

A Study on Assessment of Level of Self-Care Practices among Known Type 2 Diabetes Patients in Rural Field Practice Area of South India

Chittooru Chandra Sekhar, Darivemula Surendra Babu, Gorantla Anand Krishna, Chittem Sravana Deepthi, Jawahar Basha Kalluri

ABSTRACT

Background: Self-care in diabetes has been defined as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context. **Methodology:** A community based cross-sectional study was conducted with the objective to assess the level of self-care among known type-2 diabetes patients in rural field practice area. A total of 727 patients were involved and predesigned, pretested and semi structured questionnaire developed by referring the Summary of diabetes self-care activities measure (SDSCA), Diabetes self-management questionnaire (DSMQ) and patient health questionnaire-2 was used for the study. Data entry was made in Microsoft excel and analysis was done using the SPSS statistics 20.0 version. Results were expressed in proportions and percentages and appropriate statistical tests was applied to see the association. **Results:** A total of 727 known diabetes patients were participated, out of which 298 (40.9%) were males and 429 (59.1%) were females. With respect to self-care activities variables in diet modification except intake of fried foods, binge eating and skipping of the meals, good physical activity, drug adherence and some variables in problem solving are having good influence over glycemic control with P value <0.05 . Frequency of glucose monitoring, variables in risk reduction except stopping smoking and alcohol and healthy coping were not influencing the glucose levels and it was not significant statistically. **Conclusion:** Self-care activities such as eating green leafy vegetables and fruits frequently, occasional consumption of meat, strict restriction of sweets and consuming salt restricted diet will have positive influence over glycemic control. **Key words:** Self-care, Diabetes mellitus, Knowledge, Practices, Rural.

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INTRODUCTION

Self-care of diabetes is essential for control of disease and improvement of quality of patients' life. Earlier patient education was generally prescriptive (e.g., "Do as I say.") and therapeutic goals were set by health professionals.¹ Self-care in diabetes has been defined as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context.² According to International diabetes federation, South-East Asia is home to one fifth (19%) of the total number of people with diabetes in the world. The prevalence of diabetes in India by 2017 is 8.8% and expected to be 11.4% by 2045 in 20–79 years of age.³ Diabetes is a lifelong disease with a variety of complications, an adequate control over blood sugars would delay the onset of diabetes complications and help to lead a better quality of life.⁴ It is believed that appropriate patient knowledge of self-care is the key to achieving therapeutic goals in ambulatory care, because the vast majority of day-to-day care in dia-

betes is handled by patients and/or families.⁵ Health education can be given to improve the self-care practices among diabetes patients. But education can be effective only if we first understand the knowledge and practices of the patient with regard to the disease, complications and its management.

MATERIALS AND METHODS

A Community based Cross-Sectional Study was conducted in rural field practice area of Parla under Department of Community Medicine from November 2017 to April 2018. The objective of the study was to know the level of self-care among known diabetes patients in rural field practice area. A total of 11 villages were present under Parla Primary Health Centre and based on the records from Primary Health Centre a total of 786 diabetic individuals were present in the study area. An attempt was made to trace all the 786 diabetic individuals. Figure 1 showing the flow of participants involved. Amongst them 15 individuals

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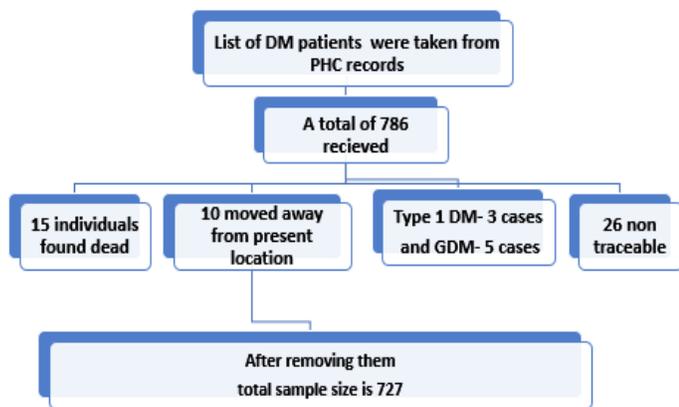


Figure 1: Flow of participants.

were found to be dead during the time of the study, 26 were non traceable, 10 moved away from present location and 10 were not willing to participate. So, the final sample size of the study was 727. Participation information sheet was given and Informed consent was taken from the study participants. All the cases of diabetes were included irrespective of the complications. Newly diagnosed cases of diabetes mellitus after the survey period were excluded. Study subjects were identified with the help of Health assistants and local people and interviewed at their houses with a Predesigned and Pre-tested semi structured questionnaire. Patients with HbA_{1c} less than 7%, were considered to meet the criteria of glycemic control.⁶

Predesigned and pretested semi-structured questionnaire consisting of demographic and socioeconomic parameters, behavioral aspects like alcohol, tobacco use and knowledge and practice of self-care activities. The self-care practices among the participants were studied in the seven domains namely Diet modification, Physical activity, Glucose monitoring, Drug adherence, Problem solving, Risk reduction and Healthy coping recommended by the American Association of Diabetes Educators (AADE) known as the “AADE 7 measures of outcome measurement”.⁷ Questions related to knowledge and practice of self-care activities were derived by referring the various scales like “Summary of diabetes self-care activities measure⁸ (SDSCA),” “Diabetes self-management questionnaire⁹ (DSMQ),” and patient health questionnaire-2.¹⁰ We translated the questionnaire in to Telugu for easy interview in the local language of the people and for analyzing the English version was used. We conducted a pilot survey on the questionnaire for the validation of the instrument. Institutional ethical committee clearance was obtained before the start of the study. Data entry was made in Microsoft excel and analysis was done with SPSS statistics 21.0 version. Results were expressed in proportions and percentages and statistical tests like chi-square was applied to see the association of different variables on the influence of glycemic control.

RESULTS

A total of 727 known diabetes patients were participated in the study, out of them 298 (40.9%) were males and 429 (59.1%) were females respectively. In Table 1 more than half 435 (59.8%) of the participants were belongs to more than 50 to 69 years, followed by 224 (30.8%) were belongs to less than 50 years and only 68 (9.3%) were belongs to more than 70 years. Majority 471 (64.7%) of them were belongs to Hindu religion followed by 157 (21.5%) and remaining 99 (13.6%) were Muslims. Nearly half 354 (48.6%) of the participants were illiterates and the remaining 373 (51.4%) had completed at least their primary education. Almost all 705 (96.9%) were living in the nuclear family and only 22 (3.1%) were living in the joint family. More than half 474 (65.2%) were belongs to

Table 1: Distribution of participants according to their socio-demographic variables.

Variable	HbA _{1c}	
	<7% (n=419)	≥7% (n=308)
Age (Completed Years)		
<50 years	146 (65.2)	78 (34.8)
50-59 years	136 (59.9)	91 (40.1)
60-69 years	104 (50.0)	104 (50.0)
≥70 years	33 (48.5)	35 (51.5)
Gender		
Male	166 (55.7)	132 (44.3)
Female	253 (59.0)	176 (41.0)
Religion		
Hindu	281 (59.7)	190 (40.3)
Muslim	66 (66.7)	33 (33.3)
Christian	72 (45.9)	85 (54.1)
Family type		
Nuclear	410(58.2)	295(41.8)
Joint	9(40.9)	13(59.1)
Socio-economic status		
Upper class	18(81.8)	4(18.2)
Upper middle class	65(53.3)	57(46.7)
Middle class	120(59.1)	83(40.9)
Lower middle class	206(57.1)	155(42.9)
Lower class	10(52.6)	9(47.4)
Marital status		
Married	306 (58.3)	219 (41.7)
Widow/Separated	113 (55.9)	89 (44.1)
Family history of DM		
Yes	288(54.8)	238(45.2)
No	131(65.2)	70(34.8)
History of Hypertension		
Yes	178(46.2)	207(53.8)
No	241(70.5)	101(29.5)
Duration of Diabetes		
≤5 Years	248(58.4)	177(41.6)
>5 Years	171(56.6)	131(43.4)
Facility sought for medical care		
Government	339(58.7)	239(41.3%)
Private	80(53.7)	69(46.3%)

below middle class and only 144 (19.8%) were belongs to upper and upper middle socio-economic class. More than three fourth 526 (72.3%) of the participants were had the family history of diabetes and 425 (58.4%) were had more than five years duration of diabetes. Majority 578 (79.5%) of them were taking treatment at the government hospitals for the diabetes and rest 149 (21.5%) were going to private clinics/hospitals for the treatment.

Table 2a showing the influence of self-care activities on glycemic control. On assessing the diet pattern of the patients, it was showing that frequency of intake of green leafy vegetables and fruits have positive influence over the glycemic control among the patients ($p<0.05$; significant). Intake of meat occasionally, restriction of sweets completely and controlled use of salt in the food making them better glycemic control.

Table 2a: Influence of self-care activities on Glycemic control.

Variable	HbA _{1c}		Chi-square value	P value
	<7% (n=419)	≥7% (n=308)		
a. Diet modification and physical activity				
1. Diet modification				
1.1 Frequency of intake of green leafy vegetables				
Occasionally	15 (34.9)		10.18	0.006; S
1 - 3 days per week	158 (57.5)	28 (65.1)		
≥3 days per week	246 (60.1)	117 (42.5)		
1.2 Frequency of intake of fruits				
Not at all	25(39.1)	39(60.9)	13.03	0.005; S
Occasionally	196(58)	142(42)		
Less frequently (1 to 2 times per week)	167(59.2)	115(40.8)		
Frequently (≥ 3 times per week)	31(72.1)	12(27.9)		
1.3 Frequency of intake of meat				
Not at all	84(51.5)	79(48.5)	20.223	<0.001; S
Occasionally	158(68.7)	72(31.3)		
Less frequently (1 to 2 times per week)	150(55.4)	121(44.6)		
Frequently (≥ 3 times per week)	27(42.9)	36(57.1)		
1.4 Frequency of intake of Sweets				
Not at all	172 (62.1)	105 (37.9)	15.25	0.002; S
Occasionally	196 (59)	136 (41)		
Frequently (≥1 time per week)	51 (43.2)	67 (56.8)		
1.5 Frequency of intake of fried foods				
Not at all	159 (62.6)	95 (37.4)	4.14	0.126; NS
Occasionally	227 (55.4)	183 (44.6)		
Frequently (≥1 time per week)	33 (52.4)	30 (47.6)		
1.6 Frequency of binge eating				
Not at all	201 (59.5)	137 (40.5)	1.403	0.496; NS
Occasionally	216 (56.3)	168 (43.7)		
Frequently (≥1 time per week)	2 (40)	3 (60)		
1.7 Frequency of skipping the meal				
Not at all	166(57.2)	124(42.8)	6.085	0.193; NS
Occasionally	126(55.3)	102(44.7)		
Once a week	85(65.9)	44(34.1)		
Frequently (≥ 2 times per week)	42(52.5)	38(47.5)		
1.8 Taking salt restricted diet				
Yes	256(60.7)	166(39.3)	3.78	0.049; S
No	163(53.4)	142(46.6)		
2. Physical activity				
2.1 Doing regular physical activity				

Yes	250(65.8)	130(34.2)	21.68	<0.001; S
No	169(48.7)	178(51.3)		
2.2 Duration of physical activity per day				
≥ 30 mins	152(69.7)	66(30.3)	3.519	0.06; NS
< 30 mins	98(60.5)	64(39.5)		
None	169(48.7)	178(51.3)		

Table 2b: Glucose monitoring, Drug adherence and problem solving.

Variable	HbA _{1c}		Chi-square value	P value
	<7% (n=419)	≥7% (n=308)		
3. Glucose Monitoring				
3.1 Frequency of glucose monitoring				
Once a month	230(57.4)	171(42.6)	0.054	0.973; NS
Every three months	99(57.6)	73(42.4)		
Very rare	90(58.4)	64(41.6)		
3.2 Monitoring of blood glucose in illness				
Yes	97 (70.3)	41 (29.7)	11.17	0.01; S
No	322(54.7)	267(45.3)		
4. Drug adherence				
4.1 Adhered to the drugs prescribed				
Yes	296(65.9)	153(34.1)	33.05	<0.001; S
No	123(44.2)	155(55.8)		
5. Problem solving				
5.1 Experienced any episode of fainting attacks				
Yes	196(53)	174(47)	6.70	0.01; S
No	223(62.5)	134(37.5)		
5.2 Frequency of fainting attacks				
Not at all	223(62.5)	134(37.5)	7.27	0.03; S
Occasionally	188(53.4)	164(46.6)		
Frequently (≥1 episode per week)	8(44.4)	10 (55.6)		
5.3 Tackling hyperglycemia state				
Consult doctor	152(55.5)	122(44.5)	4.37	0.112; NS
Adjust own	77(66.4)	39(33.6)		
Nothing done	190(56.4)	147(43.6)		

S = Significant (p<0.05); NS = Not Significant (p>0.05)

(p<0.05; significant) Consuming fried foods, binge eating and skipping the meal has no influence over the glycemic control among the patients. (p>0.05; Not significant). On assessing the physical activity pattern of the patients, it is showing that doing regular physical activity will make them better control over blood glucose level. (p<0.05; significant) But the duration of physical activity has no influence over the glycemic control. (p>0.05; Not significant).

The glucose monitoring activity (Table 2b) among the patients, it was shown that frequency of glucose monitoring and monitoring in illness episodes had no influence over glycemic control. (p>0.05; Not significant). On assessing the drug adherence among the patients, it was showing that glycemic control was better in patients who consume prescribed drugs regularly (p<0.05; significant). Out of 278 (38.2%) patients who are skipping the drugs, 145 (52.2%) patients were skips the doses because of busy work, 108 (38.8%) misses because to carry during travel, 16 (5.8%)

Table 2c: Risk reduction and Healthy coping.

Variable	HbA _{1c}		P value	
	<7% (n=419)	≥7% (n=308)		
6. Risk reduction				
6.1 Will check feet regularly for the injuries				
Yes	287(58.2)	206(41.8)	0.212	0.65; NS
No	132(56.4)	102(43.6)		
6.2 Will they consult doctor for injuries over the foot				
Yes	254(56.9)	192(43.1)	0.221	0.64; NS
No	165(58.7)	116(41.3)		
6.3 Stopped smoking and drinking				
Yes	114(66.3)	58(33.7)	12.3	0.002; S
No	27(41.5)	38(58.5)		
7. Healthy Coping				
7.1 Experienced any episode of depression or lack of interest in doing things				
Yes	91 (58.7)	64(41.29)	0.09	0.76; NS
No	328 (57.3)	244 (42.6)		

are skips because of delay in getting the medicines from medical shop or 104 services, 2 (0.7%) patients by drug reactions and 7 (2.5%) patients by other reasons.

On assessing the problem-solving skills among the patients, it was shown that significantly more number of patients without any fainting attacks has better glycemic control and also patients who experienced fainting attacks occasionally has better glycemic control than patients having at least one episode of fainting attack per week ($p < 0.05$; significant). Out of 727 known diabetes patients, 241 (33.15%) patients was carrying sugar or candy and 486 (66.85%) patients were not carrying sugar packets to tackle hypoglycemic episodes if any. Tackling hyperglycemic states by adjusting drugs or consulting doctor will not cause better glycemic control than doing nothing. ($p > 0.05$; Not significant). Table 2c on assessing the risk reduction behavior among the patients, it was showing that significantly a greater number of patients who quit the smoking and drinking has better glycemic control than patients who still continuing smoking and drinking. ($p < 0.05$; significant) on the other hand, checking the foot regularly for any injuries and taking medical attention for that will not affect the glycemic status of the patient. ($p > 0.05$; Not significant). On assessing the Healthy coping behavior among the patients, only 155 (21.3%) patients have episodes of depression or lack of interest in doing things. But this will not influence the glycemic control among the patients. ($p > 0.05$; Not significant).

DISCUSSION

The present study was conducted to assess the level of self-care among 727 type 2 diabetes mellitus patients, in which 419 (57.6%) patients were showing glycemic control with HbA_{1c} ≤ 7% and the remaining 308 (42.4%) patients has HbA_{1c} > 7%. Similarly, in a study done by Junling Gao et al.¹¹ 52.7% of participants achieved the glycemic control target. More than three fourth 526 (72.3%) of the participants had the family history of diabetes less than the reported frequency (44.2%) of Syamsundar et al.¹² and similar findings like 52.6% of the patients were suffering with hypertension along with diabetes mellitus. In the present study 56.3% of the patients consuming green leafy vegetables frequent-

ly, amongst them 60.1% had achieved glycemic control, which was low compared to the study done by D. Rajasekharan et al. (26.2%)¹³ and V. Gopichandran et al. (44%)¹⁴ among them 72.1% had shown controlled glucose levels. The World Health Organization (WHO) recommends a minimum intake of 400 g of fruit and vegetables per day. Adequate intake of fruits and vegetables not only helps in better control of blood sugar levels but also keeps at bay complications such as cardiovascular diseases, stroke, gastrointestinal tumors etc.¹⁵ More than half (54.1%) of the patients were consuming meat occasionally or not at all, in which 57.8% had shown controlled glucose levels. Almost 83.8% of them restricted sweets completely, among them 60.4% showed controlled glucose levels which was nearly similar to the findings of V. Gopichandran et al.¹⁴ (75%) and Muninarayana et al.¹⁶ (93.5%). Majority of the study subjects (91.33%) reported restricted consumption of fried food or energy dense substances, which was almost similar to the findings done by different Indian authors at different settings.^{13,14,16}

The present study showed around 52.3% diabetes patients were doing regular physical activity, in which significantly more number (65.8%) of patients achieved glycemic control. Studies from India by Suguna et al.¹⁷ (45.5%), Rajasekharan et al.¹³ (43.4%) and Suman Saurabh et al.¹⁸ (45.6%) also reported little less in achieving the glycemic control after regular physical exercise. It was the mixture of regularity and duration in doing exercise per day makes the better glycemic control than duration alone (P value > 0.05). In the present study, around 55.2% of the patients would check blood sugar levels at least once in a month, among them only 57.4% had shown good glycemic control. A facility-based study done by A. Suguna et al.¹⁷ in which monitoring blood sugar regularly on weekly basis had better glycemic control. ($p < 0.01$). It was reported that 61.8% of the patients will consume medicines prescribed to them regularly without fail and they also have better glycemic control (65.9%) than patients who skip the drugs (44.2%). ($p < 0.05$; significant) Rajasekharan et al.¹³ reported similar percentage of drug adherence (adherence to insulin was 66.9% and to oral hypoglycemic drugs was 60.5%), but studies done by V. Gopichandran et al.¹⁴ (79.8%) and Prateek Saurabh Shrivastava et al.¹⁹ (72%) reported high percentage of drug adherence. This difference could be due to the fact that patients in their study were receiving free medical care and drugs whereas patients in the current study may have had to pay for their treatment.

Present study reporting that 50.9% of the patients were experiencing at least one episode of fainting attack and are having poor glycemic control (53%) than other patients without any attack of fainting (62.5%). ($p < 0.05$; significant) Around 46.4% of the patients would not take any measures in hyperglycemic state and this behavior will not have influence over glycemic control. ($p > 0.05$; Not significant) It was revealed that only 33.2% subjects would carry sugar packets or chocolates to tackle hypoglycemic state, as most of the study subjects hardly move out of their homes. But in a study done by Swetha. T et al.²⁰ (80.9%) patients carrying sugar packets was high and in Syamsundar JR et al.¹² (20%) study it was less.

In the current study, 67.8% patients would check feet regularly for injuries and 61.4% patients will seek medical attention if they had any injury over the foot. This is almost similar to another study by Suman Saurabh et al.¹⁸ (52.4%), but lower in other studies by D. Rajasekharan¹³ et al. (28.3%) and A. Suguna¹⁷ et al. (4%) which are facility-based studies. In the present study 32.6% of the patients smoke cigarettes or consume alcohol, but 72.6% patients had stopped after they diagnosed as having diabetes. Among them 66.3% had achieved glycemic control, which is statistically significant. ($p < 0.05$; significant) Similar findings were reported in a community-based study by Muninarayana et al.¹⁶ (67.7% of the diabetes patients had stopped smoking) and in a hospital based cross sectional study by Padma K et al.²¹ (62.39% of the patients achieved glycemic control after quitting smoking or alcohol consumption). In the

present study, only 21.3% of the patients had experienced episodes of depression or lack of interest in doing things. This is more compared to another community-based study done by Syamsundar JR *et al.*¹² (10%) in which a smaller number of patients with duration of diabetes more than 5 years. In the present study it was reported that these episodes will not influence the glycemic control. ($p > 0.05$; Not significant)

Strengths and limitations

The instrument was designed and used to comprehensively measure the self-care practices among diabetic patients. The limitation of the study was that, we had involved only type 2 diabetes mellitus not the Type-1 and gestational diabetes patients for the assessment of self-care practices. We can't generalize the findings to all type of diabetes. One more limitation is that the blood sugar values that have been obtained for this study are not done by the author. The last blood sugar values done by the patient at different times have been taken for this study.

CONCLUSION

To prevent diabetes related morbidity and disability, there is an immense need of dedicated self-care behaviors in multiple domains, including food choices, physical activity, proper medications intake and blood glucose monitoring from the patients. The study revealed that good self-care activities such as dietary habits will have positive influence over glycemic control. Similarly, other domains such as doing regular physical activity, monitoring blood glucose levels in illness and not experiencing any fainting attacks will also have positive influence over glycemic control. The foot care and healthy coping domains have poor influence over glycemic control. The deficiencies identified in the self-care practices suggest a direct need to develop and integrate diabetes self-care education programs in routine clinical practice.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

T2DM: Type 2 Diabetes mellitus; **SDSCA:** Summary of diabetes self-care activities measure; **DSMQ:** Diabetes self-management questionnaire; **HbA_{1c}:** Glycated hemoglobin.

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