Effect of Tele-Nursing (Phone- Based Follow Up) and Educational Package on Life Style and Clinical Status for Diabetic Patients

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Abstract

Background: Diabetes mellitus is one of the global health problems. Tele-nursing is the use of technological resources and communication systems in nursing to provide patient care. **Aim of the study**: to evaluate the effect of tele-nursing (phone- based follow up) and educational package on life style and clinical status for diabetic patients. **Research design**: Quasi-experimental design. **Setting**: The study was conducted at endocrine & diabetic unit in Medical Department at Assiut University Hospitals. **Sample:** A purposive sample of 100 male and female adult patients diagnosed with diabetes mellitus, their age ranged from18 to 65 years. **Tools:** tool (I) Patients assessment sheet, it was consisted of three parts: Part I: Demographic data, Part II: Medical data, Part III: Clinical and laboratory data including Body Mass Index (BMI), weight, height, blood pressure, fasting, postprandial blood glucose (PPG), Glycated Hemoglobin (HbA1c). Tool (II): Health promoting life style profile. **Results:** There was significant difference of life style and clinical data for patients before and after telenursing education. **Conclusion:** Tele-nursing was effective nursing strategy for improving life style and clinical status for diabetic patients. **Recommendations:** Tele-nursing should be programmed as a part of health plan for patients with diabetes mellitus in different health setting.

Keywords: Diabetes, Tele-nursing, Educational Package, Life Style, Nursing.

Introduction:

Diabetes is one of the most common health problems over the world. Its complications lead to disabilities and increased mortality rate **(Moayeri et al., 2017).** Diabetes is a silent murderer disease, according to statistics published in 2019 by the International Diabetes Federation (IDF), the prevalence of diabetes in people aged 20–79 years has risen from (4.6% of the worldwide population at the time) to (9.3%) today **(Khan et al., 2019).** This sharp rise might be due either to an increased trend of typical T2D risk factors like obesity and physical inactivity and alter in eating patterns or other unusual risk factors **(Hegazi et al., 2015).**

Tele-nursing includes all kinds of nursing care and services which will provided from distance and includes a wide range of communication technologies like phone, fax, email, internet to overcome time and distance obstacles and provide better nursing care **(Forouzi, 2017).**

Using the telenursing (Telephone Follow-Up) method, patients got to track their ability to deal with disease on an ongoing basis and find out how to switch their lifestyle easily and effectively despite the inadequate manpower situation, time, and costs that compared to traditional approaches. By using the phone the nurse can know the patient's needs and aid them meet their demands. This approach can reduce patients stress, anxiety and depression, increase patient self-esteem, and transport patient care from clinics and hospitals to patient lifestyle at homes (**Boroumand and Moeini, 2016 & Souza-Junior et al., 2016).**

Tele-nursing becoming the new approach which promotes self-efficacy and healthy behavior in patients with type 2 diabetes by increasing their awareness towards the disease and a treatment, controlling glycemic index and lowering readmission rate **(Abd Elgaphar & Abd EL-Gafar, 2017)**. Follow-up of the diabetic patient by phone post-discharge may be a useful way that not only helps the patient after discharge but also allows the nurse to continue the care and education of the patient (**Zhang et al., 2012**).

Significant of the study:

Diabetes Mellitus is one of the high prevalence and common diseases in Egypt. The majority of diabetic patients are often unable to attend hospital or clinics for the reason of time and distance constraints. Therefore the present study was conducted to provide those patients with information via telephone. Hopefully, the use of technology, combined with counseling can improve the clinical outcomes and health status for those patients.

Aim of the Study:

The study was conducted to evaluate the effect of tele-nursing (phone-based follow up) and educational package on life style and clinical status for diabetic patients.

Hypothesis:

It was hypothesized that, the educational program through tele-nursing (phone-based follow up) will have improved life style and clinical status for patients with diabetes mellitus.

Subjects and Methods:

Research design:

Quasi-experimental design was used to achieve the aim of the present study.

Study variables:

The independent variables in this study were tele-nursing and educational package while the dependent variables were: lifestyle and clinical status outcomes for patients with diabetes mellitus.

Setting:

The study was conducted in endocrine & diabetic unit in medical department at Assiut University Hospitals.

Subjects:

Inclusion criteria: A purposive sample of 100 male and female adult patients diagnosed with DM, their age ranged from18 to 65 years, willing to participate in the study, while the exclusion criteria were, advanced history of serious illnesses such as renal failure,

hepatic failure, cardiovascular disease mental and hearing problems (according to patients' medical records).

Sample size was calculated utilizing the following equation according to **Steven K Thompson (2012):**

Sample size

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

Where:

N= Total patient population size (135) based on (Assuit statistical record, 2018)

Z = Confidence level is 0.95 and is equal 1.96

D = The error ratio is 0.05

P= Property availability ratio and neutral =0.50

Tools:

Tool I: Patients assessment sheet

It was developed by researchers to assess demographic data, medical data and clinical data it included three parts:

Part I: Concerned with demographic data of the studied patients such as age, gender, marital status, level of education and occupation.

Part II: Medical data: This part enquiry about health history of the patient such as type of diabetes, duration of disease and smoking.

Part III: Clinical data including physiological measurement such as fasting and postprandial blood glucose (PPG), Glycated Hemoglobin (HbA1c), blood pressure, weight, height, body mass index. Taken measurements of height and weight of patients used kuanyi scale calculated for the participants using international classification.

BMI= weight (kg / (height)^2 (m^2). BMI ranges are (underweight: under 18.5kg/m2, normal weight: 18.5 to 25, overweight: 25 to 30, obese: over 30).

Tool II: Health promoting life style profile:

According to compliance with international recommendations for self-care behavior and healthy lifestyle **(Dehnabi et al., 2017; Kaur, 2017; Higano, et al., 2015, Toobert et al., 2000).** This tool involved fifty-two (52) questions modified by the research investigators to assess lifestyle for diabetic patients. It was included 5 items such as healthy food, Exercise and physical activity, Medication adherence, Avoid psychological stress, follow-up and personal care.

Scoring system: Responses for each item indicated on a three Likert-scale ranging from "2= always","1 = sometimes", and "0 = for never response". The total score ranges from 0 to 104. Less than 50 = low (-ve) lifestyle, 50 and more = high (+ve) lifestyle.

Educational Package:

It was developed by the researchers from the recent related literature and researchers experiences, in simple Arabic language. The content of the educational package included information about definition, symptoms, causes, types of diabetes. Also included healthy lifestyle behavior such as proper diet, exercise and physical activity, treatment regimen, adherence to medications**,** periodic investigations, the importance of keeping blood glucose level, blood pressure and weight within normal range, daily self-monitoring of

blood glucose level, stress management, personal care and importance of follow up.

Validity and reliability:

Testing validity of the study tools was done by a jury of 5 experts in the field of Medical-Surgical Nursing and Internal Medicine from Faculty of Nursing and Faculty of Medicine at Assuit and Sohag Universities to assure the content validity. Also, testing reliability of the proposed tools was done.

Pilot study:

A pilot study was conducted on 10 % of the total sample (10 patients) to test the feasibility, clarity and time required filling the tools of the study and finding possible obstacles and problems that could interfere with the researchers in collection data. Analyses of the pilot study revealed that minimal modifications were needed, these modifications were done and the patients who shared in the pilot study were excluded.

Administrative and ethical considerations:

An official permission was obtained from the responsible hospital authorities of the department of internal medicine at Assiut University Hospitals to carry out the study, after explaining the intent and essence of the study to patients oral agreement for voluntary participation was obtained.

Field work:

Recruitment and follow-up of participants were carried out from a period of first June (2019) to the end of January (2020). The researchers attended the endocrine & diabetic unit in medical department three days per week beginning from 9:00 a.m. to 2.00 p.m. Data collection was carried out through three phases:

Phase I: Preparatory phase:

A review of current and past, local and international related literature in the various aspects using books, articles, periodicals and magazines were done. The tools and educational booklet were developed and reviewed by experts.

Phase II: Implementation phase:

After taking the patient's oral agreement for voluntary participation in the study, each patient involved in the study was interviewed individually for filling **(Tool I, II)**. Fasting, postprandial blood glucose (PPG), Glycated Hemoglobin (HbA1c), blood pressure, weight and height were measured for all patients during hospitalization and after 4 months of patients discharge.

After patients discharge telephone follow up (tele-nursing) were performed three days a week provided by the researchers. The total frequency of telephone counseling averaged 20 calls per subject. The average length of these contacts was 15 min per call. The contents of the phone conversations were based on a support booklet. Also, in each call the patient was asked about his/her issues and the researchers were directing the patients. The researchers also asked the patient if she or he has adapted the previously given instruction. The other part of conversation included information about healthy lifestyle behavior such as diet, physical activity, treatment regimen, the importance of keeping blood glucose levels within normal range, daily blood glucose level self-monitoring and stress management. Before any phone call was ended, the patient was allowed to ask his questions again.

Phase III: Evaluation phase: evaluation was carried out for every participant after 4 months using the same tool I, tool II.

Statistical design:

The data obtained had reviewed, prepared for computer entry, coded, analyzed and tabulated. Descriptive statistics (frequencies and percentages, means and standard deviation, i.e.) were done using computer program (SPSS) version (20). Independent sample t-test, ANOVA and, Chi-square tests used in the relationship between both groups'. It's considered significant when P. value was less than (0.05).

Results:

Table (1):shows that, the highest percentage of patients age was between the ages 41- 65 years, the mean age was 49.62 ±10.89 years. Also there was a predominance of married female (80%), secondary certificate (39%). As regarding to occupation more than half of studied patients were employee (54%).

Table (2):shows that, the majority of the studied patients (95.5%) were type 2, and the duration of diabetes for (72.0%) of the total number from 3-10 years. As regarding Smoking the present study found that (85.0%) of patients were smokers.

Table (3): Showed that there were significant reduction of postprandial blood glucose four months after application of educational package. Also, the study founded that a significant differences between before and after application of educational package regarding the systolic and diastolic blood pressure and Glycated Hemoglobin. Furthermore, BMI was reduced after education however it did not reach the level of significance.

Table (4) shows that improvement of lifestyle after application of educational package. There were highly statistical significance differences pre and post application of educational package regarding lifestyle of diabetic patients.

Figure (1) shows that diabetic patients had (98%) low (- ve) life style before application of educational package while after application of educational package diabetic patients had (98%) high (+ve) life style.

Table (1): Distribution of socio demographic characteristics of the studied patients (n=100).

Items	Group	
	No.	%
Age (yrs.)		
18 – 25	5	5.0
26 – 40	8	8.0
41- 65	87	87.0
Mean ± SD	49.62±10.89	
Gender:		
Male	20	20.0
Female	80	80.0
Marital status:		
Single	5	5.0
Married	91	91.0
Widow	4	4.0
Education:		
Illiterate	25	25.0
Primary certificate	18	18.0
Secondary certificate	39	39.0
Have a university degree	18	18.0
Occupation:		
Employee	54	54.0
Farmer	4	4.0
Literal	2	2.0
House wife	35	35.0
Retired	5	5.0

Table (2): Distribution of medical data of the studied patients (n=100).

Items	No.	%
Type of diabetes:		
Type 1	5	5.0
Type 2	95	95.0
Duration of diabetes in years:		
3 –10	72	72.0
11 – 20	24	24.0
21- 30	4	4.0
Mean ± SD	9.57± 5.88	
Smoking:		
Yes	15	15.0
No	85	85.0

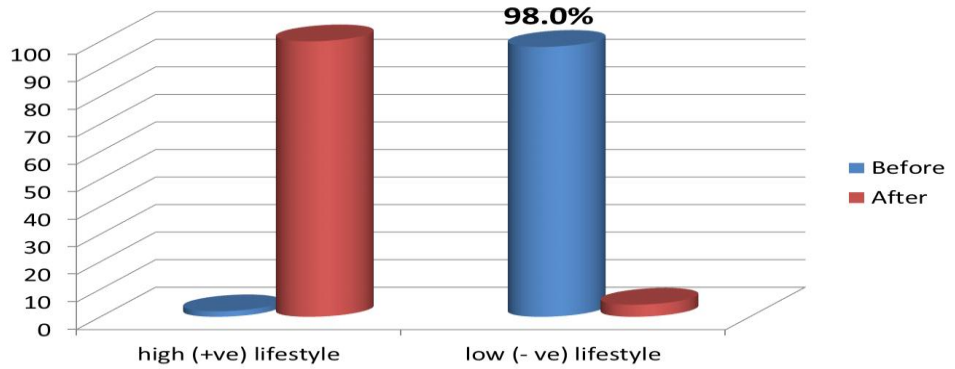
Table (3): Comparison between clinical data of diabetic patients before and after application of educational package (n=100).

Clinical data	Before Mean ±SD	After Mean ±SD	P. value
Fasting blood sugar1(mg/dl)	145.99±32.75	153.43±30.47	0.098
Postprandial blood glucose after 2 hours 1(mg/dl)	322.15±105.67	299.71±90.84	0.109
Fasting blood sugar 2 month 4 (mg/dl)	172.98±29.87	168.49±24.59	0.247
Postprandial blood glucose after 2 hours month 4 (mg/dl)	114.26±14.63	108.52±15.66	0.008**
Body mass index	29.08±5.58	28.57±6.34	0.548
Systolic blood pressure	133.68±20.64	122.8±10.74	<0.001**
Diastolic blood pressure	87.08±15.36	82.15±8.8	0.006**
Glycated Hemoglobin (HgAc1)	11.61±2.08	9.09±1.19	<0.001**

Table (4): Comparison between lifestyle of diabetic patients before and after application of educational package (n=100).

Lifestyle	Before Mean ±SD		After Mean ±SD	P- value
Healthy food	9.27±	3.14	21.95± 3.34	0.0001***
Exercise and physical activity	1.47±	2.057	8.85± 2.86	0.0001***
Medication adherence	12.36±	2.39	17.55± 3.153	0.0001***
Avoid psychological stress	4.34±	1.37	6.35± 1.65	0.0001***
Follow-up and personal care	6.10±	3.23	21.35± 3.71	0.0001***

Figure (1) Lifestyle for diabetic patients before and after application of educational package



Discussion:

According to the **American Tele-health Association (2018)**, tele-nursing may be a tool for delivering nursing care remotely to improve efficiency and patient enhance to healthcare. Wherever the nursing is done in a tele-health setting, nurses can monitor a patient's oxygen levels, pulse, respiration, blood sugar and more **Mataxen & Webb (2019)**.

The current study revealed that, the highest percentage of participants were between the ages 41- 65 years; with the mean age was 49.62 ±10.89 years. Also there was a predominance of female, married and holds secondary school certificate. Most of the studied patients were employee. These results came in accordance with **Azami et al., (2018)** who found that the mean age at baseline was 54.2 ± 11.8 years, and therefore the majority of the participants were females, had basic education, and was currently working.

Regarding clinical status the present study revealed that there were significant improvement of fasting and postprandial blood glucose level, blood pressure and HgAcI. BMI was reduced but did not reach the level of significance after application of educational package. From the researcher's opinion tele-nursing supported with educational package increased the patients awareness towards the disease and increased the patients' adherence to the therapeutic regimen that led to reduction of blood glucose level, blood pressure, HgA1c for patients.

These results were in accordance with results of **Soliman & Mohamed (2016)** who reported that following 3 months telephone follow up, the fasting blood sugar postprandial and blood pressure level were reduced with statistically significant differences were found.

The current study results also supported by the study done in Egypt by **Mohsen et al., (2020)** to examine the effect of tele-nursing versus routine outpatient teaching for improving arterial blood pressure and body mass index for hypertensive patients. Concluded that tele-nursing is an effective strategy for improving blood pressure, body mass index and decreasing the risk of complications.

This study results came in accordance with **Kazem et al., (2016)** whose study findings showed that, the tele-nursing was more effective in decreasing systolic and diastolic blood pressure compared to self-monitoring method. However, these results disagreed with **Suksomboon, et al., (2014)** who reported that telephone intervention hadn't any effect in lowering fasting blood glucose level, than standard clinical care.

The current study revealed that improvement of lifestyle after application of educational package, with highly significant difference of lifestyle for patients, before and after educational package. This result may be due to the continuous support system adopted by the researchers through tele-nursing which increased the patient's adherence to a healthy life style.

This result was confirmed with **Knar et al., (2010)** who declared that nurse telephone intervention beside education program contributed to improvement in adherence of the diet plan, regular exercise, and drug taking ability after 3 months of intervention.

The present result was in acceptance with **Fard, et al., (2017)** who

stated that educational program is an important part of the diabetic patients treatment, especially patients with type 2 DM. Combined of education program with telenursing (Telephone Follow-Up), it support self-care behavior and improve clinical outcomes, health status, and quality of life of patients. Also **Metwely and Farrag, (2016)** concluded that; telenursing support could significantly enhance the health promotion lifestyle profile score and maintain blood sugar levels.

Conclusion:

Tele-nursing (phone-based follow up) and educational package were effective in improving life style and clinical status for diabetic patients.

Recommendations:

Tele-nursing should be programmed as a part of health plan for patients with diabetes mellitus in different health setting.

Conflict of interest

There were no conflicts of interest.

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