Exploring Self-Care Behaviors in Rural Type 2 Diabetes Patients: A Study in Srikakulam District, Andhra Pradesh

[1]Jada Roopini, [2]Ponnada Sarath Chandra, [3]Paramita Roy, [4]Saptarishi Bose and [5]Sipra Komal Jena

[1]Department of Community Medicine, Great Eastern Medical School, Srikakulam, Andhra Pradesh, India

[2]Great Eastern Medical School, Srikakulam, Andhra Pradesh India

[3]Department of Dental, Great Eastern Medical School, Srikakulam, Andhra Pradesh, India

[4]Department of Community Medicine, Great Eastern Medical School, Srikakulam, India

[5]Department of Community Medicine, GSL Medical College, Rajahmahendravaram, India

ABSTRACT
Diabetes mellitus poses a substantial health challenge globally, particularly in low-and middle-income countries such as India, where its prevalence is rising. This cross-sectional study aimed to evaluate self-care practices among rural type 2 diabetic patients in Srikakulam district, Andhra Pradesh, India. Conducted in the rural field practice area of Great Eastern Medical College, Singupuram, the study enrolled 130 diabetic patients aged 18-80 years, with diabetes duration exceeding one year. Data collection spanned May to June 2023, utilizing a semi-structured interview schedule based on the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. This tool was adapted into Telugu, piloted and administered by trained interviewers to assess demographic characteristics, diabetes history and self-care behaviours encompassing diet, exercise, blood glucose testing, foot care and smoking. The findings revealed a predominantly female participant base (63.1%), with a significant proportion aged over 51 years (46.2%) and predominantly educated up to the primary level (38.5%). Most participants were engaged in sedentary occupations (82.3%) and belonged to the upper-middle socioeconomic class, residing in nuclear families. Diabetes duration was primarily 1-5 years (90%), with prevalent comorbidities including hypertension (43%) and arthritis (26.2%). Self-care practices varied among participants, with notable gaps identified in adherence to dietary recommendations, physical activity levels, blood glucose testing frequency and foot care routines. Statistical analysis highlighted significant associations between better diet scores and younger age groups (25-59 years), living in joint families, and lacking family support for self-care (p<0.05). Notably, regular blood glucose testing was significantly associated with receiving treatment from the private sector (p=0.049). In conclusion, this study underscores critical deficiencies in self-care practices among rural type 2 diabetic patients in Srikakulam district, Andhra Pradesh. Addressing these gaps through targeted educational interventions focusing on lifestyle modifications and enhancing family support is crucial for improving diabetes management in rural settings. Further research should explore these findings in broader contexts and evaluate the efficacy of interventions aimed at enhancing self-care practices among rural diabetic populations.

INTRODUCTION

Diabetes, a serious chronic condition[1], affects millions globally. In 2013, 382 million people had diabetes, with projections reaching 592 million by 2035[2]. India alone is expected to see an increase from 72.9 million diabetics in 2017-134.3 million by 2045[3]. Low-and middle-income countries will experience the most significant rise in diabetes cases over the next two decades[4].

Mainly, There are Two Types of Diabetes: Type 1 (insulin-dependent) and Type 2. Type 1 is an autoimmune condition where the body attacks its pancreas, preventing insulin production. Type 2 involves either insufficient insulin production or insulin resistance[5].

A 2023 study by the Indian Council of Medical Research-India Diabetes (ICMR INDIA) reported an overall weighted prevalence of diabetes by Oral Glucose Tolerance Test (OGTT) of 11.4%[6]. Diabetes is a leading cause of mortality and various morbidities, with diabetics at increased risk of cardiovascular and other conditions[1].

Management of diabetes requires holistic, individualized care based on structured education, self-management and effective glucose-lowering curatives[7]. Self-care activities can significantly impact glycosylated hemoglobin levels[8]. This study aims to assess self-care activities among Type 2 diabetes patients in rural areas of Srikakulam district, Andhra Pradesh.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted in May and June 2023 in the rural field practice area of Great Eastern Medical College, Srikakulam. The study covered three villages: Singupuram, Mamidivalasa and Bagguvanipeta.

The sample size was calculated using a 7.8% frequency of diabetes in rural Andhra Pradesh, with a 5% desired precision and 95% confidence interval. The minimum required sample size was 130, accounting for potential non-responders.

Inclusion criteria were diabetic patients with a duration of more than one year, residing in rural areas of Srikakulam district. Exclusion criteria included patients with less than one year of diabetes, those below 18 or above 80 years of age and those unwilling to participate.

Data was collected through personal interviews using a semi-structured interview schedule. The schedule consisted of two parts: Section A for demographic details and Section B for the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire (revised version)[9]. The SDSCA measure assessed general diet, specific diet, exercise, blood glucose testing, foot care and smoking.

The questionnaire was translated into Telugu and back-translated to English. A pilot study was conducted with 10% of the sample size. For data analysis, SPSS software of version 23 was used. Descriptive statistics, Pearson's Chi-square test and a significance level of $p < 0.05$ were used.

RESULTS AND DISCUSSIONS

In this study, the majority (63.1%) were ladies and 46.2% of the participants were over 51 years of age. The majority of the participants were educated until primary (38.5%), with 82.3% being sedentary workers. The highest number of participants belonged to the upper-middle class. About 95.4% were married, 69.2% were living with their partner, and 63.8% were living in a nuclear family. A majority (71.5%) had no dependence habits and 21.55% were smokers. (Table 1).

The majority of the participants had diabetes mellitus for 1-5 years (90%). Among the study participants, the majority of them (56.9%) did not have diabetes mellitus among their cousins. 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 private hospitals. The majority of the participants took oral specifics for diabetes (83.8%). Only 13% were on insulin. About 82.3% had received support from their family members for self-care conditioning. (Table 2)

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 further servings of fruits on 2-4 days 61.5%). High-fat foods similar as red meat or full-fat dairy products were taken only 0-1 times/ week by the majority of the subjects (65.4%). (Table 3).

About 33.2% of the participants didn't indulge in 30 minutes of physical exertion as well as high-intensity exercises indeed for a single day during the former week. About 33% had not tested their blood sugar position for a single time in the former week. Only 1.5% had checked their bases on all days during the former week. It was established that advanced food scores were significantly associated with the age group of 25-59 years (p=0.027), participants living in a common family (p=0.011) and the vacuity of family support for self-care conditioning (p=0.020). (Table 4). No significant association was found between food scores and gender, social-profitable status and the duration of diabetes. It was set up that testing for blood sugar position at least one time during the former week was significantly associated with treatment taken from the private sector (p=0.049). There was no association set up between testing for blood sugar position at least one time during the

former week and duration of diabetes, history of diabetes among the cousins and vacuity of family support.

Table 1: Distribution of Study Participants According to Socio-Demographic Variables (n=130).

Socio-Demographic Characteristics	Frequency	%
Age group (years)		
<24	1	0.8
25-59	59	45.4
>60	70	53.8
Gender		
Male	48	36.9
Female	82	63.1
Educational status		
Illiterate	39	30.0
Primary	50	38.5
High school	34	26.2
Diploma/higher secondary	6	4.6
Degree	1	0.8
Occupation		
Sedentary	107	82.3
Moderate	20	15.4
Heavy work	3	2.3
Socioeconomic status		
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
Marital status		
Yes	124	95.4
No	6	4.6
Living with spouse		
Yes	108	83.1
No	22	16.9
Family type		
Nuclear	83	63.8
Joint	47	36.2
Addiction		
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	%
Duration of diabetes mellitus (years)		
1-5	117	90.0
6-10	12	9.2
11-15	1	0.8
Diabetes mellitus among relatives		
Yes	56	43.1
No	74	56.9
History of other illness		
Hypertension	56	43.1
Arthritis	34	26.2
Heart diseases	3	2.3
Others	9	6.9
No other illness	28	21.5
Place of treatment		
Government hospitals	105	80.8
Private doctors	24	18.5
No treatment	1	.8
Type of treatment		
Insulin	17	13.1
Oral drugs	109	83.8
Herbal medicines	1	0.8
No medicines	3	2.3
Support from family members for self-care activities		
Yes	107	82.3
No	23	17.7

This study examined self-care activities among type 2 diabetic patients in rural Srikakulam District, Andhra Pradesh. The majority of participants were women, with 53.8% over 60 years old (mean age 57.58±12 years). Most had primary education (38.5%) and were sedentary workers (82.3%). The demographic profile aligned with other studies, including family structure (63.8% nuclear families, similar to the 2011 census data of 70% nuclear families in India).

Disease Characteristics and Comorbidities: The majority (90%) of participants had diabetes for 1-5 years, comparable to other studies reporting 53.6-62% for similar durations[10-12]. Comorbidities included hypertension (43%)[13] and arthritis (26.2%)[10], consistent with findings from other Indian studies. For instance, a Maharashtra study reported 62.3% hypertension prevalence[12], while another study found 80% hypertension and 17.3% arthritis.

Treatment and Family Support: Most participants (83.8%) used oral medications, with only 13% on insulin, aligning with other research reporting 88% on oral hypoglycemic agents[10] . Family support for self-care activities was reported by 82.3% of participants, slightly lower than the 90% observed in a Delhi study[13]. Good family support was associated with better self-management practices[11].

Self-Care Activities

Diet:
- 68.5% reported healthy eating 2-4 times/week.
- 18.5% reported healthy eating >5 times/week.
- 62.3% followed diet plans 2-4 times/week.
- 61.5% consumed 5+ fruit servings 2-4 days/week.
- 65.4% consumed high-fat foods 0-1 times/week.

These dietary patterns differed from other studies. For example, a Mangalore study found 45.9% followed a diet plan daily[14], while a Delhi study reported 30% adherence to daily diet plans[15].

Physical Activity:
- 56.2% engaged in 30 minutes of activity 0-1 times/week.
- 39.2% engaged in activity 2-4 times/week.

This low level of physical activity is consistent with findings from studies in Gujarat (40% exercising 3 days/week)[17] and Delhi (9% daily activity, 39.3% no activity)[13].

Blood Glucose Testing:
- 33.1% did not test in the past week.

This is lower than other studies reporting 69.5-92.3% non-testing rates[12-13].

Foot Care:
- Only 1.5% checked their feet daily.
- 40.8% didn't check their feet weekly.

These rates are lower than other studies reporting

Table 3: Frequency Of Individual Responses For Sdsca Questionnaire Among The Study Participants (n=130).

| | Number of days in a week | | | | | | | |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Item of questionnaire	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).

Food score			
Characteristics	Lower score N (%)	Higher score N (%)	χ2 (p value)
Gender			
Male	29 (22.3)	19 (14.6)	
Female	43 (33.1)	39 (30.0)	0.780 (0.465)
Age group (years)			
<24	1 (0.8)	0	6.108 (0.027)
25-59	26 (20.0)	33 (25.4)	
>60	45 (34.6)	25 (19.2)	
Socioeconomic status			
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)	
Family type			
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)	
Family support			
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)	
Duration of diabetes mellitus (years)			
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)	

9-19% daily foot care and 56.5% weekly foot care in Maharashtra[12].

Significant Associations:
Diet Scores:
- Positively associated with living in a joint family (p=0.011).
- Positively associated with family support for self-care activities (p = 0.020).
- Higher in the 25-59 age group, possibly due to economic productivity.

Exercise:
- No significant associations found with study variables, contrary to some studies reporting associations with income and marital status.

Blood Sugar Testing:
- Significantly associated with treatment from the private sector (p=0.049).

- No associations with diabetes duration, family history, or family support.
- Other studies found associations with younger age, insulin use, higher socioeconomic status and marital status.

Strengths and Limitations: The study's community-based cross-sectional design provides valuable insights into diabetes self-care practices in rural populations. However, findings may not be fully generalizable to urban areas due to potential differences in family structure and support dynamics.

CONCLUSION
This study underscores the critical need for improving self-care activities among diabetic patients in rural Srikakulam district, particularly in physical exercise, blood glucose monitoring and foot care. Given the prevalence of sedentary lifestyles and suboptimal self-care behaviors, primary care health workers

should prioritize patient education on lifestyle modifications and diabetes management.

The significant associations between diet scores, family structure and family support highlight the importance of involving family members in health education programs. This approach can foster better support systems and improve overall self-care practices among diabetic individuals.

Future Interventions Should Focus on:
- Increasing awareness about the importance of regular physical activity.
- Promoting regular blood glucose monitoring.
- Emphasizing the significance of daily foot care.
- Leveraging family support to enhance dietary adherence and overall self-management.

By addressing these key areas and adopting a family-centered approach, healthcare providers can significantly enhance the effectiveness of diabetes management strategies in rural settings, potentially reducing complications and improving quality of life for diabetic patients.

Conflict of Interest: None declared.

Ethical Approval: The study was approved by the Institutional Ethics Committee with reg. no. 07/IEC/GEMS and H/2023 dated:29.03.2023.

REFERENCES

1. Deshpande, A.D., M. Harris-Hayes and M. Schootman, 2008. Epidemiology of diabetes and diabetes-related complications. Phys. Ther., 88: 1254-1264.
2. Guariguata, L., D.R. Whiting, I. Hambleton, J. Beagley, U. Linnenkamp and J.E. Shaw, 2014. Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes. Res. Clin. Pract., 103: 137-149.
3. Alberti KG, Zimmet PZ. 1998. 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., 15: 539-553.
4. Anjana, R.M., R. Unnikrishnan, M. Deepa, R. Pradeepa and N. Tandon,et al., 2023. ICMR-INDIAB Collaborative Study Group Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study. lancet. Diab endo., 11: 474-489.
5. Chatterjee, S. and M.J. Davies, 2015. Current management of diabetes mellitus and future directions in care. Postgraduate Med. J., 91: 612-621.
6. Shrivastava, S.R., P.S. Shrivastava and J. Ramasamy, 2013. Role of self-care in management of diabetes mellitus. J. Diabetes amp Metab. Disord., Vol. 12, No. 1 .10.1186/2251-6581-12-14.
7. Toobert, D.J., S.E. Hampson and R.E. Glasgow, 2000. The summary of diabetes self-care activities measure: Results from 7 studies and a revised scale.. Diabetes Care, 23: 943-950.
8. Manobharathi, M., P. Kalyani and A. Arulmani, 2017. Factors associated with therapeutic non-compliance among type 2 diabetes mellitus patients in chidambaram, tamilnadu, India. Int. J. Of Comm Med. And Pub Health, 4: 787-791.
9. Ravi, S., S. Kumar and V. Gopichandran, 2018. Do supportive family behaviors promote diabetes self-management in resource limited urban settings? a cross sectional study. BMC Public Health, Vol. 18, No. 1 .10.1186/s12889-018-5766-1.
10. Kushwaha, A., S. Kumari and N. Kushwaha, 2016. Self care in diabetes: A study amongst diabetics in an urban community. Int. J. Comm Med. Pub Health, 3: 293-298.
11. Mohandas, A., S. Bhasin, M. Upadhyay and S. Madhu, 2018. Diabetes self care activities among adults 20 years and above residing in a resettlement colony in east delhi. Indian J. Public Health, 62: 104-110.
12. Kulkarni, V., B. Unnikrishnan, N. Kumar, R. Holla, R. Thapar and D. Rajasekharan, 2015. Self-care activities among patients with diabetes attending a tertiary care hospital in mangalore karnataka, India. Ann. Med. Health Sci. Res., 5: 59-64.
13. Padma, K., D.S. Bele, T.N. Bodhare and S. Valsangkar, 2012. Evaluation of knowledge and self-care practices in diabetic patients and their role in disease management. Natl J Community Med., 3: 3-6.
14. Gopichandran, V., S. Lyndon, M.K. Angel, B.P. Manayalil and K.R. Blessy,et al., 2012. Diabetes self-care activities: a community-based survey in urban southern India. Natl Med J India., 25: 14-17.
15. Raithatha, S.J., S.U. Shankar and K. Dinesh, 2014. Self-care practices among diabetic patients in anand district of gujarat. ISRN Family Med., 2014: 1-6.