



“ DIABETES AWARENESS IN PATIENTS IN AND AROUND REWA MADHYA PRADESH”

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ABSTRACT **BACKGROUND :** The term diabetes mellitus describes a metabolic cum vascular syndrome of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both leading to changes in both small blood vessels (Microangiopathy) and large blood vessels (Microangiopathy).¹

Type 1 DM results from autoimmune beta cell destruction, and most, but not all, individuals have evidence of islet-directed autoimmunity. In the majority, immunologic markers appear after the triggering event but before diabetes become clinically overt. Beta cell mass then begins to decrease, and insulin secretion progressively declines, although normal glucose tolerance is maintained. The rate of decline in beta cell mass varies widely among individuals, with some patients progressing rapidly to clinical diabetes and others evolving more slowly. Features of diabetes do not become evident until a majority of beta cells are destroyed (70–80%).

Type 2 diabetes mellitus is the most common form of diabetes and is the major cause of morbidity and mortality worldwide. Type 2 diabetes is not a single disease process but instead represents a heterogeneous constellation of disease syndromes, all leading to the final common pathway of hyperglycemia. Many factors, alone or in combination, can cause hyperglycemia; thus, the complexity of the pathogenesis of type 2 diabetes reflects the heterogeneous genetic, pathologic, environmental, and metabolic abnormalities that can exist in different patients. Above three major metabolic abnormalities coexist in type 2 diabetes, 2-5 each contributing to the hyperglycemic state. The prevalence of T2DM is 11% in urban areas while it is 3-9% in rural areas¹. There is also a corresponding increasing in the diabetic related complication for example neuropathy, retinopathy and nephropathy.⁶

In India, Thirty five million people have diabetes—a number expected to more than double by 2025, disproportionately affecting working age people the economic impact of this increase could be devastating to India's emerging economy studies in India estimate that. It is believed that patient's knowledge of the self-care is the key to achieve therapeutic goals in ambulatory care. Being aware of various aspects of the disease is the first step for the primary and secondary prevention. If the health care providers are aware in community they can plan their preventive measures accordingly.⁷⁻⁸

Aims and Objectives: To study diabetes mellitus awareness in diabetic patient, prevalence of diabetes in adult patients in and around Rewa, to reiterate pointers to early diagnosis, and therefore decrease morbidity associated with diabetes and factors affecting the awareness level in patient.

Material and Methods: The present study was conducted in the Department of Medicine S.S. Medical College and associated S.G.M. Hospital, Rewa from April 2017 to March 2018. Patients with known signs and symptoms of Diabetes Mellitus included and patients not having diabetes excluded.

Inclusion Criteria: Patients with known Diabetes Mellitus, signs and symptoms of Diabetes Mellitus.

Exclusion Criteria: Patients not having diabetes.

KEYWORDS : Diabetes mellitus, Awareness

The patients were there after subjected to complete clinical examination and laboratory investigations and Questionnaire based on awareness of knowledge, self care and complications of Diabetes Mellitus and Data collected were analyzed by appropriate statistical methods. The questionnaire included demographic variable like age, sex, marital status, education etc. Questions on awareness regarding DM were set under three headings namely knowledge of DM, self care practices and knowledge regarding complications of DM. The questionnaire was translated in Hindi language. The time taken by each patient to complete the questionnaire ranged from 10-15 minutes. The

responses were in the paper format of “Yes”, “No”, “Don't know”. These were analyzed as correct, don't know, wrong and were scored as 2, 1, 0 points respectively. Scores were calculated separately for knowledge, self care practices and complications and were also compared with demographic variables.

Our questionnaire was focused on three broad headings, Knowledge of DM”, “Self Care practice” and “Knowledge regarding Complications of DM”. (table no. 01)

Table – 01 Questionnaire and descriptive response to selected questions

S.No.	Question	Patient's Responses		
		Yes No. %	No No. %	Don't Know No. %
Knowledge of diabetes				
1	Is the diabetes mellitus life style related disease?	220(44%)	13(2.6%)	267(53.41%)
2	Is it important to do both fasting as well as post prandial blood sugar level for diagnosis and monitoring?	348(69.6%)	11(2.2%)	141(28.2%)
3	Apart from blood sugar level are you aware about HbA1c?	57(11.4%)	14(2.8%)	429(85.8%)
4	Do you have to take medicine for diabetes whole life?	121(24.2%)	11(2.2%)	368(73.6%)
5	Do you know about insulin?	299(59.8%)	4(.8%)	197 (39.4%)
Self care practice				
6	Are you aware of self-monitoring of blood glucose in diabetes?	193(38.6%)	12(2.4%)	295(59%)
7	It is necessary to consume high fiber diet in DM care?	379(75.8%)	16(3.2%)	105(21%)
8	Is foot care necessary in DM?	382(76.4%)	11(2.2%)	107(21.4%)

9	Should the feet clean with warm water daily?	263(52.6%)	13(2.6%)	224(44.8%)
10	Can you prevent DM by exercise?	307(61.4%)	4(0.8%)	189(37.8%)
Knowledge Regarding complication of DM				
11	Unmanaged DM can cause eye problems or even blindness?	318(63.6%)	17(3.4%)	165(33%)
12	Uncontrolled DM can affect your kidneys?	287(57.4%)	4(0.8%)	209(41.8%)
13	Uncontrolled DM can cause stroke?	231(46.2%)	9(1.8%)	260(52%)
14	Uncontrolled DM can cause Ischemic heart disease	243(48.6%)	8(1.86%)	249(49.8%)
15	Is sex desire reduce due to DM?	279(55.8%)	14(2.8%)	207(41.4%)

Statistical Analysis:

Descriptive and inferential statistics like mean, median, standard deviation, paired' test, correlation, coefficient and chi-square will be used for data analysis and presented in the form of tables, graphs and diagrams. SPSS 16 version was used. Independent t test and one way ANOVA were applied at 5% level of significance.

Results:

In present study we found the prevalence of diabetes was more among

younger age groups, urban population and with low literacy and also in patients with past history of hypertension and tobacco addiction.

Among 500 patients, highest number of diabetic patient 186 (37.2%) were in 46-60 years of age group followed by 181 (36.2%) in >60 year age group, 111 (22.2%) in 30-45 year Age group and the least 22 (4.4%) in less than 30 years age group. 306 (61.2%) patients were 61.2% male and 194 (38.8%) patients were female. 301(60.2%) and 199 (39.8%) patients belong to rural and urban residency respectively.

[TABLE-02]

Table No. 02 Comparison of awareness score in patient with Demographic variable

S. No.	Characteristics	Category	Frequency (%)	Mean Score ±SD
1	Age (Years)	<30 yrs.	22(4.4%)	21.45±4.35
		30-45 yrs.	111 (22.2%)	22.98±3.70
		46-60 yrs.	186(37.2%)	22.77±3.04
		>60 yrs.	181 (36.0%)	22.14±2.95
		F = 2.28 P value = 0.078699 (One way ANOVA)*		
2	Sex	Male	306 (61.2%)	22.64±3.23
		Female	194 (38.8%)	22.32±3.26
		t = 1.0423 p = 0.148A(Independent t test)*		
3	Marital Status	Unmarried	12(2.4%)	20.5±4.73
		Married	483 (96.6%)	22.56±3.19
		Widow	5(1%)	23±3.93
		F = 2.43, p = 0.088(One way ANOVA)*		
4	Occupation	Unemployed	175 (35.0%)	20.4±4.73
		Employed	171(34.2%)	22.03±2.96
		Retired	03(.6%)	18.33±2.08
		Farmer	151(30.2%)	21.08±2.98
		F= 11.2009, p = 0.000018(One way ANOVA) F		
5	Education	Illiterate	113(22.6%)	21.27±2.72
		Literate	387(77.4%)	23.25±3.30
		Primary School	165(33%)	22.11±2.61
		Secondary	144(28.8%)	22.35±3.15
		Graduate	73(14.6%)	23.54±3.36
		Postgraduate	5 (1.0)	25±4.94
t=6.805, p value < 0.00001 (Independent t test) F				
6	Family History of DM	Yes	219 (43.8%)	23±2.71
		No	281 (56.2%)	22.6±3.21
		t=2.826 P value 0 .00245 (Independent t test)F		
7	Body Mass Index (BMI)	Underweight (<18.5)	28(5.6%)	24.0 ±2.35
		Normal (18.6-23)	211(42.2%)	21.2±3.6
		Pre-obesity (23.1-27.5)	216(43.2%)	23.3±3.68
		Obesity (>27.5)	45(9.0%)	23.35±3.35
		F value 0.51774, P value 0.670(One way ANOVA)*		
8	Duration since diagnosis	Up to 1 yr.	120 (24.0%)	22.10±3.68
		1 yr. to 5 yrs.	244(48.8%)	23.45±3.83
		6 yrs. to 10 yrs.	92 (18.4%)	23.75±4.60
		>10 yrs.	44(8.8%)	24.5±3.67
		F = 4.01198, p value 0.007(One way ANOVA) F		
9	Urban / Rural	Urban	301(60.2%)	22.13±3.14
		Rural	199 (39.8%)	23.10±3.30
		t = 3.31062 , p value 0.000499(Independent t test) F		
10	Family H/O Hypertension	Positive	369 (73.8%)	22±3.31
		Negative	131 (26.2%)	22.15±3.01
		t=2.166,p value 0.0153(Independent t test) F		

n=500, *= Non Significant, F = Significant

Among 500 patients 387 (77.4%) patients were literate and 113 (22.6%) patients were illiterate. The most patients were educated up to primary education 165 (33%) followed by 144 (28.8%), 73 (14.6%), 5 (1.0%) to secondary education, graduate and post graduate respectively. 289 (57.8%) patients have abnormal BMI and 9% patients had obesity. Also 5.6% patients were underweight.

The majority of patients 244 (48.8%) had diabetes for 1-5 years, followed by 120 (24.0%) were up to 1 year, 92 (18.4%) were between 6 to 10 yrs. 44 (8.8%) patients were more than 10 years duration.

Most of patients 218 (43.60) presented with Polydipsia / polyuria followed by 82 (16.40%) with Increased appetite, Tingling numbness [65(13.00%)], Weakness [60 (12.0%)], weight loss were [49 (9.80%)] and Burning Maturation [26 patients (5.2%)].

Majority of patients do not know about diabetes (267) 56.08% and followed by "Yes" (220) 41.8% and "No" (13) 2.12%." the majority of patients had "Knowledge regarding Complications of DM" 54.32% followed by "Don't know" 43.68% and "No" 2.08%." the patients were aware of self care practices in diabetes and responded to questionnaire as "yes", "do not know" and "no" respectively 60.96%, 36.8% 2.24% [TABLE-03]

Table No. 03

S.No.	Question	Patient's Responses		
		Yes %	No %	Don't Know %
1	Knowledge of DM	41.8%	2.12%	56.08%
2	Self-Care practice	60.96%	2.24%	36.8%
3	Knowledge regarding Complications of D M	54.32%	2.08%	43.68%

Majority of patient's awareness score with respect to "Knowledge of DM" was "Good" (74.6%) followed by "Fair" (24.4%) and "Poor" (1.0%)." Majority of patient's awareness score with respect to "Knowledge of self-care practice" was "Good" (80.8%) followed by "Fair" (18.8%) and "Poor" (0.4%)." Majority of patient's awareness score with respect to "Knowledge of complication" was "Good" (73.4%) followed by "Fair" (26.4%) and "Poor" (0.2%)" [TABLE-04]

Table No. 04 Distribution of respondents of according to awareness score

	Category	Patients		Family member	
		No % n=500	No % n=500	No % n=500	No % n=500
Knowledge of Diabetes among the group	Good (7-10)	373 (74.6%)	318 (63.6%)		
	Fair (4-6)	122 (24.4%)	172 (34.4%)		
	Poor (0-3)	5 (1.0%)	10 (2.0%)		
Knowledge of self-care practice for diabetes among the group	Good (7-10)	404 (80.8%)	392 (78.4%)		
	Fair (4-6)	94 (18.8%)	108 (21.6%)		
	Poor (0-3)	2 (0.4%)	0 (0.0%)		
Knowledge of Complications	Good (7-10)	367 (73.4%)	388 (77.6%)		
	Fair (4-6)	132 (26.4%)	112 (22.4%)		
	Poor (0-3)	1 (0.2%)	0 (0.0%)		

Discussion:

In present study of 500 diabetic cases had mean age of 53.98 ± 14.46 yrs. Our results were comparable with **Patel et al**⁹, who carried out study on 622 newly diagnosed type 2 diabetic patients & reported the mean age of 47.7 ± 10.9 years. **Abdollahiet al**¹⁰ reported Mean age of 48.8 ± 11.8 years in their study.

In our study the predominant patients were male with male to female ratio of 1.6 :1. These observations were comparable with studies carried by **Dutta et al**¹¹ where Male to Female ratio was 1.5:1. **Patel et al**⁹ study reported prevalence of DM was 62% in males and 38% in females. Another study by **Thakkar et al**¹² reported prevalence of DM was 58% in males and 42% females. Similarly **Santoshet al**¹³ reported prevalence 58.23% and 41.76% in male and female respectively. All these studies show more prevalence of diabetes among males than in females similar to our study.

The predominant patients were from urban area compared to rural area. This could be due to easier access to hospital for urban population, lower literacy and low socioeconomic condition. These findings were comparable with **Ramachandranet al**¹⁴ who reported

that age-standardized prevalence of diabetes and impaired glucose tolerance (IGT) in urban India in 2000 was 12.1% and 14.0%, respectively. Again **Ramachandranet al**¹⁵ reported prevalence of 18.6% in urban and 9.2% in rural population.

In accordance to our study, **Valdes et al**¹⁶, **Maty et al**¹⁷ found that low education is significant predictor of type 2 diabetes mellitus. In a cross sectional study of **Tang et al**¹⁸ people with less than high school diploma were almost twice as likely to report having diabetes as those with a bachelor degree or more.

Our study we found around 43% had positive family history of DM which was comparable to **Abdollahiet al**¹⁶ finding on 152 newly detected diabetic patients who reported 41.4% positive family history. **Ranganayaet al**¹⁹ reported that positive family history in 1/3 of newly detected diabetics. **Krahulecet al**²⁰ found 44.7% of newly detected diabetics had first degree relative with diabetes.

The observed average BMI was 23.27±3.45 kg/m² in present study was comparable to average BMI of 30±5.34 kg/m² in **Metriyeliet al**²¹ study. In studies done by **Mishra et al**²² and **Wang et al**²³ average BMI were 22.75±4.03kg/m² and 25kg/m² respectively.

Awareness was more than 52% in all three aspects that have been measured in patients. Similarly, **Mehta et al**²⁴ observed that majority of the subjects (82.1%) had knowledge about the disease. In our study, awareness regarding fasting and post prandial blood sugar, high fiber diet, foot care and ophthalmic complications was observed to be high in patients. **Chandalia et al**²⁵ conducted a case control study, where it was observed that, diabetics had more awareness about footwear, self-care (foot care) and knowledge of symptoms relating to diabetic foot than the non-diabetic controls though even in the diabetics the total average score was 57% indicating that there was scope for improving knowledge about prevention of diabetic foot disease.

In our study 54.32% patients were aware regarding renal, cardiac, ophthalmological and cerebral complications of Diabetes Mellitus. In the study conducted by **Mehta et al**²⁴ 42.9% were familiar with complications of diabetes. In a study conducted by **Mohan et al**²⁶ regarding awareness and knowledge of Diabetes in Chennai, only 19.0% of whole population knew that diabetes could cause complications. Among those aware of complications, foot problems (23.0%) and kidney disease (17.4%) were the most commonly reported complications. However **Munninarayanet al**²⁷ observed that 74.2% were aware that diabetes could produce some complications.

In our study 88.6% of respondents were not aware of HbA1c. Similarly, in a study conducted by **Gulabaniet al**²⁸ 94.1% patients did not know about glycosylated hemoglobin (HbA1c).

Females and unemployed individuals have lower awareness in our study. Similarly, **Gulabaniet al**²⁸ observed that the mean score in men was 2.84 points higher than that in women and the difference was found to be statistically significant. However, in study conducted in Nigeria it is observed that female patients are more knowledgeable.

Self-employed status, higher education, family history of DM and long duration of sickness had positive effect on the scores. Similarly **Adibe MO**²⁹ observed that patients who were attending or stopped at secondary school and patients who had lived many years with diabetes (>10 years) were more likely to be knowledgeable. Similar association with education and duration of disease was also observed in other studies.

Age, marital status and BMI had no effect on the scores. However **Adibe MO** observed that younger patients were more knowledgeable. Awareness level about management of Diabetes by medication and life style measures was observed to be relatively good, though knowledge about complications of Diabetes Mellitus were observed to be quite poor. **Deepa M et al**³⁰ in Chennai observed that even among self-reported diabetic subjects, knowledge about Diabetes including awareness of complications of Diabetes was poor (40.6%).

Self-care and practice related to Diabetes awareness among Diabetics found to be 60.96. Self-care and practices related to diabetes prevention among diabetics revealed that out of 95 diabetics, only 69.5% of diabetic subjects were using medication regularly, 68.4 were using regular footwear, 61.1% have their blood Glucose monitored

regularly, 55.8% made specific dietary changes, 34.7% consulted the physician regularly and 27.4% of diabetic subjects were doing regular exercise. Only 2.1% diabetic subjects had stopped, smoking alcohol intake and only 1.1% of diabetic subjects were making efforts to control weight. Studies by **Kauret al**³¹ in Chandigarh observed that 63.3% of diabetic patients were poor in practicing foot care through regular washing & monitoring of blood sugar was infrequent (46.7%). In our study 54.32% patients were aware of knowledge regarding complication of Diabetic Mellitus. Uncontrolled diabetes can affect Eye problem, kidney, heart, CNS. A study conducted by **Deepa M, et al**³² Knowledge of organs affected by diabetes in the four regions (Jharkhand, Maharashtra, Tamilnadu and Chandigarh). Among the general population who answered in the affirmative for the question "Do you think diabetes can affect?" (n=2946), the most common organs reported were the feet (54.0%), eyes (52.3%), kidneys (36.3%), heart (33.6%) and nerves (18.7%). Other reported complications included lung problems (19.6%), brain diseases (26.6%) and stomach disorders (16.9%). Among other subjects, the knowledge of Diabetic complications was comparatively better (eyes-73.5%, feet-61.3%, kidneys-47.9%, heart-45.1% and nerve problems-26.8%). It is disturbing that even among subjects with diabetes; this basic knowledge was still so poor.

In rural area the awareness about knowledge of diabetic mellitus was lower than in Urban areas more so in female similar to study result of **Deepa M et al**³².

Also **Deepa M et al**³² in their study reported lower awareness of diabetes in illiterates as in our study compared to individuals with primary education and above (literate)

Conclusion:

Implementation of universal screening and primary prevention programs to detect diabetes at an earlier stage before development of complications. Diabetes is another popular example where prevention is bound to be better than cure. We need to reach out to individuals who are not diagnosed from community. In the study awareness is not even in all aspects of the disease we need to develop a comprehensive health education programme where knowledge, self-care and complication of the disease are covered. The study reflects need for increasing diabetes awareness activities in the form of mass campaigns in both urban and rural areas. Media and Non-Government Organization's should come forward to take up this daunting task of removing misbeliefs, ignorance and instituting diabetes preventive measures in the community as per determinants the region. As it is impractical to screen an entire population, we can aim to screen 'risk groups' such as those with a high BMI or positive family history. This study shows a higher prevalence amongst these 'risk groups'. Study also reported that prevalence diabetes was more in younger age groups, urban areas, low educational status, past history of hypertension and addiction of tobacco so screening should be focused over these areas. Promotion of lifestyle modification will be the best primordial preventive measure which, in the long term, will considerably reduce the disease burden. There should be implementation of universal screening and primary prevention programs to detect diabetes at an earlier stage before development of complications.

Conflict of interest: Authors declare that there is no conflict of interest.

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