Diabetes Self-management Education Program among Patients at Risk for Diabetic Nephropathy

[1]Wafaa Khalil Ibrahim, [2]Shimaa Fathy Miky

[1, 2] Lecturers of Community Health Nursing, Faculty of Nursing–Ain Shams University

Abstract: **Diabetic kidney disease (nephropathy) occurs in patients with diabetes mellitus (DM) and decreased kidney function that can be caused by many different causes, including hypertensive nephrosclerosis and acute kidney failure that has not been resolved. Aim: This study aimed to evaluate the effect of self-management education program among patients at risk for diabetic nephropathy. Research Design: A quasi-experimental design was used. Setting: The study was conducted in Ain Shams University Hospital at diabetes outpatient clinic. Sample: A purposive sample comprised; Total number of 96 patients, their age ranged from 25 to 50 years, Diagnosed patients at risk for diabetic nephropathy on 1st, 2nd and 3rd stages from medical record. Tools: for data collection, 1st tool: An Interviewing questionnaire for the clients divided into three parts; Socio-demographic data, Past and present medical history related to diabetes mellitus and patients knowledge regarding diabetic nephropathy (pre/post self-management program). 2nd tool: Healthy practices assessment for patients at risk for diabetic nephropathy sessions (pre/post self-management program). Results: 46.8% of patients aged 45- <50 years, and 53.2 % were female. Regarding the type of diabetes, 63.6% of patients had Type II diabetes. Conclusion: There have been extremely statistically significant differences between patients` knowledge, their practice and their kidney health pre/post self-management education program. Overall, the study has indicated that diabetes self-management education program had a positive effect on the improvement of self-care practices for patients at risk for diabetic nephropathy, which is attributable to better effect of patients` condition. Recommendations: raising community awareness and social support for diabetic patients through designing family program that have potentially important positive influence on patients' self management.**

Keywords: **Diabetic nephropathy, glomerular filtration rate, Diabetes self-management education.**

1. INTRODUCTION

Diabetic Nephropathy (DN) – which is characterized by raised urine albumin excretion or diminished glomerular filtration rate (GFR) or both – is a genuine complexity that happens in 20% to 40% of all diabetics *(Gheith et al., 2016)*.Both type 1 and type 2 diabetes can prompt nephropathy, but in type 2 diabetes, a smaller proportion of patients' advancement to end stage kidney disease (ESKD). As a result of higher prevalence of type 2 diabetes, these patients represent the greater part of of diabetics on hemodialysis *(American Diabetes Association. 2014)*.

The prevalence of diabetes around the world has reached epidemic proportions. While diabetes is as of now assessed to influence over 8% of the global population (nearly more than 350 million people), this is predictable to develop to more than 550 million people by the year 2035 *(American Diabetes Association. 2014). Piccoli et al., (2015)* estimated that over 40% of individuals with diabetes will develop diabetic nephropathy (DN), including a significant number who will develop end- stage kidney disease (ESKD) requiring renal substitution treatments (dialysis and or transplantation).

Each kidney is made a large number of thousands of small units called nephrons. These small structures filter blood and assist in removing wastes out of the body. Long-term exposure to high blood glucose may impair those functioning kidney units for individuals with diabetes and cause kidneys to lose their filtering functions. Furthermore, hypertension or high blood pressure is a diabetes complication *(WWW.kidney cares. Org, 2016)*.

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Hyperglycemia is well known risk factor for DN and it recognized that intensive glucose control reduces the risk of DN *(Gheith et al., 2016)*. Other risk factors for DN in diabetes include male sex, obesity, hypertension, inflammation, resistance to insulin, hypovitaminosis D, and dyslipidemia *(De-Boer, 2014)*. DN is a chronic complication of both type 1 diabetes mellitus (DM) (beta cell damage, absolute lack of insulin) and DM type 2 (insulin resistance and/or decreased secretion of insulin) *(Piccoli et al., 2015)*.

Five phases are in the development of diabetic nephropathy. **Stage I,** enhanced glomerular filtration rate (GFR); lasts around 5 years from the beginning of diabetes.

Nearly 20% increase in the size of the kidneys and 10% -15% increases in the pulmonary plasma flow,butwithout albuminuria or hypertension.Stage II; begin more or less 2 years after the start of the illness with thickening of the basement membrane and mesangial proliferation with GFR normalization but withoutclinical indications of the illness. The first clinically detectable sign of glomerular harm and micro-albuminuria (albumin 30- 300 mg / day) is the phase III, however. It generally happens with or without hypertension 5 to 1years after the start of the disease. This phase is reached by about 40 percent of patients. Stage IV is the phase of DN with irreversible proteinuria (> 300 mg / day), reduced GFR below 60 mL / min/1.73 m2 and maintained high blood pressure. Stage V is described when detecting ESKD with GFR < 15 mL / min/1.73 m2. In the form of peritoneal dialysis, hemodialysis or kidney transplantation, nearly 50 percent of patients will need renal replacement treatment (De-Boer, 2014).

Diabetes self-management education (DSME) is the continuous process of providing the knowledge, practice, and ability necessary for diabetes self-care. This method brings together the patient's diabetes needs objectives and life experiences and is guided by evidence-based standards. DSME's general goals are to promote informed decision-making, self care practice, problemsolving and active cooperation with the health care team and enhance clinical results, wellbeing status, and personal satisfaction *(Aerden et al, 2014).*

Self-monitoring provides information on the up to date blood sugar status, hence helps during assessment and guiding adjustments for diet, exercise and medication so as to accomplish ideal blood sugar control. Apart from weight loss, participating in day physical activity has been observed to be connected with improved health outcomes among diabetic patients *(Bird and Brown, 2014).*

Significance of the study:

The occurrence of diabetes mellitus is expanding at epidemic proportion worldwide. By 2030; it will develop to 366 million as a result of longer future and changing propensities for eating routine *(Shaw et al, 2010).* Egypt will have at any rate 8.6 million grown-ups with diabetes and will be the tenth biggest populace of diabetics on the planet *(Saad, 2013)*. In Egypt, the prevalence of chronic diabetes complication extended from 8.1% to 41.5 % for retinopathy, 21% to 22% for albuminuria, 6.7% to 46.3 % for nephropathy and 21.9 % to 60 % for neuropathy *(Bos and Agyeman, 2013).*

Community Diabetes Nurse Specialist's role aims to work with general practices, clients and their families enhance quality of life for those with diabetes. The community health nurse should should start by taking the time to assess the perceptions of their clients and create realistic and specific suggestions for self-management practices which include healthy eating, monitoring of blood sugar & blood pressure, reducing risk factors and physical exercise *(paul et al, 2014).*

Aim of the Study:

This study aimed to evaluate the effects of self-management education program among patients at risk for diabetic nephropathy through:

1) Assessing patients ' knowledge regarding diabetic nephropathy.

2) Assessing patients ' practices regarding diabetic nephropathy.

3) Developing and implementing self-management education program for patients at risk for diabetic nephropathy.

4) Evaluating the effect of self-management education program on patients at risk for diabetic nephropathy.

Research Hypothesis:

It was hypothesized that self-management education program will improved self- practices among patients at risk for diabetic nephropathy.

2. SUBJECTS AND METHODS

Research Design: A quasi-experimental design was used for the conduction of this study.

Setting: The study was conducted in the diabetes outpatient clinic at the Ain Shams University Hospital. The diabetes outpatient clinic provide the following health services to the patients which include measure blood sugar, blood pressure, physical examination and lab examinations identified with kidney assessment.

Sample: A purposive sample was composed of 96 patients in addition to 9 for pilot study from both sexes with at risk for diabetic nephropathy was was enrolled from the previously mentioned settings. They were selected according to the sensitive analysis in relation to diabetic nephropathy. The subjects were chosen by the accompanying**: Inclusion criteria:** Diagnosed clients at risk for diabetic nephropathy on 1st, 2nd and 3rd stages from medical record and according to kidney functions investigations, their age from 25 years and above and those who agreed to participate in the study and to complete the program sessions. **Exclusion criteria:** All patients with 4th and 5th stage of diabetic nephropathy from medical record and lab examinations were carried in diabetic outpatient clinic.

Tools of data collection:

First Tool: Interviewing questionnaire will be developed by the researchers based on the recent literature, experts' opinion and researcher's experience, to assess clients' self practices regarding diabetic nephropathy which includes three parts:

Part I: Socio demographic characteristics of the patients with diabetes as regards: - Age, gender, marital status, educational level, occupation, family income, and residence.

Part II: Medical history related to diabetes mellitus which include Types of diabetes, Duration of the disease (in years) and Follow up frequency per month.

Part III: It was concerned with patients' knowledge regarding diabetic nephropathy (DN) as regards:-Meaning of DN, risk factors related to DN, stages of DN, sings &symptoms of DN, proper investigation and methods of prevention.

Scoring system for knowledge: The score ranged in multiple choice questions and open ended question as (1) for correct answer and (zero) for incorrect. Total score was categorized into either satisfactory level (from 50% & more) or unsatisfactory level (less than 50%).

Part IV: *Kidney Health Assessment for patients at risk for diabetic nephropathy*: was adopted from *(WWW.kidney cares. Org. 2016) included:* kidney disease screening, early signs &symptoms of DN, GFR, and Serum creatinine level) (*pre/post self-management education program*).

Scoring system for Kidney Health Assessment: the studied patients were scored kidney disease screening as (1) for done and (zero) for not done, **Scoring for early signs &symptoms of DN as** (1) for present and (zero) for no present, **Glomerular filtration rate (GFR) according to** (*Shlipak &Michael, 2015) and Serum* **creatinine normal level for males is** (0.8 and 1.3 mg/dl) while **Serum creatinine normal level for females is** (0.6 to 1.1 mg/dl)

CKD Stage	GFR level (mL/min/1.73 m^2)
Stage 1	≥ 90
Stage 2	60 – 89
Stage 3	30 – 59

Tool II: Healthy practices assessment scale for patients at risk for diabetic nephropathy; adopted from *(Centers for Disease Control and Prevention (CDC), 2014)* and modified by the researchers to assess patients self-practices include:

A. *Diabetes self-care questionnaire included:* (dietary requirements- physical exercise- rest &sleep – compliance with treatment regimens and follow up) (*pre/post self management education program*).

Scoring system: Diabetes self-care score ranging from zero to two distributed as the following: never (0), sometimes (1), always (2), the scale includes 40 statements and the highest score is two then the total score were 80 points, equal 100%. The final score of patient's responses was 60% and above if adequate practices and less than 60% if inadequate practices.

B. Physical assessment measurements for patients at risk for diabetic nephropathy, it included: blood pressure, random blood sugar and body mass index.

■ **Assessment of body mass index,** calculated according to the following equation: BMI= weight (kg)/Height (m) ^{2}.**Scoring system of body mass index according to** (*WWW.kidney cares. Org. 2016*)

Meaning	BMI
Underweight	**Below 18.5**
Healthy weight	**18.5 to 24.9**
Above ideal range	**25 to 29.9**
Obese	**30 and above**

■ **Normal range for blood pressure according to (***James et al 2014***) :**<130/80 mm Hg

■ **Random blood sugar level according to** (*Guo et al., 2014*)**:**

Plasma glucose test	Normal	Diabetes
Random	Below 11.1 mmol/l Below 200 mg/dl	11.1 mmol/l or more 200 mg/dl or more
Fasting	Below 6.1 mmol/l Below 108 mg/dl	7.0 mmol/l or more 126 mg/dl or more
2 hour post-prandial	Below 7.8 mmol/l Below 140 mg/dl	11.1 mmol/l or more 200 mg/dl or more

■ The researchers used mercury sphygmomanometer for measuring blood pressure, **(ACCU CHEK)** for measuring random blood sugar and digital scale for measuring weigh **(Salter 9000WH3R).**

Validity and Reliability: The validity of the tools were ascertained by five experts, (three of them were community health nursing, faculty of nursing and another two from medical surgical nursing, Ain Shames University who reviewed the instruments for content accuracy. The reliability test of translated version was established by using the Cronbach alpha and Pearson correlation which showed good internal consistency construct validity Cronbach alpha = (0.887).

Operational design:

A. **Pilot study:** A pilot study was done before beginning data collection, and 10% from total study sample were chosen randomly from previous mentioned setting. It was done to estimate the time required for filling out the tools and also to check the clarity, applicability, relevance of the questions. In light of the results of the pilot study, the necessary modifications were done; these patients were excluded from the study.

B. Field work:

- An official permission to conduct the study was obtained from the Director of diabetic outpatient clinic in Ain shams Hospital. In order to obtain their agreement and cooperation, a formal letter was issued by the Dean of Faculty of Nursing, Ain Shams University, explaining the aim of the study.

- Preparation of data collection tools was carried out over a period of one month beginning from end of March 2017 to end of April 2017, after being revised from experts to test their validity.

- The application of the self management education program, done by the researchers, lasted for 5 months from the beginning of May 2017 to end of September 2017; four days/week (Saturday, Sundays, Tuesdays & Wednesdays), in the

previous unit from 9.00 a.m. to 2.00 p.m. The questionnaire took about 45 minutes to be filled by the researchers and included about (8-15 patients). The program was applied in five sessions (2 sessions for theory and 3 sessions for practices).

Self care Program Development Phases

phase1: Based on the results obtained from the pilot study, the researchers also designed the guidance program, revised and modified it according to the related recent, national and international literature, and consideration was given to the various aspects of the research problem.**Phase 2:** A pre-program assessment tool that uses the previous interviewing questionnaire for collected the data from the patients. This phase aimed at improving patients' knowledge & practices regarding diabetic nephropathy. **Phase 3:** The self care program was designed by the researchers based on outcomes obtained from the pre-program assessment tools.

Based on associated literature and sociodemographic aspects of the research sample; it has been amended and altered to cover the expertise and procedures of patients towards diabetic nephropathy.

The general objective of the program: To improve knowledge, practices among patients at risk for diabetic nephropathy. The theoretical part of the program was presented in two sessions as lectures, and discussions, followed by the second part which consisted of three subsequent sessions for patients' practices regarding their self-management toward diabetic nephropathy.

Implementation of the program:

Through group discussion, the researchers discussed with the patients the theoretical and practical parts, which included the following items:

Knowledge included the Meaning of DN, Risk factors related to DN, Stages of DN, Sings& symptoms, Proper investigations & Preventive methods for DN.

The contents of the practical part were given through asking questions that included: Adequate nutrition, Compliance with treatment regimen, Physical exercise, Rest &sleep & Follow up. Each session started by a summary about what was given through the previous sessions and objectives of the new one, taking into consideration using simple and clear Arabic language to all levels of the studied clients.

Teaching methods: Different methods were used such as Lectures, and group discussion. **Media**: Suitable teaching aids prepared especially for the program were used such as, printed materials, posters, the guiding booklet and power point presentation & videos using laptop.

Educational Booklet: A booklet was constructed for clients according to their educational level and needs. It was prepared in simple Arabic language.

Phase 4: Evaluation of the self-management of education program was connected some time recently and after the program through pre and posttest utilizing the same study questionnaire, in order to appraise differences, similarities and areas of improvement, as well as defects and estimate the effect of self-management education program on clients at risk for diabetic nephropathy.

Ethical consideration: An official permission used to be obtained. A clear and simple clarification about the aims and nature of the study was explained to all participant clients. Consent was got from the chosen patients to ensure willingness to engage in the study. Patient's participation was voluntary; they can withdraw from the study at any time. The researchers' ensured confidentiality of the participant patient's personal data and the study haven't any harmful effect on them.

Statistical Design: Data entry was done using Epi-info, version 6.04 laptop software program package, while statistical analysis was done using the statistical package for social sciences (SPSS), version 21.0. Quality control was done at the stages of coding and data entry. Data were presented using descriptive statistics for qualitative factors in the form of frequencies and percentages.

Qualitative variables were compared using Chi-square test (X2). The significance of the results was considered as not significant, if $P > 0.05$; significant, if $P < 0.05$; and highly significant, if $P<0.001$.

3. RESULTS

Table (1) reveals that the mean age of patients in this study was 24.0 ±14.7. This result shows that 53.2% of patients were females. According to marital status, 63.5% of patients were married. As regard to educational level, 35.5% of patients were illiterate. This result shows that 38.5% of female patients were housewife. 59.4% of patients were hade insufficient family income. As regard residence area this table shows that 63.5% of patients were living in urban area.

Table (2) illustrates that 63.6% of the studied patients had Type2 diabetes. According to duration of disease 46.8% of them had diabetes from 6 - < 10 years with Mean 24.0 ±SD17.09. Also, 74% of patients were frequency follow up once every month.

Figure (1) shows that, total score of satisfactory knowledge was 80.2% post program implementation compared to 39.6 % pre-program with highly statistical difference (($X2= 30.56$, P= <0.001).

Figure (2) reveals that, 78.1% of the patients done healthy practices after the program implementation compared to 38.5% only before the program implementation, with highly statistical significant difference ($X2= 29.33$, P= <0.001) pre and post program implementation.

Table (3) indicates that there was highly statistically significant in relation to kidney disease screening, early signs &symptoms of DN, GFR level, serum creatinine level for males and females (P<0.001).**Figure (3):** shows that total healthy kidney mean 51.5±SD30.40 with highly statistically significant pre/post program($X2=36.94$, P<0.001).

Table (4) reveled that Physical assessment of patients with diabetic nephropathy were highly statistically significant in relation to blood pressure and random blood sugar pre/post program (P<0.001).Meanwhile statistically significant in relation to the index of body mass (P<0.05).

Table (5) demonstrates that there were highly statistical significant relation between total patients kidney assessment and physical assessment pre /post program P<0.001.

Table (1):-Distribution of Studied Patients with Diabetes According to their Demographic Characteristics (n= 96).

Items	N	%
Age		
25- <35	13	13.6
35- <45	15	15.6
45- <50	45	46.8
50+	23	24
Mean 24.0 ±14.7		
Gender		
Male	45	46.8
Female	51	53.2
Marital status:		
Married	61	63.5
Divorced	11	11.5
Widow	15	15.6
Single	9	9.4
Educational level		
Illiterate	34	35.5
Basic education	24	25
Intermediate education	25	26
University degree	13	13.5
Occupation:		
Professional	21	21.8
Employee	27	28.2

Private	11	11.5
Housewife	37	38.5
Family Income		
Sufficient	39	40.6
Insufficient	57	59.4
Residence:		
Rural	35	36.5
Urban	61	63.5

Table (2):-Distribution of Studied patients with Diabetes According to their Medical Health History (N= 96).

Items	N	%
Types of diabetes:		
Type I	35	36.4
Type II	61	63.6
Duration of the disease(in years)		
1 - < 3 years	5	5.2
3 - < 6 years	29	30.2
6 - < 10 years	45	46.8
> 10 years	17	17.8
Mean 24.0 ±17.09		
Follow up frequency per month		
Once	71	74
Twice	25	26

Figure (1): Distribution of Studied Patients with Diabetes According to Total Knowledge Score regarding Diabetic Nephropathy Pre and Post Program (N=96).
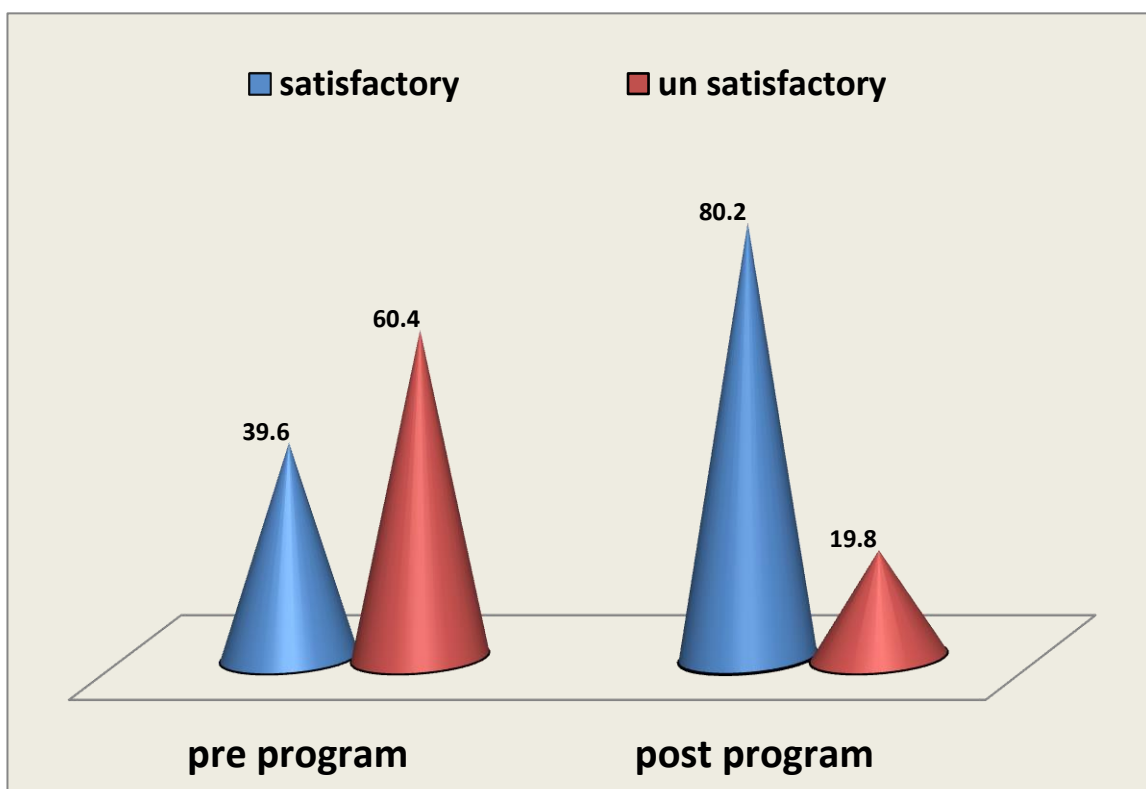
Figure (2): Distribution of Studied Patients according to Total Reported Practices regarding Diabetic Nephropathy Pre and Post Program (N=96)
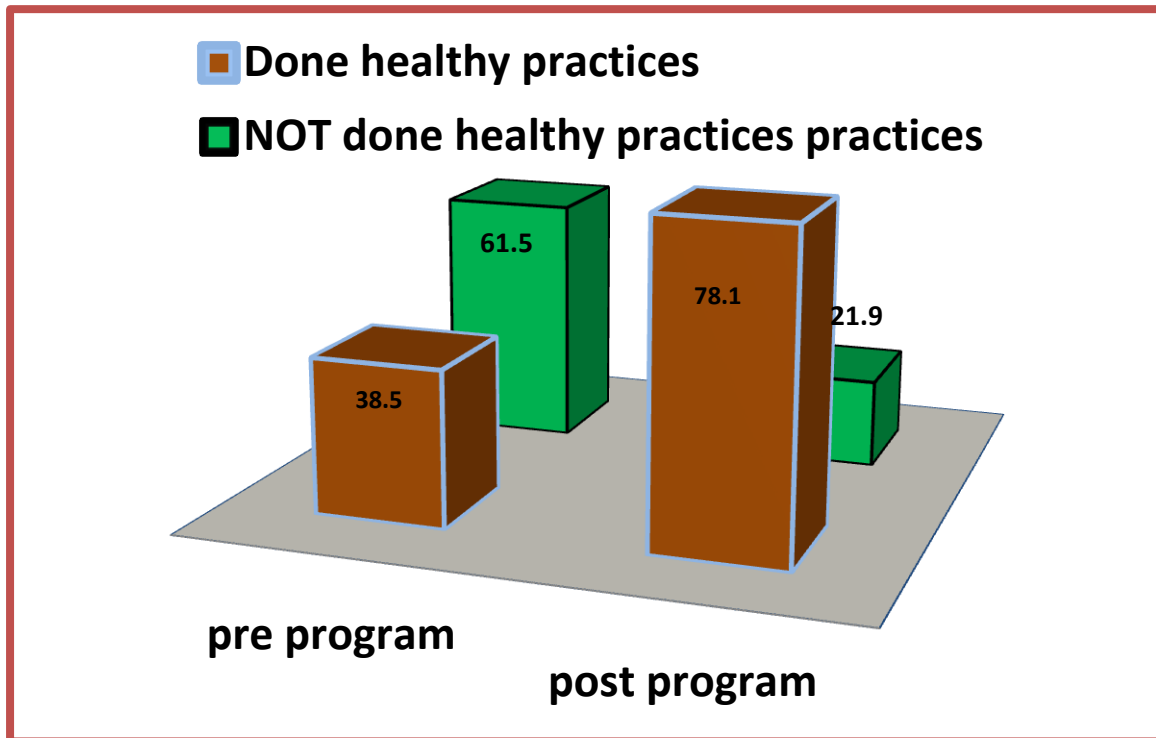

Table (3):-Distribution of the studied Patients with diabetes according to their Kidney Health assessment regarding diabetic nephropathy (DN) (n= 96).

Kidney Health assessment	Pre-program		Post -program		Chi-square	
	No	%	No	%	X2	P-value
Kidney disease screening: Done Not done	39 57	40.6 59.4	78 18	81.2 18.8	31.59	<0.001**
Early signs &symptoms of DN: Present Non present	75 21	78.1 21.9	24 72	25.0 75.0	52.13	<0.001**
GFR level (mL/min/1.73 m2): Stage 1 ≥ 90 Stage 2 (60 – 89) Stage 3 (30 – 59)	44 35 17	45.8 36.5 17.7	62 24 10	64.6 25.0 10.4	45.4	<0.001**
Mean 32 ± 19.11						
Serum creatinine level for males (n: 45): High Normal (0.8 and 1.3 mg/dl)	32 13	71.2 28.8	9 36	20 80	21.68	<0.001**
Mean 22.5±13.47						
Serum creatinine level for females (n: 51): High Normal (0.6 to 1.1 mg/dl)	41 10	80.3 19.7	7 44	13.7 86.3	42.85	<0.001**
Mean 25.5 ±19.70						

Figure (3): Distribution of the studied Patients with diabetes according to their Kidney Health regarding diabetic nephropathy (DN) (n= 96).
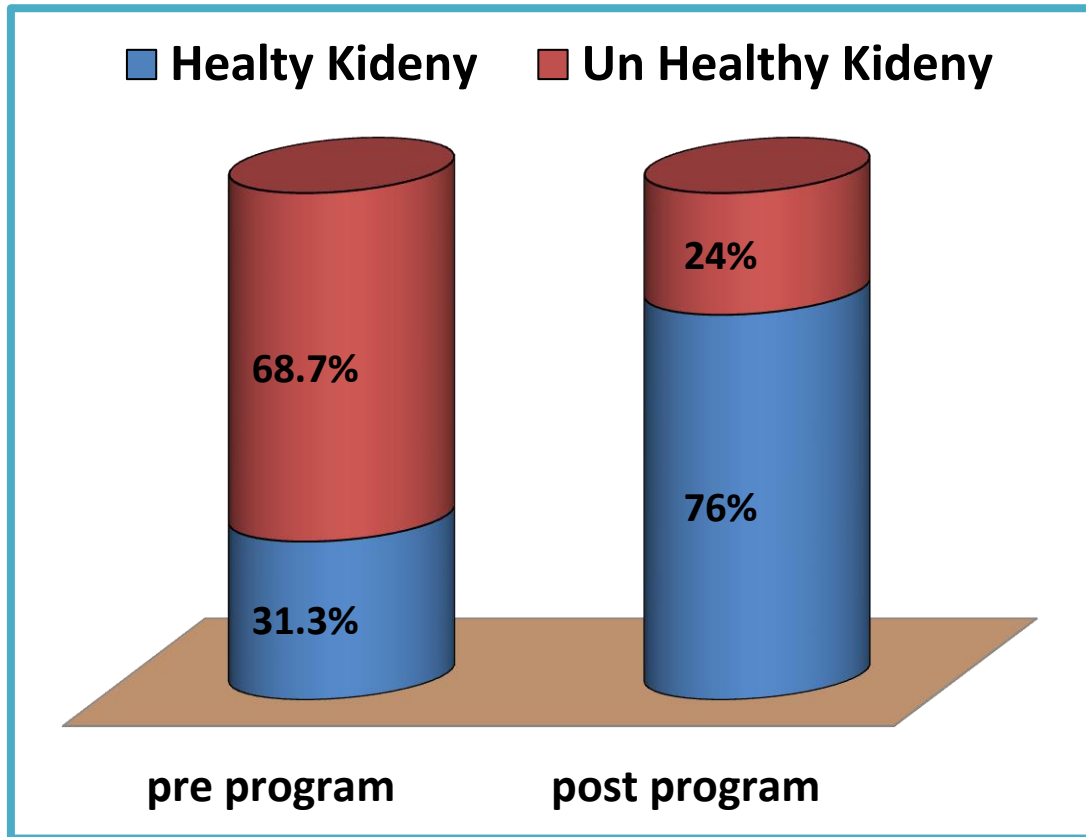

Table (4):-Distribution of the Studied Patients with Diabetes according to Their Physical Assessment regarding Diabetic Nephropathy (DN) (n= 96).

Physical assessment	Pre-program		Post -program		Chi-square	
	No	%	No	%	X2	P-value
Blood pressure High up to 130/80 mm Hg Normal <130/80 mm Hg	64 32	66.7 33.3	23 73	24.0 76.0	33.62	<0.001**
Mean48 ±24.23						
Random Blood sugar High (>200 mg/dl) Normal	85 11	88.5 11.5	35 61	36.5 63.5	53.35	<0.001**
Mean48 ±32.02						
Body mass index: Overweight "25 to 29.9 Normal weight "18.5 to 24.9 Underweight" Below 18.5	42 33 21	43.8 34.4 21.9	38 45 13	39.6 46.9 13.5	8.54	> 0.014*
Mean32 ±12.55						

* Statistically significant

Table (5):-Relation between the Total Patients Kidney Health Assessment regarding Diabetic Nephropathy and Their Physical Assessment pre/post program (n=96)

Total client's kidney assessment	Physical assessment				Chi X^2	P value
	High Risk for DN		Normal physical assessment			
	No.	%	No.	%		
Pre-Program: Healthy Kidney (N=30)	17	17.6	13	13.5	4.699	0.030 S
Un Healthy Kidney (N=66)	53	55.4	13	13.5		
Post program: Healthy kidney (N=73)	10	10.42	63	65.63	57.743	0.001 HS
Un Healthy kidney (N=23)	23	23.95	0	0		

4. DISCUSSION

Concerning the patients" socio-demographic characteristics, Table (1) reveals that more than two fifths of them in the age category from 45- <50 years. This result indicates that more than half of the patients were female. Also more than two fifths of patients were married.

These findings are in line with many previous studies such as *Karam et al., (2012)* who in a study on assessment of knowledge and self care practices in patients who have diabetic and their role in disease management in Karimnagar, found that (45.30%) between the age of 41-50 years. As well *Kavitha et al., (2016)* found in their study entitled assess the knowledge, attitude; behavior concerning self care practice on diabetic mellitus conducted at kundrathur, Chennai, that (66%) of them are females. As regard to educational level, the current study findings are the illiterate level had the highest percent 35.5%. These results of the research are compatible with *Sridhar et al., (2017),* who in a study on the awareness and knowledge regarding diabetes mellitus among diabetic and non-diabetic patients in India who reported that 19 % of diabetic patients were illiterate.

As regard medical history **Table (2)**, illustrates that less than two third of the studied clients had Type 2 diabetes. According to duration of disease the table indicates that, less than half of them had diabetes from 6-< 10 years with Mean 24.0 ±SD17.09. Also less than three quarters of patients under study were compliance to follow up once every month. These results were consistent with *Sridhar et al., (2017)* discovered that the majority of respondents had duration of disease >5 yrs where as 27% of patients had duration of disease <1yr .Mean and standard deviation of their duration of disease was 33 ± 7.77.

Regarding knowledge of patients about diabetic nephropathy **,Figure (1)** shows that, total score of satisfactory studied patients' knowledge was the majority after program implementation compared to less than two fifth before the program with statistical significant difference (X2= 30.56, P= <0.001). This outcome was endorsed by *Al-Maskari et al., (2013)* who researched Diabetic Patient Knowledge, Attitude and Practices in the United Arab Emirates & showed that diabetes knowledge is generally poor among the diabetic patients. These results mean that, the knowledge about the disease was affecting the self care practices which predispose patients to complications. This implies that the awareness level about the disease in this study was better due to implement self management education program.

In relation to patients' practices regarding to diabetic nephropathy,   **Figure (2)** reveals that, there is a clear improvement as observed in three quarter of the patients who follow adequate practices after the program implementation compared to less than two fifth only before it with highly statistical significant difference (X2= 29.33, P= <0.001) before and after program implementation. These results were supported by *Mafomekong et al.(2013),*

Who in a research of diabetes mellitus awareness among diabeticpatients in Gambia: a powerful case for health education and promotion, revealed that a important connection exists between patients following a healthy diet, engaged in periodi c practice and compliant with their glycemic control of drug therapy.

Regarding Healthy practices assessment **Table (3),** shows that there was highly statistically significant in relation to kidney disease screening, early signs &symptoms of DN, GFR level, serum creatinine level for males and females (P<0.001). **Figure (3):** shows that total healthy kidney mean 51.5±SD30.40 with highly statistically significant pre/post self management education program (X2=36.94, P<0.001).The current study congruent with a study done by ***Norris SL et al., (2011)*** to evaluate the efficacy of self management education on glycemic control in adults with type 2 diabetes, found that it improved glycemic control at immediate follow-up but the benefit declined 3 months thereafter. The principle of selfcare, which aimed at returning this control to the individual, was therefore introduced, after empowering him with the knowledge about the disease and its management. Its promotion was also motivated by cost-containment for the client and increasing the autonomy for control over the disease and its complications.

Table (4) revels that physical assessment of patients with diabetes were highly statistically significant in relation to blood pressure and random blood sugar pre/post self-care program (P<0.001). Meanwhile, there is statistically significant in relation to the index of body mass (P<0.05). This may be because the risk factors identified in DN development include hypertension, hyperglycemia, hyper filtration, smoking, advanced age and high-protein diet. These findings were coincided with the findings of ***Ankuret al (2011)*** whose concerns about Pathogenesis, prevention and treatment of diabetic nephropathy in India, they reported that evaluate benefit from intensive glycemic control large sets of patients which showed protective effect on the development and progression of albuminuria, Furthermore, nutritional intervention constitutes an alternative in the prevention and therapy of DN, as demonstrated by a meta-analysis of research carried out with individuals with type I and II diabetes mellitus and clinical nephropathy, in which the dietary protein limitation delayed DN development confirming the importance of nutritional interference in the prevention and therapy of DN.

Table (5) reflects highly statistical significant relation between total patients' practices regarding diabetic nephropathy and their kidney assessment pre/post self management education program P<0.001. **Table (6)** demonstrates that there were highly statistical significant relation between total patients kidney assessment and physical assessment pre /post self management education program P<0.001. This result is supported by that of a study diabetic renal disease diagnosis: state of the art and the future by ***Frederik &Peter (2018)*** who stated that regular, systematic diabetic renal disease screening is required to identify patients with or at risk of diabetic kidney disease. In additional to, it is suggested to monitor annually the ratio of urinary albumin to creatinine, estimated GFR and blood pressure.Several new biomarkers or biomarker profiles have been studied to enhance prognosis and diagnosis precision. One of the promising findings of our study is good number of patients had good knowledge of diabetes after implementation self management education program. Changing understanding brings about change in practice to bring about desirable massive improvements in disease control.

5. CONCLUSION

As evidenced by the study, patients who have been more aware about DN, having knowledge and regularly engaging frequently self care practices achieve improved practices of self-care among patients at risk diabetic nephropathy after implement self management education program.Regular inculcation of health education, patients aware of the disease and promotion self management education during treatment will decrease health care burden and help achieve optimal control of the disease with minimal long term complications.

6. RECOMMENDATIONS

On the basis of the outcomes present study, it can be recommended that:

1. Continuity of health education programs to raise the health awareness and knowledge of population about risk factors for DN and encourage them to adopt a healthy dietary behavior, promote physical exercise and compliance with treatment.

2. Raising public awareness through educational campaigns about healthy life style.

3. Screening for DN risk factors by primary health care physicians during their routine daily activity.

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