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Knowledge and awareness about diabetes mellitus among the rural population attending a tertiary care hospital in Jumla district

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Abstract

Introduction: Diabetes mellitus affects over 463 million adults globally, projected to reach 700 million by 2045, with Nepal showing 8.5% prevalence, particularly burdening rural regions. This study assesses diabetes knowledge among rural patients attending Karnali Academy of Health Sciences to inform targeted interventions.

Method: This was a cross-sectional study that enrolled 420 rural patients (who may not be diabetic) via systematic random sampling at the General Practice Clinic of the tertiary care center of tertiary care center of Jumla, from June 15 to October 15, 2025. Data were collected using a structured, pretested, and pre-validated questionnaire administered by trained study team members. Analysis used descriptive statistics (frequencies, percentages for categorical variables; normality-tested continuous variables) in SPSS v16 following IRC-KAHS ethical clearance.

Result: Among 420 rural participants (median age 30 years, IQR 12), universal diabetes awareness existed (100%), but knowledge was poor: 160(38.1%) knew less than 2 symptoms, 16(3.8%) recognized hypoglycemia, and 20(4.8%) knew complications. Only 63(15%) understood lifestyle modification benefits and 239(56.9%) linked obesity to diabetes, while none owned glucometers, performed regular monitoring, or knew fasting/postprandial targets; 81(21.9%) reported/would use alternative medicines and 206(49%) believed diabetes curable.

Conclusion: This study revealed widespread awareness of diabetes among 420 rural patients in Jumla; however, significant deficiencies were identified in recognizing symptoms, understanding complications, and awareness of lifestyle modifications, and there was a complete absence of home glucose monitoring.

Keywords: Awareness; Diabetes Mellitus; General Practice; Knowledge; Nepal; Rural population

INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia, resulting from defects in insulin secretion, insulin action, or both.¹ The global prevalence of diabetes has ascended dramatically, with over 463 million individuals affected worldwide, a figure projected to reach 700 million by the year 2045.² The burden of this condition is particularly escalating in low- and middle-income countries, including Nepal, where recent estimates suggest that approximately 8.5% of adults are affected by diabetes.²

Rural populations, such as those inhabiting Karnali and other remote regions, frequently encounter unique challenges in diabetes awareness and management. Research conducted in rural India in Tamaka village indicated that while approximately half of the population knew of diabetes symptoms, three-quarters were uninformed about its long-term complications and appropriate diabetic care.³ Similarly, in rural Arunachal Pradesh, only about 21% of the population demonstrated an awareness of diabetes, thereby highlighting a significant knowledge gap.⁴ A survey conducted in rural Bangladesh revealed a significant lack of diabetes knowledge, low testing rates, and rare glucose monitoring among diagnosed diabetics, underscoring the urgent need for widespread awareness and prevention efforts.⁵

Given the escalating prevalence of diabetes and the documented low levels of awareness within rural populations, it is imperative to assess knowledge and understanding regarding DM among rural patients attending tertiary care centres. Such assessments yield invaluable insights for formulating targeted educational interventions and health policies to improve diabetes prevention, early diagnosis, and management in underserved regions, such as Karnali.

This study aims to address this knowledge gap by evaluating the level of diabetes awareness among rural patients attending the General Practice Clinic of Karnali Academy of Health Sciences (KAHS), a tertiary care hospital in Karnali, Nepal.

METHOD

This was a cross-sectional observational study conducted at the General Practice Clinic run by the Department of General Practice and Emergency Medicine of KAHS, Jumla, Nepal. A randomized sampling method was employed, with every fifth patient selected. The study was conducted from 15th June to 15th October 2025.

Inclusion criteria included all patients attending the Outpatient Department (OPD) of General Practice at KAHS. Exclusion criteria were patients under 18 years old or those who declined to give informed consent.

The study population comprised patients presenting to the General Practice Clinic with any condition. The final sample size was 420 participants, calculated using the formula

$$n = (1.96)^2 \times p \times (1-p) / (0.05)^2 + 10\% \text{ non-response}$$

Based on an estimated prevalence of knowledge and awareness about risk factors of diabetes (46%),⁶ which yielded the minimum sample size. The total sample size calculated was 420.

Informed consent was obtained from all participants prior to enrollment. All participants were assured that their information would not be disclosed and would be kept confidential. Data were collected using a structured, pretested, and pre-validated questionnaire administered by trained study team members. The questionnaire gathered demographic information, including name, age, sex, education, and residence area. Additionally, it included fundamental questions to assess knowledge and awareness of DM. The questionnaire was available in English and Nepali. The interviewer read out the questions and completed the forms based on participants' responses.

The first section of the questionnaire includes 7 questions on socio-demographic characteristics to be asked of the participants. The second section of the questionnaire contained 8 questions to assess participants' knowledge of DM, and the third section included 6 questions to assess awareness and practice of DM. For assessing knowledge and awareness, yes/no questions was used.

The continuous variable (age) was first checked for normality and then represented accordingly based on the normality test. Categorical variables (sex, marital status, education level, district, local level, and questionnaire on knowledge and awareness) were presented as numbers and percentages. The data was entered into Microsoft Excel 2019 and analyzed in SPSS version 16. Ethical clearance for the study was obtained from the Institutional Review Committee of KAHS on June 08, 2025 (Ref no: Ref no: 2025/063).

RESULT

A total of 420 participants were included in the study. The patient's age was not normally distributed. The median age of participants was 30 years (27-39 years) with an interquartile range of 12 years. Baseline socio-demographic characteristics of the participants are shown in Table 1.

During the assessment of participants' knowledge and awareness of DM, 100% of patients reported having heard of it. Similarly, 160 (38.1%) patients knew at least 2 known symptoms of DM. Symptoms of hypoglycemia were known by only 16 (3.8%) of the participants. Similarly, 20 (4.8%) participants were aware of the complications of DM.

Of the total participants, 63 (15%) respondents are aware that lifestyle modifications (e.g., exercise, dietary modification, smoking cessation, and alcohol cessation) can help control DM.

Table 1. Socio-demographic characteristics of study participants(n=420)

Characteristics	(%)
Sex	
Male	182(43.3%)
Female	238(56.7%)
Marital Status	
Married	320(76.2%)
Unmarried	100(23.8%)
Educational Status	
University level	69(16.4%)
Secondary	207(49.3%)
Primary	13(3.1%)
Informal School education	85(20.2%)
Uneducated	46(11%)
District	
Jumla	410(97.6%)
Mugu	10(2.4%)
Local electoral division inside Jumla District	
Chandannath	164(39.0%)
Tila	87(20.7%)
Guthichaur	58(13.8%)
Patarasi	45(10.7%)
Kanakasundari	23(5.5%)
Tatopani	18(4.3%)
Hima	15(3.6%)

Regarding whether diabetes is related to obesity, 239(56.9%) responded that it was true. Out of the total participants, 309(73.6%) think taking too much sugar can cause diabetes(Table 2).

None of the participants were diagnosed as having diabetes in the past. When asked whether they had a glucometer at home for regular glucose checks, none of the participants had one. None of the participants checks their blood glucose regularly. None of the participants knew about fasting and post-prandial blood sugar levels. Among the

total participants, 35(8.3%) have someone in their family with DM.

The participants were asked if they use alternative medication if they have diabetes, 91(21.7%) replied that they do. Of the total participants, 206(49%) believe that diabetes can be cured permanently.

DISCUSSION

DM is a growing problem worldwide. As per the STEPwise approach to Non-communicable disease(NCD) risk factor surveillance(STEP) survey report 2019,⁷ in Karnali Province, the prevalence of raised blood sugar (defined as fasting blood glucose ≥ 126 mg/dl or currently on medication for raised blood glucose) was 3.2%. This was the lowest among all provinces in Nepal.⁷ Our study tried to identify the knowledge and awareness about DM among the patients presenting in the OPD of KAHS.

Our study showed that all the participants had heard of diabetes or knew something about diabetes. A study done at Haranya, India, among patients diagnosed with DM showed that around 84% of patients answered that diabetes means raised blood glucose levels.⁶ A study by Singh et al. in Arunachal, India, found that only 21.4% were aware of DM, a figure far lower than in our study. A study by Salima et al. in Malaysia found that only 24.2% had a good level of diabetes knowledge, 52.0% an average level, and 23.9% a poor level.⁸ Manandhar and colleagues conducted a cross-sectional assessment in Banepa Municipality (2019–2020), finding 61.9% of respondents possessed higher-level diabetes knowledge.⁹ There seems to be a difference in knowledge about diabetes across populations, this might be due to the type of question asked of participants and to local disease-related awareness.

Our study found that 38.1% knew at least 2 symptoms of DM. The typical symptoms include excessive thirst, frequent urination, fatigue or low energy, constant hunger,

Table 2. Knowledge about DM among the participants(n=420)

Item	Yes	No
Heard of DM	420(100.0%)	0(0.0%)
Know symptoms of DM	160(38.1%)	260(61.9%)
Know symptoms of hypoglycemia	16(3.8%)	404(96.2%)
Aware of complications of DM	20(4.8%)	400(95.2%)
Know normal fasting and post-prandial blood sugar levels	0(0.0%)	420(100.0%)
Aware that lifestyle modification can control diabetes	63(15.0%)	357(85.0%)
Think taking too much sugar can cause diabetes	309(73.6%)	111(26.4%)
Believe diabetes is related to obesity	239(56.9%)	181(43.1%)

Table 3. Awareness and practices related to DM among the participants(n=420)

Item	Yes	No
Previously diagnosed as diabetic	0(0.0%)	420(100.0%)
Have glucometer at home	0(0.0%)	420(100.0%)
Check blood glucose regularly	0(0.0%)	420(100.0%)
Have a family member with DM	35(8.3%)	385(91.7%)
Would use alternative medication if they have diabetes	91(21.7%)	329(78.3%)
Believe diabetes can be cured permanently	206(49.0%)	214(51.0%)

sudden weight loss, and blurred vision.¹⁰ The Bangladesh population-based survey by Fottrell and colleagues found that approximately 55% of rural adults were aware of any diabetes symptoms.⁵ Similarly, a cross-sectional study from the United Kingdom reported a symptom awareness rate of 41.2%, remarkably close to our 38.1%.¹¹ A study by Kumar et al. in India showed that 79.14% of the participants were aware of the symptoms of DM.⁶ Though our participants knew about diabetes when asked about at least 2 symptoms, they were unable to provide information; this might be due to limited awareness of the symptoms.

In our study, we found out that 4.8% of participants only knew about the complication of DM. A study by Sahadevan and colleagues in the UK showed that 44% of their respondents knew about the complications of DM.¹¹ In the study by Kumar and colleagues identified that about 41% of patients were aware of diabetes-related complications, which include blurred vision, nerve damage, renal damage, and various issues with foot and oral health.⁶ Study in Saudi Arabia showed that among 368 patients of DM at King Fahad Specialist Hospital, 75.3% knew common diabetes complications, with 84% recognizing vision loss, 80.2% renal disease, and 70.9% heart disease.¹² A study by Ng et al. found that patients with diabetes had a high level of knowledge about their condition.¹³ Since most of the literature found was done among the patients of the DM, while visiting the hospital, they must have been aware of the complications of the DM, which is different from the characteristics of the patient in our study. That might be why knowledge of DM complication is low.

This study found that 15% of respondents were aware that lifestyle modifications (e.g., exercise, dietary modification, smoking cessation, and alcohol cessation) can help control DM. A study from Ethiopia showed that the majority of participants (diabetic patients) were knowledgeable (i.e., 59%) regarding lifestyle modification and having DM.¹⁴ A study conducted in Rwanda showed that 98.4% of participants (who were diagnosed with DM) had good knowledge of lifestyle modifications for managing type 2 DM (T2DM).¹⁵ A study done in Nigeria among diabetic patients showed that 61.8% of respondents had a good understanding of the role diet plays in managing T2 DM.¹⁶ Most studies have been conducted on patients with DM, so knowledge of lifestyle modification for controlling diabetes appears to be low in our setting.

This study showed that 56.9% of the respondents replied that obesity is one of the causes of diabetes. A survey conducted in Pakistan found that 56.4% of respondents knew that diabetes was associated with obesity.¹⁷ In a study conducted in Haryana, India, 46% of respondents knew that obesity is a cause of diabetes.⁶ A study conducted in Poland among the general population found that 80.4% of respondents were aware of the link between diabetes and obesity.¹⁸ A study in Saudi Arabia among the general population showed that most (64%) knew obesity was the

main cause of DM.¹⁹ The finding in this is consistent with other studies. This might be due to the emphasis in all the media that obesity is the cause of diabetes.

This study sought to determine whether any participants had a glucometer at home; none did. A study conducted in Uganda among diabetic patients found that only 9% had a glucometer at home for regular glucose monitoring.²⁰ A study by Ewunetu and colleagues showed that 37.2% in patients with DM types 1 and 2 had a glucometer at home for regular monitoring.²¹ A study done among patients with diabetes in Pakistan showed that 59% had a glucometer at home.²² Recently, the use of continuous glucose monitoring (CGM) in the non-diabetic population has been growing in the West, and technology in this area is advancing quickly. This trend has emerged as interest in using CGM as a personal health device to track blood sugar trends, promoting healthy habits and lifestyle changes.²³ Since none of the study participant had diabetes, which may explain why they do not have a glucometer at home.

Our study found no respondents who regularly tested their blood sugar. A retrospective study conducted in Canada found that older age, being female, living in a high-income neighborhood, having a regular primary care physician, and visiting a physician more often were all associated with a greater likelihood of being up to date with regular blood sugar testing.²⁴ The STEP survey showed that in Karnali Province, 7.0% of adults aged 15-69 years reported ever having their blood sugar measured by a doctor or health worker.⁷ This was the lowest screening coverage among all provinces in country.⁷ Though no other studies were identified for comparison for this finding, regular blood sugar is important to find the alarming condition.

This study showed that if the participants get DM, 21.7% would use alternative medication if they have diabetes. A study done by Sheikhrabari et al. in Iran among patients with diabetes showed 88.4% of the patients had used alternative medication in the past 1 year for diabetes.²⁵ Similar study from a different place among diabetic patients shows a different pattern, i.e., Australia(23.6%),²⁶ Turkey(41%),²⁷ United State(72.8%).²⁸ Though none of our participants are diagnosed as DM, the practice of using alternative medications is present in different parts of the world.

The study identified several possible sources of bias. Selection bias may have occurred because the study was hospital-based and included only outpatient department participants, potentially limiting the extent to which the sample reflects the broader rural population. Information bias, such as interviewer and recall biases, could have arisen since data were gathered through interviewer-administered questionnaires, which may introduce interviewer bias if responses are unintentionally influenced.

CONCLUSION

This study reveals participants from rural Jumla had heard about DM, but critical knowledge gaps i.e. symptom recognition, complication awareness, lifestyle modification knowledge, and home glucose monitoring, consistent with LMIC patterns and underscoring structural barriers to prevention. Hospital-based design limits generalizability to community settings, warranting population-based longitudinal research.

DECLARATIONS

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Conflict of Interest

Two of the author in this study are on editorial board of the Journal. They have no role in editorial flow of the article.

Funding

None

Ethical Clearance

Ethical clearance for the study was obtained from the Institutional Review Board of KAHS (IRC-KAHS) on June 08, 2025 (Ref. no.: 2025/063).

Consent of the Study

Verbal and written consent was taken from the participants.

Consent for Publication from Authors

All author/s and participants consented to the publication of the findings.

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