



# SELF-REPORTED, SELF-CARE ACTIVITIES AMONG TYPE 2 DIABETIC PATIENTS IN RURAL AREAS OF SRIKAKULAM DISTRICT, ANDHRA PRADESH: A CROSS-SECTIONAL STUDY

K. Satyanarayana<sup>1</sup>, Saptarishi Bose<sup>2\*</sup>, Paromita Roy<sup>3</sup>

<sup>1,2</sup>Department of Community Medicine, <sup>3</sup>Department Of Dental, Great Eastern Medical School, Srikakulam, Andhra Pradesh

Correspondence: Dr. Saptarishi Bose

## ABSTRACT

**Background:** Diabetes is a chronic condition. The burden of diabetes is, expected to rise to 592 million by 2035. Diabetes self-care activities can have a dramatic impact on lowering glycosylated hemoglobin levels. Hence, this study has been planned to assess the self-care activities among the type 2 diabetes patients in rural areas of Srikakulam district, Andhra Pradesh.

**Methods:** A cross-sectional study was conducted among type 2 diabetic patients residing in rural field practice area of Great Eastern Medical School, Srikakulam district during May 2023 and June 2023. Personal interview using semi-structured questionnaire including summary of diabetes self-care activities- revised version was conducted.

**Results:** Majority of the study participants were female and 46.2% were above 51 years of age. Majority had diabetes mellitus for 1-5 years. Of the diabetic self-care activities 68.5% had healthy eating 2-4 times/week. About 33.2% of the participants were not indulged in physical activity as well as high-intensity exercises even for a single day; about 33% had not tested their blood sugar level for even a single time and only 1.5% had checked their feet on all days during the previous week. Higher food scores were found significantly associated with availability of family support for self-care activities (*p* value 0.020).

**Conclusions:** Of the diabetic self-care activities the healthy dietary component was followed satisfactorily but exercise, foot care and testing of blood sugar were followed poorly by the study participants.

**KEYWORDS:** Diabetes mellitus, Self-care, Rural area

## INTRODUCTION

Diabetes is a grave, chronic condition.<sup>1</sup> In 2013, it was estimated that 382 million people were diabetic and this number is expected to rise to 592 million by 2035.<sup>2</sup> According to the reports of the International Diabetes Federation, 72.9 million Indians were diabetic in 2017, which would be expected to rise till 134.3 million by the year 2045.<sup>3</sup> Most people with diabetes live in low- and middle-income countries and these will experience the greatest increase in cases of diabetes over the next 22 years.<sup>4</sup>

Diabetes is of two types type 1 and type 2. In type 1 diabetes is also known as insulin-dependent diabetes. It usually begins in childhood thus also known as juvenile-onset diabetes. Type 1 diabetes is an autoimmune condition where a person's own body attacks its own pancreas with antibodies and doesn't make insulin. In type 2 diabetes, either the pancreas isn't making enough insulin as per the body's requirement or there is insulin resistance.<sup>5</sup>

Phase 1 of the Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study, reported the prevalence of diabetes in Tamil Nadu to be 10.4%.<sup>6</sup> Diabetes is the highest cause of mortality and various morbidities. Diabetics are at increased risks of cardiovascular and other diseases.<sup>1</sup> Diabetes should be managed with holistic and individualised patient care based on structured education, self-management and safe and effective glucose-lowering therapies.<sup>7</sup> Diabetes self-care

activities can have a dramatic impact on lowering glycosylated haemoglobin levels.<sup>8</sup> Hence, this study has been planned to assess the self-care activities among the type 2 diabetes patients in rural areas of Srikakulam district, Andhra Pradesh.

## METHODS

Singupuram is the rural field practice area of Great Eastern Medical College, Srikakulam. There are three villages covered in the Singupuram Health sub-center area namely Singupuram, Mamidivalasa and Bagguvanipeta. A community based cross-sectional study was conducted among the people residing in the above area to assess the self-care activities among the type 2 diabetes patients during the period of two months of May 2023 and June 2023. The sample population was all the diabetic patients of more than one-year duration residing in the above villages.

The sample size was calculated using the prevalence of diabetes in rural areas of Andhra Pradesh as 7.8%, taking 5% of desired precision along with a 95% confidence interval.<sup>6</sup> The sample size came out to be 116. With non-responders assuming to be 10%, the required minimum sample size was calculated as 130.

A line list of diabetic patients from the three villages was prepared from the records available in the Government PHC, Singupuram. All the diabetic patients of more than one-year duration residing in rural areas of Srikakulam district were



included in the study. Patients with disease duration of less than one year, patients below 18 years of age, patients above 80 years (as they could have senile forgetfulness dementia, etc.) and those not willing to participate were excluded from the study. A personal interview using a semi-structured interview schedule was conducted with the study participants.

The interview schedule comprised of two parts. Section A consisted of basic patient history (demographic details and details regarding), while section B was for summary diabetes self-care activities (SDSCA) questionnaire (revised version) on diabetes mellitus.<sup>9</sup> The SDSCA measure is a brief self-report questionnaire of diabetes self-management that includes items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood-glucose testing, foot care, and smoking. Minor changes were made to the SDSCA questionnaire to suit local context i.e., instead of self-monitoring of the blood sugar level, underwent testing of blood sugar level was included.

The questionnaire was translated into Telegu and back-translated into English by a separate person. A pilot study was conducted with 10% of sample size with the translated version of the questionnaire.

Data were entered in Microsoft excel and analysed using the SPSS version 23 software. The frequency of respondents was calculated with regard to the number of days per week they practiced self-care activities on a scale of 0–7 for general diet, specific diet, exercise, blood- glucose testing and footcare. For smoking, it was dichotomised into smokers and non-smokers.

Diet score was calculated by adding the individual score for items of 1, 2, 3 and 4 after reversing the score of item 4. Exercise score was calculated by adding the individual score for items 5 and 6. Blood sugar tested at least one time in the previous week was taken as monitoring of blood sugar level. Checking of the foot for all the seven days of the previous week was taken as foot care.

Descriptive statistics were reported as mean (SD) for continuous variables and frequency (percentage) for categorical variables. Pearson's Chi-square test was used to find an association between two categorical variables. A p value <0.05 was considered as statistically significant.

Ethical clearance was obtained from the institutional ethics committee before the start of the study. Informed written consent was obtained from the study participants before conducting the interview.

## RESULTS

In this study the majority (63.1%) were females and 46.2% of the participants were above 51 years of age. The majority of the participants were educated until primary (38.5%) with 82.3% being sedentary workers. Most of the participants belonged to the upper-middleclass. About 96.2% were married, 69.2% were living with their spouse and 63.8% were living in a nuclear family. A majority (71.5%) had no addiction habits and 21.55 were smokers (Table 1).

The majority of the participants had diabetes mellitus form 1-5 years (90%). Among the study participants, the majority of them (56.9%) didn't have diabetes mellitus among relatives. About 43% of the participants had a history of hypertension, followed by arthritis (26.2%). About 80.8% of the participants had taken treatment in government hospitals, followed by 18.5% in private hospitals. The majority of the participants took oral medications for diabetes (83.8%). Only 13% were on insulin. About 82.3% had received support from their family members for self-care activities (Table 2).

In this study, 68.5% had reported healthy eating 2-4 times/week. Only 18.5% of the participants reported >5 times/week of healthy eating. It was seen that the majority of the participants followed diet plans only 2-4 times/week (62.3%) and took 5 or more serving of fruits on 2-4 days (61.5%). High-fat foods such as red meat or full-fat dairy products were taken only 0-1 times/week by the majority of the subjects (65.4%).

About 33.2% of the participants were not indulged in 30 minutes of physical activity as well as high-intensity exercises even for a single day during the previous week. About 33% had not tested their blood sugar level for even a single time in the previous week. Only 1.5% had checked their feet on all days during the previous week (Table 3).

It was found that higher food scores were significantly associated with the age group of 25-59 years ( $p=0.027$ ), participants living in a joint family ( $p=0.011$ ) and the availability of family support for self-care activities ( $p=0.020$ ). No significant association was found between food scores and gender, social-economic status and the duration of diabetes (Table 4).

It was found that testing for blood sugar level at least one time during the previous week was significantly associated with treatment taken from the private sector ( $p=0.049$ ). There was no association found between testing for blood sugar level at least one time during the previous week and duration of diabetes, history of diabetes among the relatives and availability of family support (Table 5).



**Table 1: Distribution of study participants according to socio-demographic variables (n=130).**

Socio-Demographic Characteristics	Frequency	%
<b>Age group (years)</b>		
<24	1	0.8
25-59	59	45.4
>60	70	53.8
<b>Gender</b>		
Male	48	36.9
Female	82	63.1
<b>Educational status</b>		
Illiterate	39	30.0
Primary	50	38.5
High school	34	26.2
Diploma/higher secondary	6	4.6
Degree	1	0.8
<b>Occupation</b>		
Sedentary	107	82.3
Moderate	20	15.4
Heavy work	3	2.3
<b>Socioeconomic status</b>		
Upper class	4	3.1
Upper middle class	46	35.4
Middle class	38	29.2
Lower middle class	35	26.9
Lower class	7	5.4
<b>Marital status</b>		
Yes	124	95.4
No	6	4.6
<b>Living with spouse</b>		
Yes	108	83.1
No	22	16.9
<b>Family type</b>		
Nuclear	83	63.8
Joint	47	36.2
<b>Addiction</b>		
No addiction habits	93	71.5
Smoking	28	21.5
Alcohol	4	3.1
Tobacco chewing	3	2.3
Others	2	1.6

**Table 2: Distribution of study participants according to disease and treatment profile (n=130).**

Characteristics	Frequency	%
<b>Duration of diabetes mellitus (years)</b>		
1-5	117	90.0
6- 10	12	9.2
11-15	1	0.8
<b>Diabetes mellitus among relatives</b>		
Yes	56	43.1
No	74	56.9
<b>History of other illness</b>		
Hypertension	56	43.1
Arthritis	34	26.2
Heart diseases	3	2.3
Others	9	6.9
No other illness	28	21.5
<b>Place of treatment</b>		
Government hospitals	105	80.8



Private doctors	24	18.5
No treatment	1	.8
<b>Type of treatment</b>		
Insulin	17	13.1
Oral drugs	109	83.8
Herbal medicines	1	0.8
No medicines	3	2.3
<b>Support from family members for self-care activities</b>		
Yes	107	82.3
No	23	17.7

**Table 3: Frequency of individual responses for SDCSA questionnaire among the study participants (n=130).**

Item of questionnaire	Number of days in a week							
	0	1	2	3	4	5	6	7
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Followed diet plan	5 (3.8)	12 (9.2)	34 (26.2)	30 (23.1)	25 (19.2)	14 (10.8)	8 (6.2)	2 (1.5)
Followed healthy eating	4 (3.1)	10 (7.7)	32 (24.6)	30 (23.1)	19 (14.6)	18 (13.8)	10 (7.7)	7 (5.4)
Had 5 or more serving of fruits	12 (9.2)	29 (22.3)	40 (30.8)	25 (19.2)	15 (11.5)	4 (3.1)	4 (3.1)	1 (0.8)
Had high fat foods	24 (18.5)	61 (46.9)	26 (20.0)	7 (5.4)	7 (5.4)	4 (3.1)	0	1 (0.8)
Did 30 minutes of physical activities	42 (32.3)	31 (23.8)	25 (19.2)	15 (11.5)	11 (8.5)	3 (2.3)	2 (1.5)	1 (0.8)
Did high intensity exercises	42 (32.3)	18 (13.8)	43 (33.1)	12 (9.2)	6 (4.6)	6 (4.6)	2 (1.5)	1 (0.8)
Undergone monitoring of blood sugar	43 (33.1)	60 (46.2)	18 (13.8)	4 (3.1)	1 (0.8)	3 (2.3)	1 (0.8)	0
Undergone recommended times blood sugar testing	37 (28.5)	72 (55.4)	11 (8.5)	3 (2.3)	2 (1.5)	1 (0.8)	1 (0.8)	3 (2.3)
Checked their feet	53 (40.8)	33 (25.4)	33 (25.4)	8 (6.2)	1 (0.8)	0	0	2 (1.5)
Inspected the inside of their foot wares	60 (46.2)	31 (23.8)	18 (13.8)	12 (9.2)	1 (0.8)	5 (3.8)	1 (0.8)	2 (1.5)

**Table 4: Association between food score and characteristics of study participants (n=130).**

Characteristics	Food score		$\chi^2$ (p value)
	Lower score	Higher score	
	N (%)	N (%)	
<b>Gender</b>			
Male	29 (22.3)	19 (14.6)	0.780 (0.465)
Female	43 (33.1)	39 (30.0)	
<b>Age group (years)</b>			
<24	1 (0.8)	0	6.108 (0.027)
25-59	26 (20.0)	33 (25.4)	
>60	45 (34.6)	25 (19.2)	
<b>Socioeconomic status</b>			
Upper class	4 (3.1)	0	5.272 (0.257)
Upper middle class	22 (16.9)	24 (18.5)	
Middle class	23 (17.7)	15 (11.5)	
Lower middle class	18 (13.8)	17 (13.1)	
Lower class	5 (3.8)	2 (1.5)	



<b>Family type</b>			
Nuclear	53 (40.8)	30 (23.1)	6.667 (0.011)
Joint	19 (14.6)	28 (21.5)	
Total	72 (55.4)	58 (44.6)	
<b>Family support</b>			
Yes	54 (41.5)	53 (40.8)	5.918 (0.020)
No	18 (13.8)	5 (3.8)	
Total	72 (55.4)	58 (44.6)	
<b>Duration of diabetes mellitus (years)</b>			
1-5	67 (51.5)	50 (38.2)	2.267 (0.287)
6- 10	5 (3.8)	7 (5.4)	
11-15	0	1 (0.8)	

## DISCUSSION

This study was conducted to study the self-care activities among type 2 diabetic patients in rural areas of Srikakulam District, Andhra Pradesh. In our study the majority were female and 53.8% of the participants were above 60 years of age. The mean age of the participants was found to be 57.58±12 years. The majority of the participants were educated until primary (38.5%) with 82.3% being sedentary workers. Most of the participants belonged to upper-middle-class (35.4%), married (96.2%), stayed with their spouse (69.2%). About 63.8% were staying in a nuclear family similar to the census 2011 data of 70% nuclear families in India.

In this study, the majority (90%) of the participants had diabetes mellitus from 1-5 years. In other studies, it was reported as 62%, 57% and 53.6% for having a duration of diabetes of fewer than 5 years.<sup>10-12</sup>

In this study, 43% of the participants had a history of hypertension, followed by arthritis (26.2%) as comorbidities. A similar finding was observed in one study that 43.3% had also hypertension.<sup>13</sup> In a study conducted in Maharashtra, it was 62.3% for hypertension as comorbidity.<sup>12</sup> In another study, it was found that 80% had hypertension and 17.3% had arthritis.<sup>10</sup>

In the present study majority of the participants took oral medications for diabetes (83.8%) and only 13% were on insulin. Similarly, findings were noted in a study that 88% of the participants were on oral hypoglycaemic agents.<sup>10</sup>

About 82.3% had reported that they received family support for the self-care activities in this study. Good family support was found associated with better self-management practices.<sup>11</sup> In a study conducted in Delhi, it was reported that family support was perceived by 90% of the participants.<sup>13</sup>

In this study, 68.5% had reported healthy eating 2-4 times/week. Only 18.5% of the participants reported >5 times/week of healthy eating. It was seen that the majority of the participants followed diet plans only 2-4 times/week (62.3%) and took 5 or more serving of fruits on 2-4 days (61.5%). High-fat foods such as red meat or full-fat dairy products were taken only 0-1 times/week by the majority of the subjects (65.4%). In a study at Mangalore, it was found that 45.9% followed diet plan for all days of the week and 26.2% taken fruits on all days.<sup>14</sup>

In a study conducted in Delhi, it was reported that 30% followed the diet plan on all 7 days and 1.8% for the specific diet.<sup>15</sup> In a study in Vellore, it was found that good dietary practices were present in 29% of participants.<sup>16</sup> In a study in Pune, it was reported that 75.4% followed the diet plan for at least five days a week and 34.8% followed in all days.<sup>12</sup>

The result of this study showed that the physical activity element of self-care activities was followed poorly by the study participants, as only 56.2% of the participants were indulge in 30 minutes of physical activity only 0-1 times/week, followed by 2-4 times/week by 39.2% of the participants. The majority of the participants were indulging in high-intensity exercises like swimming, walking, biking etc., for 0-1 times/week and 2-4 times/week. In a study in Gujarat, it was reported that only 40% were involved in physical exercise in 3 days in a week's time.<sup>17</sup> In a study in Delhi, only 9% practiced physical activity on all 7 days and 39.3% did not practice physical activity for even a single day.<sup>13</sup> In the study from Maharashtra, 29% were not practiced physical activity even for a single day.<sup>12</sup>

Results showed that 33.1% of the participants did not test their blood sugar in the past week. Similar results were observed that 92.3% and 69.5% had not tested even for a single time in other studies.<sup>12,13</sup>

Foot care was found poor among the study participants. Only 1.5% of them checked their feet on all days in the past week. It was reported as 19% and 9% in other similar studies.<sup>16,17</sup> About 40.8% did not check their feet at least once in the past week in this study. It was reported as 56.5% in another study.<sup>12</sup> Footcare was the poor self-care activity reported in a study in Vellore.<sup>16</sup>

It was found that higher food scores were significantly associated with participants living in a joint family (p=0.011) and the availability of family support for self-care activities (p=0.020). Similar findings were seen in the study that a general diet score was higher among diabetic patients who received family support.<sup>13</sup> It was found in a study that of all the family supportive behaviors, the more common were for the diet-related self-care activities.<sup>11</sup>

Higher food scores were significantly associated with the age group of 25-59 years. This may be due to the economically productive nature of the age group.



There was no significant association found between the exercise score and the study variables. But in one study exercise practice was found associated with income and in another study, it was associated with gender and marital status.<sup>13,16</sup>

It was found that testing for blood sugar level at least one time during the previous week was significantly associated with treatment taken from the private sector (p=0.049). There was no association found between testing for blood sugar level at least one time during the previous week and duration of diabetes, history of diabetes among the relatives and availability of family support. In a study in Delhi, blood sugar testing was found associated with younger patients and patients on insulin therapy.<sup>13</sup> In a study in Vellore, it was found associated with higher socioeconomic status and among the married participants.<sup>16</sup>

### Strengths and limitations of this study

This was a community-based cross-sectional study to assess the self-care practices in rural diabetic patients. It provides insights into the diabetic self-management educational activities among the rural community. The limitations of this study are that being a study conducted in rural areas, the results may not be applicable to urban areas where family type, as well as the support from the family members for self-care activities, may be different.

### CONCLUSION

This study shows that among the self-care activities, physical exercise and foot care needs improvement among the diabetic patients. The primary care health workers should emphasize on educating the diabetic patients' education about self-care activities including life style modification. Health education programs involving family members for better self-care activities will improve the management of diabetes.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

### REFERENCES

1. World Health Organisation (WHO). 2016. Global report on Diabetes. Available at: [https://apps.who.int/iris/bitstream/handle/10665/204874/WHO\\_NMH\\_NVI\\_16.3\\_eng.pdf;jsessionid=E4A09E7B2362142C71E456A811F0B6A8?sequenc](https://apps.who.int/iris/bitstream/handle/10665/204874/WHO_NMH_NVI_16.3_eng.pdf;jsessionid=E4A09E7B2362142C71E456A811F0B6A8?sequenc). Accessed on 8 December 2019.
2. Deshpande AD, Harris-Hayes M, Schootman M. Epidemiology of diabetes and diabetes-related complications. *Physical Therapy*. 2008;88(11):1254-64.
3. ICMR Guidelines for management of type 2 Diabetes. 2018. Available at: <https://medibulletin.com/wp-content/uploads/2018/05/ICMR.diabetesGuidelines.2018.pdf>. Accessed on 8 December 2019.
4. Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. Global estimates of diabetes prevalence for 2013 and projections for 2035. *Diab Res Clin Practice*. 2014;103(2):137-49.
5. Alberti KG, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Part

- 1: diagnosis and classification of diabetes mellitus. Provisional report of a WHO consultation. *Diab Med*. 1998;15(7):539-53.
6. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, et al. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: Phase I results of the Indian Council of Medical Research-IndiaDIABetes (ICMR-INDIAB) study. *Diabetologia*. 2011;54(12):3022-7.
7. Chatterjee S, Davies MJ. Current management of diabetes mellitus and future directions in care. *Postgraduate Med J*. 2015;91:612-21.
8. Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. *J Diab Metabol Disorders*. 2013;12(1):14.
9. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes care*. 2000;23(7):943-50.
10. Manobharathi M, Kalyani P, Arulmani A. Factors associated with therapeutic non-compliance among type 2 diabetes mellitus patients in Chidambaram, Tamilnadu, India. *Int J Community Med Public Health*. 2017;4(3):787-91.
11. Ravi S, Kumar S, Gopichandran V. Do supportive family behaviors promote diabetes self-management in resource limited urban settings? A cross sectional study. *BMC Public Health*. 2018;18(1):826.
12. Kushwaha AS, Kumari S, Kushwaha N. Self-care in diabetes: a study amongst diabetics in an urban community. *Int J Community Med Public Health*. 2016;3:293-8.
13. Mohandas A, Bhasin SK, Upadhyay M, Madhu SV. Diabetes self-care activities among adults 20 years and above residing in a resettlement colony in East Delhi. *Indian J Public Health*. 2018;62(2):104.
14. Rajasekharan D, Kulkarni V, Unnikrishnan B, Kumar N, Holla R, Thapar R. Self-care activities among patients with diabetes attending a tertiary care hospital in Mangalore Karnataka, India. *Ann Med Health Sci Res*. 2015;5(1):59-64.
15. Padma K, Bele DS, Bodhare TN, Valsangkar S. Evaluation of knowledge and self-care practices in diabetic patients and their role in disease management. *Natl J Community Med*. 2012;3:3-6.
16. Gopichandran V, Lyndon S, Angel MK, Manayalil BP, Blessy KR, Alex RG, et al. Diabetes self-care activities: a community-based survey in urban southern India. *Natl Med J India*. 2012;25(1):14-7.
17. Raithatha S1, Shankar SU, Dinesh K. Self-Care Practices among Diabetic Patients in Anand District of Gujarat. *ISRN Family Med*. 2014;2014:743-1.