Effect of Nursing Guidelines on Self-Efficacy and Compliance level among Patients with Type2 Diabetes Mellitus

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Abstract:

Background: Patients with type2 Diabetes Mellitus (T2DM) must control their condition by enhancing self-efficacy and following nursing guidelines on compliance to healthy diet, treatment, and lifestyle. Study Aim: This study aimed to evaluate the effect of nursing guidelines on self-efficacy and compliance level among patients with Type 2 Diabetes Mellitus. Research design: A pre-posttest quasi experimental design was utilized. Subjects: A purposive sample of 60 patients. Setting: The study was conducted in outpatient diabetic clinics at Zagazig University Hospital. Data collection Tools: Interviewing Questionnaire for Patients, Self-Efficacy Scale for Diabetes Management, and The Compliance Assessment Questionnaire. Results: 66.7% of studied patients their age <50 years old, 60.0% of them were females and from urban, 70.0% were educated and married. 90% of patients had satisfactory level of self-efficacy after nursing guidelines than before, with a statistical significant difference (P<0.001). Also, 78.33% of studied patients had a good compliance level regarding dietary regimen, treatment, and life style after guidelines than before with a statistical significant difference (P<0.001). A positive correlation was found between self-efficacy and compliance level among studied patients after nursing guidelines with a highly statistical significant differences (P=0.001). Conclusion: It can be concluded that nursing guidelines had a significant positive effect on improving self-efficacy for patients with type 2 Diabetes Mellitus which reflected on improving their level of compliance. Recommendations: It is recommended that nursing guidelines should be established to improve self-efficacy, as it is the most significant factor affecting patients' compliance.

Keywords: Compliance, Diabetes Mellitus, Nursing Guidelines, & Self-Efficacy.

Introduction:

Diabetes Mellitus (DM) is a metabolic condition marked by persistent hyperglycemia and disrupted metabolism of proteins, carbohydrates, and fats, which arises from deficiencies in insulin secretion or its action. This disorder can adversely affect multiple organs in patients and reduce their life expectancy. Diabetes represents a significant and escalating issue across all age groups. It is the most prevalent endocrine disorder, affecting over 140 million individuals globally (Aschner, et al., 2020).

The incidence of diabetes is on the rise globally, particularly in developing nations, making it one of the foremost challenges facing healthcare in the 21st century. Projections indicate that by 2030, approximately 366 million individuals worldwide will be affected by this condition (**Saeedi, et al., 2019**). Type 2 diabetes (T2D) constitutes roughly 90-95% of all diagnosed cases for adults. While diabetes cannot be cured, it can be effectively managed (**Babazadeh, et al., 2023**).

Diabetes can lead to significant complications, including vision loss, renal failure, cardiac failure, cerebrovascular accidents, neurological issues, limb amputation, and erectile dysfunction. The involvement of nurses is essential in preventing these complications (**Fadli, 2022**). Nurses play a vital role in educating individuals with diabetes mellitus (DM) by implementing nursing intervention guidelines that focus on blood sugar management, dietary practices, physical exercise, foot care for diabetics, and medication adherence. These nursing guidelines can be effectively delivered through educational initiatives, empowering patients with type 2 DM to take greater responsibility for their health management and self-care. Nursing guidelines aims to improve self-efficacy in preventing and enhancing compliance (**Fithria, et al., 2022**).

Patients with type 2 diabetes must manage their illness by adhering to self-care programs that focus on medication adherence, healthy diet, regular exercise, and blood glucose monitoring, which reduces the risk of macro or micro complications, in order to feel self-effective (Chiou, et al., 2023).

The perception of self-efficacy in managing diabetes can significantly influence the patient's overall wellbeing. Self-efficacy refers to an individual's belief in their capability to successfully execute actions or their perception of control over various events. (**Chen, et al., 2022**). Self-efficacy significantly influences adherence to treatment regimens, thereby affecting clinical outcomes. An enhancement in an individual's self-efficacy correlates with improved compliance to prescribed treatments for chronic illnesses. Additionally, it indicates a person's capacity to implement behavioral modifications that promote effective self-care. Consequently, evaluating the selfefficacy of diabetic patients is essential for identifying appropriate self-care programs tailored to their needs (Calli, & Kartal, 2021).

Compliance refers to the degree to which an individual engages in behaviors such as taking prescribed medications, adhering to dietary guidelines, and implementing lifestyle modifications. The notion of adherence encompasses a reciprocal and evolving relationship between patients and healthcare professionals, leading to sustained alterations in patients' behaviors over time. Factors that hinder adherence include insufficient knowledge, psychosocial conditions, the intricacy of the illness, coexisting health issues, a lack of understanding regarding treatment, and ineffective communication between the patient and healthcare provider (Yang, et al., 2022).

Adherence to a medication regimen is characterized by the degree to which patients adhere to prescribed medications; however, it also encompasses healthrelated behaviors that extend beyond merely taking medications (Ranibaran, et al., 2020). The integration of nursing intervention guidelines with self-efficacy and adherence to therapy leads to notable enhancements in patients' self-care practices. It is crucial for patients to consistently follow their medication regimens to mitigate the risk of additional diabetic complications. To effectively reduce the occurrence of such complications, it is vital to implement anti-diabetic treatments, conduct timely screenings, ensure accurate diagnoses, promote a balanced diet, perform daily health assessments, and education provide on diabetes management (Abdullah, 2021).

Significance of the study:

The prevalence of diabetes in Egypt has risen dramatically, surpassing global averages, as reported by attendees of the 4th Arab Diabetes Forum. Egypt now holds the eighth position worldwide for the highest rates of this disease. Diabetes has emerged as a rapidly escalating health concern in the country, significantly affecting morbidity, mortality, and healthcare resources. Presently, the prevalence of Type 2 Diabetes (T2D) for adults aged 20 to 79 years in Egypt is approximately 15.6% (**Baroni, et al., 2022**).

Nursing guidelines empower patients to gain greater control over their daily activities and enhance their ability to manage their performance. Furthermore, these guidelines facilitate the education of patients, equipping them with the necessary knowledge and skills to make informed decisions and address selfrelated challenges effectively (**D'Souza**, & **Al Salmi**, **2018**). Therefore, the present study was accomplished to evaluate the effect of nursing guidelines on selfefficacy and compliance level among patients with type 2 Diabetes Mellitus.

Aim of the study:

This study aimed to evaluate the effect of nursing guidelines on self-efficacy and compliance level among patients with Type 2 Diabetes Mellitus.

Objectives:

- Assess self-efficacy for patients with Type 2 Diabetes Mellitus.
- Assess level of compliance among patients with Type 2 Diabetes Mellitus.
- Design, implement, and evaluate the effect of nursing guidelines on self-efficacy and compliance level among patients with Type 2 Diabetes Mellitus.

Research Hypotheses:

- **H1:** Self-efficacy of studied patients will be increased after nursing guidelines than before.
- **H2:** Patients' compliance will be improved after nursing guidelines than before.

Subjects and Method:

Research Design:

Pre/posttest quasi experimental design was used. A quasi-experimental design is a useful tool in situations where real experiments cannot be used for ethical or practical reasons because it uses a non-random method to assign subjects to groups (Maciejewski, 2020).

Study Setting:

The study was carried out in outpatient diabetic clinics at Zagazig University Hospital, which situated on the 4th floor of outpatient clinics building, composed of three rooms; the first for medical staff, the second for nursing staff, and the last one for diabetic patients' checkup.

Subjects:

A purposive sample consisting of 60 patients was utilized for both the pre-test and post-test phases, adhering to the following inclusion criteria: individuals of both sex, adult patients aged between 20 and 60 years, diagnosed with type 2 diabetes mellitus for a minimum duration of one year, capable of effective communication, and expressing a readiness to participate in the study. The exclusion criteria included patients with neurological or psychiatric disorders, as well as those suffering from end-stage chronic illnesses.

The sample was selected randomly, and the sample size was determined using a power and sample size estimation program, ensuring a statistical power of 80% at a confidence level of 95%. The sample size was calculated using the specified formula.

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{(N-1) \cdot e^2 + Z^2 \cdot p \cdot (1-p)}$$

Data collection Tools:

Tool I: Interviewing Questionnaire for Patients: It was designed by the researchers in Arabic form to avoid misunderstanding, based on review of literatures [Saleh, et al., 2021; Goli Roshan, et al., 2021; Chan, et al., 2020] and covered two main components as the following:

First Part: Personal characteristics of diabetic patients: included age, sex, social status, residence, education, work, weight, height, and Body Mass Index (BMI) which categorized by **Consultation**, (2004); into Normal Weight18.5-24.9 kg/m², Overweight 25- 29.9 kg/m², Obesity \geq 30 kg/m², Severe Obesity \geq 40.00 kg/m².

Second Part: Medical and Family History of studied patients: Consisted of 16 questions regarding duration of DM, how it discovered, family history of DM, relatives who had DM, and common complication occurred as a result of diabetes Mellitus. Hypoglycemia and hyperglycemia, occurrence times and causes. Hospital admission, and type of treatment for Diabetes mellitus.

Tool II: Self-Efficacy Scale for Diabetes Management (Pre/ Post-test): It was developed and tested by Tamiru, et al., (2023), Sallay, et al., (2021), Sousa, et al., (2020), subsequently, the researchers adjusted the assessment to gauge the patients' confidence in performing specific activities. It included 20 items covered patients' confidence to measure blood glucose level, glycaemic control during hyperglycaemia and hypoglycaemia, suitable diabetic foods, follow healthy dietary regimen most of times and out homes, and during festivals, parties, sickness, and maintain ideal body weight. In addition to foot examination for cuts or ulcers, regular exercise as walking, and bicycling according to doctor advice.

Scoring System: Each question is to be answered by choosing a number between 0 and 10, where 0 indicates no confidence whatsoever and 10 represents the highest level of confidence. Patients' self-efficacy is categorized as satisfactory self-efficacy if the score is 60% or higher, and as unsatisfactory self-efficacy if the score is below 60%.

Tool III: The Compliance Assessment Questionnaire (Pre/ Post-test): It was adapted from Demirtaş & Akbayrak (2017), & Wainwright, et al., (2022) and modified by the researchers. It was utilized to evaluate the adherence of patients with type 2 Diabetes Mellitus to diet, treatment, and life style. It comprised three sections. Section 1: Patients' Compliance Toward Diet: It was adapted from Al-Salmi, et al., (2022) and modified by the researcher. It Consisted of seven questions about: adherence to healthy dietary regimen, follow given guidelines related to foods, meals on regular times, five meals around the day, low sugar diet, low starch foods, and fast food.

The scoring system: Each question regarding patients' adherence to the diet was assigned a score as follows: Never adhered received zero points (0), occasionally adhered received one point (1), and consistently adhered received two points (2). The compliance scores were categorized as follows: Good compliance level is defined as a score of 60% or higher, while Low compliance level is indicated by a score of less than 60%.

Section 2: Patients' **Compliance** Toward Treatment: It was adopted from Patel, et al., (2023) and modified by the researchers. It composed of 14 questions regarding patient's adherence to take medications on time, medications doses prescribed, self-insulin injection, regular rotation of injection site, keep insulin vial in refrigerator after usage, follow up schedule, follow up with ophthalmologist, regular follow up with dentist, regular checkup of diabetic foot, taking medications without consultation, adhere to the prescribed medication even when experiencing an improvement in health; however, discontinue the medication if side effects are excessive or if the treatment duration is prolonged.

Scoring: Each aspect was assigned as follows: Never taking medication received 0 points, sometimes taking medication received 1 point, and always taking medication received 2 points. The compliance scores were categorized as follows: Good compliance level is defined as a score of 60% or higher, while Low compliance level is indicated by a score of less than 60%.

Part III: Patients' **Compliance** Regarding Lifestyle: It was adopted from Hailu, et al., (2021). It encompassed seven components: adherence to regular physical activity post-meals, avoidance of proximity to smokers, reduction of excess body weight, engagement in breathing exercises for stress relief, and implementation of relaxation techniques. The scoring employed a Likert scale to evaluate patients' compliance with lifestyle, assigning points as follows: no adherence received 0 point, occasional adherence received 1 point, and consistent adherence received 2 points. The compliance scores were categorized as follows: Good compliance level is defined as a score of 60% or higher, while Low compliance level is indicated by a score of less than 60%.

Content Validity:

Content validity was employed to revise the tools and nursing guidelines to assess their alignment with the study objectives. This evaluation involved five and dista

experts, comprising three nursing academic staff and two medical practitioners.

Reliability:

The analysis revealed that the Cronbach's alpha reliability coefficients were 0.88 for Patients Interviewing Questionnaire, 0.89 for Self-Efficacy Scale for Diabetes Management, and 0.89 for Patients' Compliance toward diet, 0.85 Patients' Compliance toward treatment, and 0.87 for Patients' Compliance regarding lifestyle Questionnaire.

Preparatory phase:

This phase began with reviewing past and current literatures of national and international resources concerning T2DM. This was done using textbooks, articles, periodicals, magazines, research, and internet search. The purpose was to gain in-depth knowledge of all aspects related to the study, as well as, to develop data collection tools.

Field Work:

After obtaining all required official approvals from outpatient diabetic clinics at Zagazig University Hospitals. The researchers informed the clinics about the time and date of data collection, as pre/post was completed by the researchers' availability three days a week from 9.00 AM to 1.00 PM. For baseline data regarding patient conditions, the researchers collected the data before implementing the nursing guidelines. The study conducted through six months from the beginning of June 2024 and to the end of November 2024. The study was conducted in four phases as the following;

Assessment phase:

The researchers conducted a visit to the study setting, where they engaged with the directors and head nurses to outline the objectives and methodologies of the study, seeking their approval and collaboration. Subsequently, the researchers approached the patients who met the eligibility criteria, providing them with a detailed explanation of the study's purpose, procedures, and their rights, while inviting them to take part. The phone numbers of the patients were obtained initially when corresponding with them to ascertain the additional appointments necessary to complete the data collection.

Planning phase:

In this stage, the researchers designed the nursing guidelines in Arabic based on patients' needs identified during the assessment phase, while also reviewing the latest and most pertinent literature to enhance self-efficacy and compliance.

The nursing guidelines were divided into two components. The first component was theoretical, offering comprehensive information regarding diabetes mellitus, self-efficacy, and compliance. It included definitions of diabetes mellitus, causes, signs

and symptoms, diagnosis, treatment, complications, dietary recommendations, physical activity, and the significance of follow-up care. Furthermore, it addressed the concept of self-efficacy, its impact, methods of assessment, goal-setting techniques, and skills for enhancing self-efficacy. Additionally, it defined compliance and outlined strategies to enhance patient adherence to treatment, dietary guidelines, and lifestyle changes. The second component was predominantly practical, encompassing dietary plans, physical exercise routines, insulin injection, glucose monitoring, care for various body parts (including body, eyes, oral cavity, skin, feet, and nails), wound care, regular follow-ups with healthcare providers, hypoglycemia and management of and hyperglycemia.

The instructional strategies were chosen to accommodate small group teaching through various formats, including lectures, group discussions, demonstrations, and re-demonstrations, all aimed at enhancing understanding and the integration of theoretical concepts with practical application. Teaching materials were developed in the form of PowerPoint presentations, video films, colorful brochures, and illustrative images. In addition, an illustrative booklet was written in Arabic to assist patients in comprehending and retaining the information provided.

Implementation phase:

Nursing guidelines applied through 20 consecutive sessions in patients' checkup room of diabetic clinics after the patients received their care. The initial session served as an orientation to elucidate the purpose and content of the guidelines, five sessions for the theoretical part and 14 sessions for the practical part. These sessions were conducted for small group (4-5 patients). Each session lasted 45 minutes. Each patient was provided with the booklet.

Evaluation phase:

Immediately after nursing guidelines implementation, each patient was evaluated (posttest) using the same data collection tools used in pre-test.

Administrative design:

Prior to the commencement of the study, formal approval was secured from the Research Ethics Committee of the Faculty of Nursing with code (ID/Zu.Nur.REC#:0157) and the general director of Zagazig University Hospitals. The researcher convened meetings and discussions with the nursing administrative staff to inform them of the study's aims and objectives, thereby fostering enhanced cooperation during the implementation phase. Additionally, patient consent was obtained prior to the initiation of data collection. The administrative personnel exhibited strong support for the study.

Pilot study:

A preliminary study was conducted including six patients, representing 10% of the study sample, who were randomly selected to assess the clarity and comprehension of the presented items, as well as to estimate the time required to complete the instruments. The data collected from these pilot participants were not included in the main study sample.

Ethical consideration:

During the interview, each participant was made aware of the study's objectives and benefits. Participants were made aware that their participation is completely voluntary and that they retain the right to withdraw from the study at any time without the necessity of providing a justification. Additionally, the confidentiality and anonymity of the participants were assured through the coding of all data collected. No harm was expected from study implementation; conversely, the nursing intervention guidelines had a positive impact on self-efficacy which reflected on improvement of their therapeutic compliance.

Statistical analysis:

Collected data were coded, calculated and analyzed using SPSS, version 22. Qualitative data were presented as frequency and percentages using Chi square (χ^2) for comparison of variables and Fisher Exact Test (FET). Quantitative data were presented as mean \pm SD, Paired t test used to compare between means of quantitative variables. Difference was considered significant at P \leq 0.05 and a highly significant at P \leq 0.01. Pearson correlation test (r) was used to test correlation between studied variables.

Results:

Table (1): Personal	Characteristics of	the Studied Patients (n=60)
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Personal Characteristics	No.	%
Age		
< 50	40	66.7
\geq 50	20	33.3
Mear	$t \pm SD = 46.83 \pm 8.45$ years	
Sex		
Male	24	40.0
Female	36	60.0
Social status		
Married	42	70.0
Unmarried	18	30.0
Residence		
Urban	36	60.0
Rural	24	40.0
Education		
Educated	42	70.0
Not educated	18	30.0
Work		
Working	34	56.7
Not working	26	43.3
BMI		
Average (18.5-24.99)	2	3.3
Overweight (25-29.99)	4	6.7
Obese (≥ 30)	54	90.0
	Mean \pm SD = 39.95 \pm 12.64	

Table (2): Medical and Family History of Studied Patient
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Items	No.	%
Duration of DM		
3-5	22	36.7
6-10	30	50.0
11-15	8	13.3
	Mean \pm SD = 7.6 \pm 2.96 years	
Discovery of DM		
By chance	28	46.7
When symptoms appear	32	53.3
Family history of DM		
Yes	44	73.3
No	16	26.7
Relatives with DM		
Brother or sister	26	59.1
Mother or father	16	34.4
One of grandfathers	2	4.5
Complication of DM	60	100.0
Complication:		
Eye	38	63.3
Neurological	12	20.0
Renal	4	6.7
Repeated infection	4	6.7
Diabetic foot	2	3.3

Table (3): Frequency and Percentage Distribution of Patients according to Complications Occurrence (n=60)

Items	No.	%
Hypoglycemia		
Yes	38	63.3
No	22	36.7
Times of Hypoglycemia		
Once	34	89.5
Twice	2	5.3
Three or more	2	5.3
Causes of hypoglycemia		
Overdose	4	10.5
Late eating	22	57.9
Extraneous effort	12	31.6
Hyperglycemia	60	100.0
Times of hyperglycemia		
Once	20	33.3
Twice	22	36.7
Three	14	23.3
Fourth or more	4	6.7
Causes of hyperglycemia		
Over eating sweets	18	30.0
Eating fatty diet	8	13.3
Neglect medication	18	30.0
Stress	16	26.7
Hospital admission		
Yes	54	90.0
No	6	10.0
Times of admission		
Once	32	59.3
Twice	10	18.5
Three	10	18.5
Fourth or more	2	3.7
Causes of admission		
Hyperglycemia	38	70.4
Hypoglycemia	16	29.6

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Items	No.	%
Treatment of DM		
Tablets	4	6.7
Insulin injection	34	56.7
Both	22	36.7

Table (4): Patient's Self-Efficacy Before and After Nursing Guidelines (n=60)

Solf Efficiency	Before		After		Significance test
Self-Efficacy	No.	%	No.	%	-
Satisfactory	22	36.66	54	90.00	t-54 527 P<0.001
Mean \pm SD	58.27 ± 11.30		170.40 ± 7.38		t=54.527, F<0.001
Un Satisfactory	38	63.33	6	10.00	t-41 743 P<0.001
Mean \pm SD	115.	32±6.47	31.75± 9.35		1=41.743,1<0.001

Significant ($P \le 0.05$)

Table (5): Compliance Level among Patients Before and After Nursing Guidelines (n=60)

Compliance Level	Before		After		Significance test	
Compliance Level	No.	%	No.	%	Significance test	
Dietary regimen						
Good Compliance	14	23.33	40	66.66	t=56.159, P<0.001*	
Mean \pm SD	4.83	3 ± 1.25	14.00	0 ± 00.00		
Treatment						
Good Compliance	21	35.00	49	81.66	t=40.529, P<0.001*	
Mean \pm SD	11.7	7 ± 2.97	27.90	0 ± 0.399		
Life style						
Good Compliance	16	26.66	46	76.66	t=112.10, P<0.001*	
Mean \pm SD	2.87	7 ± 0.77	14.00	0 ± 00.00		
Total compliance					*	
Good Compliance	17	28.33	47	78.33	t=73.416, P<0.001 [*]	
Mean \pm SD	19.4	0 ± 3.74	55.90	0 ± 0.399		

Significant ($P \le 0.05$)

Table (6): Relation between Personal Characteristics and Patient's Self-Efficacy Before and After Nursing Guidelines

Barganal Characteristics	No	Self-efficacy Scores		
Personal Characteristics	190.	Before	After	
Sex				
Male	24	57.0 ± 11.6	172.8 ± 8.9	
Female	36	59.1 ± 11.2	168.8 ± 5.7	
Significance tes	t	t=0.706, P0.485	t=2.149,P0.036	
Work				
Working	34	55.4 ± 12.7	172.3 ± 7.3	
Not working	26	62.0 ± 8.00	167.3 ± 6.8	
Significance tes	t	t=2.320, P0.024	t=2.442,P0.018	
BMI				
Average	2	62.0 ± 00.0	160.0 ± 00.0	
Overweight	4	56.0 ± 11.5	178.0 ± 10.4	
Obese	54	58.5 ± 11.6	170.2 ± 6.78	
Significance tes	t	t=0.185, P0.832	t=4.635, P0.014	
Hospital admission				
Yes	54	58.9 ± 11.2	169.5 ± 6.8	
No	6	52.7 ± 12.0	178.3 ± 8.0	
Significance tes	t	t=1.287, P0.203	t=2.953, P0.005	

Significant ($P \le 0.05$)

Dansanal Charactaristics	No	Compliance Scores			
Fersonal Characteristics	INU.	Before	After		
Social status					
Married	42	20.2 ± 3.7	55.9 ± 0.22		
Unmarried	18	17.6 ± 3.3	55.8 ± 0.65		
Significance test		t=2.620, P0.011	t=1.572, P0.121		
Education			55.9 ± 0.42		
Educated	42	20.0 ± 3.6	56.0 ± 0.00		
Not educated	18	17.9 ± 3.7			
Significance test		t=2.106, P0.040	t=1.057, P0.207		
Work					
Working	34	19.5 ± 4.2	56.0 ± 0.00		
Not working	26	19.3 ± 3.2	55.8 ± 0.59		
Significance test		t=0.166, P0.869	t=2.298, P0.025		
BMI					
Average	2	22.0 ± 0.0	54.0 ± 0.00		
Overweight	4	19.5 ± 0.0	56.0 ± 0.00		
Obese	54	19.3 ± 3.9	55.9 ± 0.19		
Significance test		t=0.496, P0.611	t=10.602, P<0.001		
Duration of DM (years)					
3-5	22	18.8 ± 3.5	55.8 ± 0.59		
6-10	30	19.0 ± 2.7	56.0 ± 0.00		
11-15	8	22.0 ± 6.2	55.8 ± 0.46		
Significance test		t=3.445, P0.039	t=2.038, P0.140		
Family history					
Yes	44	20.0 ± 3.6	55.7 ± 0.46		
No	16	17.8 ± 3.6	56.0 ± 0.00		
Significance test		t=2.119, P0.038	t=1.174, P0.245		

Table (7): Relation	ı between	Personal	Characteristics	and	Patient's	Compliance	Before and	l After
Nursir	g Guidelii	nes				_		

Significant ($P \le 0.05$)

Table (8): Correlation between Self-Efficacy and Compliance Before and After Nursing Guidelines

		Compliance				
		Before		Afte	r	
Salf Efficient		R	Р	r	Р	
Sen-Encacy	Before	0.430	0.006			
	After			0.435	0.001**	
r Correlation co affic	piont ** D	<0.001 (high significant)				

r Correlation co efficient $**P \leq 0.001$ (high significant)

Table(1): Illustrates that 66.7% of studied patients their age was less than 50 years old with mean \pm SD = 46.83 \pm 8.45 years, 60.0% of them were females and from urban, 70.0% were married and educated, and 56.7% of them were workers. Regarding BMI, 90.0% were obese as they had \geq 30 of BMI with Mean \pm SD = 39.95 \pm 12.64.

Table (2): Reveals that 50.0% of studied patients had diabetes for 6-10 years with Mean \pm SD = 7.6 \pm 2.96 years and 53.3% discovered it when symptoms appear, 73.3% of studied patient had family history of DM with 59.1% of them were first degree of relatives (brothers or sisters had diabetes). Also, 100.0% of patients had common complications from diabetes represented in 63.3% had eye complications followed by 20.0% had neurological complications.

 Table (3): Clarifies that 63.3% of studied patients

 had hypoglycemia, which occurred once in 89.5% of

them, and caused by eating late in 57.9% of them. 100.0% of patients had hyperglycemia which occurred twice in 36.7%, that caused by neglecting medication and over eating sweets in 30.0% of them. Also, 90.0% of studied patients admitted hospitals; 59.3% admitted once and 70.4% of studied patients admitted hospitals due to hyperglycemia. In addition, 56.7% of studied patients had insulin injection as the type of treatment, while 36.7% of them took tablets and injection.

Table (4): Illustrates that 90% of patients had satisfactory level of self-efficacy after nursing guidelines than before, with a statistical significant difference (P < 0.001).

Table (5): Denotes that 78.33% of the studiedpatients had a good compliance level regardingdietary regimen, treatment, and life style after

guidelines than before with a statistical significant difference (P<0.001).

Table (6): Reveals that there was a significant relation between patients' self-efficacy and their personal characteristics as sex, work, BMI, and hospital admission after nursing guidelines (P=0.036, 0.018, 0.014, 0.005) respectively.

Table (7): Clarifies that there was a significant relation between patients' compliance and their personal characteristics as social status, education, duration of DM, and family history before nursing guidelines. Meanwhile, there was a statistical significant relation between patients' compliance, work, and BMI after nursing guidelines.

Table (8): Displays that there was a positive correlation between self-efficacy and compliance level among studied patients after nursing guidelines with statistical significant differences (P=0.001).

Discussion:

Study findings of the current study revealed that more than two third of studied patients their ages were below fifty years old, higher than fifty percent of them were females, workers and from urban, more than two third of them were married and educated. This could be associated with the fact that the majority of the patients were females who bear significant work-related responsibilities, potentially resulting in the neglect of healthy lifestyle, that led to low compliance and un satisfactory self-efficacy. Regarding BMI, most of studied patients were obese as they had more than thirty BMI. This may be due to that obesity is one of the most common modifiable risk factor of developing DM.

This result agreed with **ElGerges**, (2020) who found that number of females was higher than males for the study group, and the majority of the participants were married. On the same line, **Yang**, et al., (2020) found that the majority of the participants were females. Similarly, **Malek & Ahmad** (2023) illustrated that about half of studied patients their age less than fifty years old, and females, and the most of them were married and educated. Similarly, **Krzemińska**, et al., (2021) found that more than two thirds of participants were from urban. In consistent with **Oluma**, et al., (2020) who mentioned the same results.

Concerning medical and family history of studied patients, higher than fifty percent of them had from six to ten years' duration of diabetes, also over fifty percent of the studied patients discovered the disease when symptoms appeared and their brothers or sisters had diabetes. Two third of patients had family history of DM and eye complications. This finding was similar to that of **Krzemińska**, et al., (2021) who mentioned that two more half of participants their duration of diabetes was from five to ten years. Study results revealed that two third of studied patients had hypoglycemia, which occurred once in majority of them. All studied patients had hyperglycemia which occurred twice in about one third of studied patients. Also, most of studied patients admitted hospitals; more than two third of studied patients admitted hospitals due to hyperglycemia. More than half of studied patients had insulin injection as treatment of DM, while about one third of them took both; tablets and insulin injection.

This result was similar to that of study done by **Kong**, & Cho, (2020) who illustrated that nearly half of participants had experienced complications, and less than one third hospitalized due to diabetes. Family history of diabetes was found in one third of participants. For treatment, the majority of subjects were taking an oral hypoglycemic agent (OHA). In the same line with **Oluma**, et al., (2020) who clarified that higher than two third of patients were utilizing a combination of oral hypoglycemic agents along with insulin. Respectively, **Yang**, et al., (2020) stated that nearly half of the participants were currently using insulin medication.

Study finding indicated that the most of studied patients has satisfactory level of self-efficacy after nursing guidelines than before. This could be attributed the various instructional methods used in nursing guidelines implementation, such as lectures, discussions, a colored booklet, and presentations. Additionally, the demonstration and re demonstration provided at the conclusion of each session and prior to the subsequent session.

This finding was consistent with **ElGerges**, (2020) who demonstrated that the study group experienced enhancements in diabetes self-efficacy and improved glycemic control. Similarly, **Malek & Ahmad** (2023) illustrated that self-efficacy of studied patients was significantly improved in posttest and follow up phase in intervention group than in control group. On the same line, **Najafpour**, et al., (2021) mentioned that after the intervention the mean of self-efficacy increased.

In the same way, **Motaghi, et al.**, (2023) found that the intervention had a significant effect on diabetes management self-efficacy, and treatment adherence. Consistent with **Kurniawati, et al.**, (2020) stated that the treatment group exhibited notable differences between the pretest and post-test values of selfefficacy. Similarly, **Abbassi, et al.**, (2022) expressed that the average scores indicating self-efficacy are significantly elevated in the Experimental group, while they are moderately low in the control group.

Study finding showed that the studied patients had a good compliance level regarding dietary regimen, treatment, and life style after nursing guidelines than before. This result indicates that offering more detailed information about diabetes mellitus is associated with good compliance level, where the studied patients were provided with a booklet (nursing guidelines) illustrating different information and practices to facilitate access to information when needed and to help them to remember, that led to better compliance. Consistent with **Najafpour, et al.,** (2021) who mentioned that medication adherence increased significantly in the experimental group.

This result was in agreement with Alhaiti, et al., (2020) who found that a higher score reflects a greater commitment to diabetes self-care activities, with patient adherence to medication management being actively maintained and recognized as the most frequently practiced among all domains. Similarly, Mohammadi, et al., (2022) illustrated that the intervention group demonstrating an increase in their treatment compliance score. In the same way Abdullah, (2021) mentioned that higher than two third of respondents were adherent to medication.

The study finding revealed that a significant relation was found between patients' self-efficacy and sex, work, BMI, and hospital admission after nursing guidelines. Additionally, study finding revealed a significant relation between patients' compliance and work and BMI after nursing guidelines. This result was similar to that of **Oluma, et al., (2020)** who illustrated that there was a significant relationship between self-efficacy and marital status, weight, and smoking. Consistent with **Abdullah, (2021)** who illustrated that there was a significant relation between patients' adherence to the medications and their personal characteristics regarding gender, age, employment status, and BMI.

The study results indicated that there was a positive correlation between self-efficacy and compliance level among studied patients after nursing guidelines with statistical significant differences. This might be due to the improvement of patients' self- efficacy reflecting on improving patients' compliance level. This means that the nursing guideline was effective in improving self- efficacy and compliance level.

This finding is corroborated by the research conducted by **Chindankutty & Devineni** (2023), which demonstrated a significant correlation between self-efficacy and adherence for individuals with T2DM. Similarly, **Najafpour**, et al., (2021) illustrated that the correlation between self-efficacy and medication adherence was significant. Consistent with **Krzemińska**, et al., (2021) mentioned that there were significant positive correlations between the adherence and self- confidence.

Conclusion:

It can be concluded that nursing guidelines had a significant positive effect on improving self-efficacy

for patients with type 2 Diabetes Mellitus which reflected on improving their level of compliance.

Recommendation:

- Nursing guidelines should be established to improve self-efficacy, as it is the most significant factor affecting patients' compliance.
- Provide Outpatient Clinics with enough qualified nurses to give diabetic patients information about self-care practices.
- Further related studies are suggested in order to improve self-efficacy and compliance for patients with type 2 diabetes Mellitus.

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Author contribution:

The first author was involved in the creation of tools, conducting statistical analyses, participating in data collection, and designing nursing guidelines. The second author played a role in data collection, supplied the pre- and post-tests, executed the nursing guidelines, prepared videos, and color brochures and contributed to the gathering and analysis of references, as well as administering the nursing guidelines.

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