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Mt. Farida Khatun
Senior Staff Nurse, Upazila
Health Complex Singra,
Natore, Bangladesh

Sadiya Aktar Sukhi
Senior Staff Nurse, 250 Bedded
District Hospital,
Chapainawabganj, Bangladesh

Mst. Afroza Khatun
Senior Staff Nurse, Upazila
Health Complex Godagari
(Premtoli), Rajshahi,
Bangladesh

Mousomi Akhter
Senior Staff Nurse, Mugda
Medical College and Hospital,
Dhaka, Bangladesh

Maksuda Aktar
Senior Staff Nurse, Shaheed
Ziaur Rahman Medical College
Hospital, Bogura, Bangladesh

Mst. Jakera Khatun
Senior Staff Nurse, Shaheed
Ziaur Rahman Medical College
Hospital, Bogura, Bangladesh

Nipa Aktar
Senior Staff Nurse, Upazila
Health Complex Sariakandi,
Bogura, Bangladesh

Mukti Rani
Senior Staff Nurse, Upazila
Health Complex Kahaloo,
Bogura, Bangladesh

Corresponding Author:
Mt. Farida Khatun
Senior Staff Nurse, Upazila
Health Complex Singra,
Natore, Bangladesh

Assessment of Nurses' Knowledge and Practice regarding the Management of Type 2 Diabetes Mellitus at 250 Bedded Mohammad Ali Hospital, Bogura, Bangladesh

Mt. Farida Khatun, Sadiya Aktar Sukhi, Mst. Afroza Khatun, Mousomi Akhter, Maksuda Aktar, Mst. Jakera Khatun, Nipa Aktar and Mukti Rani

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Abstract

Background: Diabetes mellitus is one of the most common chronic diseases in nearly all countries, and continues to increase in numbers and significance, as changing lifestyles lead to reduced physical activity, and increased obesity. Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by elevated blood glucose levels due to insulin resistance and/or impaired insulin secretion. It is a major global public health issue, affecting approximately one in ten adults worldwide, and contributes to significant morbidity and mortality rates, with thousands of deaths occurring daily due to diabetes-related complications². According to the World Health Organization, over 80% of deaths related to diabetes now occur in low- and middle-income countries, where it is especially prevalent among individuals of low socio-economic status⁴.

Objective: The aimed was to assess the level of nurses knowledge and practice regarding the management of type 2 diabetes mellitus at 250 Bedded Mohammad Ali Hospital, Bogura.

Methodology: This was a descriptive cross sectional study design was used and sample size 110 that was purposive sampling technique followed those who meet the inclusion criteria and the study was conducted from December 2024 to May, 2025. The instruments for data collection were a semi-structured questionnaire which composed of three parts: Demographic related variables, knowledge and practice based information on the management of type 2 diabetes mellitus.

Results: The present study findings revealed that the socio demographic characteristics of the highest 44% were within 40-45 years; 89% were female; 82% were Islam; 91% were married; 44% were diploma in nursing; and 31% were within >20 yrs of length of service and the main findings of the present study revealed that the average level of knowledge 10% were high level of knowledge, 50% were moderate level of knowledge and 40% were low level of knowledge about the knowledge and in relation to practice average level of practice 10% were high level of practice, 50% were moderate level of practice and 40% were low level of practice on type- 2 diabetes mellitus. Similarly, A conducted by Emami, *et al.*, (2019) reported that the Overall nurses moderate level of practice on the Type -2 diabetes mellitus patients' management¹⁸.

Conclusion: The study highlights the strengths and gaps in nurses' knowledge and practices regarding the type 2 diabetes mellitus patients' management in a district hospital in Bangladesh. Nurses were 50% were moderate level of knowledge and 50% were moderate level of practice of type 2 diabetes mellitus patients' care was positive. However, the findings of the study indicated that there is a half percent of knowledge deficit of nurses in some aspects related to type 2 diabetes mellitus patients' management. These findings suggest that a better education strategy for nurses as in-service education, workshop and training is needed to understand the importance of practicing Type 2 diabetes patients' management and improving their knowledge that confidence their practice.

Keywords: Knowledge, Practice, Type 2 diabetes mellitus

Introduction

Diabetes mellitus (DM) is a group of metabolic diseases characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both ^[1]. Globally, 366 million people had DM in 2011; by 2030, this would have risen to 552 million

[2]. In Bangladesh, the economic burden of Type 2 Diabetes Mellitus (T2DM) is significant, with an average annual cost per patient estimated at US\$864.70, primarily due to medication and hospitalization expenses, and influenced by factors such as gender, insulin use, diabetes duration, and the presence of complications [3]. It is one of the most prevalent non-communicable diseases worldwide and can lead to serious complications such as cardiovascular disease, kidney failure, neuropathy, and vision impairment if not properly managed [4]. Nurses play a central role in the effective management of Type 2 Diabetes Mellitus (T2DM), as they are often the primary healthcare providers interacting with patients daily. They are responsible for educating patients about the disease, including the importance of diet, exercise, and adherence to medication regimens, which directly impacts glycemic control and the prevention of complications [5]. Nurses also monitor blood glucose levels, assess for signs of hypo- or hyperglycemia, and assist with the administration of medications such as insulin or oral hypoglycemic agents, ensuring treatment protocols are correctly followed [6]. In addition, they provide guidance on lifestyle modifications, reinforce self-care behaviors, and offer psychosocial support, helping patients manage stress and anxiety associated with living with a chronic condition. Through these roles, nurses contribute not only to better clinical outcomes but also to improved patient knowledge, self-efficacy, and quality of life, highlighting the importance of their knowledge and practice in diabetes care [5]. Adopting a balanced diet rich in whole grains, vegetables, lean proteins, and healthy fats, while limiting refined sugars and processed foods, is essential for managing T2DM. Clinical guidelines emphasize that weight loss through nutrition and physical activity is fundamental to type 2 diabetes management. Consistent evidence has indicated that intentional weight loss reduces blood glucose in people with type 2 diabetes and improves most other major cardiometabolic risk factors [7]. Engaging in regular physical activity, such as brisk walking or aerobic exercises, for at least 150 minutes per week, can improve insulin sensitivity and aid in weight management. Overwhelming evidence shows that lifestyle changes—namely, improvements in physical activity and diet, leading to weight loss—reduce diabetes risk significantly. Randomized controlled trials have shown that lifestyle interventions focused on physical activity, healthy diets, and weight loss can reduce diabetes risk by 58% in people with impaired glucose tolerance [8]. Achieving and maintaining a healthy weight through diet and exercise can significantly enhance blood glucose control and reduce the risk of complications. Weight loss for the prevention of T2DM has been shown to be an effective strategy as it has been found to improve insulin secretion; it has also been suggested intervention for patients with T2DM who are overweight or obese. Evidence from several prominent studies has supported the notion that weight loss is associated with a decreased risk of developing T2DM [8]. Effective diabetes self-management education and support (DSMES) are pivotal in improving health outcomes. The individuals who participate in DSMES programs experience better dietary habits, enhanced glucose management, and a reduction in long-term complications [9]. Health promotion and wellness programs also have great potential to decrease diabetes complications. Because of frequent contact with patients, nurses can provide nutrition, physical activity, and stress management

interventions [10, 11]. This study aimed to evaluate the knowledge, attitudes, and practices (KAP) of nurses concerning the management of Type 2 Diabetes Mellitus (T2DM) at the 250-Bedded Mohammad Ali Hospital in Bogura, Bangladesh.

Methodology and Materials

The study aimed to assess nurses' knowledge and practice regarding the management of type 2 diabetes mellitus patients at the 250 Bedded Mohammad Ali Hospital, Bogura. A descriptive cross-sectional design was adopted to achieve this objective. The research was conducted at the same hospital, and the study population included all nurses working there. This study was carried out from December 2024 to May 2025 for completion of this study. From the Medicine, Surgery, and Orthopedic departments, 110 nurses were selected as participants. The sample size was determined using a statistical formula, and a non-probability purposive sampling technique was applied based on specific inclusion and exclusion criteria.

Inclusion Criteria

- Nurses working in the selected departments of the hospital.
- Nurses willing to participate in the study.
- Nurses with at least six months of work experience in the hospital.

Exclusion Criteria

Nurses who were not available during data collection.

Ethical Considerations

First, the research proposal was approved by the Ethical Committee of Bogura Nursing College, Bogura. Before data collection, a permission letter issued by the Principal of Bogura Nursing College was submitted to the Director of the 250 Bedded Mohammad Ali Hospital, Bogura. A covering letter was attached to each questionnaire, explaining the purpose and details of the study to the respondents. Participation was voluntary, and informed written consent was obtained from each participant. The right to decline or withdraw from the study at any stage without any penalty was clearly explained. Participants were assured that all data would remain confidential, coded for anonymity, and securely stored with access restricted to the researchers only.

Data Collection Procedure

A semi-structured questionnaire was developed by the researchers based on the objectives and variables of the study. The instrument was divided into three parts to collect data from the respondents. Part I included demographic information such as age, gender, religion, marital status, professional qualifications, monthly income, and length of service. Part II consisted of 14 multiple-choice questions assessing knowledge related to type 2 diabetes mellitus, measured by a percentage-based scoring system. Part III included 10 practice-related questions on type 2 diabetes mellitus, measured using a checklist scale, with responses evaluated by percentage scores for each item. The scoring system for the knowledge-based questionnaire was as follows:

High level of knowledge: Respondents scoring between 80-100% on the 14 knowledge questions.

Moderate level of knowledge: Respondents scoring between 60-79% on the 14 knowledge questions.

Low level of knowledge: Respondents scoring below 59% on the 14 knowledge questions.

Data were collected by the researchers at the participants' workplace, at times convenient for them, through face-to-face interviews.

Statistical Analysis

Collected data were checked, organized, and manually edited to identify and correct omissions or inconsistencies. The cleaned data were compiled into a master sheet and analyzed using simple descriptive statistics. Data analysis was carried out both manually and with computer assistance in Microsoft Excel. The results were presented in tables and figures (bar charts and pie charts) and interpreted in terms of percentages according to the study variables. The study findings were presented in tables and bar charts along with detailed interpretation.

Results

Table 1 demonstrated that the majority of participants 44% were aged between 40-45 years, followed by 25% in the 30-34 years group and 20% in the 35-39 years group, with a mean age falling in the mid-thirties. Most respondents were female 89%, while 11% were male. Most of them practiced Islam, 82%, Hinduism 14% and Christianity, 4%. In terms of educational qualification, 44% held a Diploma in Nursing, 36% had a Bachelor of Science in Nursing, and 20% completed a Master's degree, MSN/MPH. Monthly income distribution showed that 36% earned above 40,000 BDT, while 32% each earned 20,000-30,000 BDT and 30,000-40,000 BDT. A large proportion of the participants were married 91%, and only 9% were unmarried. Figure 1 illustrates the distribution of respondents according to their length of service. Predominantly, 31% had less than 10 years of professional experience, whereas an equal proportion, 31% had more than 20 years of service. Additionally, 21% of respondents had less than 5 years of experience, and 17% had between 10 to 20 years of service. This distribution reflects that a significant number of respondents were relatively experienced, with a substantial proportion having served for more than a decade in the nursing profession. Table 2 shows that most nurses 91%

knew about T2DM, with 60% identifying it as high blood sugar and 20% citing insulin deficiency. About 64% knew normal fasting glucose levels, 53% emphasized diet and exercise, and 38% mentioned insulin resistance as the main cause. Non-modifiable factors 61% were key risk factors, and polyuria 81% was the most recognized symptom. As shown in Table 3, fasting blood sugar 60% was the main diagnostic test, and insulin therapy 61% with nutritional support 72% were common management practices. Hypoglycemia 81% and retinopathy 40% were noted as short- and long-term complications, although tight glucose control 60% and exercise 44% were key preventive measures. According to Table 4, 50% of nurses had moderate knowledge, and 40% low practice levels. Table 5 shows 80% provided diabetes education, but fewer addressed psychological care 35% or glucose monitoring 29%, indicating gaps in practice.

Table 1: Demographic characteristics of the study population (n=110)

Variables	Frequency (n)	Percentage (%)
Age (years)		
25-29	12	11
30-34	28	25
35-39	22	20
40-45	48	44
Gender		
Male	12	11
Female	98	89
Religion		
Islam	90	82
Hindu	16	14
Christian	4	4
Educational Qualification		
Diploma in Nursing	48	44
BSc in Nursing	40	36
MSN/MPH	22	20
Monthly Income		
<20000	0	0
20000-30000	35	32
30000-40000	35	32
>40000	40	36
Marital Status		
Married	100	91
Unmarried	10	9

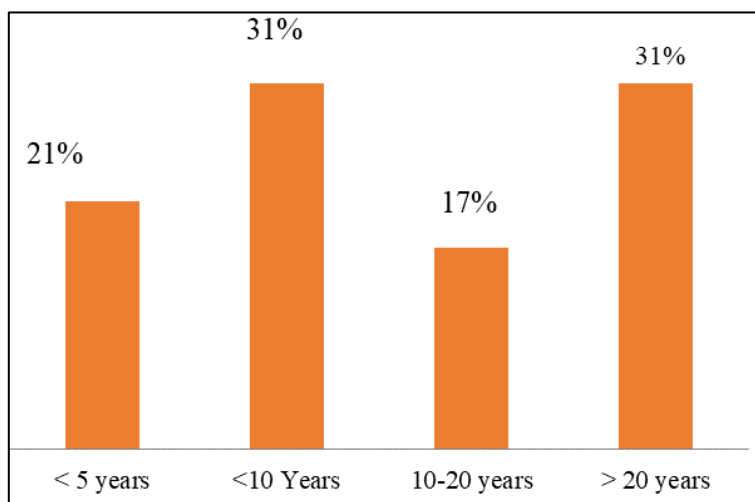


Fig 1: Distribution of respondents by length of service (n=110)

Table 2: Awareness and understanding of type 2 diabetes mellitus among respondents (n=110)

Variables	Frequency (n)	Percentage (%)
Idea about Type 2 Diabetes Mellitus		
Yes	100	91
No	10	9
Meaning of Type 2 Diabetes Mellitus		
The leading to high blood sugar	66	60
The inability to produce enough insulin	22	20
Manage blood glucose levels effectively	8	7
The blood sugar level constantly high	14	13
Normal Value of Fasting Blood Sugar Level (mg/dL)		
70-99	70	64
120-150	32	29
200-250	7	6
Above 300	1	1
Controlling Measurement		
Diet and exercise	58	53
Regular medical monitoring of blood glucose	38	35
prevent of complications	6	5
Improve quality of life	8	7
Primary Cause		
Combination of genetic factors	26	24
Insulin resistance and beta cell dysfunction	42	38
Impaired insulin function	25	23
Life style and environmental factors	17	15
Risk Factors		
Modifiable risk factors (overweight, physical inactivity, smoking)	26	24
Non-modifiable risk factors (age, family history)	68	61
Other health related risk factors (high blood pressure, high cholesterol, fatty liver)	12	11
Gestational diabetes mellitus	4	4
Common Sign and Symptoms		
Polyuria	89	81
Polyphagia	12	11
Slow wound healing	3	3
Blurred vision	6	5

Table 3: Respondents' knowledge on diagnostic tests, management, and complications of type 2 diabetes mellitus (n=110)

Variables	Frequency (n)	Percentage (%)
Common Diagnostic Test of Patients		
Fasting blood sugar (FBS)	66	60
Oral glucose tolerance test (OGTT)	2	2
Glycated hemoglobin (HbA1c)	7	6
Random blood sugar (RBS)	35	32
Medical Management of Patients		
Lifestyle modifications (Diet, exercise, weight loss)	23	21
Pharmacological (1st line: metformin, 2nd line agents: liraglutide etc)	18	16
Insulin therapy	67	61
Treatment of co-morbidities & risk factors	2	2
Nursing Management of Patients		
Regular assessment (monitor vital sign, blood glucose level)	12	11
Medication administration & nutritional support	79	72
Patient education & foot care	9	8
Preventive measures of complications	10	9
Short-term Complication of Patients		
Hypoglycemia (low blood sugar)	89	81
Hyperglycemia (high blood sugar)	15	14
Hyperosmolar hyperglycemic state	1	1
Infections	5	4
Long term Complication of Patients		
Diabetic retinopathy	44	40
Diabetic nephropathy	18	16
Cardiovascular diseases	16	15
Diabetic foot complications	32	29
Preventive Measure for Complications of Patients		
Tight glucose control	66	60
BP & lipid control	12	11
Regular screening	22	20

Healthy lifestyle	10	9
The Recommended Level of Physical Activity		
30 minutes, 1 day / week	32	29
20 minutes, 3 days/ week	30	27
150 minutes/ week	48	44

Table 4: Average levels of knowledge and practice among respondents (n=110)

Items	Frequency (n)	Percentage (%)
Average Level of Knowledge		
High	3	21
Moderate	7	50
Low	4	29
Average Level of Practice		
High	1	10
Moderate	5	50
Low	4	40

Table 5: Frequency distribution of nurses' practices on diabetes education and management (n=110)

Practice Area	Always, n(%)	Often, n (%)	Sometimes, n (%)
Nurses' role in diabetes education	88 (80.00)	7 (6.00)	15 (14.00)
Address psychological aspects	39 (35.00)	6 (5.00)	65 (60.00)
Instruct on diabetic nutrition	82 (75.00)	8 (7.00)	20 (18.00)
Provide nutrition information	56 (51.00)	6 (5.00)	48 (44.00)
Teach glucose monitoring use	32 (29.00)	4 (4.00)	74 (67.00)
Emphasize regular checkups	66 (60.00)	24 (22.00)	20 (18.00)
Stress importance of foot care	38 (35.00)	17 (15.00)	55 (50.00)
Advise medical consultation	46 (42.00)	9 (8.00)	55 (50.00)
Recommend balanced diet	76 (69.00)	2 (2.00)	32 (29.00)
Involve family in counseling	32 (29.00)	14 (13.00)	64 (58.00)

Discussion

Among 110 respondents, most nurses were aged between 40-45 years (44%), indicating a mature workforce with substantial experience. A similar age predominance was observed in the study by Alotaibi *et al*, where the majority of nurses managing diabetes were in their late 30s to early 40s ^[12], suggesting that mid-career nurses form the backbone of diabetes care in many hospitals. Females constituted 89% of respondents and males 11% in this study, a distribution that closely matches national nursing workforce data for Bangladesh, where nurses are overwhelmingly female ^[13]. Most respondents were Muslim (82%), married (91%), and held either a Diploma in Nursing (44%) or a BSc in Nursing (36%) in our study. Workforce policy analyses and hospital surveys note that although BSc seats have increased, diploma holders remain numerically dominant among practicing nurses because of historical intake patterns and slower turnover into degree programs ^[14]. No respondents reported income <20,000 BDT; 32% reported 20,000-30,000 BDT, 32% 30,000-40,000 BDT, and 36% >40,000 BDT. Study found that earning medium income were significantly associated with having good knowledge of self-care regarding diabetes ^[15]. In this study, nurses with <10 and >20 years of experience showed higher knowledge and practice regarding type 2 diabetes management compared to mid-career nurses. Similar findings were reported in other studies ^[16,17]. The present study revealed that the majority (91%) of nurses had an idea about type 2 diabetes mellitus (T2DM), indicating good basic awareness. This finding is consistent with Farzaei *et al*, who found most of nurses had general knowledge of diabetes ^[18], reflecting increasing educational exposure among nursing staff. Regarding understanding, 60% correctly identified diabetes as a condition leading to high blood sugar, while 38% recognized insulin resistance and

beta-cell dysfunction as primary causes. In this study, 64% correctly identified the normal fasting blood sugar range (70-99 mg/dL), similar to Alotaibi *et al*, where majority of nurses demonstrated accurate knowledge of diagnostic criteria ^[12]. Diet and exercise were the most commonly reported control measures (53%), consistent with Shrivastava *et al*, who emphasized nurses' recognition of lifestyle modification as the cornerstone of diabetes management ^[19]. Moreover, 81% identified polyuria as a common symptom in the present study. The present study demonstrated that most nurses (60%) correctly identified fasting blood sugar (FBS) as the common diagnostic test for T2DM, whereas only 6% mentioned HbA1c testing, indicating limited awareness of advanced diagnostic measures. This aligns with Albagawi *et al*, who found that Saudi nurses had good knowledge of basic diabetes testing but lacked understanding of HbA1c interpretation ^[16]. Regarding management, 61% recognized insulin therapy and 21% mentioned lifestyle modification, comparable to findings by Elmahdy and Anwer (2024), where majority of nurses highlighted insulin therapy as the main treatment ^[20]. In terms of nursing management, 72% emphasized medication administration and nutritional support. Awareness of short-term complications such as hypoglycemia (81%) was high, consistent with Alotaibi *et al* ^[12], while recognition of long-term complications like diabetic retinopathy (40%) and foot complications (29%) was moderate. Most respondents (60%) identified tight glucose control as the main preventive measure. However, knowledge about optimal physical activity (150 minutes/week) was limited (44%), suggesting a need for continuous professional education. We found that half of the nurses demonstrated a moderate level of knowledge (50%) and practice (50%) regarding diabetes management, and only 21% and 10% showed high knowledge and practice,

respectively. These findings align with Albagawi *et al*, who reported that most nurses had moderate knowledge and limited confidence in diabetes care ^[16], and with Elmahdy and Anwer (2024), who found that nurses had moderate performance in nutritional and educational aspects of diabetes management ^[20]. Regarding practice areas, 80% of nurses actively participated in diabetes education, and 75% instructed patients on diabetic nutrition. However, fewer nurses consistently addressed psychological aspects (35%) or involved family counseling (29%), reflecting that psychosocial support and family engagement were often neglected in diabetes care. The emphasis on balanced diet (69%) and regular checkups (60%) shows positive engagement but also highlights areas needing continued professional training for holistic patient-centered management.

Limitations of the study

- This study was conducted at only one hospital, so it does not reflect features of all hospital in Bangladesh.
- There was no allocated budget for conducting the research project.
- The study only focused on the assessment of knowledge level but not the attitude and practice of nurses.
- The study was conducted only among nurses but not all the health workers.

Conclusion And Recommendations

In conclusion, this study highlights both the strengths and gaps in nurses' knowledge and practices regarding the management of type 2 diabetes mellitus patients in a district hospital in Bangladesh. Findings revealed that 50% of nurses had a moderate level of knowledge and practice, while notable knowledge deficits remained in certain aspects of diabetes care. These results emphasize the need to review nursing curricula to ensure adequate diabetes-related education. Moreover, continuous professional development through in-service education, workshops, and targeted training programs is essential to enhance nurses' understanding, counselling abilities, and documentation practices. Strengthening these areas will not only improve nurses' confidence and competence but also contribute to better management and outcomes for patients with type 2 diabetes mellitus.

Recommendations

- Special training on the management of type 2 diabetes mellitus at is recommended for the nurses and refresher training frequently.
- Concerned authority should give more emphasis on monitoring to the all ward.
- Arrange workshops and seminars on the management of type 2 diabetes mellitus at to update nurses' knowledge.
- Provide regular updated medical information through monthly meeting from the higher authorities to the nurses.

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Conflict of interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

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