RESEARCH PAPER

Assessment of Awareness on Prevention of Complications of Diabetes Mellitus among Patients and Caregivers in a Tertiary Care Hospital, Ambala, Haryana

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ABSTRACT

Diabetes mellitus is a major global health problem, with rapidly increasing prevalence and significant complications affecting quality of life and healthcare systems worldwide. Despite advances in treatment, effective prevention of complications largely depends on patients' and families' awareness, lifestyle modification, and self-management practices, especially in resource-limited settings. India, including Haryana, bears a high burden of diabetes, highlighting the urgent need for preventive strategies through education and awareness.

Aim: This study aimed to assess the awareness of diabetic patients and their relatives regarding prevention of diabetic complications and its association with selected demographic variables.

Methods: A descriptive study was conducted to assess the awareness of diabetic patients and their relatives regarding prevention of diabetic complications and its association with selected demographic variables. Sample were selected by using purposive sampling technique. data were collected from 100 diabetic patients and their 100 diabetic patient's relatives in MMIMSR Mullana and MMCSR Sadopur, Ambala. Data was collected by using socio demographic variables and self-structured questionnaire.

Result: The findings of patients shows that (49%) are from 46 to 50 years, (56%) were males, (76%) were married, (45%) having primary education,(66%), don't know about the type of diabetes, (48%) having diabetes from 5 to 10 years,(94%) were on current medication,(49%) having family history of diabetes, (52%) having moderate level of physical activity, (58%) never smoked, (56%) never had alcohol,(50%) had weekly frequency of blood sugar check, (43%) having less than five hours sleep duration, (67%) doctor was the source of diabetes information, (54%) our on tablet and(56%) having hypertension as a comorbidity of diabetes mellitus. The findings of patient's relative shows that (40%) were of age group 36 -45 years, (59%) were male, (66%) were married, (48%) having blood relation with patient, (38%) having higher secondary education, (69%) were employed, (31%) having monthly income of 30,000 - 50,000, (55%) never smoked, (63%) never had alcohol, (81%) were from rural area. It shows that 64% of the patients has average awareness, 26% patients have below average awareness, 9% patients have above average and 1% patients has excellent awareness and 91% of diabetic patient's relatives has above average awareness, 6% diabetic patient's relatives have average and 3% diabetic patient's relatives having excellent awareness.

Conclusion: This study revels tat majority of diabetic patients and diabetic patient's relatives have average awareness of regarding the prevention of complications of diabetes mellitus.

Keywords: Awareness, prevention of complications, diabetes mellitus patients and their relatives.

How to cite this article: Ms Shikha Chaudhary, Ms. Simarjot Kaur, Ms. Simran, Mr. Shoryaman Singh, Mr. Shubham Thakur. (2026). Assessment of Awareness on Prevention of Complications of Diabetes Mellitus among Patients and Caregivers in a Tertiary Care Hospital, Ambala, Haryana. Int J Drug Deliv Technol. 2026;16(5s): 88-95. DOI: 10.25258/ijddt.16.5s.14

INTRODUCTION

Breastfeeding provides optimal nutrition and immunity, giving infants the best chance for survival, healthy growth, and brain development while reducing the risk of obesity and chronic diseases later in life. It also helps prevent infections, malnutrition, and mortality worldwide and supports natural birth spacing through lactational amenorrhea. Although widely promoted as lifesaving and normative, breastfeeding for the recommended duration remains underutilized, resulting in missed health benefits for both mothers and children.11 Menstruation is a normal biological process, yet poor menstrual hygiene—largely due to inadequate knowledge, resources, and socio-cultural taboos—poses a major public health challenge, especially among adolescent girls in India. These gaps lead to reproductive tract infections, psychological distress, school absenteeism, and reduced educational and social participation, disproportionately affecting girls from underprivileged backgrounds.12 Diabetes mellitus is a long-term condition that significantly affects quality of life and is among the most common and important disorders seen in clinical practice. Owing to its numerous complications and associated comorbidities, it currently poses a major global health risk. According to the 2024 International Diabetes Federation Diabetes Atlas, approximately 589 million adults aged 20–79 years are living with diabetes worldwide. World Health Organization (WHO) data further indicate that the global number of people with diabetes increased from around 200 million in 1990 to approximately 830 million in 2022 across all age groups. In 2021, the estimated prevalence of diabetes among adults aged 20–79 years was about 10.5%. In India, an estimated 89.8 million adults in this age group were living with diabetes as of 2024.8 The national average prevalence is ~11.4%. There are also ~136 million people with pre-diabetes.9 In Haryana, the weighted prevalence of diabetes is ~12.4%, which is slightly above the national average. There is a marked urban–rural difference: in urban areas ~17.9%, in rural areas ~9.5%1.

Across the world, many people with type 1 diabetes experience repeated episodes of low blood sugar, which can sometimes lead to unconsciousness and pose serious clinical challenges. For type 2 diabetes, treatment usually involves insulin injections or oral medicines that lower blood sugar. Although these medicines are effective, they often come with side effects. Understanding the causes, effects, and long-term course of diabetes has helped improve insulin and its analogues. However, achieving strict blood sugar control without problems like low blood sugar or weight gain is still a major challenge in diabetes management.2

The foundation of good diabetes care is helping individuals adopt and maintain healthy lifestyle habits. This includes medical nutrition therapy, regular physical activity, psychological support, and, where necessary, weight management and counselling on tobacco or substance use. These interventions are often delivered through Diabetes Self-Management Education and Support, which empowers people to take an active role in their own care. Over the past decade, there has been a rapid expansion of treatment options, ranging from lifestyle and behavioural interventions to glucose-lowering medications, medical devices, and surgery. While this gives both patients and health professionals more choices, it also makes treatment planning more complex. Some newer medications particularly GLP-1 receptor agonists and SGLT2 inhibitors offer benefits that go beyond blood sugar control. They help protect the heart and kidneys and reduce the overall burden of diabetes and its complications. These organ-protective effects occur largely independently of their glucose-lowering action. Originally designed to reduce blood glucose levels, these medications are now also used to protect the heart and kidneys, particularly in individuals at high risk for conditions such as atherosclerotic cardiovascular disease, heart failure, and chronic kidney disease.3

the U.S. National Diabetes Prevention Program reached nearly 500,000 people over the past ten years, which represents only a small portion of the 88 million individuals at risk. Limited public awareness of personal diabetes risk, weak coordination between healthcare providers and community-based services, and a shortage of program sites all contribute to low coverage. Participation and retention are particularly poor among racial and ethnic minorities, low-income groups, and younger adults, underscoring the influence of structural inequities. In addition, the modest reimbursement models available in the U.S. make it difficult to sustain programs and expand them to communities with the highest need. These realities highlight an urgent requirement to strengthen the reach, effectiveness, and equity of diabetes mellitus prevention efforts.

The International Diabetes Federation Atlas estimated that approximately 537 million people had diabetes mellitus in 2021, with projections indicating an increase to 643 million by 2030 and 783 million by 2045. In the same year, roughly 6.7 million individuals aged 20–79 died as a result of diabetes. This escalating global prevalence is one of the most concerning aspects of the disease, underscoring the importance of studying diabetes and the conditions that contribute to its development.4,

In low-resource settings, where the financial burden of diabetes mellitus (DM) is substantial, health education emerges as a cornerstone of care. Primary care physicians, who are often the first point of contact for both newly diagnosed and existing diabetic patients, play a pivotal role in this process. By delivering targeted education, these providers can help individuals adopt healthier lifestyles, maintain motivation for routine blood glucose monitoring, and understand the risks associated with uncontrolled diabetes. This proactive approach enables early detection and timely management, reducing the likelihood of costly complications and enhancing long-term outcomes.5

Equally important is educating patients about the prevention of diabetic complications. Patients and their family members play an essential role in the day-to-day management of diabetes, including dietary control, medication adherence, and lifestyle modifications. Primary care teams can guide individuals on foot care, blood pressure control, lipid management, smoking cessation, eye and kidney screening, and adherence to prescribed medications. Counselling on balanced nutrition, regular physical activity, stress reduction, and the importance of keeping scheduled follow-up visits reinforces positive behaviour change. Such comprehensive education improves patients' knowledge, attitudes, and self-management practices, which are essential for sustained glycaemic control and minimizing risks of complications such as neuropathy, nephropathy, retinopathy, and cardiovascular disease. Globally 589 million adults are suffering from diabeties mellitus in 2024, in India 100 million person suffering from diabeties mellitus and In Haryana 12.47 million suffering from diabeties mellitus in 2019. Based on these criteria, the study identified a need to assess awareness of diabetes mellitus. Moreover, in resource-limited settings, where the cost of complications imposes a heavy financial burden on individuals and the healthcare system, prevention through awareness is the most cost-effective strategy.(6)

The aim of this study was to assess the awareness of patients and their relatives regarding prevention of complications of diabetes mellitus patients attending the hospital. To find out the correlation between the diabetic patients and their relatives with selective demographic variables.

Materials and methods

A Purposive sampling study was conducted on November 2025 to January 2026 at tertiary care hospitals.

Inclusion criteria

Patients between 25 and 65 years of age with one or more of the following conditions; Diabetic patient and their relatives who give consent to take part in the study and present during the time of data collection.

Exclusive Criteria

Who were not present in the hospital and who were not have any diabetic disease in tertiary hospitals were excluded.

Belmont stated three broad principles on which standards of ethical conducts in research are based; beneficence, respect for human dignity, and justice. Ethical approval to conduct the study was obtained from the institutional ethical committee of MM University, Mullana, Ambala, Haryana. The formal permission for conducting final study was taken from the medical superintendent of M.M. Institute of Medical Sciences and Research, Mullana Ambala and M.M. College of Medical Sciences and Research, Sadopur, Ambala. Written informed consent was obtained from the study subjects regarding their willingness to participate in the research project. The purpose of research project was explained to the subjects and assurance of confidentiality was given. The most important & crucial aspect of any investigation is the collection of appropriate information, which provides necessary data for study, Data collection plans for quantitative studies ideas yield accurate, valid and meaningful data. This is a challenging goal, typically considerable time and effort to achieve.

Table No. 1.1 Tool and techniques

SELECTION	TOOL	TECHNIQUES
Section A	Selected Variables for patient	Paper and pencil (Interview)
Section B	Selected Variables for patient's relatives	Paper and pencil (Interview)
Section C	Structured Questionnaire	Paper and pencil (Interview)

SELECTED TOOL A : SELECTED VARIABLES FOR PATIENT

It was developed to find information regarding sample collection. It included 16 questions are filled by diabetic patient that is age, gender, marital status, educational level ,type of Diabetes, duration of Diabetes, Current Medication, family history, physical activity level, smoking status, alcohol Consumption, frequency of blood sugar check, sleep Duration, source of Diabetes information, type of medication used.

SELECTED TOOL B : SELECTED VARIABLES FOR PATIENT'S RELATIVES

S.NO.	CATEGORIES	SCORE
1	BELOW AVERAGE	0-05
2	AVERAGE	06-10
3	ABOVE AVERAGE	11-15
4	EXCELLENT	16-20

It was developed to find information regarding sample collection. It included 10 questions are filled by patient's relatives that is patient's relatives age, gender, marital status, relationship with patient, educational level of relative, occupation of relative, monthly income, smoking status, comorbidities of Diabetes mellitus, alcohol Consumption of patient.

TOOL C- STRUCTURED QUESTIONARE

Table 1.2 SCORE INTERPRETATION

Data collection is the formal procedure that researchers develop to guide the collection procedure of the data in standardized fashion. Formal permission was taken from the medical superintendent of MMIMSR Mullana Ambala and MMCMSR Sadopur, Ambala. Data collection was done on the month of December 2025. All the patients and relatives were assured about the confidentiality of their response given by them before the data collection. Purposive sampling technique was used for the patients and relatives of MMIMSR Mullana and MMCMSR Sadopur, Ambala, Haryana.

The data was obtained from the diabetic patients and their relatives.

Data analysis was planned to include descriptive and inferential statistics. **Descriptive statistics**- Frequency and percentage distribution, mean median, standard deviation.

Inferential statistics - Chi-square test and pie chart were used to depict the findings.

Results

Data were collected from the 100 diabetic patients. Table 1:3 Nearly half of the participants (49%) were aged 46–50 years, followed by 36–45 years (37%). Males constituted 56% of the sample, while females accounted for 44%. Most participants were married (76%), with smaller proportions widowed (12%), single (7%), and divorced (5%). Regarding education, 45% had primary education and 39% had higher secondary education. Only 10% had no formal education, while graduates and postgraduates comprised 3% each. Concerning diabetes type, 66% belonged to the "other" category, followed by Type 1 (13%), Type 2 (12%), and gestational diabetes (9%). Nearly half (48%) had diabetes for 5–10 years, while 31% had it for less than 5 years. The majority (94%) were on medication, predominantly oral tablets (54%). Combined therapy was used by 27%, insulin by 15%, and other treatments by 4%. About 49% reported a positive family history of diabetes. More than half (52%) engaged in moderate physical activity, while 28% had a sedentary lifestyle. Most participants had never smoked (58%) or consumed alcohol (56%). Weekly blood sugar monitoring was practiced by 50% of participants. Hypertension was the most common comorbidity (56%), followed by tuberculosis (22%) and chronic kidney disease (17%).

Table No. 1.3 **Frequency and percentage distribution of diabetic patients in selected variables. (n=100)**

Sr. No.	SELECTED VARIABLES OF DIABETIC PATIENTS	f	%
1.	**Age (in years).**		
1.1.	25-35 years.	02	2
1.2.	36- 45 years.	37	37
1.3.	46- 50 years.	49	49
1.4.	More than 50 Years.	12	12
2	**Gender**		
2.1.	Male.	56	56
2.2.	Female.	44	44
2.3.	Others.	0	0

3	**Marital Status**		
3.1.	Single.	07	07
3.2.	Married	76	76
3.3.	Divorced.	05	05
3.4.	Widowed.	12	12
4.	**Educational level**		
4.1.	No formal education.	10	10
4.2.	Primary.	45	45
4.3.	Higher Secondary.	39	39
4.4.	Graduate.	03	03
4.5.	Postgraduate.	03	03
5	**Type of Diabetes**		
5.1.	Type I.	13	13
5.2.	Type II.	12	12
5.3.	Gestational.	09	09
5.4.	Others.	0	0
5.5.	Don't know.	66	66
6	**Duration of diabeties mellitus since years**		
6.1.	Less than 5 years.	31	31
6.2.	5-10 years.	48	48
6.3.	11-15 years.	14	14
6.4.	More than 15 years.	07	07
7.	**Current Medications**		
7.1.	Yes	94	94
7.2.	No	06	06
8	**Family History of Diabetes**		
8.1.	Yes	49	49
8.2.	No	37	37
8.3.	Don't Know.	14	14
9	**Physical activity level of patient**		
9.1.	Secondary.	28	28
9.2.	Moderate.	52	52
9.3.	Active.	18	18
10.	**Smoking status of patient**		
10.1.	Never	58	58
10.2.	Regular.	33	33
10.3.	Occasionally.	09	09
11.	**Alcohol consumption of patient**		
11.1.	Never	56	56
11.2.	Regular	28	28
11.3.	Occasionally	16	16
12.	**Frequency of Blood Sugar Checking**		
12.1.	Daily	22	22
12.2.	Weekly	50	50
12.3.	Monthly	18	18
12.4.	Occasionally	10	10
13	**Sleep Duration of patient**		
13.1	<5 hours	43	43
13.2	5-7 hours	42	42
13.3	7-9 hours	12	12
13.4	> 9 hours	10	10
14	**Source of Diabetes Information**		
14.1	Doctor	67	67
14.2	Internet	14	14
14.3	Family	10	10
14.4	Media	07	07
14.5	Other	02	02
15	**Type of medication used by the patient**		

15.1	Tablet	54	54
15.2	Insulin	15	15
15.3	Combined	27	27
15.4	Others	04	04
16	**Comorbidities of diabetic's patient**		
16.1	Hypertension	56	56
16.2	Tuberculosis	22	22
16.3	Chronic kidney disease	17	17
16.4	Coronary artery disease	05	05

The table 1.4 depicts the distribution of participants according to selected demographic variables using frequency and percentage. Most participants were aged 36–45 years (40%), followed by 46–50 years (26%). Males constituted 59% of the sample, and the majority were married (66%). Regarding relationship, 28% were relatives, 20% friends, and 4% neighbours. Educational status showed 38% with higher secondary education, followed by primary education (28%). Most participants were employed (69%), with others being retired, students, homemakers, or unemployed. Monthly income predominantly ranged between ₹30,001–₹50,000 (31%). Most participants were non-smokers (55%), non-alcohol consumers (63%), and belonged to rural areas (81%).

Table 1.4 **Frequency and percentage distribution of diabetic patient's relatives in selected variables. (n=100)**

Sr. No.	SELECTED VARIABLES OF DIABETIC PATIENT'S RELATIVES	f	%
1.	**Age (in years)**		
1.1.	25-35 years	**19**	19
1.2.	36- 45 years	**40**	40
1.3.	46- 50 years	**26**	26
1.4.	More than 50 Years	**15**	15
2	**Gender**		
2.1.	Male	59	59
2.2.	Female	38	38
2.3.	Others	0	0
3	**Marital Status**		
3.1.	Single	12	12
3.2.	Married	66	66
3.3.	Divorced	06	06
3.4.	Widowed	16	16
4.	**Relationship with patient**		
4.1.	Blood relation	48	48
4.2.	Relative	28	28
4.3.	Friend	28	28
4.4.	Neighbour	04	04
5	**Educational level of patients relative**		
5.1.	No formal education	13	13
5.2.	Primary	28	28
5.3.	Higher Secondary	38	38
5.4.	Graduate	19	19
5.5.	Post graduate	02	02
6	**Occupation of patient's relatives**		
6.1.	Employed	69	69
6.2.	Unemployed	06	06
6.3.	Retired	09	09
6.4.	Student	05	05
6.5	Homemaker	09	09
6.6	Others	16	16
7.	**Monthly Income of patient's relatives**		
7.1.	<10,000	21	21
7.2.	10,001-30,000	28	28
7.3.	30,001- 50,000	31	31

7.4.	>50,000	20	20
8	**Smoking Status of patient's relative**		
8.1.	Never	55	55
8.2.	Formal	29	29
8.3.	Occasionally	16	16
9	**Alcohol Consumption of patient's relatives**		
9.1.	Never	63	63
9.2.	Formal	26	26
9.3.	Occasionally	11	11
10.	**Place of Residence**		
10.1.	Rural	81	81
10.2.	Urban	19	19

The Table No. 1.5 illustrates the frequency and percentage distribution of diabetes mellitus patients based on their level of awareness regarding prevention of diabetic complications. Awareness scores ranged from 0 to 20, with higher scores indicating better knowledge. The majority of patients (64%, n=64) had an average level of awareness, scoring between 6 and 10. About 26% (n=26) demonstrated below-average awareness (scores 0–5), indicating inadequate knowledge. Only 9% (n=9) showed above-average awareness (scores 11–15). A very small proportion (1%, n=1) attained excellent awareness with scores between 16 and 20. Similarly, most patients' relatives (64%, n=64) had an average level of awareness. Below-average awareness was observed in 26% (n=26) of relatives, while 9% (n=9) showed above-average awareness. Only 1% (n=1) of relatives demonstrated excellent awareness. Overall, the findings highlight the need for targeted education for both patients and their relatives to prevent diabetic complications. Among diabetic patients, scores ranged from 3 to 17, with a mean of 1.85 ± 0.60 and a median of 2.00, indicating moderate awareness.

Relatives showed scores ranging from 7 to 18, with a higher mean of 1.97 ± 0.30 and a median of 2.00. Overall, both groups had comparable median awareness, while relatives demonstrated slightly higher and more consistent awareness levels.

Table No 1.5 **Frequency and percentage distribution to assess the awareness of diabeties patients and patient's relatives regarding prevention of complications of diabetes mellitus patient. (n=100)**

S.NO.	CATEGORIES	SCORE	Diabetic patient's		Diabetic patient's relatives	
			f	%	f	%
1.	Below average	0-05	26	26	0	0
2.	Average	06-10	64	64	6	6
3.	Above average	11-15	9	9	91	91
4.	Excellent	16-20	1	1	3	3

Minimum Score = 0 **Maximum Score = 20**

The findings depict no significant association between awareness regarding prevention of diabetic complications and selected demographic variables among diabetic patients. No significant association was observed with age, gender, marital status, education, type and duration of diabetes, medication, lifestyle factors, comorbidities, or sources of information. Similarly, awareness levels among patients' relatives showed no significant association with demographic and socioeconomic variables. Variables such as age, gender, marital status, relationship with patient, education, occupation, income, lifestyle habits, and residence were not significantly related to awareness. Hence, the null hypothesis was accepted for both patients and their relatives, indicating no significant association with selected variables.

DISCUSSION

The findings of the present study highlight that most diabetes mellitus patients and their relatives had a moderate level of awareness regarding the prevention of diabetic complications, while a considerable proportion demonstrated inadequate knowledge. Only a small number of patients and relatives exhibited a high level of awareness, indicating the need for strengthened educational interventions. These findings are consistent with the study conducted by Ibrahim B. Ahmed et al. (2019) in Saudi Arabia, which reported that better knowledge of diabetes was associated with improved awareness and preventive practices related to complications. Similarly, the study by Nabina Paneru and Raj Devi Adhikari (2019) in Kathmandu demonstrated that higher knowledge levels—influenced by education, economic status, and diabetes counselling—were significantly associated with better awareness of complication prevention. The present results are also supported by Muthupriya and A.R. Bharathi, who found

that education on lifestyle modification, diet, exercise, and yoga improved glycaemic control and reduced the risk of diabetic complications. Likewise, Christiana Asiedu et al. (2024) in Ghana reported a positive association between knowledge and the adoption of preventive measures among patients with diabetes mellitus. Overall, the discussion suggests that adequate knowledge plays a vital role in enhancing awareness and preventive practices related to diabetic complications. The similarity of findings across different settings emphasizes the importance of continuous patient and family education as a key strategy in preventing diabetes-related complications.(7,8,9,10)

CONCLUSION

Patient with diabetes mellitus and their relatives have average awareness due to this the diabetic patients and their relatives have very less awareness about the prevention of diabeties mellitus.

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