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ORIGINAL

Evaluation of knowledge in Type 2 Diabetes Mellitus using the dkq-24 questionnaire

Evaluación del conocimiento en Diabetes Mellitus Tipo 2 mediante el cuestionario dkq-24

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ABSTRACT

Introduction: type 2 Diabetes Mellitus (T2DM) is one of the leading causes of morbidity and mortality worldwide, with a significant impact on the health and economy of countries. Its proper management depends on patients' knowledge about the disease and their involvement in self-care, making it necessary to design educational strategies aimed at optimizing metabolic control, preventing complications, improving treatment adherence, and enhancing quality of life.
Objective: to determine the level of knowledge about T2DM in patients attending the Center for Diabetes Care and Prevention (CAPD) in Santa Cruz, Bolivia, using the Diabetes Knowledge Questionnaire 24.
Method: an observational, descriptive, and analytical cross-sectional study with a quantitative approach was conducted among 104 patients diagnosed with T2DM. The DKQ-24, an internationally validated questionnaire, was applied by the researcher in a controlled setting. Results were analyzed using descriptive statistics and nonparametric tests.
Results: a total of 59,76 % of participants showed an intermediate level of knowledge, 25,61 % an adequate level, and 14,63 % an inadequate level. Misconceptions were identified regarding the etiology of diabetes, insulin production, and glucose monitoring. No significant differences were found in the level of knowledge according to sex or age.
Conclusions: although most patients demonstrated a moderate level of knowledge about T2DM, conceptual errors persist that may affect self-care. The need to implement structured educational strategies to improve knowledge, optimize treatment adherence, and reduce complications is highlighted.

Keywords: Type 2 Diabetes Mellitus; Health Knowledge; DKQ-24; Self-Care; Health Education.

RESUMEN

Introducción: la diabetes mellitus tipo 2 (DM2) es una de las principales causas de morbilidad y mortalidad a nivel mundial, con un impacto significativo en la salud y economía de los países. Su adecuado manejo depende del conocimiento de los pacientes sobre la enfermedad y su participación en el autocuidado, lo que hace necesario diseñar estrategias educativas orientadas a optimizar el control metabólico, prevenir complicaciones, mejorar la adherencia al tratamiento y la calidad de vida.
Objetivo: determinar el nivel de conocimiento sobre la DM2 en pacientes atendidos en el Centro de Atención y Prevención de la Diabetes (CAPD) en Santa Cruz, Bolivia, mediante la aplicación del cuestionario Diabetes Knowledge Questionnaire 24.
Método: se realizó un estudio observacional, descriptivo y analítico de tipo transversal con enfoque cuantitativo en 104 pacientes diagnosticados con DM2. Se utilizó el DKQ-24, un cuestionario validado internacionalmente,

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aplicado por el investigador en un entorno controlado. Se analizaron los resultados mediante estadísticas descriptivas y pruebas no paramétricas.
Resultados: el 59,76 % de los participantes mostró un nivel intermedio de conocimiento, el 25,61 % adecuado y el 14,63 % inadecuado. Se identificaron conceptos erróneos sobre la etiología de la diabetes, la producción de insulina y el monitoreo de la glucosa. No se encontraron diferencias significativas en el nivel de conocimiento según sexo o edad.
Conclusiones: si bien la mayoría de los pacientes posee un conocimiento moderado sobre la DM2, persisten errores conceptuales que pueden afectar el autocuidado. Se resalta la necesidad de implementar estrategias educativas estructuradas para mejorar el conocimiento, optimizar la adherencia al tratamiento y reducir complicaciones.

Palabras clave: Diabetes Mellitus Tipo 2; Conocimiento en salud; DKQ-24; Autocuidado; Educación en Salud.

INTRODUCTION

Type 2 diabetes is one of the causes of morbidity and mortality worldwide, impacting the health and economy of countries, especially those with low and middle incomes.[1] Management depends on patients' knowledge of the disease and their active participation in self-care.[2]

Diabetes education has been identified as an essential tool for optimizing metabolic control, preventing complications, and improving patients' quality of life.[3] Despite the benefits in Latin America, the implementation of educational programs has not achieved the desired development due to socioeconomic, cultural, and structural barriers in each government that affect the effectiveness of interventions.[4]

Patients' level of knowledge about diabetes is a critical determinant in the success of educational interventions.[2] Tools such as the Diabetes Knowledge Questionnaire 24 (DKQ 24) have proven useful in assessing knowledge about the disease.[5] However, there is no research evaluating the level of knowledge about the disease in the city of Santa Cruz, Bolivia. The present study aims to assess the level of knowledge about type 2 diabetes mellitus in patients treated at the Diabetes Care and Prevention Center (CAPD) in the city of Santa Cruz, Bolivia, through the application of the Diabetes Knowledge Questionnaire 24 (DKQ-24), which will identify gaps in knowledge and contribute to the design of future educational strategies aimed at strengthening self-care and disease control.

METHOD

This was an observational, descriptive, analytical, cross-sectional study conducted with 104 patients with type 2 diabetes mellitus (DM2) at the Diabetes Care and Prevention Center (CAPD) in Santa Cruz, Bolivia. The validated DKQ-24 questionnaire was used, administered in person and in a guided manner, to assess the level of knowledge about the disease. Patients over 30 years of age treated in 2024 were included, excluding those with cognitive disorders or incomplete records. The questionnaires were coded and digitized in Microsoft Excel 2019, generating a refined and validated database. Statistical analysis was performed using IBM SPSS Statistics v25, applying descriptive statistics and the Shapiro-Wilk test to assess normality. Since the data did not follow a normal distribution, nonparametric tests (Mann–Whitney U and Kruskal–Wallis) were used to explore associations between the level of knowledge and sociodemographic variables. A significance level of $p < 0,05$ was established. The study complied with the principles of the Declaration of Helsinki and the CIOMS guidelines; all participants signed informed consent prior to inclusion, and the research was approved by the Ethics Committee of the Domingo Savio Private University.

RESULTS

Table 1. Sociodemographic characteristics of the study sample

Variable	Value
Total number of participants	104
Female	63,46
Male	36,54 %
Average age (years)	59,15
Standard deviation	± 8,43
Median (years)	60,5
Age range (years)	40–74

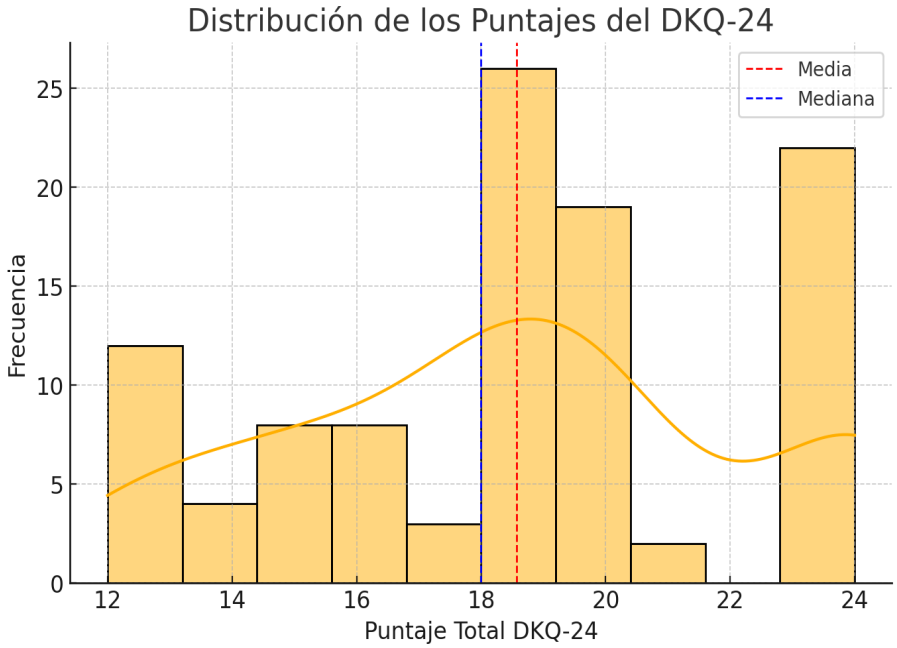
The analysis of knowledge about DM2, using the DKQ-24 questionnaire, revealed that 100 % correctly recognized the types of diabetes. However, misconceptions persisted, such as that sugar consumption causes the disease (12,5 %) or that the kidneys produce insulin (55,77 %).

Most participants demonstrated adequate knowledge of nutrition (98,08 % recognized the importance of food preparation methods) and personal care (97,12 % identified the need for skin care; 98,08 % for nail care), as well as the prevention of complications (94,23 % linked diabetes with the risk of diabetic foot). However, areas such as the pathophysiology of the disease (e.g., insulin production and organs involved) and glycemic monitoring (50,96 % mistakenly believed that measuring sugar in urine is the best method) continue to be poorly understood.

Regarding comprehensive disease management, 76,92 % recognized the combined importance of diet, exercise, and medication, although 23,08 % prioritized pharmacological treatment alone. In addition, 95,19 % understood that not following a diet or exercising increases the risk of hyperglycemia. Regarding the interpretation of blood glucose values, 92,31 % correctly recognized a fasting value of 210 mg/dL as hyperglycemia.

56,73 % percent did not consider that hereditary factors necessarily mean that children will develop the disease; 52,88 % identified that sweating and coldness are not symptoms of hyperglycemia; and 60,58 % recognized that thirst and appetite do not correspond to hypoglycemia.

To evaluate the distribution of the scores obtained in the Diabetes Knowledge Questionnaire 24 (DKQ-24), the Shapiro-Wilk normality test was performed, which yielded a p-value of 2,23e-05, indicating that the data do not follow a normal distribution ($p < 0,05$).



Note: The histogram shows the distribution of scores obtained on the Diabetes Knowledge Questionnaire 24 (DKQ-24). The dashed red line represents the mean of the scores, while the dashed blue line indicates the median

Figure 1. Distribution of DKQ-24 Scores in the Study Sample

The levels of general knowledge categorized using the DKQ-24 showed that most respondents had an intermediate level of knowledge about DM2, followed by a smaller group with adequate knowledge and a small percentage with inadequate knowledge. These results reflect that, although there is a basic understanding of the disease, misconceptions persist in fundamental areas such as pathophysiology, glycemic monitoring, and symptoms, underscoring the need to reinforce health education strategies that promote self-care and effective disease management.

Although the majority of patients have intermediate knowledge about diabetes (59,76 %), there are still 14,63 % with inadequate knowledge, which could compromise their ability to self-care. In addition, the failure to identify symptoms of hypoglycemia in a considerable percentage of patients highlights the need for educational interventions aimed at improving understanding of the signs of glycemic decompensation.

No significant relationship was found between age group or gender and knowledge category, indicating that the proportion of people with inadequate, intermediate, or adequate knowledge is similar across different age ranges and genders.

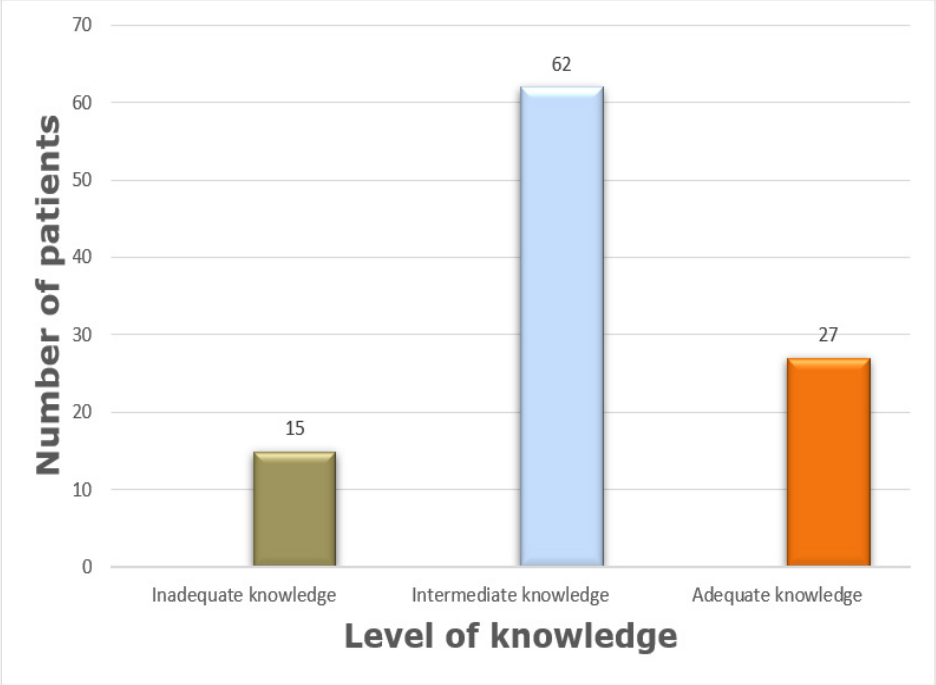


Figure 2. Distribution of General Knowledge Level about Diabetes

DISCUSSION

The findings of this study show that most participants have an intermediate level of knowledge about type 2 diabetes mellitus (T2DM), which is consistent with previous research in similar populations, for example, Galeas Calleja et al.[6] reported that 70,4 % of patients had moderate knowledge, with only 15,1 % at an adequate level and 14,6 % at an inadequate level, results consistent with those of the present study. Similarly, it was found that the main deficiencies are in pathophysiology and metabolic control, while knowledge about complication prevention is significantly higher.[6]

Bukhsh's 2019 study in Pakistan revealed suboptimal knowledge about diabetes. Patients with better glycemic control showed greater knowledge, indicating that understanding the disease is associated with more effective management and lower blood glucose.[7] These findings reinforce the need to develop structured educational interventions that improve understanding of the disease.

Similarly, a study was conducted in Mexico in 297 patients with DM2, where knowledge was assessed using the DKQ-24. The results showed that the majority had insufficient knowledge, with only 7 % obtaining an adequate level, while 56 % had fair knowledge.[8]

In Colombia, an intensive educational program was implemented in 60 hospitalized patients with DM2, measuring knowledge with the DKQ-24 before and 90 days after. After five educational sessions, the average DKQ-24 score increased from 10,13±3,28 to 20,13±2,77, a significant improvement ($p<0,0001$), highlighting the importance of health education.[9]

With regard to gender and age as factors associated with the level of knowledge about DM2, although no statistically significant differences were found in the present study, other studies have found correlations between these variables. Thus, a study conducted in Portugal,[10] with a sample of 1 200 patients indicates that age emerged as an important factor, with patients under 65 years of age having a better level of knowledge compared to those ≥65 years of age ($p<0,001$), but agrees that there is no difference between men and women. Another study conducted in Argentina in 2019,[11] reinforces the assumption that the level of knowledge does not depend on the patient's sex or age. However, a study conducted in the United States on Hispanic adults suggests that men and younger adults have less knowledge or awareness about their diabetes.[12]

A study in the Philippines with 184 patients with DM2 13showed that a 12-week educational program significantly improved knowledge about diabetes ($p < 0,001$) and promoted healthy habits such as increased physical activity and consumption of fruits and vegetables. Similarly, these programs improve self-care behaviors and self-efficacy and are associated with greater adherence to diet and exercise, better glycemic monitoring, and, in some cases, better HbA1c control.[14]

Improving education about T2DM in patients with the condition can translate into savings in healthcare costs of approximately $5,3–$5,6 million over a period of 2–3 years.[15]

A systematic review published in 2024 that included 28 studies[16] concludes that structured diabetes education programs improve clinical outcomes at a justifiable cost, reducing complications and improving the quality of life of patients.[16] Another similar study suggests a favorable trend in diabetes education in reducing

the burden on health systems by decreasing acute complications requiring hospitalization and in being cost-effective.[17]

CONCLUSIONS

The study assessed the level of knowledge about type 2 diabetes in CAPD patients in Santa Cruz, using the DKQ-24 questionnaire. Most patients had intermediate knowledge, with persistent errors in key areas such as the function of the pancreas and glucose monitoring. No significant associations were found with age or sex. The results highlight the need to strengthen diabetes education to improve self-care and prevent complications. It is recommended that continuous and accessible educational programs be implemented to promote self-management, improve patients' quality of life, and reduce the socioeconomic burden of the disease in Bolivia.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

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Formal Analysis: Sergio Roca Edelman.
Research: Nataly Duran.
Methodology: Sergio Roca Edelman.
Software: Sergio Roca Edelman.
Supervision: Nataly Duran.
Writing – Original Draft: Sergio Roca Edelman, Nataly Duran.
Writing – Proofreading and Editing: Sergio Roca Edelman, Nataly Duran.