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A descriptive study to assess diabetes self-management among diabetes mellitus patients in a selected hospital, Bangalore

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Abstract

Background: Diabetes mellitus incidence is rapidly approaching epidemic proportions on a global scale. The onset of chronic issues is influenced by hyperglycemia. The best way to regulate blood sugar levels and reduce the risk of developing retinopathy, nephropathy, and neuropathy is through self-management of diabetes. Controlling diabetes will aid in avoiding issues. The study aims to evaluate the level of diabetes self-management among people with diabetes mellitus who are receiving tertiary care in Bangalore, Karnataka.

Purpose: The study aimed to assess diabetes self-management among patients with diabetes mellitus.

Materials and Techniques: A descriptive research design was adopted to assess diabetes self-management among diabetes mellitus patients in tertiary hospital Bangalore. A nonprobability convenient sampling technique was used to select 165 diabetes mellitus patients who were hospitalized and visiting medical OPDs. Data were collected by using the updated version of the diabetes self-management questionnaire (DSMQR-2015), to gather information regarding Socio-Demographic and diabetes self-management. The collected data we reanalyzed by using descriptive and inferential statistics.

Results: The majority of the subjects 66.1% had a moderate level of diabetes self-management, 23% of the subjects had a high diabetes self-management and 10.9 % had poor diabetes self-management. The mean diabetes self-management score was 5.29 with a standard deviation of 1.670. In terms of domains of diabetes self-management, 52.1% of the subjects had a moderate level of diabetes self-management in the domain of glucose management and 68.5% of the subjects had poor levels of diabetes self-management in the domain of medication adherence. The overall diabetes self-management score of the study subjects was 5.299±1.670. With regards to domains of diabetes self-management physician contact means the score was 6.61±2.114 whereas the medication adherence domain score was 7.41±7.071 lower than other

domain scores. There was a significant association between diabetes self-management and socio demo graphic variables about age (p=0.002), gender (p=0.004), family income, educational status, and residential area (p=0.003), occupation (p=0.007), presence of comorbid dities (p=0.007), marital status, type of diabetes mellitus, habits, sleep pattern and source of health information related to diabetes self-management (p=0.001), specifi cation of health insurance (p =0.002) but not with Body Mass Index (BMI), type of family, duration of diabetes mellitus, medication for diabetes mellitus and health insurance at $p < .05$.

Conclusion: The study concluded that diabetes mellitus patients had a moderation of diabetes self-management. There was a strong association between diabetes self-management and socio-demographic factors. The results of the domains of self-management of diabetes showed that physician contact had the greatest score followed by glucose management, dietary control, and physical activity, while medication adherence had the lowest score.

Keywords: Diabetes Mellitus, Self-Management, Type 2 Diabetes Mellitus, Medication Adherence

Introduction

Diabetes mellitus is a chronic illness in which the body has trouble ping blood sugar levels within a normal range. This can injure several different organs, including the heart, blood vessels, eyes, kidneys, and many more.[1] According to the International Diabetes Federation (2020), By 2021, diabetes will likely affect 537 million persons (20-79 years old). Diabetes mellitus or its consequences currently causes the death of one person every seven seconds.[2] The World Health Organization (2020) reports that it is the fourth most reason for medical visits and the fifth most common cause of death.[3] Worldwide, there will be 643 million diabetics by 2030, and 783 million by 2045. [4]

India is known as the "Diabetes Capital of the World" and is one of the countries where the diabetes mellitus pandemic is most prevalent worldwide. [5] The American Diabetes Association (ADA, 2020) asserts that DM is in nearly all middle-income nations, the main contributor to cardiovascular disease, blindness, renal failure, and lower limb amputation. [6] Although there is no known treatment for diabetes, a person can live a long and healthy life with the right care and self-management techniques.[7] Successful self-management of diabetes can manage the level of diabetes mellitus while reducing the danger of both immediate and long-term com plications.

Internationally, several studies reported that it is important to analyze all areas of self-care management to improve diabetic subjects' attitudes and behaviors, encourage improved compliance with diabetes self-care management, and implement preventative strategies for diabetes and its complications. [8-10] Previous reports revealed that diabetes complications, gender, and diabetes self-management were significant predictors of HRQOL in subjects.[11]

According to recent research by the Indian Council of Medical Research (ICMR, 2018), which was carried out in four separate rural and urban areas of India, the prevalence of diabetes is 7.7% in Karnataka. [12] Studies from Karnataka demonstrate the necessity of self-care practices for people with diabetes mellitus in India and the use of standardized tools like the DSMQ-R for tracking such behaviors [13-15] Additionally, studies have indicated that failing to implement the recom mended diabetes self-care management measures might lower lifespan and quality of life. [16] The current study aims to evaluate patient diabetes self-management to

offer information on the role that self-care plays in the management of diabetes mellitus subjects in India.

Materials and methods

Study Design

A descriptive research design was used in this study.

Research variables

Study variable

Diabetes self-management.

Attribute variables

Age, gender, BMI, educational qualification, occupation, family income, marital status, residential area, type of family, duration of diabetes mellitus, duration of diabetes mellitus, presence of co-morbidities, type of diabetes mellitus, medication for diabetes mellitus, family history of diabetes mellitus, habits, sleep pattern, health insurance, specification of health insurance and source of health information related to diabetes self-management.

Setting and Sample size

The study was carried out at medical OPDs of Tertiary care hospitals in Bangalore, Karnataka (M.S. Ramaiah Memorial and M.S. Ramaiah Teaching hospital).165 diabetes mellitus patients (Type 1 and Type 2) were selected as samples for this study.

Sampling technique

A nonprobability convenient sampling technique was used to select the samples.

Inclusion and exclusion criteria

Inclusion criteria

Diabetes mellitus patients who were

1. Willing to participate in the study.
2. Diagnosed with diabetes mellitus for more than 2 months.
3. Available at the time of data collection.
4. Able to read and understand English and Kannada.

Exclusion criteria

1. Diabetes mellitus patients associated with neurological disorders manifesting altered sensorium.
2. Patients diagnosed with gestational diabetes.

Ethical Consideration

This study was approved by the Institution Review Board of the Ramaiah Medical College (Approval no: MSRMC/EC/SP-06/7-2021).

Measurements / Instruments

After an extensive review of the literature, discussion with the experts, and with the researcher's personal and professional experience. A Structured self-report question naire called the Diabetes Self-Management Question naire-Revised version (DSMQ -R, 2015) developed by Andreas Schmitt et al at the Research Institute of the Diabetes Academy Mergentheim (Germany) was used to assess their level of diabetes self-management. In addition, information regarding the socio-demographic variables of subjects was collected.

The researcher's tool includes two parts,

- **Section A**: Socio-Demographic Profile.
- **Section B:** Diabetes Self - Management Question naire-Revised (DSMQ-R, 2015).

This instrument comprises 27 components and is intended for subjects who require intensive insulin treatment. Items include (i) Dietary control (DC) (ii) Glucose management (GM) (iii) Physician contact (PC) (iv) Physical activity (PA) and (v) Medication adherence (MA). The results from each subscale are totaled up to achieve the overall sum scale score. The degree of diabetes self-management is determined by the DSMQ-R questionnaire's cut-off scores. A score of 7 to 10 denotes high diabetes self-management, a score of 6 to 4 is considered moderate, and a score of 3 to 0 denotes poor diabetes self-management. DSMQ-R was translated into

the native tongue Kannada, and the tool reliability in that language was established (Cronbach α = 0.86).

Data collection Procedure

Written formal permission was obtained from the Hospital Administrators and Medical Superintendent of Ramaiah Hospital, Bangalore. A total of 165 subjects who met the inclusion criteria were selected using a non-probability convenient sampling technique. Subjects were given detailed information about the study and informed consent was obtained from all the participants The tool was distributed to each subject and informed to read the instructions carefully. Data was collected using a structured self-report questionnaire on diabetes self-management. The confidentiality of the subjects was maintained. The average time taken to complete the tool was about 25-30 minutes. Approximately 10-15 subjects were assessed per day. The collected data were coded and entered in the master sheet.

Statistical method

The data analysis was done by using descriptive and inferential statistics. SPSS (version 20) was used to analyze the data.

1. Frequency and percentage distribution were computed for socio-demo graphic variables.
2. Frequency and percentage distribution were computed for the level of diabetes self-management.
3. Frequency and percentage distribution of subjects in terms of domains of diabetes self-management.
4. Mean and standard deviation of diabetes self-management.
5. Association between diabetes self-management and socio-demographic variables.

Results

The collected data were analyzed by the objectives of the study. Either visual or tabular representations of the results were used. Below is a representation of the outcomes.

The subject's socio-demographic profile

Table 1 shows the frequency and percentage distribution of sociodemographic variables of the subjects. It was observed that 89.7% of the subjects were married and that most of the subjects 46.7% were between the ages of 50 and 64.

The gender split of the research subjects was 41.2% females and 58.8% males. 35. 8% of the partici pants had a normal body mass index. 93.3% of the subjects were in the work force, this group of persons included home makers, farmers, retired people, and workers in the public and private sectors. With regards to educational status, 33.9% of the subjects had higher secondary qualifications and 26.7% were graduates. 38. 2% of the subject's income was Rs 8000-22,400 and 28. 5% of the subject's income was between Rs 22,401-36, 801. The majority of the subjects (75.8%) were living in urban areas. 69.7% of the subjects have nuclear families and 65.5% of the subject's duration of diabetes mellitus was 1-10 years.

28.5% of the subjects had hypertension and other comorbid conditions, including coronary heart disease, hernia, peptic illness, pulmonary disease, and peripheral vascular disease. 94.5% of the subjects had type 2 diabetes, and 57% of them were using oral hypo glycaemic medications to manage their condition.

More over half (51.5%) of the subjects did not have any unhealthy behaviors, and 62.4% of the subjects had a family history of diabetes mellitus. Most participants (69.7%) got less than 8 hours of sleep per night, 74 % had health insurance, 4.3% had government health insurance, and many subjects (70.9%) got their diabetic self-management information from doctors.

Diabetes self-management among people with diabetes mellitus

Table 2 shows the frequency and percentage distribution of diabetes self-management among the subjects. 66.1% of the subjects had a moderate level of diabetes self-management and 23% of the subjects had a high level of diabetes self-management.

Table 3 shows the frequency and percentage distribution of subjects in terms of domains of diabetes self-management revealing that a moderate level of diabetes self-management was practiced by 52.1% of the respondents in glucose control, 70.3% moderate level in dietary control, and 42.4% moderate level in physical activity. 68.5 percent of the participants had a poor level of diabetic self-management, whereas 51.5 percent of the subjects had a moderate level of self-management in physical contact.

Table 4 shows the mean, mean percentage, and standard deviation of diabetes self-management of the subjects it was observed that the overall diabetes self-management score of the study subjects was 5.299 ± 1.670. With regards to domains of diabetes self-management, the physician contact means the score was maximum whereas the medication adherence subscale score was 7.41 ± 7.071 lower than other sub-scale scores.

Association Between the level of Diabetes Self-Management Using Socio-Demographic Factors.

Table 5 shows the association between socio-demo graphic variables and diabetes self-management. Chi-square was used to find the association between socio–demo graphic variables and diabetes self-management and it was observed that there was a statistical association with many sociodemographic variables except for body mass index, type of family, duration of diabetes, medication for the management of diabetes mellitus, and health insurance.

Discussion

In this study, 23% of the diabetes mellitus subjects had a high level of diabetes self-management, and 66.1% had a moderate level of diabetes self-management. These findings align with a recent study by Asmare Getie et al. (Eastern Ethiopia, 2019), which discovered that 20% of diabetes subjects had a high level of self-management and 60% had a moderate level.[8] In contrast to the results of the current study, Bashar R. Mohammed-earlier Ali's research (Iraq, 2016) suggested that 89.5% of diabetes mellitus subjects had a moderate level of diabetes self-management and just 0.5 percent of the diabetes subjects had a high degree of diabetes self - management. [17]

The present study findings also showed that diabetes self-management domains: physician contact score was maximum compared to glucose management, dietary control, physical activity, and medication adherence. These findings are supported by a study conducted by Hammad et al (Saudi Arabia, 2015) on the assessment of diabetes self-management which found nearly similar diabetes self-management scores, and with regards to domains of diabetes self-management medication adherence score was maximum as compared to other domains scores.[18] A study by Mehra Var et al. (Iran, 2016) found that the physician contact sub-scale score was lower than that of another domain, which contrasted significantly with the current study findings. [10]

In the present study, age and gender were found to significantly influence diabetic self-management (p= 0.001). A similar study conducted by Zhenzhen Xie et al (China, 2020) showed that diabetes self-management was associated with age (p=0.03) and gender (p=0.02) [19]

In this study, there was a significant association between level of diabetes self-management with socio-demo graphic variables such as the family history of diabetes

and source of information. A study done by Zafar Iqbal Bhatti et al (Iraq, 2018) showed that diabetes self-management of subjects with diabetes is influenced by socio demo graphic factors such as the family history of diabetes source of information.[11] According to the study's findings, diabetes self-management was sub stantially correlated with the profession and the existence of comorbid conditions ($p < 0.001$). Similar findings were found in the study by Davide Ausili et al. (Iran, 2019), which showed that diabetes self-care management was associated with the profession and the presence of comorbidities ($p=0.04$). [20] The study findings revealed that the duration of diabetes was significantly associated with diabetes self-management. Similar findings were reported in the study conducted by Stephani et al (Africa, 2018) where the duration of diabetes was associated with the duration of diabetes at $p<0.001$.[21]

Furthermore, follow-up studies showed a connection between several patient characteristics and diabetes self-management. [22-24] Patients should be encouraged to make positive life style Modi fication, especially regarding physical exercises and medication adherence, which can be achieved through targeted health promotion and counseling programs.

So, to adhere to self-care activities such as diet, glucose management, and Medi cation adherence. Therefore, nurses should advise diabetes subjects to stick to self-care activities dietary changes, medication adherence, quitting smoking, and alcohol abstinence to cure diabetes mellitus and prevent complications.

Limitation

- The authenticity of the information regarding socio-demographic variables is based on the response of the subjects.
- Limited small sample size has restricted the generali zation of the findings.

Conclusion

According to the study findings, those with diabetes mellitus had just a minimal amount of diabetes self-management. Physician contact earned the greatest score in the diabetes self-management areas, followed by glucose management, dietary control, and physical activity, while medication usage had the lowest score. According to the findings, socio-demographic factors are linked to diabetes self-management. This study highlights the necessity for measures to enhance diabetes mellitus patients' self-care routines. A patient information booklet on diabetes self-management could be made available to subjects in medical OPDs, as well as the use of standardized instruments like the DSMQ-R for the evaluation of the same should be implemented at the outpatient clinic of tertiary care hospitals under the direction of a trained nurse educator.

Recommendations

Based on the findings of the study, the following recommendations have been made.

- The study recommends an education program should be designed and implemented to increase patients' information about a self-care regimen for diabetes mellitus to reduce or prevent complications.
- Patients with diabetes mellitus need instruction with means of education materials.
- An informative booklet should be used for facilitating patients with diabetes mellitus as guidance for self-care activities.
- A comparative study can be done to assess the relationship between self - efficacy and diabetes self - management among diabetes patients in rural and urban community areas.
- A similar study can be replicated as a multicentre study.

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Table 1: Socio-Demographic Characteristics of The Study Subjects (N= 165).

Variables	N (%)
Age In Years	
20-34	19 (11.5)
35-49	29 (17.6)
50-64	77 (46.7)
65-80	40 (24.2)
Gender	
Men	97 (58.8)
Women	68 (41.2)
(BMI)	
<18.5 (Underweight)	9 (5.5)
18.5 – 22.9 (Normal Weight)	59 (35.8)
23-24.9 (Overweight)	50 (30.3)
25 – 29.9 (Obese I)	35 (21.2)
>30 (Obese II)	12 (7.2)
Educational Status	
Primary Education	39 (23.7)
Secondary Education	19 (11.5)
Higher Secondary Education	56 (33.9)
Graduation	44 (26.7)
Post-Graduation	7 (4.2)
Occupation	
Government Employee	1 (0.6)
Private Employee	36 (21.8)
Farmer	16 (9.7)
Self Employed	22 (13.3)
Retired	27 (16.4)
Home Maker	52 (31.5)
Unemployed	11 (6.7)
Monthly Income of The Family (In Rs)	
8000 - 22400	63 (38.2)
22401 – 36801	47 (28.5)
36802 – 51202	35 (21.2)
51203 – 65603	18 (10.9)
65604 – 80004	2 (1.2)
Marital Status	
Married	148 (89.7)
Unmarried	17 (10.3)
Residential Area	
Rural	40 (24.2)
Urban	125 (75.8)
Type Of Family	
Nuclear	115 (69.7)
Joint	35 (21.2)
Extended	15 (9.1)
Duration Of DM	
1-10years	108 (65.5)
11-20 Years	38 (23)
21-30 Years	17 (10.3)
31-40 Years	2 (1.2)
Presence Of Comorbidities	
HTN	34 (20.6)
HTN/Kidney Disease	46 (27.9)
HTN/Stroke	6 (3.6)
HTN/Others	47 (28.5)
No Comorbidities	32 (19.4)
Type Of DM	
Type 1	9 (5.5)
Type 2	156 (94.5)
Medication For DM	
Oral Hypoglycaemic Agents	94 (57)
Insulin	71 (43)
Family History of DM	
Yes	103 (62.4)
No	62 (37.6)
Habits	
Smoking	31 (18.7)
Tobacco Chewing	9 (5.5)
Consuming Alcohol	12 (7.3)
Smoking And Consuming Alcohol	28 (17)
No Bad Habits	85 (51.5)

Sleep Pattern	
< 8 Hrs.	115 (69.7)
≥ 8 Hrs.	50 (30.3)
Health Insurance	
Yes	122 (74)
No	43 (26)
Specification Of Health Insurance	
Private Insurance	44 (26.7)
Government Insurance	78 (47.3)
No Medical Insurance	43 (26)
Source Of Health Information Related to Diabetes Self - Management	
Doctors	117 (70.9)
Relatives	12 (7.3)
Health Care Professionals	20 (12.1)
Reading Materials	60 (9.7)

HTN= Hypertension; BMI= Body Mass Index; DM= Diabetes Mellitus.

Table 2: Level of Diabetes Self-Management Among Study Subjects (N= 165).

Level of Diabetes Self-Management	**n (%)**
High Diabetes Self-Management	38
Moderate Diabetes Self-Management	109
Poor Diabetes Self-Management	18

Table 3: Distribution of Subjects in Terms of Domains of Diabetes Self-Management (N= 165).

Domains of diabetes self-management	Level of diabetes self-management		
	High	Moderate	Poor
	n (%)	n (%)	n (%)
GM	46 (27.9)	86 (52.1	33 (20)
DC	29 (17.6)	116 (70.3)	20 (12.1)
PA	43 (26.1)	70 (42.4)	52 (31.5)
PC	50 (30.3)	85 (51.5)	30 (18.2)
MA	20 (12.1)	32 (19.4)	113 (68.5)

GM = Glucose Management; DC = Dietary Control; PA= Physical Activity; PC= Physician Contact; MA = Medication Adherence.

Table 4: mean, mean percentage, and standard deviation of diabetes self-management among study subjects (N= 165).

Domains	The maximum score of subjects	Mean	Mean percentage	Standard deviation
Overall Diabetes Self-Management	10	5.299	52.9	± 1.67
GM	15	8.13	54.2	±3.13
DC	18	9.53	52.9	±2.93
PA	9	4.39	48.7	± 1.88
PC	12	6.61	55	±2.11
MA	27	7.41	27.4	± 7.70

GM = Glucose Management; DC = Dietary Control; PA= Physical Activity; PC= Physician Contact; MA = Medication Adherence.

Table 5: Association Between the Level of Diabetes Self-Management and Socio-demographic variables of study subjects (N= 165).

Variables	Level Of Diabetes Self-Management			Chi-Square Value	P-Value
	High	Moderate	Poor		
Age (Years)					
20-34	14	5	0	36.51	*0.002
35-49	3	23	3	df = 6	
50-64	14	50	13		
65-80	7	31	2		

Gender					
Men	22	58	17	10.85	*0.004
Women	16	51	1	df =2	
Body Mass Index (BMI) [Kg/M2] For Asians					
<18.5 (Underweight)	3	6	0	11.54	0.317
18.5 – 22.9 (Normal Weight)	12	45	2	df = 8	
23-24.9 (Overweight)	14	27	9		
25 – 29.9 (Obese I)	7	22	6		
>30 (Obese II)	3	8	1		
Educational Status					
Primary Education	3	28	8	40.13	*0.003
Secondary Education	5	14	0	df= 8	
Higher Secondary Education	6	47	3		
Graduation	19	18	7		
Post-Graduation	5	2	0		
Occupation					
Government Employee	0	1	0	39.86	*0.007
Private Employee	11	22	3	df = 12	
Farmer	0	13	3		
Self Employed	4	12	6		
Retired	8	14	5		
Homemaker	7	44	1		
Unemployed	8	3	0		
Monthly Income of The Family (In Rs)					
8000 - 22400	2	51	10	29.79	*0.002
22401– 36801	16	26	5	df = 8	
36802– 51202	12	21	2		
51203– 65603	8	10	0		
65604 – 80004	0	1	1		
Marital Status					
Married	24	106	18	37.75	*0.001
Unmarried	14	3	0	df=2	
Residential Area					
Rural	0	35	5	15.95	*0.003
Urban	38	74	13	df = 2	

Type Of Family					
Nuclear	26	76	13	2.83	0.58
Joint	9	21	5	df = 4	
Extended	3	12	0		
Duration Of DM					
1-10years	24	76	8	10.63	0.1
11-20 Years	8	21	9	df = 6	
21-30 Years	6	10	1		
31-40 Years	0	2	0		
Presence Of Comorbidities					
HTN	3	31	0	42.34	*0.001
HTN/Kidney Disease	11	29	6	df=8	
HTN/Stroke	3	3	0		
HTN/Others	3	35	9		
No Comorbidities	18	11	3		
Type Of DM					
Type 1	9	0	0	31.81	*0.001
Type 2	29	109	18	df = 2	
Medication For DM					
Oral Hypoglycemic Agents	17	68	9	3.98	0.137
Insulin	21	41	9	df =2	
Family History of DM					
Yes	15	73	15	12.84	*0.002
No	23	36	3	df = 2	
Habits					
Smoking	7	18	6	27.31	*0.001
Tobacco Chewing	0	9	0	df= 8	
Consuming Alcohol	2	10	0		
Smoking And Consuming Alcohol	5	14	9		
No Bad Habits	24	58	3		
Sleep Pattern					
< 8 Hrs	17	84	14	14.567	*0.001
≥ 8 Hrs	21	25	4	df = 2	
Health Insurance					

Yes	30	75	17	5.14	0.076
No	10	32	1	df= 2	
If Yes, The Specification of Health Insurance					
Private Insurance	17	21	6	20.98	*0.002
Government Insurance	12	55	11	df= 6	
No Health Insurance	9	33	1		
Source Of Health Information Related to Diabetes Self-Management					
Doctors	21	80	16	33.03	*0.001
Relatives	0	12	0	df= 6	
Healthcare Professionals	5	13	2		
Reading Materials	12	4	0		

*Significant - $p < .05$; HTN= Hypertension; DM= Diabetes Mellitus