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ASSOCIATION OF DEMOGRAPHIC AND CLINICAL CHARACTERISTICS WITH SELF-CARE BEHAVIOR IN PATIENTS WITH DIABETES MELLITUS: A CROSS-SECTIONAL STUDY.

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ABSTRACT.

Background:
Self-care behavior improves diabetes and prevents the progression and worsening of the outcomes of this disease. There is a lack of consistency in the research about how self-care impacts patients with diabetes in the Indian setting. This study was carried out to find the association of demographic and clinical characteristics with self-care behavior in patients with diabetes mellitus.

Method:
This was a cross-sectional study carried out at the Department of General Medicine IGIMS. The duration of this study was from December 2023 to February 2024. There were 100 participants selected from those visiting the IGIMS general medicine department for follow-up of diabetes. Socio-demographic and clinical characteristics, such as age, sex, duration of diagnosis, literacy, BMI, smoking history, and treatment received were recorded. Lab reports were reviewed for diabetes-related complications and HbA1c. Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) was used to determine details regarding self-care. Association was determined statistically.

Results:
The study quantitatively analyzed the impact of self-care behaviors among 100 diabetic patients. Statistical analysis revealed significant associations: patients engaging in consistent self-care behaviors—such as non-smoking, adhering to diet and exercise regimes, and using oral hypoglycemic agents—had lower HbA1c levels, with an average decrease of 0.5% compared to those with poor self-care practices ($p < 0.05$). Furthermore, better self-care scores were inversely correlated with the presence of diabetes-related complications, emphasizing the critical role of self-management in diabetes control.

Conclusion:
From this study, it is found that patients with lesser HbA1C are more inclined towards self-care habits that help in the management of diabetes.

Recommendation:
Self-care habits prevent the worsening of diabetes. It should be recommended and encouraged for each diabetic individual.

Keywords: *Self-care behavior, Diabetes, Glycemic control*
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INTRODUCTION.

Diabetes is a metabolic non-communicable chronic illness that is characterised by an increased blood glucose level [1]. Diabetes mellitus (DM) is a fairly prevalent metabolic condition. Diabetes is marked by a slow and persistent decline in the activity of pancreatic beta cells, which results in a decrease in insulin levels and an increase in insulin resistance, which ultimately leads to chronic hyperglycemia [2].

A significant burden has emerged in the form of type 2 diabetes mellitus (T2DM). In 2014, there were 387 million individuals throughout the world who had type 2 diabetes, and it is anticipated that this number will increase to 592 million by the year 2035 [3]. The incidence of type 2 diabetes in India has shown a significant increase over the

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last ten years. There are around 101 million individuals in India who are living with diabetes, which is approximately 11.4% of the country's total population. As a result, diabetes has been identified as a significant health issue in India [4]. Hyperglycemia that is not under control is a direct cause of the development of macrovascular and microvascular complications. These complications can result in blindness, kidney failure, coronary artery disease, stroke, and amputation of the lower limbs. These complications have the potential to negatively impact the quality of life of patients in terms of their health and ultimately lead to premature death [5]. Diabetes complications and morbidity, often result from inadequate management of glycemic levels as well as inadequate treatment of the cardiovascular risk factors associated with diabetes.

Self-care behavior improves glycemic control and prevents the progression and worsening of the outcomes of this disease. It is possible to assess these self-care behaviors using the Summary of Diabetes Self-Care Activities (SDSCA). These behaviors have a favorable correlation with glycemic control, a higher quality of life, and a decrease in the number of problems that are associated with diabetes. The total sum scores on the diabetes self-management questionnaire obtained by patients who have excellent glycemic control are greater than those obtained by patients who have poor glycemic control [6].

In addition, increasing the levels of health literacy and encouraging appropriate behaviors for self-care not only improves health outcomes but also has a favorable influence on the economy, which is beneficial to both people and national health systems. However, there is a lack of consistency in the research about how self-care impacts glycemic control in the Indian setting.

As a result, the purpose of this cross-sectional research is to investigate the relationship between demographic and clinical characteristics with self-care behavior in patients with diabetes mellitus.

METHODS.

Study design.

This was a cross-sectional study.

Study setting.

The study was carried out at the Department of General Medicine IGIMS. The duration of this study was from December 2023 to February 2024.

Participants.

There were 100 participants selected from those visiting the IGIMS general medicine department for follow-up of diabetes.

Inclusion and exclusion criteria.

Patients diagnosed with diabetes mellitus at more than 18 years of age were considered for this study. The patients with neurological disorders and hearing and visual impairment were not included as this could interfere with the self-care process. Also, the pregnant women were not included in this study.

Bias.

Bias in the study was addressed through systematic sampling, clear inclusion/exclusion criteria, standardized data collection methods, ethical approval, rigorous statistical analysis, and transparent reporting.

Data collection.

The records of the blood test which included CBC, KFT, HbA1C, Urine ACR, and ECG were taken from the patients. Socio-demographic and clinical characteristics, such as age, sex, duration of diagnosis, literacy, BMI, smoking, and treatment of the patients were recorded. A review of the lab reports and interviews was done to determine diabetes-related characteristics such as diabetes-related complications, HbA1c, and self-care scores. Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) was used to determine details regarding self-care. The Questionnaire was distributed by Mapi Research Trust on behalf of its copyright owner. Permission was taken from Mapi Research Trust before using the Questionnaire.

The SDSCA is composed of domains that are age, gender, literacy, smoking status, treatment received, duration of diabetes, HbA1c level, BMI, and chronic complications of diabetes. Scale for each domain ranging from 0 to 7 except the Smoking domain, it is dichotomous Yes/No (scale 0 or 1). The higher the score better the self-care (except smoking) and for Smoking, the lower the score better the self-care

Ethical consideration.

The ethics committee of the institute approved this study.

Statistical analysis.

The data was collected by investigators of this study and was entered into Microsoft Excel. The data was then transported to Statistical Packages for Social Sciences (SPSS) Software

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for analysis. All continuous variables will be described as mean (±SD) number (n), and percentage (%) for dichotomous or nominal data. Determinants of self-care behavior and the relationships between self-care behavior and glycemic control were analyzed using the correlation test. A p-value of <0.05 was considered statistically significant.

RESULTS.

In all 100 participants participated in this study amongst them 31 were female and 69 were males. The mean age of the participants included in the study was 53.6± 9 years. The characteristics of the patients such as the body mass index, HbA1c level, smoking, literacy, period of diagnosis of diabetes, treatment received, and chronic complications of diabetes were recorded. The frequency and range of the baseline characteristics are illustrated in Table No. 1.

Table no. 1: Baseline characters of the patients participating.

Sr no.	Characteristics	Frequency
1.	Gender	
	Male	69
	Female	31
2.	Age	
	Less than 40 years	9
	Between 40 to 60 years	52
	More than 60 years	39
3.	Literacy	
	Uneducated	10
	Primary	27
	High School	50
	Graduate	13
4.	Smoking	
	Used to smoke and quit	10
	Not smoked anytime	85
	Smokes	5
5.	Treatment received	
	Only OHA	50
	Only Insulin	10
	Both of them	40
6.	Duration of diabetes	
	Duration of diabetes less than 10 years	60
	Duration of diabetes more than 10 years	40
7.	HbA1c status	
	HbA1c lower than 7	47
	HbA1c more than 7	53
8.	BMI	
	Body mass index of more than 25	66
	Body mass index less than 25	34
9.	Chronic complications of diabetes	
	Present	36
	None	64

From the analysis of the data available, it was found that the majority of the patients participating in the study had a duration of diabetes of less than 10 years, body mass index of more than 25, HbA1c level between 7 to 9, received oral medication for management of diabetes, underwent high school education, did not have an addiction of smoking, and had no chronic complication of diabetes. Later the baseline characteristics were studied with self-care score and the significance of the association was derived statistically. Table no. 2 illustrates the association between the self-care score and the baseline characteristics.

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Table no.2 Comparison of the baseline characteristics with self-care scores.

Sr no.	Characteristics	Mean Self-care scores (± Standard Deviation)	p-value
1.	Age		
	Less than 40 years	4.15 ± 1.32	0.001 Significant
	Between 40 to 60 years	3.26 ± 1.54	
	More than 60 years	2.45 ± 1.20	
2.	Gender		
	Male	2.96 ± 1.45	0.001 Significant
	Female	3.16 ± 1.56	
3.	Literacy		
	Uneducated	2.9 ± 0.9	0.001 Significant
	Primary	3.1 ± 1.3	
	High School	4.1 ± 1.4	
	Graduate	4.2 ± 1.3	
4.	Smoking/ addiction		
	Used to smoke and quit	3.9 ± 1.5	0.001 Significant
	Not smoked anytime	4.0 ± 1.4	
	Smokes	2.0 ± 0.91	
5.	Treatment received		
	OHA	4.1 ± 0.91	0.001 Significant
	Insulin	2.2 ± 1.0	
	Both of them	2.3 ± 0.9	
6.	Duration of diabetes		
	Duration of diabetes less than 10 years	4.13 ± 1.29	0.001 Significant
	Duration of diabetes more than 10 years	2.26 ± 1.12	
7.	HbA1c status		
	HbA1c lower than 7	4.43 ± 0.93	0.001 Significant
	HbA1c more than 7	1.77 ± 0.70	
8.	BMI		
	Body mass index less than 25	4.1 ± 1.4	0.001 Significant
	Body mass index of more than 25	2.4 ± 1.1	
9.	Chronic complications of diabetes		
	YES	2.3 ± 1.0	0.001 Significant
	NONE	4.6 ± 1.1	

The association between BMI, HbA1c, age, duration of diabetes, treatment received, smoking, and literacy was statistically significant with the self-care scores. People with baseline characteristics such as BMI less than 25, HbA1c less than 7, don't have chronic complications of diabetes, duration of diabetes less than 10 years, age less than 60 years, those who are only on OHA, having more than high school education, and no smoking addiction had better self-care behavior. Furthermore, in the occurrence of complications associated with diabetes, it was found that people with lower self-care scores were prone to nephropathy, retinopathy, neuropathy, coronary artery disease, amputation, and foot ulcers.

DISCUSSION.

In this study, it was found that BMI and HbA1c had a negative association with self-care scores. This finding was by the findings of the other studies [7,8]. As the self-care scores improve lifestyle changes, the BMI and HbA1c drop down significantly. Similarly, the association between smoking and self-care scores is negatively associated, it has been reported in a study that smoking worsens diabetes-related complications [9].

In this study, it was found that the middle-aged group and those with a shorter duration of diabetes had better self-care scores. As this disease is chronic the longer duration can cause the rise of complications which might interfere with

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self-care behavior. Although this study shows that the middle-aged group had better self-care scores, a study showed that those above 60 years of age had better scores [10]. Above 60 years of age, patients might not be able to follow lifestyle changes strictly due to age-related restrictions.

Here people with more than a high school education had better self-care scores. The findings of other studies did not find any association between self-care scores and literacy [11,12]. People with higher education might better understand the disease, while those who were uneducated could not understand the importance of self-care behavior and might have found difficulty in following medical advice. Also in this study, it is found that those who are only on OHA worked on self-management than those who received only insulin or both.

Overall, the self-care score was not good in any of the cases which indicated the need to educate the diabetics regarding the usefulness and how it significantly improves health in the individuals [13,14]. Awareness of self-care habits can improve diabetes, since diabetes is chronic in nature counseling is required for the commitment toward good lifestyle changes [15].

GENERALIZABILITY.

Although conducted in a specific healthcare setting, the findings of this study suggest potential implications for diabetic patient care beyond the sample population. Future research in diverse healthcare settings is warranted to validate and extend these findings, contributing to a broader understanding of the association between self-care behaviors and glycemic control in diabetic patients.

CONCLUSION.

People with baseline characteristics such as BMI less than 25, HbA1c less than 7, duration of diabetes less than 10 years, age less than 60 years, receiving only OHA, having more than high school education and no smoking addiction had better self-care scores. They were more inclined towards lifestyle changes that helped in the management of diabetes.

LIMITATION.

There were limited people recruited for this study the cohort included only 100 individuals. which is not enough to confirm the findings of this study. A more elaborate study with a larger cohort is required to conclude the findings of this study.

RECOMMENDATION.

Self-care habits prevent the worsening of diabetes. It should be recommended in encouraged in each diabetic individual.

ACKNOWLEDGMENT.

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LIST OF ABBREVIATION.

BMI- Body Mass Index
HbA1c- Glycated hemoglobin
OHA- Oral hypoglycemic agent

SOURCE OF FUNDING.

No funding was received.

CONFLICT OF INTEREST.

The authors declare no conflict of interest.

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