

## Diabetes Mellitus: Assessment of Academic Knowledge of the Health Courses of an Higher Education Institution (HEI)

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### ABSTRACT

**Introduction:** Diabetes Mellitus (DM) is a multifactorial disease with high worldwide progression. In view of this scenario, an evaluation of future professionals who will compose the front line in assistance provided to people is justified.

**Objective:** to identify the knowledge of students from different health courses regarding DM and the specific care actions of each professional area. **Methodology:** quantitative descriptive exploratory study, carried out in an HEI in the Federal District. Students from health courses were evaluated.

**Result/Discussion:** There was a higher prevalence of females; aged between 18 and 24 years. In the evaluation categories that addressed issues of Specific Knowledge, Treatment and Complications of DM, the Physical Education and Nursing courses stood out.

**Conclusion:** It can be concluded that 5 of the 7 courses in the health area of this HEI achieved scores referring to expected/desired scientific knowledge that demonstrate training for the clinical management of diabetic patients.

### Keywords

Diabetes Mellitus, Students, Health.

### Introduction

Diabetes Mellitus (DM) is part of a group of metabolic diseases characterized by hyperglycemia resulting from defects in the secretion and/or action of insulin in food metabolism. Insulin, in turn, is a hormone synthesized in the pancreas and performs the maintenance of glucose metabolism. Its absence triggers a deficit in its metabolism and, consequently, DM [1].

There are three most common types of DM: Type 1 (T1DM), which is caused by an autoimmune response in which the body's immune system attacks the beta cells responsible for producing insulin in the pancreas, resulting in reduced or no insulin production. This type represents about 10% of cases; Type 2 (T2DM) is the most common type and represents about 90% of all cases. It is

characterized by a failure of the body to respond to the action of insulin, also known as insulin resistance. Among the most prevalent risk factors for the onset of T2DM are sedentary lifestyle and obesity [2,3].

There is also Gestational DM (GDM), which is a pathological condition linked to the period of gestation that may or may not persist after delivery. It usually affects between 3% and 25% of pregnant women and the main risk factors related to the onset of GDM are: previous pregnancy with a history of GDM, family history of DM, advanced maternal age, obesity or excessive weight gain in the current pregnancy, family history of diabetes mellitus in first-degree relatives, fetal overgrowth, polyhydramnios, hypertension or preeclampsia in the current pregnancy, short stature (< 1.50 m), excessive central body fat deposition, macrosomia and neonatal fetal death, obstetric history of recurrent miscarriages, malformations, or GDM, polycystic ovary syndrome, and glycosated

hemoglobin  $\geq 5.9\%$  in the first trimester [1].

In terms of prevalence, the demographic transition added to the urbanization process are the main factors related to the increase in Non-Communicable Chronic Diseases (NCDs), including DM. Stressful routines and agitation in large urban centers favor unhealthy eating and low adherence to physical activities, and the lack of continuity of such practices consequently results in an increase in their incidence and prevalence [4].

According to the International Diabetes Federation (IDF), currently in the world, about 463 million people aged between 20 and 79 live with the disease. And it is estimated, from a projection, that there will be 643 million adults with DM in 2030 and 783 million in 2045 [5]. In the world ranking, Brazil occupies the 4th place with the highest number of cases, behind only India, China and the United States [6].

Given that DM is considered a multifactorial pathology, the participation of a multidisciplinary team in the care of people with the diagnosis is essential, aiming at a better care profile and an integrated and collaborative therapy, where each professional intervenes in their area. and together, as a team, reach a consensus on the best conduct to be adopted for health promotion and disease prevention [7].

In view of the above, multidisciplinary care in DM care is considered important. It is extremely important that there are trained and able professionals to act in the face of this problem of significantly increasing projection. It is important to emphasize the need to acquire scientific technical knowledge on a constant basis, starting from academic training.

The hypothesis of the study was: students from different areas of health have sufficient information and scientific knowledge to manage patients with DM. The general objective was: to identify the knowledge of students from different health courses regarding DM and the specific care actions of each professional area; as specific objectives: to match the scores of each health course regarding general knowledge about DM; to analyze the care actions mentioned by the students regarding the specific care of each professional area.

### Methodology

This is a quantitative descriptive exploratory study. Held at an Higher Education Institution (HEI) in the Federal District, through the application of a questionnaire developed by the authors themselves and made available on digital platforms, namely: WhatsApp, e-mail and Teams from August to October 2021.

In order to define the public in question, the inclusion criteria were: being a student of any courses in the health area of the HEI, who were attending the last year of graduation and who accepted to participate in the research by signing the FICT (Free and Informed Consent Term) in a digital way. The same contained

clarifications about the research and guarantee of confidentiality of the information provided by it. The health courses of this HEI: Physical Education, Nursing, Pharmacy, Physiotherapy, Nutrition, Dentistry and Psychology. After analyzing the distribution grid of the different classes, comparing the number of students, it was identified that to obtain the number of answers in an equivalent way, a coefficient of 20 answers per course was needed. Thus, 20 students from each course answered the 25 questions.

The questionnaire was divided into categories as follows: 1. Sociodemographic Characteristics; 2. Previous knowledge about DM; 3. Specific Knowledge; 4. Treatment; 5. Complications; 6. Multidisciplinary team, consisting of qualitative and quantitative issues. In the quantitative ones, there were objective multiple-choice questions with one or more correct alternatives.

As criteria for correct answers, it was necessary to obtain 100% in the question score to be considered “correct”; to be considered “partially correct” it was necessary to obtain 75% in the score and could not select all the options of the multiple choice questions. Thus, responses that did not meet the criteria mentioned above were considered “wrong”.

At the end of the answers, a coefficient equal to or greater than 70% was expected in the general yield of correct answers to consider that these students have satisfactory knowledge and a coefficient from 60% to less than 70% for partially satisfactory knowledge. For below 60% unsatisfactory.

This study complies with national and international standards of ethics in research involving human beings and was approved by the Research Ethics Committee, protocol 4.800.872.

### Results and Discussion

Data were collected with sociodemographic characteristics such as: name, age group, gender and academic semester. The target audience consisted predominantly of females, aged between 18 and 24 years old and in the last semester of graduation.

**Table 1:** Sociodemographic Data.

Variable	No (%)
Profile of the study subjects	
Age	
18 - 24	67 (57,8)
25 - 35	37 (31,9)
35 - 55	9 (7,8)
Above 55	3 (2,6)
Sex	
Feminine	91 (78,4)
Male	25 (21,6)
Semester	
Last	65 (56,0)
Penultimate	51 (43,9)

Source: Prepared by the authors based on research data

Next, in the questionnaire there was the category “1. Prior Knowledge”, where the main objective was to identify whether

the student had a general understanding of DM and how he self-assessed this knowledge about DM. The next category was about “2. Specific Knowledge” and the objective was to identify knowledge acquired by students during the undergraduate course, which ranged from pathophysiology, glycemic levels and DM risk factors. In category “3. Treatment” it was possible to assess whether the student had knowledge about the administration and storage of insulin, in addition to carrying out a health assessment. In category “4. Complications” addressed questions to assess students' degree of knowledge about DM complications. And finally, category “5. Multidisciplinary Team”, which aimed to assess whether the student was able to identify the performance of the members of a professional team and judge whether or not he thought the participation of this team was necessary in the management of the care of patients with DM.

In the “Prior Knowledge” category, courses that had previous contact with the DM theme were evaluated. Table 2, below, shows in percentage the number of students who have already encountered a subject that addressed DM, and how he judged this approach within these subjects. Within the sample N, it was possible to observe that 82.8% had already encountered disciplines, during graduation, that addressed the theme; within that percentage, 33% considered this approach “Excellent” and 35% considered it a “Good” approach.

**Table 2:** Previous Contact with the DM theme.

Variable	No %
Approach to DM	
Yea	96 (82.8)
Not	13 (11.2)
Do not remember	7 (6)
Assessment of the approach to DM	
Good	41 (35.1)
Excellent	38 (33.0)
Regular	32 (27.8)
Bad	5 (4.1)
very bad	0

Fonte: Elaborado pelos autores com base em dados de pesquisa

Table 3, 4 and 5, below, show the percentage of correct answers by category, where it is possible to observe a contrast in the score of each course referring to its area of greatest domain in the care scenario for patients with DM.

As shown in Table 3, it is possible to observe that the Nursing course has the highest score with regard to Specific Knowledge about DM, followed by the Physical Education course. In a smaller domain for this category, there is the Psychology course.

The curriculum guidelines of the Nursing course (DCNs) show that the professional nurse is based on a generalist view and attention focused on the main pathologies prevalent in their national epidemiological profiles, highlighting the need, from graduation, to this professional is already able to exercise his profession with a critical-reflective sense in the care of patients with DM [8].

With regard to the Physical Education course, the professional is seen as the one who prescribes physical activity, but behind, he needs to have knowledge and technical-scientific skills about the disease, as well as its complications to, finally, to intervene [9]. When it comes to the pathophysiology of DM, issues such as health education, medication administration and good quality of life are more highlighted and visualized since professional training. The professional Psychologist does not directly intervene in these actions, which does not make it less important, but justifies its performance focused on the pathophysiology of DM. This professional seeks to intervene and act in actions that minimize psychological situations, which can be aggravated by the diagnosis of DM [10].

In addition, on the distribution of the Unified Health System (SUS), programs, such as HiperDia, show an expanded view of a care network and having the professional Nurse as a gateway, which consequently justifies the good performance and preparation of these students [11].

**Table 3:** Corrections: Specific Knowledge about DM.

Variable	No % of hits
Specific knowledge questions	
Physical Education	124 (62.0)
Nursing	149 (69.5)
Pharmacy	120 (60.0)
Physiotherapy	116 (58.0)
Nutrition	118 (59.0)
Dentistry	121 (61.5)
Psychology	115 (57.5)

Source: Prepared by the authors based on research data

Because it is a chronic disease, treatment for DM is essential, as well as professional monitoring over the years. The professional team in this case is seen as an important base, since it is a multifactorial pathology [3].

Table 4 below illustrates, in this category, the Physical Education course with the highest score, followed by Pharmacy. Lastly, the Physiotherapy course. Considering that it is a multifactorial pathology, including that its treatment depends on the pharmacological way, the good performance of Pharmacy students can be justified.

In addition, for the ideal treatment, non-pharmacological actions such as physical activities, making changes in lifestyle in order to avoid complications are indispensable, thus justifying the high score of the Physical Education course, since they are directly linked in this treatment process [12,13].

Physiotherapists, on the other hand, play an important role in the prevention of comorbidities, promoting greater functional independence, so a better performance of students in this category was expected, in addition to the category complications [14].

**Table 4:** Corrections - Treatment on DM.

Variable	No % of hits
Treatment	
Physical Education	42 (70.0)
Nursing	39 (65.0)
Pharmacy	40 (66.7)
Physiotherapy	23 (38.3)
Nutrition	32 (53.3)
Dentistry	37 (61.6)
Psychology	33 (55.0)

Source: Prepared by the authors based on research data

The main objective of care policies for patients with chronic diseases is early diagnosis, aiming to reduce damage and long-term complications. However, once evolved, professionals capable of managing and monitoring this patient are essential [15].

About the “Complications”, they are the results of an inappropriate therapy to the patient's condition repeated/practiced for a long term. In this category, Dentistry stood out in first place, then the Nursing course and in last place the Physiotherapy course, as shown in Table 5.

The dental professional is worthy of the performance achieved since he works by promoting direct actions related to the patient's oral health, being able to identify and minimize long-term complications, through observation of signs such as ketone breath, xerostomia, periodontal disease and difficulties in healing [16].

The Nurse's role is directly related to actions that make the patient the protagonist of their care, through educational and encouraging actions, making them achieve and commit to managing their self-care. This professional also works by observing signs of aggravations and complications of the disease [17]. As measured in the previous graph, a better percentage of correct answers was expected in the Physiotherapy course, since they work by promoting and encouraging greater functional independence of these patients, and in their curricular base it is possible to observe these characteristics. In addition, the rehabilitation process through physiotherapeutic techniques is one of the main phases assigned since the patient develops complications as a result of DM.

**Table 5:** Hits - Complications about the DM.

Variable	%
Complications	
Physical Education	24 (40.0)
Nursing	26 (43.3)
Pharmacy	14 (23.3)
Physiotherapy	09 (15.0)
Nutrition	22 (36.6)
Dentistry	29 (48.3)
Psychology	18 (30.0)

Source: Prepared by the authors based on research data

Finally, as a last approach, we have the category “5. Multidisciplinary Team”, which, in addition to identifying whether the students were prepared/apt for the management of patients

with DM, considering theoretical knowledge, the study sought to identify how they understand the work of the multidisciplinary team and if they can identify the actions of care linked to each professional area.

To assess whether students were attentive to care actions, questions were applied with actions, issues and approaches related to different professional areas, making it necessary for the student to associate them with the profession in question.

It was possible to observe that 79 students (68.1%) were able to identify health actions and associate them with each professional area. The number of correct answers was not specified for each course individually, but in an overview of all students who responded to the questionnaire. Table 6 below, on the other hand, presents a survey of the students' view of the most relevant professional area in multidisciplinary care for patients with DM.

**Table 6:** Students' view of the most relevant professional area in multidisciplinary care.

Variable	No (%)
Professional	
Physical Education	110 (95.7)
Nursing	101 (87.8)
Pharmacy	91 (79.1)
Physiotherapy	75 (65.2)
Nutrition	114 (99.1)
Dentistry	62 (53.9)
Psychology	105 (91.3)
Doctor	17 (19.7)
Endocrinologista	07 (8.1)
Cardiologista	01 (0.8)
Psiquiatra	01 (0.8)
Occupational Therapist	01 (0.8)
Biomedic	01 (0.8)
social worker	01 (0.8)

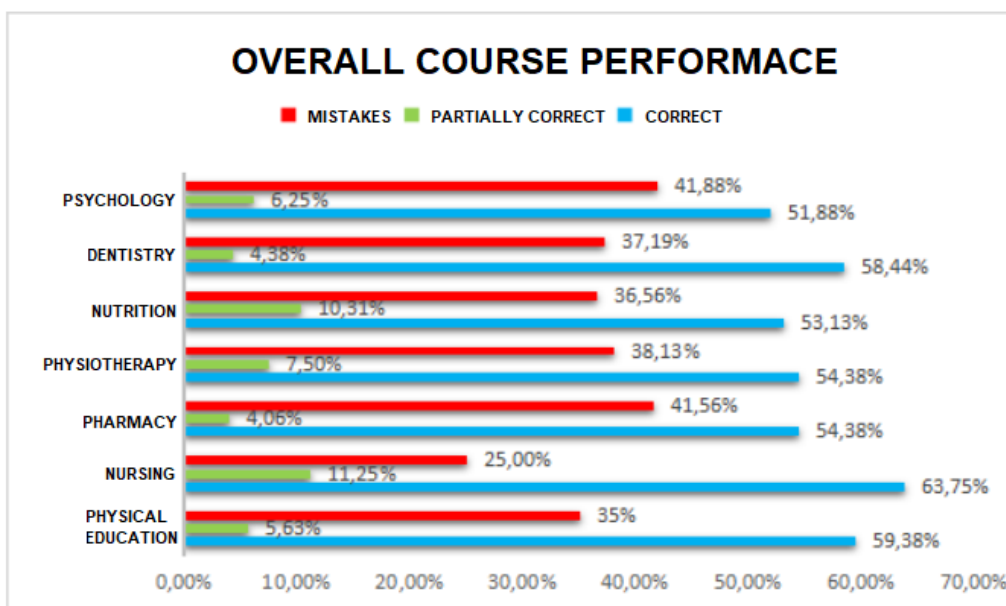
Source: Prepared by the authors based on research data

It is possible to observe that the courses most marked as an indication for relevance in the treatment were, respectively: Nutrition, Physical Education and Psychology. In addition to the professional areas available, it was possible for students to describe other professionals they considered relevant in the management of patients with DM and the following professionals were listed: Specialist physicians (Psychiatrist, Endocrinologist and Cardiologist) and Occupational Therapist.

In addition, Graph 1 below illustrates the sum of percentages in each category, showing: “errors, partially correct and correct” of each course. Thus, the course that obtained the best overall performance was: Nursing, followed by Physical Education; and lastly, the Psychology course.

The nurse is seen as a key player in monitoring patients with DM. The same works by offering a differentiated service, in addition to providing assistance, always aiming at prevention and health promotion, with the purpose of reducing cases, injuries and complications of the disease. This professional also becomes extremely important in the health education of these patients,





**Graph 1:** General performance of each course regarding the correct answers to the knowledge questions.

Source: Prepared by the authors based on research data

improving their quality of life. With this, the good general performance of the students of this course is expected [18].

Since the attention and health promotion of the patient is mainly focused on health education practices, changes in life habits and physical activity practices, it was essential for the Physical Education and Nutrition courses to obtain a good placement in the ranking, as they are the main professionals responsible for helping to control DM, encouraging patients to change their lifestyle [19].

As measured above, the professional Psychologist does not make himself less important, but his actions and activities in this scenario are well defined. This professional is mainly responsible for encouraging the adherence of these patients and helping them to accept the disease, offering support and reception. Thus, the result with some limitations to the general information of the disease is justified [20].

During the questionnaire, it was possible for the students to self-assess their knowledge about DM, quantifying this knowledge from 0 to 10. The first self-assessment was carried out in the first moment, in the Prior Knowledge category, before directing the specific questions about it. of the theme; the second self-assessment was performed at the end of the questionnaire.

It was possible to observe that the answers "from 0 to 3" there was an increase of 7.8%, that is, the number of students who considered their self-assessment bad, initially, was confirmed and even if students who judged their self-assessment different were added. knowledge. As a result, the answer "from 5 to 7" decreased by 6%, that is, the result migrated from those who scored "from 5 to 7" to "less knowledge", "from 0 to 3".

**Table 7:** Student self-assessment: before.

Variable	No %
Before	
0 a 3	16 (13.8)
3 a 5	30 (25.9)
5 a 7	49 (42.2)
7 a 10	21 (18.1)

Source: Prepared by the authors based on research data

**Table 8:** Student self-assessment: after

Variable	No %
After	
0 a 3	25 (21.6)
3 a 5	33 (28.4)
5 a 7	44 (37.9)
7 a 10	14 (12.1)

Source: Prepared by the authors based on research data

### Conclusion

The hypothesis of the study for the students' knowledge to be considered satisfactory was to obtain a final percentage equal to or greater than 70%, in a sum of correct and partially correct, and to be considered partially satisfactory, a total of at least 60%.

Based on this, only the Nursing course with 75% managed to reach values considered satisfactory for the management of patients with DM, being considered partially satisfactory the Physical Education courses (65.01%), Nutrition (63.44%), Dentistry (62.82%) and Physiotherapy (61.88%) respectively.

Since DM is a global health problem and because it is a multifactorial disease that requires a multidisciplinary approach, it was expected that the Pharmacy (58.44%) and Psychology (58.13%) courses would obtain better results. With this, it is considered that the courses that achieved "satisfactory and partially satisfactory"

results have sufficient scientific knowledge, or rather, desirable so that they can work with patients with DM.

Finally, it is expected that the present study will collaborate by demonstrating that future health students, and consequently future professionals in the labor market, are able and directed to strategies for patients with DM, considering the global dimension of this chronic disease.

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