Assessment of Self-Care Practices among Type 2 Diabetes Mellitus Patients attending Health Care Centres of Urban Area of Hyderabad, India

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Abstract:

Introduction: As per the International Diabetic Federation Atlas, 2021, 3 in 4 adults with type 2 diabetes mellitus live in low and middle income countries. This represents a tremendous burden on the healthcare system of these countries. Self-care practices can mitigate the disease burden. **Objective:** To assess the self-care practices among the type 2 diabetic patients using Summary of Diabetes Self-Care Activities (SDSCA). **Method:** A facility based cross sectional study was undertaken among adults aged 25-60 years using a modified SDSCA, validated in Indian settings to study the self-care practices in diabetic patients. The modified domains included practices on dietary modifications, regular physical activity, foot care, regular blood glucose monitoring, drug adherence and addictions. Mean scores of these domains in SDSCA were compared with HbA1c measurements. Statistical tests performed included unpaired t-test and chi-square. **Results:** Mean age of the patients was 49.60+ 11.13 Years. There were about 117 (54.4%) patients with controlled HbA1c measurements. There was a statistically significant association of dietary modifications, regular physical activity, foot care, drug adherence and addictions with controlled HbA1c measurements. (p value=0.05). **Conclusion:** Self-care practices can significantly alter diabetes control and prevent complications. Regular glucose monitoring was lacking in several patients and led to poor glycemic controls. These results can inform clinical practice and patient care for better management of the type 2 diabetes mellitus.

Keywords: Summary of Diabetes Self-Care Activities (SDSCA), Self-care practices, Type 2 Diabetes Mellitus

Introduction:

Type 2 Diabetes mellitus is a lifestyle disorder resulting due to insulin resistance and this is precipitated by improper lifestyle practices like intake of high carbohydrates rich diet, reduced intake of fruits and vegetables, lack of adequate exercise and physical activity.[1] In the current Indian scenario, an estimated 8.7% diabetic population is present between the age group of 20 and 70 years.[2] Diabetes is related to many life threatening complications such as coronary heart disease, stroke, diabetic foot and chronic renal failure.[3] Based on reports, the average monthly expenditure per person for all of India is $1,098.25, or $13,179 per person per year.[4]

Simple carbohydrate variants are the staple food of Indians which are consumed in higher proportion. Urbanization and globalization are causing a nutrition and lifestyle transition, thereby increasing the prevalence rate of Diabetes Mellitus in the country. Other risk factors such as alcohol, smoking, and obesity also contribute to the increased prevalence.[5] It is a chronic disease that impacts at physical and physiological level. Hence, diabetes requires a multi modular approach for management

which includes lifestyle modification, self-care, medication and follow-up. These self-care practices play an important role in the control of the disease and also reduces the incidence of complications.

Various studies have reported that by adherence to self-care practices, diabetes associated complications can be reduced.[6,7] Self-care practices are the habits taken up by the individual and the family members (who are or at risk of developing diabetes) in order to manage the disease on their own.[8] The effectiveness of diabetic control depends mainly upon the selfcare followed by the individual and support from the family members. These self-care practices include diet modification, regular physical activity, foot care, compliance to medications and periodic blood sugar levels check-up. These factors were found to have an association with good glycemic control. It is also necessary for the patient to have proper knowledge to carry out these self-care practices in a systematic manner to improve the blood sugar level. The current study aims to assess self-care practices measured by a modified Summary of Diabetes Self-Care Activities (SDSCA) and the association of these practices with Hb1AC measurements.

Method:

A facility based cross sectional study was conducted in the two urban health centers attached to a medical college in Hyderabad in the month of January 2023 to March 2023. The centers were selected based on convenience sampling considering cost and accessibility reasons.

The population selected was adults aged between 16-80 years and diagnosed with type 2 diabetes mellitus for more than 1 year. Systematic random sampling was employed and every third patient attending the OPD and meeting the study criteria was included for the study. Those with type 1 diabetes mellitus, women with gestational diabetes, lactating women, chronically ill and bed ridden patients were excluded from the study.

Sample size was calculated considering the formulae $4pq/l^2$; prevalence of self-care practices as 78% and 6% as absolute precision. The sample size was estimated to be 191 and rounded off to 215 with addition of 10% non-response rate.[9]

Institutional ethical committee clearance and informed written consent was obtained from patients before the study was undertaken. Subjects were interviewed with the use of a pretested and semi- structured questionnaire consisting of socio-demographic variables, and duration of diabetes. Following the OPD visit, a trained medical intern verbally administered the questionnaire and recorded the responses. This was later transcribed electronically. A modified SDSCA questionnaire, validated in Indian settings was used.[10, 11] The instrument was translated into the local Telugu language. The Telugu version was back translated and tested in a small group to ensure validity. This questionnaire checks the frequency with which diabetics have followed the prescribed self-care practices in the last 7 days. In total, five domains were studied which included the dietary domain covering a total of five items, namely, frequency of avoiding sweets, frequency of consuming fat-rich foods, having snacks during the mid-lunch and evening periods, restricting the quantity of cereals consumed, and consumption of fruits and vegetables. Similarly, foot care covered five items: Soaking of feet, inspecting sandals/shoes every day, washing of feet, drying of feet in between the toes and inspection of feet every day. The physical activity domain covered two items of work related and leisure-time physical activity. Adherence to medication measures covered one item (consumption of prescribed oral hypoglycemic agents). The glucose monitoring domain covered two items, how frequently the patient monitored blood glucose and how often the care taker recommended glucose monitoring. Self-care practices under each item were scored between 0 (none of the days in a week) to 7 (all 7 days were followed).

Domains were scored as per the prescribed scoring for the modified SDSCA by Selvaraj et al. [12] All items were positively scored except consumption of fat-rich items in the dietary domain and soaking of feet in the foot care domain. Reverse scoring was done for the two items mentioned above. In the dietary domain, appropriate self-care was ascertained if the patient had followed the self-care measures more than 75% of the time in a week. A cumulative score was calculated from all five items

and was converted to percentage. Similarly, for foot care the same definitions were followed, however the cut off was reduced to 20% based on the local context. The exercise domain was defined as satisfactory if the patient had followed at least 6 days of leisure-time or work-related physical activity. Adherence was measured as following prescribed medications on at least 6 days of the week. Glucose monitoring was considered satisfactory if the patient followed the recommendations given by their care provider.

Each participant's glycemic status in the last 3 months was also reviewed by measuring HbA1C using standardized method and quality assured laboratory attached to the centers. A value of HbA1c lesser than 7% was considered as a controlled measurement for glycemic status.[12]

Data entry was done and analyzed using Microsoft excel 2019. Descriptive statistics such as mean [standard deviation(SD)] and percentages were used for continuous and categorical variables, respectively. Domains of the SDSCA were compared using unpaired t test and chi-square test with the HbA1c measurements as a categorical variable. A p value less than 0.05 was considered as statistically significant.

Results:

The current study included 215 participants with the mean age of 49.60 ± 11.13 years. Among the study population, males were 112 (52.09%) and females were 103(47.9%). Most of them were Hindus (78.6%), followed by Muslims (13.48%) and Christians (7.9%). Mean duration of type 2 diabetes in the study population was 7.41 ± 6.81 yrs. (Table 1)

Table 1: Socio-demographic variables of study participants (N = 215)

Socio-demographic Variables	n(%)
Age (Years)	
< 30	11 (5.12%)
30-40	37 (17.21%)
40-50	61 (28.37%)
50-60	67 (31.16%)
> 60	39 (18.14%)
Gender	
Male	112 (52.09%)
Female	103 (47.9%)
Religion	
Hindu	169 (78.6%)
Muslim	29 (13.48%)
Christian	17 (7.9%)
Mean duration of diabetes	**7.41± 6.81yrs**

Table 2: Assessment of mean scores on SDSCA domains and their association with HbA1c measurements (N = 215)

Domains of SDSCA	Controlled HbA1c(<7) (N = 117)	Uncontrolled HbA1c ($\geq$7) (N = 98)	t value	p value
Diet	22.9 ± 6.2	16.6 ± 7.68	37.695	0.0001
Physical activity	9.85 ± 3.93	8 ± 4.33	29.24	0.0001
Glucose monitoring	4.35 ± 3.3	4.52 ± 3.12	17.508	0.0001
Foot care	28.2 ± 11.2	23.1 ± 12.1	31.22	0.0001
Drug adherence	6.71 ± 0.965	6.37 ± 1.34	69.63	0.0001

Out of 215 study population, 117(54.4%) were having controlled Hb1Ac values(<7) and 98(45.5%) were having uncontrolled Hb1Ac values($\geq$7).

Among the various domains of self -care practices using SDSCA, on unpaired t test, the dietary practices, physical activity, foot care measures, glucose monitoring and drug adherence were found to be statistically significant with the controlled glycemic status of HbA1c <7.(Table 2)

Smoking was significantly associated with poor HbA1C control. (Table 3) The five domains of SDSCA, diet, physical activity, glucose monitoring, foot care and drug adherence were classified into satisfactory and unsatisfactory based on the cut offs defined in the methodology. Cross tabulation across the domains and control of HbA1C is depicted in Table 4. On the diet domain, 47% of the people with unsatisfactory diet had uncontrolled HbA1C. On the physical activity domain, 29% of the people with unsatisfactory physical activity had uncontrolled HbA1C while 17% of the people with satisfactory physical activity had uncontrolled HbA1C. Similarly, in foot care and glucose monitoring domains, the association between good foot care and good glucose monitoring was significant for achieving good HbA1C control. P values were significant for the four domains of diet, physical activity, glucose monitoring and foot care. P value was not significant for drug adherence as over 88% of the people were already having good adherence to medication.

Table 3: Association between smoking and HbA1c control (N = 215)

Smoking	Controlled Hb1Ac(<7)	Uncontrolled Hb1Ac($\geq$7)	Chi-square	p value
Yes	9 (4.19%)	108 (50.23%)	19.942	0.0001
No	32 (14.88%)	66 (30.7%)		

Table 4: Association between domains of SDSCA and HbA1c Control (N = 215)

Domains of SDSCA	Controlled HbA1c(<7) n (%)	Uncontrolled HbA1c ($\geq$7) n (%)	Chi square value	p value
Diet				
Not satisfactory	79 (36.74%)	92 (42.79%)	22.75	< 0.001
Satisfactory	38 (17.67%)	6 (2.79%)		
Physical activity				
Not satisfactory	56 (26.05%)	62 (28.84%)	5.1	0.023
Satisfactory	61 (28.37%)	36 (16.74%)		
Glucose monitoring				
Not satisfactory	95 (44.19%)	64 (29.77%)	6.991	0.008
Satisfactory	22 (10.23%)	34 (15.81%)		
Foot care				
Not satisfactory	34 (15.81%)	42 (19.53%)	4.44	0.035
Satisfactory	83 (38.60%)	56 (26.05%)		
Drug adherence				
Not satisfactory	11 (5.12%)	15 (6.98%)	1.74	0.19
Satisfactory	106 (49.30%)	83 (38.60%)		

Discussion:

This cross-sectional study was conducted in two urban health centers of Hyderabad focusing on self-care practices among type 2 diabetes mellitus patients. In the current study, mean age of population was 49.60 ± 11.13 years, males were 52% and females (48%). Most of them belonged to lower middle class and mean duration of diabetes was 7.41±6.81years. About 24.8% had coexisting hypertension and 32.4% had other co-morbidities. Controlled HbA1c measurements were found among 54.4% of the patients.

Higher means domain scores in the modified SDSCA were obtained on the domains of dietary modifications, physical activity, foot care practices, glucose monitoring and drug adherence in patients with controlled HbA1c measurements. The association was statistically significant. Smoking was statistically significant among those having uncontrolled HbA1c measurements.

In consistency with current study findings, Molalign Takele in their multi centric study from regional states of Ethiopia found the mean age of patients as 46±14.6 years and mean duration of diabetes was 6±4.36 years. About 46.7% of the participants had followed the self-care practices. The highest SDSCA domain score was in foot care practices in concordance to the current study. Similarly, the lowest domain score was in regular blood sugar checking.[13] This may be due to non-availability of the personal glucose monitoring machines and also regular access for checking the parameters.

A study conducted in Puducherry by kalaiselvi Selvaraj et al noted the mean (SD) age of patients was 57 (11.1)years, males (17.9%) and females (82.1%). According to the modified Kuppuswamy scale, majority of them (66%) belonged to the lower middle class. Only one third of the patients followed self-care practices satisfactorily in the diet and exercise domains. The lowest domain score was in foot care practices.[12] This foot care practices score was similar to the current study which could be explained by the existing knowledge and awareness of the patients on foot care.

Another study conducted by Karthik RC in the rural area of Kancheepuram found their patients (78.8%) belonged to more than 50 years age group. More than half of them, (62%) had been diagnosed with the disease of duration greater than 5 years. The authors have categorized the SDSCA domain scores as satisfactory and unsatisfactory. The highest satisfactory score was found with regular blood sugar checkups, followed by medication adherence, dietary modifications, practicing physical exercise and the least with foot care practices.[14]

Wajid Syed in their study among outpatients of Warangal city in Telangana found statistically significant SDSCA domain scores related to physical activity and adherence to medication with controlled HbA1c measurements (Hb1Ac of value ≤7.5).[15] This variation can be explained by the discrepancies in the cut off values for the HbA1c measurements being established by different authors in their studies.

The limitations of the study is that it cannot be generalized for all types of diabetes as self- care practices as type1 DM and gestational diabetes patients were not included in this study. The cross sectional study design also hinders us from depicting the causal association and generalization of the results which are the limitations.

Conclusion:

Self-care practices can significantly alter diabetes control and prevent complications. Regular glucose monitoring was lacking in several patients and led to poor glycemic controls. These results can inform clinical practice and patient care for better management of the type 2 diabetes mellitus.

Recommendations:

Health education about self-care practices is helping patients achieve their glycemic goals. Provision of regular blood glucose monitoring with maintenance of log book about the measurements needs to be implemented by taking all the patients and their families into confidence.

Declaration:

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Conflict of Interest: Nil

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