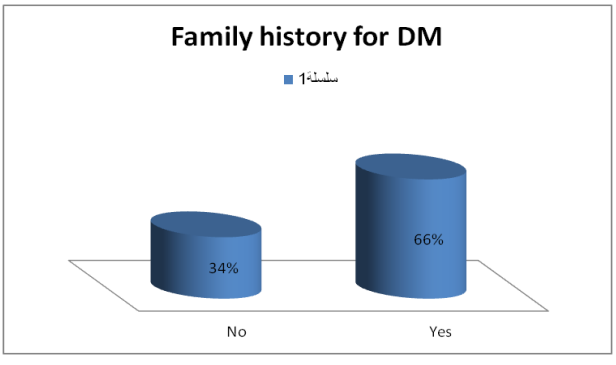
4. Results :

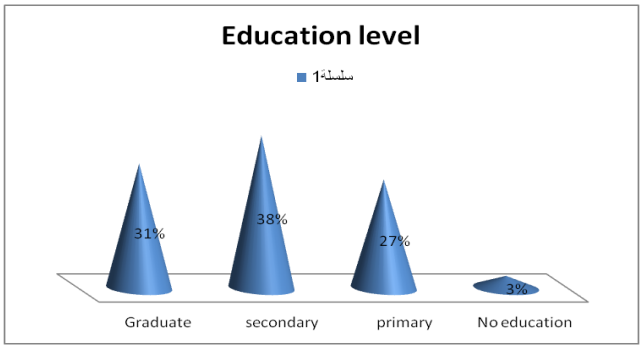
Table(1) Social demographic :

Social demographic	Items	Frequencies	Percentage
Age	15-20 years	-	-
	21-30 years	12	10%
	31-40 years	16	14%
	41-50 years	20	17%
	51-60 years	49	42%
	61-70 years	20	17%
Gender	Male	48	41%
	Female	69	59%
Family history for DM	Yes	77	66%
	No	40	34%
Education level	No education	4	3%
	Primary	32	27%
	Secondary	45	38%
	Graduate	36	31%









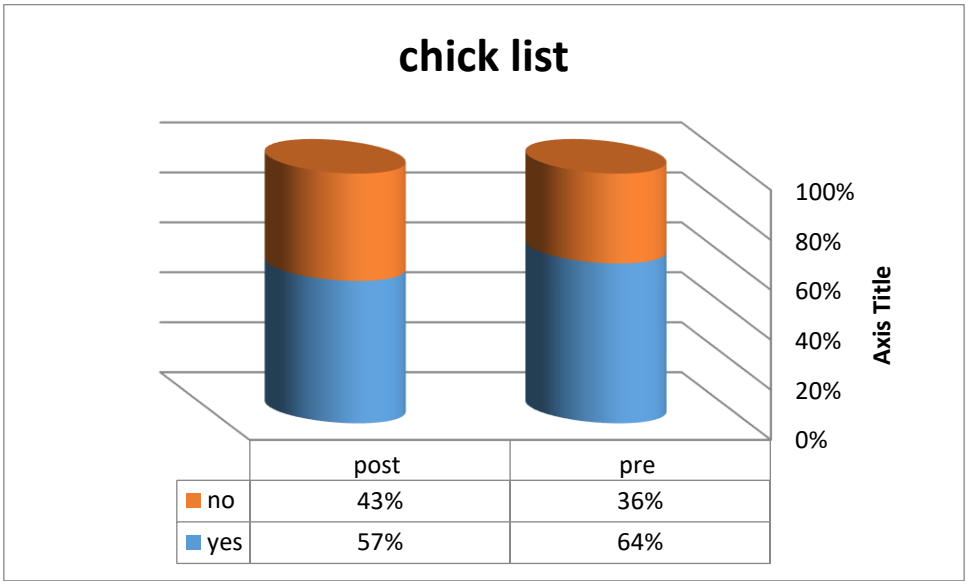
most of the study population their age range between (51-60 years) at percentage of (42%), and few of the study population their age range between (21-30 years) at percentage of (10%).

most of the study population are females at percentage of (59%), and males at percentage of (41%).most of the study population has Family history for DM at percentage of (66%), and (34%) not has Family history for DM .most of the study population their education level are secondary at percentage of (38%) , and (27%) their education level are primary, and (31%) their education level are Graduate , and (3%) are no education .

table (2) chick list :

Behaviors	Pre				Post			
	Yes		**No**		**Yes**		**No**	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
A -Use tabs at the correct time	98	87%	19	13%	94	80%	23	20%
b-Insulin :-	48	40%	69	60%	70	60%	47	40%
1- Check the insulin expiry date								
2- Mixing cloudy insulin	40	33%	77	67%	62	53%	55	47%
3-Inj technique 90 degree and wait for 10 second	32	27%	85	73%	74	63%	43	37%
4-Sites of injections (arms-thighs –abdomen)	48	40%	72	60%	74	63%	43	37%
5-Injecton storage	32	27%	85	73%	66	56%	34	44%
6-Sharps (lancet –pen needles-insulin pen)safe disposable	44	37%	73	63%	62	53%	55	47%
c- Blood glucose monitoring:-	44	37%	73	63%	78	67%	39	33%
7-Test time								
8-Strips storage	32	27%	85	73%	74	63%	43	37%
9-Strips expiry day	40	33%	77	67%	58	49%	59	51%
10-Record keeping	32	275	85	67%	50	43%	67	57%
11-Pt demonstrate correct using test technique	89	77%	28	23%	70	60%	47	40%
d-Diet :-	53	47%	64	53%	62	53%	55	47%
12-Time								
13-Diet component (diabetic pt diet)	77	67%	40	33%	78	67%	39	33%
14-Carbs count	8	7%	109	93%	10	8%	107	92%
e- Foot care :-	40	33%	77	67%	70	60%	47	40%
15-Check feet every day for cuts-cracks-and red ness.								
16-Wear soft socks	101	87%	16	13%	70	60%	47	40%
17-Go bear foot at home	28	23%	89	77%	42	36%	75	64%
18-Cut nails carefully	97	83%	20	17%	74	63%	43	37%
19-Check between fingers about any fingers or wounds	105	90%	12	10%	78	67%	39	33%
20-Rub lotion or cream on the top and bottoms of feet not between toes	65	57%	52	43%	74	63%	43	37%
Average	**%64**		**%36**		**57%**		**43%**	

Source: Preparation of the researcher, based on the questionnaire data, 2025.



Source: Preparation of the researcher, based on the questionnaire data, 2025.

Test the effect of the effect of the difference in the personal characteristics of the diabetes patients:

(Chi-Square) is a statistical test used for a test of an effect on one of the variables as a result of differences on the characteristics of the seam vocabulary[11] .

If the probability value of the test is less than 0.05, the result is explained as moral, and this means that there is an effect on the study variable resulting from the difference in the specific characteristic of the sample individuals, but if the test result is greater than 0.05, the result is interpreted as non -moral and this means that there is no effect The study variable is caused by the difference in the specific property of the sample individuals[8].

In this study, the (Chi-Square) test is used to test the effect of the difference in the personal characteristics of the diabetes patients (age, gender ,education level) on the knowledge and practices of type 2 diabetes patients .

1. Is there a difference in the knowledge and of type 2 diabetes patients between the diabetes patients caused by age ?
2. Is there a difference in the knowledge and of type 2 diabetes patients between the diabetes patients caused by gender ?
3. Is there a difference in the knowledge and of type 2 diabetes patients between the diabetes patients caused by education level?

table (3) shows the relationship between age and practice

		practice			Chi-Square-test	P-value
		Poor	Moderate	Good		
Age	15 less than20years	8	9	15	28.9	0.002
	21 less than30year	8	4	8		
	31 less than40year	5	4	8		
	41 less than50year	2	0	8		
	51 less than60year	4	8	4		
	61 less than70year	4	4	12		
Total		33	29	55		

source: preparing by researcher from questionnaire data , 2024.

Table (3) shows that the difference in the ages of diabetes patients has an effect on the knowledge and practices of type 2 diabetes patients, through the probability value of the (Chi-Square) test, which equals (0.002), which is less than (0.05).

table (4) shows the relationship between gender and practice

		practice			Chi-Square-test	P-value
		Poor	Moderate	Good		
Gender	Male	24	16	12	31.7	0.000
	Female	8	28	29		
Total		32	44	41		

source: preparing by researcher from questionnaire data , 2024.

Table (4) shows that the difference in the gender of diabetes patients has an effect on the knowledge and practices of type 2 diabetes patients, through the

probability value of the (Chi-Square) test, which equals (0.000), which is less than (0.05).

table (5) shows the relationship between education level and practice

		practice			Chi-Square-test	P-value
		Poor	Moderate	Good		
education level	Diploma	12	8	16	26.4	0.000
	Bacalorhea	29	12	12		
	Master	4	12	12		
Total		45	32	40		

source: preparing by researcher from questionnaire data , 2024.

Table (5) shows that the difference in the education level of diabetes patients has an effect on the knowledge and practices of type 2 diabetes patients, through the probability value of the (Chi-Square) test, which equals (0.000), which is less than (0.05).

5. Discussion :

This study is to evaluate the effect of health education program on information and performance of type 2 diabetics regarding diabetes. The result shows that more the participants with in age group of 51-60 has the highest rate of diabetes at a rate of 42%. This Can be near as Study done in Sadia arabia2020 it report that 51 and 64 years old.. This study also showed that in terms of gender, females have the highest rate of diabetes compared to males, the rate was 59% for females and 41% for males as result done in pakistan 2023 showed that male 35.3% female 64.7%. This study also showed that most of the patients had a family history of diabetes, at a rate of 66% its look like studay done in china The disease-related characteristics of the participants were assessed and showed that 133 had a family history of diabetes, 79·12 %

The result showed that the practices of the study population with type 2 diabetes regarding the use of sugar pills in correct time is about .80% before to 87% after a period of time.. We also noticed that those who check the expiry date of insulin before using it increased from 40% before to 60% after,. Intermediate-acting mixed insulin. Those who mixed it well before use increased their percentage from 33% before to 53% after. Those who inject insulin at the correct injection angle of 90 degrees also increased from 27% before to 63% after. For patients who were periodically changing insulin injection areas, including the arms, abdomen, and thighs, the percentage of those who were doing so increased from 40% before to 74% after

The correct way to store insulin The percentage of those who were doing it correctly increased from 27% before to 56% after.

Regarding the safe disposal of sharps and syringes, the percentage increased from 37% before to 53% after.

Sugar analysis: The percentage of those who analyzed their blood sugar at the correct time increased from 37% before to 67% after.

By storing blood sugar analysis strips correctly, the percentage increased from 27% to 63%,

Also, the percentage of those who checked the expiry date of strips before using them increased from 33% before to 49% after.

Patients who save blood sugar tests to compare their highs and lows increased from 27% before to 43% after.

The percentage of those who do blood sugar tests at home using a diabetic device decreased from 77% to 60%. due to the lack of strips ,supply and medications for chronic diseases in the city of Kosti due to the closure of the road related to the war.

Regarding the sugar diet, the number of those who avoided sugar was equal, at53% before and after The number of those who did not take shelter decreased by47 % before and increased afterward. The difficulty of implementing the diet, as patients said. This also related to lack amount of foods

Likewise, the percentage of the participant's who wear comfortable, non-compressive socks increased from 60% before to 87% after.

Walking barefoot at home decreased the percentage of those who used to do this behaviour from 36% to 23%,

Cut nails in a correct and careful manner increased the percentage of the participant's who did from 63% before to 83% after.

Check between the toes to detect any fungi or wounds. The percentage increased from 67% before to 90% after.

Those who used to apply moisturizing cream on the backs and soles of the feet to protect them from dryness, their percentage increased from 57% before to 63% after,

The health education program conducted by this study in Kosti city led to good and satisfactory results due to shedding light directly on the causes of diabetes and its complications, correcting some concepts and clarifying information and practice in a smooth and scientific way through direct lectures with patients and involving them and answering their questions related to diabetes. Also through distributing brochures and the correct Explaining the correct way to deal with diabetes, including the use of insulin needles, diabetes devices, and foot care, and informing them about the appropriate diet for diabetics by distributing healthy meals to patients.

. 6. Recommendations:

The study recommended the following :

1. There is a need to Conducting health awareness campaigns in health centre's, schools, and even markets from ministry of health .

2. Enhancing the important and effective role of diabetic educator's and conducting training courses and workshops to increase their competence and enhance their
3. effective role in protecting against the dangers of sugar.

7. Conclusion :

. The study conclude the following. Few of the participant's have suitable diet of diabetes pre and post. This study also indicates that most of the patients were in the 51-60 age group, and the majority of the participating patients were female. It also showed that most of the patients had a family history of diabetes. Most of the patients did not have blood sugar testing devices. This study can be used to focus in the future on some important points such as the importance of a proper diet for diabetics and exercise, how to use medications at the right time and how to store and take them. It can also be used to highlight the importance of having a blood sugar testing device to monitor .and reduce the death's rate resulting from low blood sugar.

8. Recommendations:

The study recommended the following :

1.There is a need to Conducting health awareness campaigns in healthy centre's, schools, and even markets from ministry of health .

2.Enhancing the important and effective role of diabetic educator's and conducting training courses and workshops to increase their competence

Acknowledgement's:-

To my co -super visor DR \Manal Mohammed Hassan, your endless patience and understanding, especially during the most demanding phases of this research, have been my anchor.

References :

[1] HallaMahagoub Idrees Adam . Dietary knowledge, attitude and practice among type 2 diabetes mellitus patients in Sudan: a hospital-based cross-sectional study. Diabetes Care Journal **,** 2018 .5(13): 111–120.

[2] Saeed M. Omar, Imad R. Musa . Prevalence, risk factors, and glycaemic control of type 2 diabetes mellitus in eastern Sudan: a community-based study. Diabetes international Journal **2022 .** 9(16): 96–116.

[3] Mohamed Khan. The participants who know the appropriate time for a blood sugar test. World Journal of Diabetes. 2023 , 3 (12): 78–98.

[4] lamya Mohamed Ali .Type 1 diabetes through the life span: a position statement of the American Diabetes Association". Family Health journal 2021 . 15 (2): 29–33.

[5] Ahmed Salahaldean Ahmed. Management of blood glucose in type 2 diabetes mellitus". Family Health journal 2016. 23 (4): 34–44.

[6] ***Siminerio L. M., Albright A., Fradkin J., et al.*** *The National Diabetes Education Program at 20 years: lessons learned and plans for the future. Diabetes Care. 2018;41(2):209–218.*

[7] ***Kerfoot B. P., Gagnon D. R., McMahon*** *team-based online game improves blood glucose control in veterans with type 2 diabetes: a randomized controlled trial. Diabetes Care. 2017;40(9):1218–1225.*

[8] Galaviz, KI, Narayan, KMV, Lobelo, F, and Weber, MB. Lifestyle and the prevention of type 2 diabetes: a status report. Am J Lifestyle Med. 2018. 12:4–20

[9] Cole, JB, and Florez, JC. Genetics of diabetes mellitus and diabetes complications. Nat Rev Nephrol. (2020) 16:377–90

[10] hisi, GLM, Aultman, C, Konidis, R, Foster, Effectiveness of an education intervention associated with an exercise program in improving disease-related knowledge and health behaviours among diabetes patients. Patient Educ Couns. (2020) 103:1790–7

[11]Saleh, AM. People with diabetes adherence to drug, dietary, and lifestyle changes in Erbil city. Iraq BMC Endocr Disord. (2022) 22:305.

[12]American Diabetes Association. Screening for type 2 diabetes. Clinical Practice Recommendations. Diabetes Care, 27(1): S11–S14 (2004).