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A Cross Sectional Study On The Evaluation Of Time Spent And Adherence For Selfcare Activities In Patients With Type II Diametes Mellitus And Its Correlation With The Glycemic Control

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ABSTRACT

Type 2 diabetes mellitus is a metabolic disorder that occurs when insulin resistance and eventual insulin deficiency lead to high blood glucose. DM was one of the most common disease in Endocrinology and Metabolism. Practical understanding of selfcare activities and glycemic control will advocate the appropriate treatment. The aim of our study was to evaluate the time spent and adherence for selfcare activities in patients with type 2 DM and its correlation with glycemic control in department of Endocrinology and Metabolism Sri Venkateshwara Institute of Medical Sciences south Indian tertiary care teaching hospital Tirupati Andhra Pradesh. A prospective observational study was conducted in 180 patients with type 2 DM. The data collected from 180 patients was initially assessed for their laboratory investigations, time spent and adherence for selfcare activities, prevalence of selfcare activities vs glycemic control.

Keywords: *Type 2 Diabetes Mellitus (T2DM), International Diabetes Federation (IDF), Fasting Blood Sugar (FBS), Post Prandial Blood Sugar (PPBS), Glycated Haemoglobin (HbA1c), Summary of Diabetes Selfcare Questionnaire (SDSCA)*

INTRODUCTION

The highest prevalent noncommunicable diseases in India is Type II DM (Diabetes mellitus). Diabetes acute and persistent consequences have a negative influence on patient's physical, emotional, and social health, which places a significant strain on the health care system. According to studies, people who practice proper self-care will have better glycemic control and avoid complications.

The International Diabetes Federation projects that 693 million individuals will have diabetes mellitus (DM) by the year 2045, up from an estimated 451 million in 2017.[1] India, a developing nation, has recently been threatened by both contagious and noncontagious diseases. The popularity of type II diabetes mellitus (DM) rising significantly over recent years among noncommunicable diseases. India has 72.9 million diabetics, making it the 2nd place in the world in terms of the prevalence of the condition in 2017.

Insulin resistance is the cause of the lifestyle illness known as type 2 diabetes. This insulin resistance is brought on by poor lifestyle choices, such as eating a diet high in carbohydrates, eating fewer fruits and vegetables, and not engaging in enough physical activity. The condition appears as a long-term metabolic imbalance that causes persistent hyperglycemia and the accompanying harm to a number of body parts. A strict schedule established through life-based adjustments, consistent treatment, and routine follow-through examination greatly reduce the risk of the disease's consequences. [2]

Regular blood glucose monitoring, dietary and medication compliance, regular exercise, and frequent foot exams are all examples of self-care techniques. [3] Several previous studies have shown that proper self-care routines significantly helped diabetics lower their glucose levels and improve their overall quality of life. [4] Sufferers who are familiar about the disease and appropriate medical procedures are possible to have controlled glucose levels and lower the risk of cardiovascular diseases, and vice versa. [5] Since most of the selfcare for people with diabetes is handled by patients and their families, there is an immediate action for reliable and efficient diabetic self-care management techniques. [6]

The costs for the society are reduced through prudent care for diabetics, general health, and wellbeing. Rise in the popularity of DM risk factors are obesity, smoking, and alcohol consumption.[7]

Risk Factors Influencing Glycaemic Control

The most common kind of diabetes is type 2 DM, which is brought on by genetic factors that affect insulin production, insulin resistance, and environmental variables. Obesity has a prominent pathophysiological mechanism among the various environmental influences, and it works in the following ways:

- Increase in adipose tissue mass, which causes liquid oxidation
- Storage and oxidation of glucose as a mediator of insulin resistance.
- Excess glycogen that is not being utilised, preventing the storage of further glucose.
- Beta-cell depletion in its totality.[8]

Self Care Practices In Preventing Diabetes Mellitus

Diabetes sufferers who want to properly manage their condition on their own should engage in self-care measures. [9] These self-care techniques are linked to improved glycemic management, which lowers the likelihood of complications from diabetes. [10]. Preventive measures are encouraged for the management of DM due to the severity and effects of diabetes on health, physiologically, and psychological welfare. Individual and family members self-care choices are the only factors that affect how well a diabetic is managed. Maintaining blood glucose levels within normal ranges and maintaining a healthy body weight are the major goals of secondary treatment.

Aid of HbA1C levels and glucose monitoring at home by using glucometer. This is crucial to check the glycemic levels at regular time periods. Numerous therapies, including lifestyle changes, glycemic and BP management, optic examination, regular assessment of foot have been shown to be successful. The seven concepts of a healthy diet, exercise, monitoring, medication use, problem-solving, good coping, and risk reduction have all been shown to be successful in managing diabetes. Of these seven principles, primary care facilities typically access nutritional consumption, daily exercises, stick on to the treatment, and regular checkups are to learn about the patient's self-care habits. [2].

Persuasive data suggests that patients can achieve better blood sugar management when they conduct self-care in a systematic and appropriate manner while receiving ongoing health education. Furthermore, research shows that when diabetics take their medications as prescribed, they have inadequate knowledge of problems and poor blood sugar monitoring and lifestyle adjustment habits. [11]. It is beneficial to develop health care and personal care for diabetes sufferers, there is an increasing need to evaluate the self-care practise pattern in rural areas because there has been very little research done on it. This is predicted that by 2035 the popularity of DM are rising globally to 592 million adults will have the disease [12]. Diabetes is a substantial factor in lower limb amputation, kidney failure, heart attacks, and blindness [13]. Type II DM accounts raised to 95% of all cases of diabetes and is mostly brought on by obesity and sedentary lifestyle [12, 13], is caused by abnormal insulin production.

This is important to maintain their health condition includes, difficulties with the optic nerves and central nervous system, and chronic kidney disease. Blood sugar management, insulin administration, oral hypoglycemic medication use, healthy eating and exercise routines are a few routine behaviours or actions that are necessary for sufferers to organise and manage their illness. Patients claim that they find self-care management more challenging than even their diabetes diagnosis [14].

An 11-item self-reporting tool called the Summary of Diabetes Self-Care Activities Assessment (SDSCA) [15] is used to gauge how well-adjusted persons with diabetes are at taking care of themselves. Regarding self-management, it is crucial to measure this facet of diabetes care, particularly when evaluating the efficacy of particular healthcare solutions for chronic diseases like diabetes mellitus.[16]

MATERIALS AND METHODS
Study Design
The study was a Prospective observational study.

Study Settings
The study was conducted at Sri Venkateshwara institute of medical sciences in the department of Endocrinology and metabolism. This study got ethical approval from the IEC of SVIMS, Tirupati.

Study Period
The study was conducted at a period of 6 months.

Inclusion Criteria
1. Patients with the age between 40-75 years with type 2 diabetes mellitus.
2. Patients with Type 2 DM for at least 6 months.
3. Patients who are interested to participate in the study.
4. Patients with type 2 DM who are capable of understanding and responding the Diabetes Mellitus Selfcare Questionnaire (DMSQ)

Exclusion Criteria
1. Patients with age of less than 40 years and above 75 years are excluded from this study.
2. Patients with other types of Diabetes (Type 1 DM, Gestational diabetes)
3. Patients who are under psychological illness
4. Patients administering certain medications like corticosteroids, estrogen, oral contraceptives etc.,
5. Patients with type 2 Diabetes Mellitus who are not willing to participate are excluded from the study.

Stastistical Analysis
All data collected based on the SDSCA questionnaire was entered into excel software of Microsoft windows and analyzed using SPSS software version 25. Continuous variables were presented as mean $\pm$ SD. Categorical variables was presented as percentages. In group comparison, categorical variables were compared with Chi Square test and continuous variables were compared with Student's t test. In all analyses a P-value of < 0.05 was considered as criterion of statistical significance.

RESULTS

Age & Gender distribution among patients with Type 2 DM

A total of 180 participants were included in the final analysis. The mean age of the study participants was 56.7 ± 13.29. Considering the 180 total study subjects 91 subjects (50.55%) were males and 89 subjects (49.44%) were females. Among the 180 study population the majority of the subjects were belonged to age group of 40 - 50 years (n= 84) constituting 46.66% of patients followed with age group of 51- 60 years (n=50) constituting 27.77% oof patients followed with age group of 61 – 75 years (n=46) constituting 26.11%. According to gender the male to female ratio is 91: 89 (50.55: 49.44).

Distribution of patients regarding laboratory investigations

Some of the laboratory investigations are included they are FBS, PPBS, HbA1C.

The patients with FBS level less than 110 mg/dl are 31 patients comprising 17:22 percentage and more than 110 mg/dl are 149 patients comprising 82:77 percentage. The patients with PPBS levels less than 140mg/dl are 29 patients with 16.11 percentage and more than 140 mg/dl are 151 patients with 83.88 percentage and HbA1C

The estimation of HbA1C (Glycated haemoglobin) in patients with Type 2 Diabetes mellitus normal level is below 5.7%. A level of 6.5% or more indicates diabetes. The estimation of HbA1C (Glycated haemoglobin) in patients with Type 2 Diabetes mellitus normal level is below 5.7%. A level of 6.5% or more indicates diabetes. In our study patients with more than normal range are 127 patients with 70.55 percentage.

Distribution of patients according to time spent and adherence for selfcare activities

Frequency of 153 patients spent time for selfcare activities for <2hrs with 85.01% and 27 patients spent time for selfcare >2hrs having 15.03%

Distribution regarding the prevalence of selfcare practices among the study participants

According to SDSCA questionnaire the diabetic patients are examined for their selfcare activities with weekly consumption of carbohydrates is categorised in days as 0 to 4 days are 32patients with 17.77% and >5days are 148 with 82.22%. Weekly consumption of fats with 0 to 2 days are 158 patients having 87.77% and >2 days are 12.22%. Weekly consumption of fruits or vegetables are categorised as 0 to 4 days are127 patients having 70.55% and 5 to 7 days are 53 patients having 29.44%. Regarding exercise divided as 0 to 4 days are 122 patients having 67.77% and 5 to 7 days 58 having 32.22%. Regarding weekly foot examination 0 to 4 days 142 patients having 78.88% and for 5 to 7 days are 42 patients having 23.33%. Smoking history in men are categorised as present with 36 patients with 20% and absent in 144 patients with 80%. Periodic examinations done over past 3 months are 156 patients have 86.66%.

Comparing the selfcare activities vs glycemic control.

Population adhere to selfcare activities are only 27 patients with the 15.03% and non adhere to selfcare activities are 153 with the 85.01. So many of the patients have high glycemic levels indicating diabetic.

DISCUSSION

Our study demonstrates the importance of self-care activities in patients with Type 2 Diabetes Mellitus in accordance with their glycaemic control by evaluating the response of study population to SDSCA questionnaire. In our study all the study participants (n=180) undergone laboratory investigations for FBS, PPBS, HbA1C for the estimation of glycaemic control and mainly to evaluate the time spent and adherence for self-care activities in correlation with their glycaemic control.

A total of 180 participants were included in the final analysis. The mean age of the study participants was 56.7 ± 13.29. Considering the 180 total study subjects 91 subjects (50.55%) were males and 89 subjects (49.44%) were females. Among the 180 study population the majority of the subjects were belonged to age

group of 40 - 50 years (n= 84) constituting 46.66% of patients followed with age group of 51- 60 years (n=50) constituting 27.77% oof patients followed with age group of 61 – 75 years (n=46) constituting 26.11%.

According to International Diabetes Federation self-care practices are defined as a set of behaviour practices by people with diabetes in order to successfully manage the disease on their own. These self-care practices are found to have an association with the glycemic control and thereby reduce the incidence of complications and improves the quality of life occurring due to DM. Patients with good knowledge and good health care practices have higher chances of achieving good glycemic control and reduce cardiovascular risk and vice versa.[48] In this study the evaluation of self-care activities in correlation with glycemic control shows that the population adherence to self-care activities (n=27) constituting 15.03% have shown better glycemic control.

In our study, only n=58 (32.22%) was doing regular exercise and 142 (78.88%) participants were not doing regular exercise. This might be due to a lack of knowledge on the difference between physical activity and daily living activities and lack of access to recreational centers in the area.

In our study n=142 constituting 78.88% of the study population were not paying attention towards foot care this may leads to further foot infections. These patients with diabetes have slow wound healing capacity so the diabetic footcare is necessary self-care activity to be taken care of.

LIMITATIONS
- Relatively small sample size.
- Inadequate follow up period.

CONCLUSION
Overall, our study showed a poor self-care practice in relation to diet, foot care and exercises. This could have arisen because of the lack of awareness and knowledge regarding diabetic care. This study concludes that the self-care practice had association with the glycemic control in patients with T2DM. So that the patient should concentrate on self-care activities in order to improve their quality of life and reduce the risk of further complications. There is a greater need for periodic evaluation and risk identification where the health worker is expected to assess, monitor, and educate regarding the self-care practices. It is essential for the pharmacists a to educate the patients on diet, exercise and foot care practices to the patients. Structured programs need to be planned to improve the attitude and practices of diabetic patients to promote better compliance towards diet, exercise, adherence to drugs and appropriate foot care.

Conflict of interest statement
We declare that we have no conflict of interest

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TABLE 1: Descriptive analysis of study population age
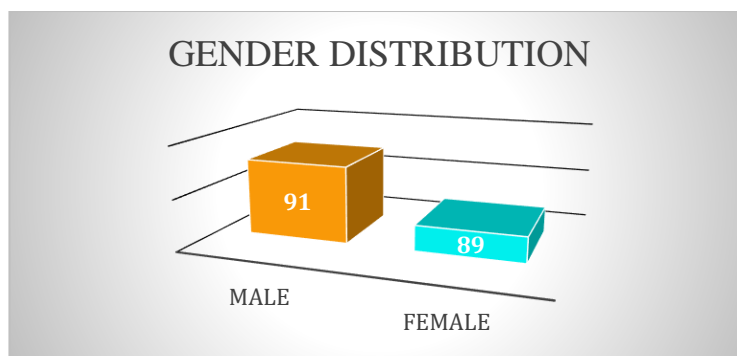
PARAMETER	Mean ± STD	Median	Max	Min
AGE	56.7 ± 13.29	53	75	40

TABLE 2: Age distribution among study population

S.NO	AGE GROUP(YEARS)	FREQUENCY(n=180)	PERCENTAGE (%)
1.	40-50	84	46.66%
2.	51-60	50	27.77%
3.	61-75	46	26.11%
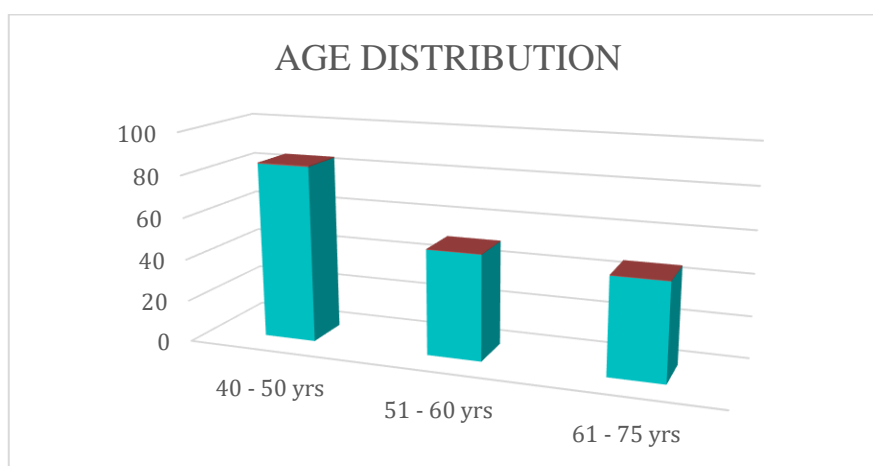
AGE DISTRIBUTION

TABLE 3: Gender percentage among study population

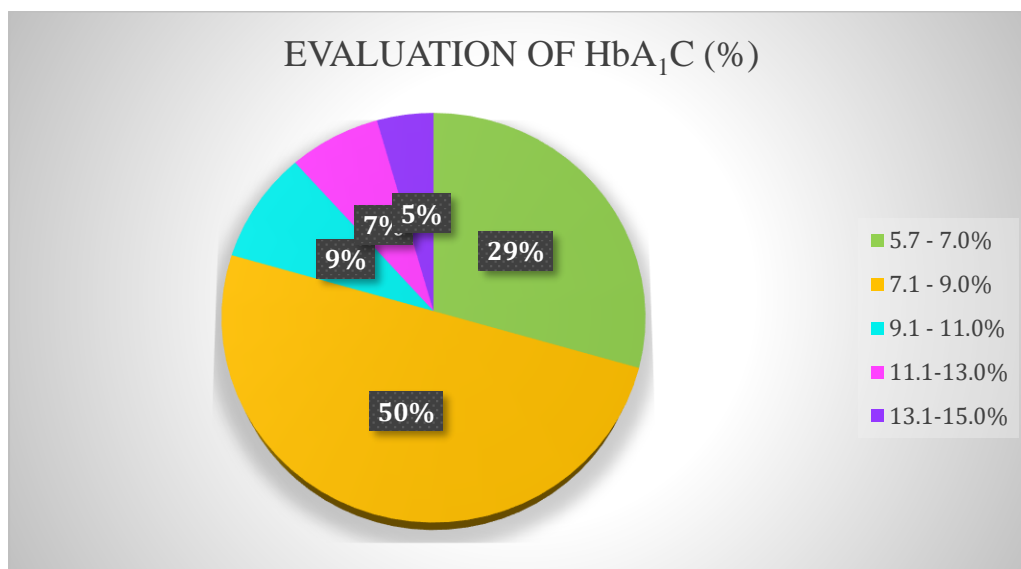| GENDER	FREQUENCY (n=180)	PERCENTAGE (%)
MALE	91	50.55
FEMALE	89	49.44

GENDER DISTRIBUTION

91 — MALE
89 — FEMALE

TABLE 4 : Population distribution based on FBS & PPBS

Fasting Blood Sugar (FBS)		Post Prandial Blood Sugar (PPBS)	
<110 mg/dl	>110 mg/dl	<140 mg/dl	>140 mg/dl
31 (17.22%)	149 (82.77%)	29 (16.11%)	151 (83.88%)

ESTIMATION OF FBS AND PPBS
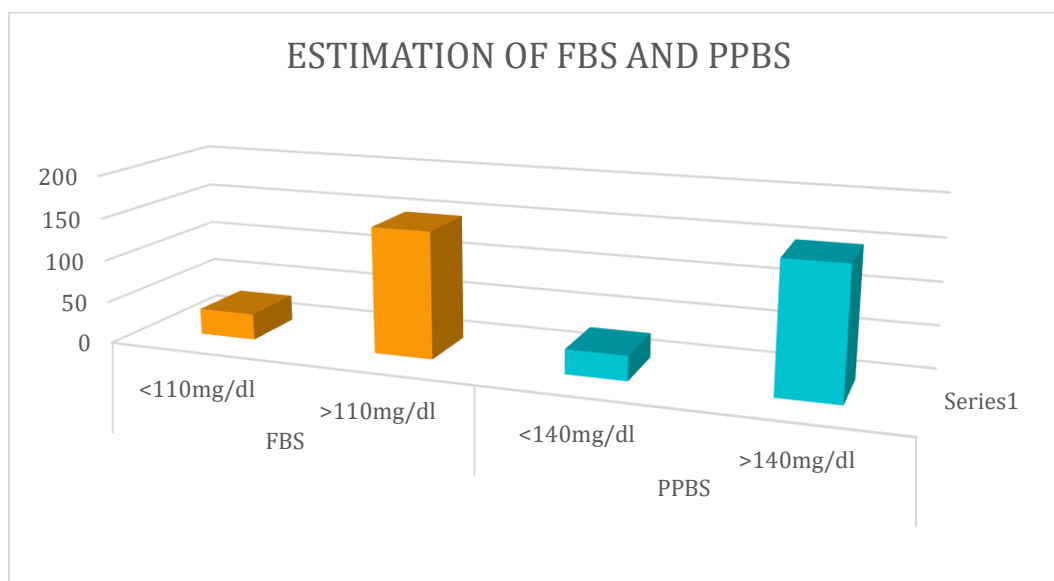
TABLE 5: Estimation of HbA1C values in study population

HbA1C (%)	STUDY POPULATION	PERCENTAGE (%)
5.7 – 7.0	53	29.44
7.1 – 9.0	90	50.00
9.1 - 11.0	16	8.88
11.1 – 13.0	13	7.22
13.1 – 15.0	8	4.44

TABLE 6: Time spent and adherence for self-care activities in patients with T2DM

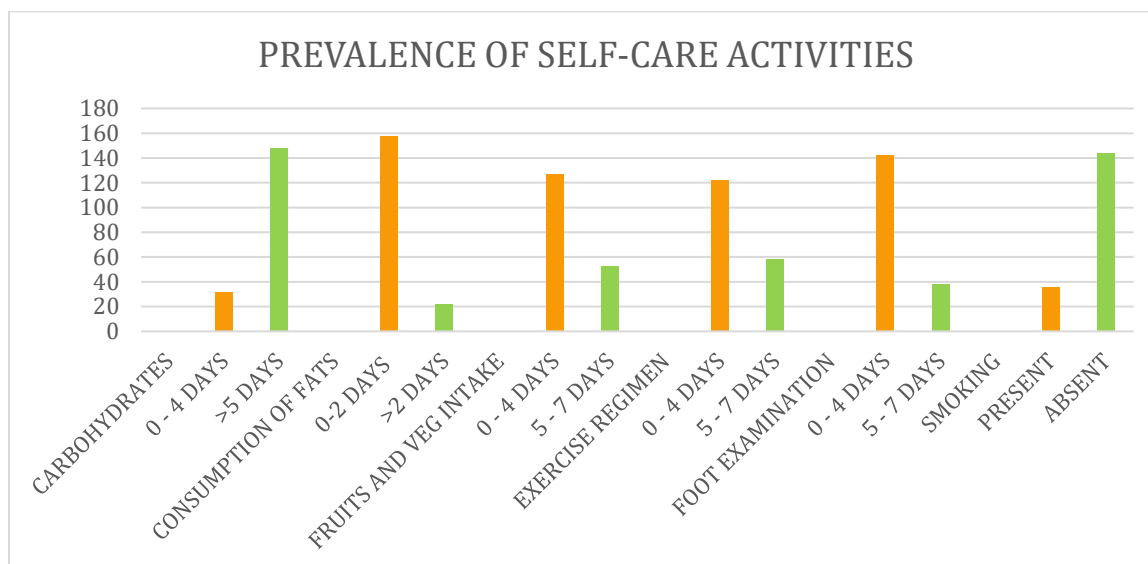| Time Spent For Self-Care Activities By Study Population (In Hours)	Frequency(N=180)	Percentage (%)
< 2 hrs	153	85.01%
> 2 hrs	27	15.03%
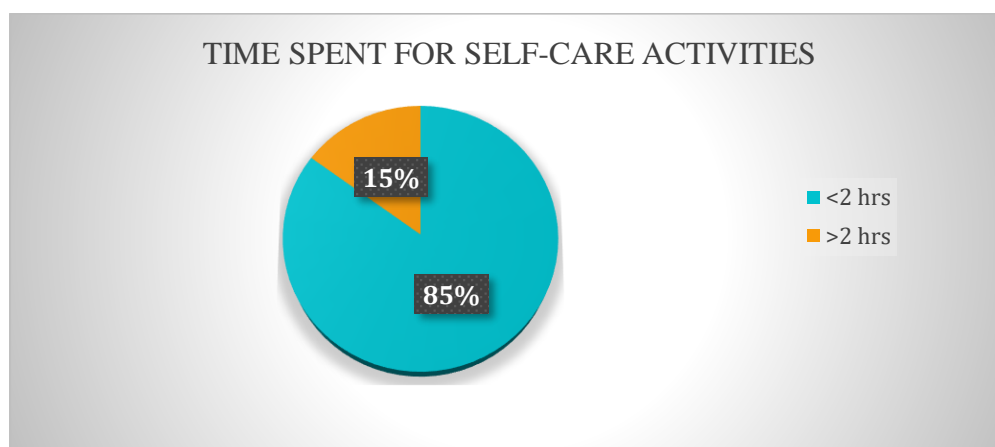
TABLE 7: Prevalence of self-care activities among the study participants

Parameter	Frequency	Percentage	Chi sq	P value
Weekly consumption of carbohydrates 0-4 days	32	17.77		0.005
>5 days	148	82.22	54.632	0.0001
Weekly consumption of fats 0-2 days	158	87.77	37.844	0.01
>2 days	22	12.22	47.779	0.004
Weekly consumption of fruits / vegetables 0-4 days				
5-7 days	127	70.55	25.569	0.004

	53	29.44	31.885	0.0001
Weekly exercise regime 0-4 days				
5-7 days	122	67.77	24.768	
	58	32.22	38.975	0.001
Weekly foot examination 0-4 days				
5-7 days	142	78.88	62.548	<0.01
	42	23.33	23.374	
Smoking history Present				
Absent	36	20	18.695	0.01
	144	80	26.707	
Periodic blood sugar testing done over past 3 months				
	156	86.66	48.902	0.001

PREVALENCE OF SELF-CARE ACTIVITIES

TABLE 8: Adherence for self-care activities VS glycemic control in study population

SELF-CARE ACTIVITIES		GLYCEMIC CONTROL	
Population Adherence	Population Non-Adherence	Normal Value	High Range
27 (15.03%)	153 (85.01%)	53 (29.44%)	127 (70.55)
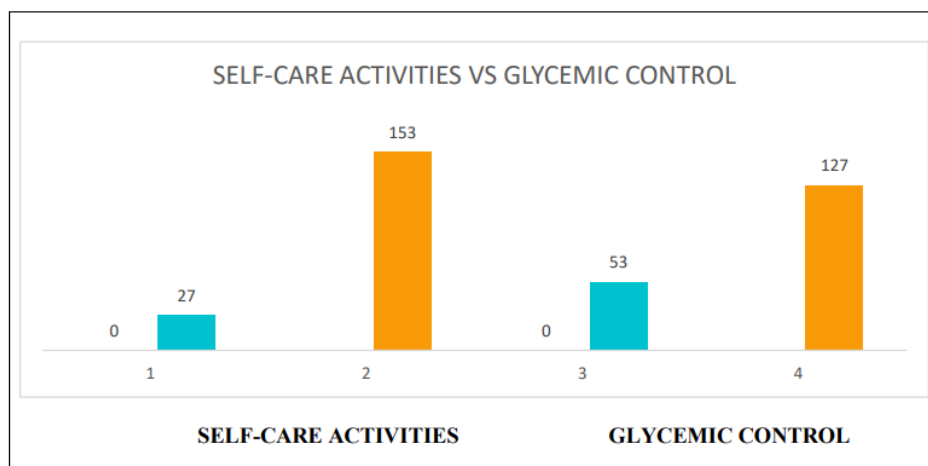
S.NO	EVALUATION	P.VALUE
1.	Time spent and adherence for self-care activities in patients with T2DM	< 0.0001*
2.	Adherence for self-care activities VS glycemic control	< 0.0001*