Section: Miscellaneous

Original Research Article

# AWARENESS AND KNOWLEDGE OF DIABETES MELLITUS AND ITS COMPLICATIONS AMONG PATIENTS IN PURI, ODISHA: A HOSPITAL BASED STUDY

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## ABSTRACT

**Background:** Diabetes mellitus (DM) poses a significant public health challenge in the twenty-first century. With an estimated global prevalence of 537 million in 2021, this figure is expected to rise dramatically. India ranks second after China in the global diabetes epidemic, with millions remaining undiagnosed for years. Lack of awareness, particularly in regions with low socioeconomic status and limited access to quality education, exacerbates the problem, often leading to complications such as retinopathy, nephropathy, and neuropathy. **Aim:** This study aims to assess the level of awareness and knowledge about DM and its complications, treatment options, lifestyle modifications, and self-monitoring among diabetic patients in Puri, Odisha.

**Materials and Methods:** A hospital-based cross-sectional study was conducted at Shri Jagannath Medical College and Hospital, Puri, Odisha, from August 15 to October 15, 2022. A total of 211 patients with a prior diagnosis of DM participated. Data were collected using a structured questionnaire covering demographic information, knowledge, and awareness of DM. Analysis was performed using SPSS version 22.0, with categorical data presented as percentages and frequencies, and the mean age of diabetes onset expressed as mean ± standard deviation.

**Results:** The study included 211 patients, predominantly aged 51-60 years (24%), with a mean age of 53.3 ± 16.4 years. The prevalence of diabetes was higher in males (55.5%) than females (44.5%). Most participants were from rural areas (59%). Educational levels varied, with 32% having completed high school, 27% middle school, 25% illiterate, and 16% graduates. Regarding awareness, 84% knew diabetes involves elevated blood sugar levels, and 79% recognized common symptoms. However, only 41% were aware of diabetes complications, and 18% knew hypoglycemia symptoms.

**Discussion:** Despite recognizing symptoms and understanding basic disease mechanisms, patients' knowledge about complications and treatment options was limited. Many patients held misconceptions about the disease, including the belief that diabetes could be permanently cured (67%) and that it is caused by excessive sugar intake (84%). These misconceptions highlight the need for better education and awareness programs.

**Conclusion:** The study reveals a significant lack of knowledge and awareness about DM among patients in Puri, Odisha. Misconceptions about the disease and a shift towards alternative medications pose risks for severe complications. There is an urgent need for community-based awareness campaigns and educational initiatives to promote early diagnosis and effective management of diabetes.

**Keywords:** Diabetes mellitus, awareness, knowledge, complications, treatment, lifestyle modifications, Hospital based.

## INTRODUCTION

Diabetes mellitus (DM) is rapidly becoming one of the most significant public health challenges of the twenty-first century. According to the International Diabetes Federation (IDF) 10th edition, the prevalence of diabetes was 537 million in 2021, and it is projected to rise sharply to 643 million by 2030 and 783 million by 2045, with about half of these cases (one in two adults with diabetes) remaining undiagnosed.[1] Studies have shown that India ranks second after China in the global diabetes epidemic,[2] with an estimated 79.4 million diabetic cases expected by 2030.[3] Many individuals (approximately 45%) remain undiagnosed for years, only to be later diagnosed with type 2 DM.[1]

The lack of awareness among people regarding their condition is often linked to low socioeconomic status and limited access to quality education about diabetes. Many people only discover they have diabetes when it leads to complications such as retinopathy, nephropathy, and neuropathy. Therefore, increasing public awareness and education about diabetes can help individuals manage their blood sugar levels and prevent complications.[4]

Diabetes is a serious condition that can lead to several complications if not properly managed.[5] There are various treatment options for diabetes, including insulin injections or pumps combined with continuous glucose monitoring for type 1 diabetes and oral hypoglycemic drugs for type 2 diabetes.[6] Additionally, lifestyle changes, such as adopting a healthy diet, engaging in regular exercise, losing weight, managing stress, and quitting smoking, are crucial for managing diabetes and improving the overall health and well-being of patients.[7]

This study aims to raise awareness and knowledge about DM and its complications. The objectives are to evaluate the awareness and understanding of the disease, its complications, treatment options, lifestyle modifications, and self-monitoring of glucose among diabetic patients.

The rationale for this study is based on the fact that many people in Puri, Odisha, have low literacy rates, and diabetes is a prevalent non-communicable disease affecting a large population. It is crucial to increase awareness about diabetes, as its incidence is rising, particularly among younger age groups.

## MATERIAL AND METHODS

This hospital-based cross-sectional study was conducted on patients with a prior diagnosis of diabetes mellitus (DM). The study took place at Shri Jagannath Medical College and Hospital, Puri, Odisha, over two months from July, 2022, to November, 2022, with a sample size of 211. Patients aged 18 years or older, of any gender, who had been diagnosed with type 1 or type 2 DM were included, while those with gestational diabetes were excluded.

Informed consent was obtained from all participants before their inclusion in the study. Participants completed a structured questionnaire to collect demographic information such as name, age, gender, occupation, education level, and area of residence. The questionnaire also included basic questions to assess the participants' knowledge and awareness of DM. The interviewer interpreted the questions for participants who could not read or understand English, translating them into the local language (Hindi). After completing the questionnaire, the responses were analyzed to determine the level of knowledge and awareness among the participants. All collected data were kept confidential.

Data were entered into Microsoft Excel (Microsoft, Redmond, Washington) and analyzed using the Statistical Package for the Social Sciences (SPSS®) version 22.0 (IBM Corp., Armonk, NY). Categorical data were presented as percentages and frequencies, while the mean age of diabetes onset was calculated and expressed as mean ± standard deviation.

## RESULTS

The study included 211 patients with diabetes mellitus (DM). Most of the participants, 51 patients (24%), were aged between 51-60 years, with an average age of 53.3 ± 16.4 years (Table 1). Patients older than 60 years constituted 37.4% of the study population, while those under 50 years made up 38.4%. [Table 1]

The prevalence of diabetes was higher in males (55.5%) compared to females (44.5%). [Table 2]

Additionally, a majority of participants (59%) were from rural areas, compared to 41% from urban areas. [Table 3]

Regarding education, 32% of patients had completed high school, 27% had finished middle school, and 25% were illiterate, with only 16% holding a graduation degree. [Table 4]

Among the diabetic individuals, 84% were aware that diabetes involves elevated blood sugar levels, [Table 5] and 79% recognized symptoms such as frequent urination, increased thirst, persistent hunger, and unexpected weight loss. However, only 41% were aware of complications like blurred vision, nerve damage, renal issues, and foot and oral health problems. Furthermore, only 18% knew the symptoms of hypoglycemia.

About 38% of patients owned glucometers and monitored their blood sugar regularly, but 57% were unaware of normal fasting and postprandial blood sugar levels. [Table 6]

Regarding treatment options, 38% were knowledgeable about the various treatments for DM and the duration of treatment, while 52% were aware of insulin injections. [Table 7]

Approximately 49% of the patients reported skipping their antidiabetic medications, with 22% of those taking a double dose the following day. Furthermore, 57% combined alternative medications

with allopathic treatments, and 22% had completely replaced allopathic medications with alternative medicines. [Table 8]

Additionally, 53% of patients had a positive family history of diabetes. [Table 9]

About 54% believed obesity and diabetes were unrelated, and despite 79% being aware of the necessary lifestyle modifications, many failed to implement these changes. Notably, 67% thought diabetes could be permanently cured, and 84% believed it was caused by excessive sugar intake. [Table 10]

**Table 1: Age distribution**

| Age | Number of participants |
|---|---|
| 18-30 years | 25 |
| 31-40 years | 28 |
| 41-50 years | 28 |
| 51-60 years | 51 |
| 61-70 years | 46 |
| 71-80 years | 33 |
| Total | 211 |

**Table 2: Gender**

| Gender | Number of participants | Percentage (%) |
|---|---|---|
| Female | 94 | 44.5 |
| Male | 117 | 55.5 |
| Total | 211 | 100.0 |

**Table 3: Area of residence**

| Residence | Number of participants | Percentage (%) |
|---|---|---|
| Rural | 124 | 58.8 |
| Urban | 87 | 41.2 |
| Total | 211 | 100.0 |

**Table 4: Education**

| Education | Number of participants | Percentage (%) |
|---|---|---|
| Illiterate | 53 | 25.1 |
| Middle school | 57 | 27.1 |
| High school | 67 | 31.7 |
| Graduate | 34 | 16.1 |
| Total | 211 | 100.0 |

**Table 5: Knowledge and awareness about the disease**

| Questions | No | Yes |
|---|---|---|
| Knowledge about diabetes | 33 (15.64%) | 178 (84.36%) |
| Symptoms of DM | 44 (20.86%) | 167 (79.14%) |
| Symptoms of hypoglycemia | 172 (81.52%) | 39 (18.48%) |
| Complications of diabetes | 124 (58.76%) | 87 (41.24%) |

**Table 6: Knowledge and awareness about the blood test of diabetes**

| Questions | No | Yes |
|---|---|---|
| Own a glucometer and check your blood glucose level on a regular basis | 130 (61.61%) | 81 (38.39%) |
| Knowledge about normal fasting blood sugar levels and postprandial blood sugar levels | 120 (56.87%) | 91 (43.13%) |

**Table 7: ?**

| Questions | No | Yes |
|---|---|---|
| Awareness about the various treatment options for diabetes and the duration of treatment | 130 (61.61%) | 81 (38.39%) |
| Awareness about the insulin therapy | 101 (47.86%) | 110 (52.14%) |

**Table 8: Knowledge and awareness about the medication for diabetes**

| Questions | No | Yes |
|---|---|---|
| Missed your antidiabetic medications | 108 (51.2%) | 103 (48.8%) |
| if missed, take a double dose on the next day | 80 (77.7%) | 23 (22.3%) |
| Use alternative medications along with allopathic medications | 90 (42.65%) | 121 (57.35%) |
| Replaced the allopathic medicines with alternative medicines completely | 95 (78.51%) | 26 (21.49%) |

**Table 9: Risk factors of diabetes**

| Questions | No | Yes |
|---|---|---|
| Family history of DM | 100 (47.4%) | 111 (52.60%) |
| Association with obesity | 114 (54%) | 97 (46%) |
| Lifestyle modifications (exercise, dietary changes, smoking, alcohol cessation, etc.) | 45 (21.4%) | 166 (78.6%) |

**Table 10: Knowledge and awareness about the myths related to diabetes**

| Questions | No | Yes |
|---|---|---|
| Diabetes can be cured permanently | 70 (33.18%) | 141 (66.82%) |
| Diabetes is caused by eating too much sugar | 35 (16.59%) | 176 (83.41%) |

## DISCUSSION

Diabetes mellitus (DM) is a chronic condition marked by elevated blood glucose levels due to insufficient insulin production or ineffective insulin utilization.[1] Symptoms include excessive thirst, frequent urination, fatigue, constant hunger, sudden weight loss, and blurred vision.[1] In our study, 79% of patients recognized these symptoms, and 84% understood that diabetes means elevated blood glucose levels. The mean age of participants was 53 ± 16 years, with 24% aged 51-60 years. Age is a significant risk factor for DM, especially for those aged 60 and above, who are at higher risk of complications.[8] In our study, 37% were over 60 years old, similar to previous studies.[9,10]

A positive family history of diabetes is another critical risk factor. People with a family history of DM are generally more knowledgeable about the disease and its complications.[11] In our study, 53% had a positive family history, and 26.4% of these individuals were knowledgeable about diabetes.

Obesity, particularly central obesity, is closely linked to type 2 diabetes onset and progression. A prior study found high rates of overall, abdominal, and central obesity among type 2 DM patients.[12] In our study, 46% were aware of the link between obesity and diabetes. Insulin resistance in obese individuals is due to increased levels of nonesterified fatty acids, glycerol, hormones, cytokines, and pro-inflammatory chemicals.[13,14]

DM diagnosis follows the criteria of the American Diabetes Association (ADA).[15] A 2020 meta-analysis highlighted that glucometer use is associated with higher medication adherence.[16] In our study, only 38% owned a glucometer, and 57% were unaware of normal blood sugar levels.

Type 1 diabetes is traditionally managed with subcutaneous insulin injections and blood glucose monitoring.[17] Insulin pumps and continuous glucose monitoring (CGM) technology have been shown to reduce long-term complications.[6] Gene therapy and stem cell-based treatments are emerging as promising options for DM management.[17-19] For type 2 DM, various non-insulin oral treatments are available, including biguanides, insulin secretagogues, SGLT2 inhibitors, and insulin sensitizers.[20] In our study, 38% were aware of DM treatment options, and 52% knew about insulin therapy.

A study by Benil et al. (2003) found that 10% of patients took a double dose if they missed a previous one. In our study, about half missed their medications, with 22% taking a double dose the next day. Additionally, 57% used alternative medications alongside allopathic ones, with 22% completely switching to alternatives.[21]

Beta cell replacement through islet transplantation is a potential DM treatment, though limited by donor availability and high costs.[22-24] Lifelong immunosuppression is also a significant drawback post-transplantation.

Poor glycemic control and prolonged illness are major risk factors for diabetes complications, which can affect almost every organ system.[25] Complications include microvascular issues (nephropathy, neuropathy, retinopathy) and macrovascular issues (coronary artery disease, stroke, peripheral vascular disease).[5] In our study, 41% were aware of these complications, but only 18% knew the symptoms of hypoglycemia.

The National Diabetes Prevention Program (NDPP) in the US demonstrated that lifestyle modifications could significantly reduce type 2 diabetes incidence.[26,27] In our study, 22% were unaware of the benefits of lifestyle changes.

Many patients believed the misconception that diabetes is caused by excessive sugar intake and that it can be permanently cured. In our study, 67% thought diabetes could be cured permanently. Other misconceptions include beliefs about diabetes onset, management, and causes.[28]

## CONCLUSION

Our study revealed a significant lack of knowledge and awareness about diabetes among patients. Many held misconceptions about the disease, and a considerable number were shifting to alternative medications, risking severe complications. There is an urgent need to promote diabetes awareness through community-based campaigns, media collaborations, and social media. Emphasis should be on early diagnosis and proper management to prevent complications and improve the quality of life for diabetes patients.

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