ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

Assessment of diabetes self-management amongst young diabetics of an eastern Indian city using the diabetes self-management questionnaire: a cross-sectional study

First and Corresponding author : Dr. ArshadAyub, Assistant Professor, Dept. of Community Medicine, ESIC Medical College & Hospital-Bihta, Patna
Second author : Prof. (Dr.) Basanta Kumar Behera, Professor and Head , Department of Community Medicine, Kalinga Institute of Medical Sciences, Bhubaneswar
Third author : Prof.(Dr.) DayanidhiMeher, Professor , Department of Endocrinology, Metabolism and Diabetology, Kalinga Institute of Medical Sciences, Bhubaneswar

Correspondence : Dr. ArshadAyub, Assistant Professor, Dept. of Community Medicine, ESIC Medical College & Hospital-Bihta, Patna-801103
E-mail :drarshadayubcommed@gmail.com Ph.no : 7077786137

Abstract :
Background : Although it is commonly understood that lifestyle changes can impact plasma glucose levels, there is limited formal evidence supporting the long-term effectiveness of exercise and nutrition in the management of diabetes mellitus (DM). In DM, self-care refers to the patient's actual use of the knowledge learned during the educational programmes. **Aims & Objectives** :To explore the domains of diabetes self-management among young diabetics using the DSMQ, and to explore their perception about their self-care.**Methodology:** A cross sectional observational study was done using a pre-designed, semi-structured, and pre-tested questionnaire. Patients' clinical and socio-demographic data, were obtained. A scoring system for the self-care by diabetes self-management questionnaire (DSMQ) was used. **Results :**The highest mean score achieved was 5.916 in the Health care utilities domain followed by 5.722 in the Dietary Control domain. Mean score was minimum in the physical activity domain.**Conclusion :**Participants were more compliant when it comes to Diet and Health care utilities, while very less compliant to prescribed physical activity. Health care utilities remain the first domain in the diabetes self care and management which reflects the belief in the healthcare system and modern medicine.

Keywords :Diabetes, Self care, Management, DSMQ

Introduction :

Diabetes mellitus (DM) is a growing metabolic condition that is a leading cause of morbidity and mortality worldwide.(1) In recent decades, doctors and academics have paid more attention to the concept of DM self-care. Nonetheless, the focus has been on the development of new medicines to manage hyperglycemia. Given the high prevalence of DM complications,increasing

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

emphasis has recently been placed on improving DM education, particularly through the development of structured education programmes. Because daily self-care activities (SCA) in DM are mostly the responsibility of patients and their families, effective DM self-management education (DSME) is expected to result in greater performance in the former.(2)

In DM, self-care refers to the patient's actual use of the knowledge learned during the educational programmes.(3) The objectives are to influence the patient's behaviour and thereby improve glycemic control.(3) Following a good diet, regular physical activity, blood glucose monitoring, adherence to DM therapy, and having healthy coping and problem-solving abilities connected to DM activities are all important components of diabetic self care activities.(4) The number of patients with a HbA1c of less than 7% increased from 27% to 70% following the intervention in a trial evaluating the efficacy of DSME on glucose management.(5)

The benefit of DSME programmes appears to be significant; a systematic review found that they are effective in improving glycaemic management, lowering body mass index, lowering blood lipids, and marginally lowering blood pressure.(6) The 16-question Diabetes Self-Management Questionnaire (DSMQ), which is meant for patients to complete, is a validated and helpful tool for assessing self-care behaviours.(7) As a result, the purpose of our research was to determine the amount and influence of self-management activity ratings in diabetic patients.

Objectives :

The objectives of the present study are :

1. To explore the domains of diabetes self-management among young diabetics using the DSMQ, and
2. To explore the young diabetics' perception about their self care.

Materials and Methods

This study was carried out in the Department of community Medicine, Kalinga Institute of Medical Sciences, - Kalinga Institute of Industrial Technology(KIIT), University, Bhubaneswar, Odisha.

Which is a tertiary care hospital and is having specialized consultative care by specialists in each subject including endocrinology.The study design was a cross sectional observational study.

Study Population:The Study population was all the young patients with diagnosed Diabetes Mellitus (1 & 2) in the age group of 21-45 years of age , attending the Endocrine OPD of the tertiary care hospital.

Sample Size :The minimum sample size required for a cross sectional study is calculated by the following statistical formula.(8)

$$n = \frac{Z^2_{1-\alpha/2}Pq}{d^2}$$

Where n = minimum required sample size, Z = Reliability coefficient at required confidence interval (1-α), α= Type 1 error taken as 0.05 (5%), the level of confidence = (1-α) =0.95 (95%). Value of Z obtained from a normal curve table = 1.96,P = It is the proportion of the population having the event of interest i.e. taking prevalence of diabetes control (non diabetic)76% , NFHS-5.(9)

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

q = 100-P, it is the proportion of population without the event of interest i.e. q = 100 – P, = (100 – 76%) = 24, d = Absolute allowable error,taken as 0.05 (5%) as per usual convention. Putting all these values in the above equation we got the sample size n as 401 (Adjusted for the City's finite population and a non response rate of 30%).Hence a little more sample of 416 was taken by using Convenient sampling method.

Inclusion Criteria: All patients with type 1 and 2 diabetes, aged 20 to 45 years, non-pregnant, non-lactating, or non-puerperal at the time of the interview (for female patients), and those who had a recent (last 3 months) laboratory report on glycosylated haemoglobin (HbA1C) levels, as well as those who were not seriously ill, those who gave informed consents to participate in the study, and those who had not previously been interviewed by the researcher were included.

Informed Consent : All study volunteers were given written and informed consent after the nature and goal of the investigation were explained to them in detail. They were given assurances that the results would remain anonymous. The survey was completely voluntary, and participants had the option of not responding any questions with which they felt uncomfortable. Ethical Clearance was obtained from the Institutional Ethics Committee (IEC) of the institute.

Study Tool :

Following a thorough literature review, a pre-designed, semi-structured, and pre-tested Interview schedule was created. It was then pre-tested in a similar Outpatient Department (OPD) setting, and the necessary changes were made. Patients' socio-demographic data, such as their age, sex, religion, family type, and so on, were obtained. The subjects' socioeconomic class was determined by their educational status, occupation, and income. To identify co morbidities and drug history, relevant medical and surgical histories and findings were collected.

A portable stadiometer, weighing machine, and sphygmomanometer were used for measurements.

According to the inclusion and exclusion criteria, all patients attending the endocrine OPD with a pre-diagnosed diabetes for at least 3 months were included for the study. The data was collected throughout OPD hours, and the registration and interview step was repeated until the required sample was obtained.

A scoring system for the self-care by diabetes self-management questionnaire (DSMQ) was used. Scoring of the questionnaire involved reversing negatively worded items such that higher values are indicative of more effective self-care. Scale scores were calculated as sums of item scores and then transformed to a scale ranging from 0 to 10 (raw score / theoretical maximum score * 10; for example, for the subscale 'Glucose Management' a raw score of 12 leads to a transformed score of 12 / 15* 10 = 8). A transformed score of ten thus represented the highest self-rating of the assessed behaviour. If 'not required as a part of my treatment' had been marked in an item, it was not used, and the scale score computation was adapted accordingly (by reducing the theoretical maximum score by three points). However, in case of more than half of the items of a scale missing, a scale score should not be computed. For the convenience of analysis a score of > 5 was considered good (in each domain) and a score of < 5 as poor.(10)(11)

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

After the interview general examination of the patient was done along with blood pressure management. Anthropometric measurements were also taken. Body mass index and waist to hip ratio were also calculated. The latest available lab values including fasting and post prandial Blood sugar, HBA1C as well as Renal function tests and Thyroid profile (if available) were copied from their available lab reports. The complications (if any) and comorbidities were also recorded along with the lab or radiological evidence. Dietary habits along with the last 24 hours meal history was also recorded.

Analysis :

Inferences were drawn using the mean, proportions, and relevant statistical tests as needed. As needed, significance tests such as the Chi-square test and Fisher exact tests were utilised. Any significant or highly significant value was investigated for possible influencing factors. SPSS (Statistical Package for the Social Sciences) version 20.0 software was used for the analysis, which was provided by PHFI (Public Health Foundation of India).

Sources of funding : None

Results :

Table-1 : Socio demographic characteristics of the participants (N=416)

Characteristics		N (Percentage)
Age	**<35 years**	54 (12.98%)
	>35 years	362 (87.01%)
Gender	**Male**	206 (49.51%)
	Female	210 (50.48%)
Religion	**Hindu**	368 (88.46%)
	Others	48 (11.53%)
Marital Status	**Married**	302 (72.59%)
	Unmarried	114 (27.40 %)
Family Type	**Nuclear**	239 (57.45 %)
	Joint	177 (42.54 %)
SE Class	**Upper**	332 (79.80 %)
	Lower	84 (20.19 %)
Literacy	**Illiterate**	117 (28.12 %)
	Literate	299 (71.87 %)
Residence	**Rural**	112 (26.92 %)
	Urban	304 (73.07%)

The mean age of participants was found to be 39.42 ± 5.21 years (Mean ± SD).Out of the 416 participants 206 (49.51%) were male and 210 (50.48%) were female. Most (88.4%) of the participants were Hindus while 9.61% were Muslims and very few (1.92%) belonged to other

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

religion. It was observed that most (57.45%) of the participants were having nuclear family while 42.5 % were having Joint family. The higher percentage of nuclear family reflects the urban Culture where most of the families are nuclear. Most (73.07%) of the participants in our study were from urban areas while around 26.92% were from the rural areas. It was found that majority (71.8%) of the participants were literates while 28.1 % were illiterates. The modified kuppuswamy scale was used as it is applicable to the urban population. It was found that 66.1% of the study participants were from the upper middle class while upper and lower middle class had almost the same percentage of participants (13.7% & 13.5%) respectively. Very few (6.7 %) participants were from the upper lower class. Upper and upper middle class were combined to be depicted as Upper class and others were combined as lower class for the ease of analysis.

Table 2 : Average (mean & mode of the responses in the Diabetes self-management questionnaire)

The above table shows the average of the responses in the Diabetes self-management questionnaire
in each domain. The highest mean score achieved was 5.916 in the Health care utilities domain followed by 5.722 in the Dietary Control domain. Mean score was minimum in the physical activity domain. This indicates that the people were more Complacent when it comes to health care utilities and dietary control as compared to physical exercise.

Table 3 : Frequency of Good and poor scores in the Diabetes self-management

DSMQ	Mean	Mode	Standard deviation
Glucose management	5.108	4.66	1.33
Dietary Control	5.722	5.83	1.50
Physical activity	4.664	4.44	2.14
Health care utilities	5.916	5.55	1.85
Self care	NA	2	NA

questionnaire domains

Glucose management, N=416	**Frequency**	**Percentage**
Good	210	50.5%
Poor	206	49.5%
Dietary control, N=416		
Good	255	61.3%
Poor	161	38.7%
Physical activity, N=416		
Good	157	37.7%
Poor	259	62.3%
Health care utilities, N=416		

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

Good	287	69.0%
Poor	129	31.0%

The table summarizes the responses indicating compliance with each domain from the diabetes self-management questionnaire. Maximum Good compliance was found in the Health care utilities domain (69.0%) followed by dietary control domain (61.3%). Study participants were having minimum compliance in the "physical activity" domain i.e. 37.7%.

1.Glucose management Among 416 participants, glucose management was found to be good and poor in almost equal number of participants i.e. 50.5% good and 49.5% poor.

2.Dietary control

According to the DSMQ responses it was found that 61.3% participants were having good dietary control while 38.7 % were bad at dietary control.

3.Physical activity

DSMQ scoring revealed that 62.3 % participants were poor at doing physical activity while only 37.7 % were doing physical activity as prescribed.

4.Health care utilities

It was found that 69 % participants were good at utilizing health care facilities while 31% had poor utilization.

5. Diabetes self care

It was observed that only 2.9 % of the participants were satisfied with their self-care and think that their diabetes self-care is not poor at all. Maximum (54.3%) Of them think that their self-care is considerably poor, and only around 16.6 % think that their diabetes self-care is very much poor.

Table 4 : Responses from Sum-16 indicating self-perception of the people about their diabetes self care

Sum-16 responses	Frequency	Percent
0	12	2.9%
1	109	26.2%
2	226	54.3%
3	69	16.6%
Total	416	100%

The above table summarizes the self-perception (what the patients think) about their diabetes self care. Only 2.9 % of the participants were satisfied with their self-care and thought that their diabetes self-care is not poor at all while maximum (54.3%) Of them thought that their self-care is considerably poor, and only around 16.6 % thought that their diabetes self-care is very much poor.

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

Discussion :

The mean age of participants was found to be 39.42 ± 5.21 years (Mean ± SD).Out of the 416 participants, 207 (49.75%) were male and 209 (50.24%) were female.

In a study conducted by ***Shuvankar Mukherjee et al*** in Kolkata, (12) the mean age of the participants was 42.64 (SD 15.70) years. Among them, 66.4% (312/470) were males while 33.6% (158/470) were females. The difference in male, female population might be due to different cities serving the hospitals.

In another study done by ***Medi et al*** at Warangal, Andhra Pradesh it was found that most of them

were Females (*n* = 79, 56.57%), than males (*n* = 61, 43.57%).(13)which is higher than the present

study which might be due to different sex ratios of therespective populations.

Most (88.20%) of the participants were Hindus while 9.61% were Muslims and very few (1.92%)

belonged to other religion.In a study done by ***Parveensingh et al*** in Kangra, Himachal Pradesh, around 85.90 % of the participants were Hindus and around 9.07 % were Muslims which is very similar to our study. (14)

While ***Parveensingh et al*** in their study observed that most (75.48%) of the families were joint

and 24.51% were nuclear,(15)which was opposite to our study.The reason could be the difference

in the type of population in the studies, In later it was rural ,while in present study the population was mostly Urban. Most of the participants in our study were from urban areas while lesser were from the rural areas.Similar distribution was found in the study done by ***ManjushaSajith et al*** . They had around 66.67 % participants hailing from urban areas while 33. 33 % were from rural Areas.(16) Literacy wise, majority of the participants were literates in our study similarly, in study done by ***ManjushaSajith et al*** literacy was around 80 % among the study participants. (16) It was found that most of the study participants were from the upper class while in a study done By ***Kakumani et al*** it was obsereved that most of the participants were from the upper (10 %) and upper middle (60%) class.(17)

Ourstudy shows the average of the responses in the Diabetes self-management questionnaire in eachdomain. The highest mean score achieved was 5.916 in the Health care utilities domain followedby 5.722 in the Dietary Control domain. Mean score was minimum in the physical activity domain.

This indicates that the people were more Complacent when it comes to health care utilities and dietary control as compared to physical exercise.There were similar findings in a study by Okoye et al.The most important DSMQ behaviours for glycemic control were 'medication adherence,' 'blood glucose monitoring,' and 'dietary control,' whereas 'physician contact,' and 'physical activity,' proved to be less important.(18)

Also , Mean score order from highest to lowest was ‘Health care utilities’, ‘Glucose

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

management' 'Dietary control', and 'Physical activities' in a study by Popoviciu et al which is similar to our findings.(19)

Conclusion :

Participants were more compliant when it comes to Diet and Health care utilities, while very less compliant to prescribed physical activity. Health care utilities remain the first domain in the diabetes self care and management which reflects the belief in the healthcare system and modern medicine. Still motivation and awareness is required towards physical activity as it is an important part of management of diabetes.

References :

1. Serban D, Papanas N, Dascalu AM, Stana D, Nicolae VA, Vancea G, et al. Diabetic Retinopathy in Patients With Diabetic Foot Ulcer: A Systematic Review. The International Journal of Lower Extremity Wounds. 2021 Jun 1;20(2):98–103.
2. Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. J Diabetes Metab Disord. 2013 Mar 5;12:14.
3. Hailu FB, Moen A, Hjortdahl P. Diabetes Self-Management Education (DSME) - Effect on Knowledge, Self-Care Behavior, and Self-Efficacy Among Type 2 Diabetes Patients in Ethiopia: A Controlled Clinical Trial. Diabetes Metab Syndr Obes. 2019;12:2489–99.
4. Tomky D, Tomky D, Cypress M, Dang D, Maryniuk M, Peyrot M, et al. Aade Position Statement. Diabetes Educ. 2008 May 1;34(3):445–9.
5. Marincic PZ, Hardin A, Salazar MV, Scott S, Fan SX, Gaillard PR. Diabetes Self-Management Education and Medical Nutrition Therapy Improve Patient Outcomes: A Pilot Study Documenting the Efficacy of Registered Dietitian Nutritionist Interventions through Retrospective Chart Review. J Acad Nutr Diet. 2017 Aug;117(8):1254–64.
6. Mikhael EM, Hassali MA, Hussain SA. Effectiveness of Diabetes Self-Management Educational Programs For Type 2 Diabetes Mellitus Patients In Middle East Countries: A Systematic Review. Diabetes Metab Syndr Obes. 2020;13:117–38.
7. Bukhsh A, Lee SWH, Pusparajah P, Schmitt A, Khan TM. Psychometric properties of the Diabetes Self-Management Questionnaire (DSMQ) in Urdu. Health Qual Life Outcomes. 2017 Dec;15(1):200.
8. Agarwal GG. Medical statistics: Principles & methods. Indian Journal of Medical Research. 2010 Sep 1;132(3):347–9.
9. Khordha.pdf [Internet]. [cited 2022 May 23]. Available from: http://rchiips.org/nfhs/NFHS-5_FCTS/OR/Khordha.pdf
10. Schmitt A, Gahr A, Hermanns N, Kulzer B, Huber J, Haak T. The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. Health Qual Life Outcomes. 2013 Aug 13;11:138.

ISSN:0975-3583,0976-2833 VOL13,ISSUE05,2022

11. Vincze A, Losonczi A, Stauder A. The validity of the diabetes self-management questionnaire (DSMQ) in Hungarian patients with type 2 diabetes. Health Qual Life Outcomes. 2020 Oct 19;18(1):344.
12. Mukherjee S, Sharmasarkar B, Das KK, Bhattacharyya A, Deb A. Compliance to anti-diabetic drugs: observations from the diabetic clinic of a medical college in kolkata, India. J Clin Diagn Res. 2013 Apr 1;7(4):661–5.
13. Medi R, Mateti U, Kanduri K, Konda S. Medication adherence and determinants of non-adherence among south Indian diabetes patients. Journal of Social Health and Diabetes. 2015 Jun;03(01):048–51.
14. Adherence for medication among self-reporting rural elderly with diabetes and hypertension Singh P, Gupta RK, Jan R, Raina SK - J Med Soc [Internet]. [cited 2022 May 25]. Available from: https://www.jmedsoc.org/article.asp?issn=0972-4958;year=2017;volume=31;issue=2;spage=86;epage=89;aulast=Singh
15. Singh P, Gupta R, Jan R, Raina S. Adherence for medication among self-reporting rural elderly with diabetes and hypertension. J Med Soc. 2017;31(2):86.
16. Sajith M, Pankaj M, Pawar A, Modi A, Sumariya R. MEDICATION ADHERENCE TO ANTIDIABETIC THERAPY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS. undefined [Internet]. 2014 [cited 2022 Apr 17]; Available from: https://www.semanticscholar.org/paper/MEDICATION-ADHERENCE-TO-ANTIDIABETIC-THERAPY-IN-2-Sajith-Pankaj/2c1b2334e42c6692d6baddf2020bcf7069f16bff
17. Kakumani KV, Waingankar P. Assessment of Compliance to Treatment of Diabetes and Hypertension amongst Previously Diagnosed Patients from Rural Community of Raigad District of Maharashtra. J Assoc Physicians India. 2016 Dec;64(12):36–40.
18. Okoye OC, Ohenhen OA. Assessment of diabetes self-management amongst Nigerians using the diabetes self-management questionnaire: a cross-sectional study. Pan Afr Med J. 2021 Nov 24;40:178.
19. Popoviciu MS, Marin VN, Vesa CM, Stefan SD, Stoica RA, Serafinceanu C, et al. Correlations between Diabetes Mellitus Self-Care Activities and Glycaemic Control in the Adult Population: A Cross-Sectional Study. Healthcare (Basel). 2022 Jan 17;10(1):174.