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PROFILE OF TYPE 1 DIABETIC INSULINTHERAPY USERS IN CUITÉ, PARAÍBA, BRAZIL

PERFIL DE DIABÉTICOS TIPO 1 USUÁRIOS DE INSULINOTERAPIA EM CUITÉ, PARAÍBA, BRASIL

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Maria Isabel Gomes da Luz
Universidade Federal de Campina Grande (UFCG), Centro de Educação (CES) e Saúde, Cuité-PB.
Orcid.org/

***Francisco Patricio de Andrade Júnior**
Programa de Pós-Graduação em Produtos Naturais e Sintéticos Bioativos, Centro de Ciências da Saúde, Universidade Federal da Paraíba, João Pessoa – PB.
Orcid.org/

Camila de Albuquerque Montenegro
Universidade Federal de Campina Grande (UFCG), Centro de Educação (CES) e Saúde, Cuité-PB
Orcid.org/

***Autor correspondente:** Doutor em Farmacologia; e mail: juniorfarmacia.ufcg@outlook.com.

ABSTRACT

Introduction: Type 1 diabetes mellitus (T1DM) is an autoimmune disease that requires continuous insulin therapy to improve patient survival. **Objective:** To evaluate the use of insulin and related practices by T1DM patients in Cuité, Paraíba. **Methodology**: This cross-sectional, descriptive, and quantitative study included 30 patients receiving insulin in Cuité/PB. **Results:** Most participants were male (56.7%), over 70 years old (33.4%), had low education (66.7%), and had an income of 1–3 minimum wages (86.7%). It was observed that 83.3% of the participants reported having a healthy diet, 60% were sedentary, and 73.3% had rotated insulin injection sites, with the arm being the most commonly used site (56.7%). **Conclusion:** There is a need to increase guidance on the proper use of insulin and correct disposal of sharps to improve patient care and quality of life.

KEYWORDS: Type 1 diabetes mellitus; insulin therapy; pharmaceutical assistance; medication disposal.

RESUMO

Introdução: O diabetes mellitus tipo 1 (DM1) é uma doença autoimune que requer terapia contínua com insulina para melhorar a sobrevida dos pacientes. **Objetivo**: Avaliar o uso de insulina e as práticas relacionadas por pacientes com DM1 em Cuité, Paraíba. **Metodologia**: Este estudo transversal, descritivo e quantitativo incluiu 30 pacientes em uso de insulina em Cuité/PB. **Resultados**: A maioria dos participantes era do sexo masculino (56,7%), tinha mais de 70 anos (33,4%), possuía baixa escolaridade (66,7%) e uma renda de 1 a 3 salários mínimos (86,7%). Observou-se que 83,3% dos participantes relataram ter uma alimentação saudável, 60% eram sedentários e 73,3% rotacionavam os locais de aplicação da insulina, sendo o braço o local mais utilizado (56,7%). **Conclusão**: Há a necessidade de aumentar a orientação sobre o uso adequado da insulina e o descarte correto de objetos cortantes para melhorar o cuidado com os pacientes e a qualidade de vida.

PALAVRAS-CHAVE: Diabetes *mellitus* tipo 1; Insulinoterapia; Assistência Farmacêutica; Descarte de medicamentos.

INTRODUCTION

Diabetes *mellitus* (DM) is an important and growing health problem in all countries, regardless of the individual's stage of development. Around 75% of cases are located in developing countries, where this condition is expected to increase in the coming decades. According to the Brazilian Diabetes Society, Brazil currently has over 13 million people living with diabetes, which corresponds to 6.9% of the national population. Type 1 diabetes accounts for between 5% and 10% of this total[1].

DM is classified in second place by its etiology and not by the therapy used. The World Health Organization (WHO) and the American Diabetes Association [2] divide it into 4 types (1) Type 1 diabetes mellitus, of autoimmune or idiopathic etiology, which is described by the attack on the beta cells of the pancreas with consequent impairment in insulin production, (2) Type 2 diabetes mellitus, is the most common form of chronic non-communicable disease, characterized by insulin resistance, (3) gestational diabetes mellitus, defined by the presence of glucose intolerance during pregnancy and (4) other specific types. It is also important to highlight the existence of pre-diabetes states and impaired glucose tolerance, which are not characterized as clinical forms, but rather as inducing factors for the progression of the disease.

Thus, during diabetes, a series of complications arise, such as hypoglycemia, ketoacidosis, hyperosmolar coma, retinopathy, nephropathy, and diabetic neuropathy, in addition, high plasma concentrations of glucose lead to the development of chronic degenerations associated with society of various organs. , mainly eyes, kidneys, heart, nerves and blood vessels [3].

Type 1 diabetes mellitus (DM 1), more specifically, is autoimmune, polygenic, resulting from the destruction of pancreatic β cells, resulting in complete deficiency in insulin production. Therefore, the correct use of home insulin requires training, changes in daily life, discipline, availability for learning and administration, and interest in self-care. Therefore, the success of pharmacotherapy, in addition to depending on the number of daily applications and type, also involves adherence to use, increasing the patient's responsibility in controlling this chronic condition [4].

Thus, numerous types of insulin, such as basal insulin Peglispro, Icodec, Icodec combined with Semaglutide, and Efsitora Alfa insulin, have been studied. Additionally, non-injectable insulins administered via inhalation, such as "Exubera" and "Technosphere," are in phase three of research, aiming to improve the quality of life of individuals with DM 1 and DM 2 (5).

In this context, the efficiency of the pharmacist's clinical performance is necessary to improve the quality of life of diabetic patients, since this professional can directly collaborate in guiding the correct use of insulin, reducing adverse effects, and greater adherence to pharmacotherapy. Therefore, the present study aims to evaluate the profile of type 1 diabetics using insulin therapy in Cuité-PB.

METHODS

Kind of study

This is a cross-sectional, descriptive study, with a quantitative approach through the application of a questionnaire. Simple and absolute frequencies were calculated.

Study location

The research was carried out in the 4th Health Management and the Basic Pharmacy in the municipality of Cuité (6028'53.94" S and 36008'58.87" W) which is located in the mesoregion of Agreste Paraibano and the microregion of Western Curimataú, with population of 20,312 inhabitants in 2014, according to the census by the Brazilian Institute of Geography and Statistics (IBGE). Its territorial area is 758 km², density of 26.3 inhabitants/km², being 235 km away from the state capital, João Pessoa, and the city of Campina Grande, 117 km. About sea level, the altitude is 667 m. Its neighboring municipalities are Cacimba de Dentro, Barra de Santa Rosa, Nova Floresta, Picuí, Pedra Lavrada, Cubati, and Sossego[6].

Sample

The study was carried out with 30 patients with diabetes mellitus who receive insulin through the Specialized Center for Dispensing Exceptional Medicines (Cedmex) in the 4th Health Management through the basic pharmacy in the city of Cuité/PB. Some visits were made to obtain data. It should be noted that the work was carried out during the coronavirus pandemic and that all safety measures were respected to avoid viral transmission.

Inclusion and exclusion criteria

This study included patients with type 1 diabetes mellitus who (or their caregivers/guardians) received insulin through the Cedmex Center in the 4th Health Management and in the Basic Pharmacy in the city of Cuité/PB; who signed the TCLE and were able to answer the questions asked. Individuals who were not cognitively healthy enough to answer the questionnaire were excluded; those unaccompanied by a legal

guardian or caregiver; who did not understand the objectives, benefits, and risks of the project; in addition to those who did not agree to participate in the research and, therefore, did not sign the ICF.

Data Collection Instrument

Data collection occurred through the application of a questionnaire, in which the following variables were analyzed: age, sex, number of people with whom they live, family income, level of education, age at which they received the diagnosis, time of use of insulin therapy, storage location, identification of the individual who applies insulin, identification of the most used application sites and evaluation of the disposal of syringes and packaging.

Ethical aspects

The researchers used the data obtained from the questionnaires administered in the 4th. health management in the municipality of Cuité/PB to have information on the use of insulin by people with diabetes mellitus, checking whether it is rational. To this end, the project was submitted and approved by the Research Ethics Committee of the Federal University of Campina Grande (CEP/ HUAC/ UFCG), under certificate number: 4.035.013.

RESULTS

During the study period, 30 patients who received insulin were interviewed at the 4th Health Department and at the Basic Pharmacy in the city of Cuité/PB, where we received a good response from those interviewed. We also highlight the collaboration offered by the 4th Health Management team and the basic pharmacy, to achieve the objectives of this research.

Table 1 presents the social and demographic variables of insulin users participating in this study.

Table 1. Social and demographic characteristics of insulin users (n=30); 2021.

Variables	n	%
Age range		
Up to 29 years old	6	20.0%
30 a 49 years old	6	20.0%
50 a 69 years old	8	26.6%
≥ 70 years old	10	33.4%
Sex:		
Female	13	43.3%

Male	17	56.7%
Education:		
No education	3	10.0%
* Low education level	20	66.7%
**Average schooling	4	13.3%
***High schooling	3	10.0%
Number of members residing		
Alone	2	6.7%
1	6	20%
2	7	23.3%
3	8	26.7%
4	7	23.3%
Family income		
Even a salary	3	10%
1 - 3 salaries	26	86.7%
3 - 5 salaries	1	3.3%

*Complete and incomplete primary education; **complete and incomplete secondary education;*** complete and incomplete higher education and postgraduate studies.

Source: survey data, 2021.

Table 2 presents the variables that provide information about DM1 and the use of insulin.

Table 2. Information about diabetes of insulin users from the 4th Health Management in the city of Cuité/PB (n=30); 2021.

Variáveis	**n**	**%**
Age at diagnosis		
Variables		
Up to 29 years old	13	43.3%
30 a 49 years old	4	13.3%
50 a 69 years old	7	23.4%
≥ 70 years old	6	20.0%
Treatment		
Pharmacological		

insulin glargine	11	36.7%
humalog insulin	2	6.7%
Insulin aspart	5	16.7%
NPH	12	40%
Years of using insulin		
1 – 5	11	36.6%
6 – 10	7	23.4%
11 – 20	6	20.0%
≥ 21 years	6	20.0%

Source: survey data, 2021.

Below (table 3), you can see information about insulin storage.

Table 3. Information on insulin storage for insulin users in the 4th Health Department of the municipality of Cuité/PB (n=30); 2021.

Variables	**n**	**%**
Storage location		
Refrigerator	30	100%
It is within reach of		
Children	1	3.3%
Yes	29	97.7%

Source: survey data, 2021

Information about the application of insulin can be seen in table 4.

Table 4. Information on how insulin users use the 4th Health Department in the municipality of Cuité/PB (n=30); 2021.

Variables	**n**	**%**
Self application		
Yes	18	60.0%
No	12	40.0%
Application rotation		
Yes	22	73.3%
No	8	26.7%
Most used location for application		

Arm	17	56.7%
Thigh	3	10.0%
Abdomen	9	30.0%
Glute	1	3.3%
Use the same needle for applications		
Yes	10	33.3%
No	20	66.7%
Times of reuse of needle in applications		
2	7	70.0%
3	2	20.0%
4	1	10.0%

Source: survey data, 2021

DISCUSSION

In Table 1, the age range of the interviewees ranged from 6 to 92 years old, with the average age being 53.57. It was observed that the majority of interviewees were over 50 years old (60%). These results are similar to the data observed in insulin-dependent patients residing in Belém-PA, where the average age was 55.4 years, ranging from 15 to 88 years[7] .

Regarding the level of education, 10% declared themselves illiterate, and 66.7% of the sample had low education. Barbosa Junior et al.[8] carried out research with patients with DM, insulin users, registered in the Family Health Strategy units in the city of Formiga/ MG and found that 63% did not complete high school and 40% reused the syringe more tenfold due to lack of information. In Belém-PA, among 75 insulin-dependent individuals, the majority have low education levels (44.3%)[7].

Studies show that low education can make access to information difficult and, in this way, harm the performance of self-care in a safe way [9]. Furthermore, low education is associated with worse levels of adherence to pharmacological and non-pharmacological measures of DM therapy.

Regarding family composition, 6.7% say they live alone. According to Soares et al.[10], in a study on factors related to adherence to the use of insulin in patients treated in Primary Care, 6.7% of those interviewed lived alone. It was seen that the fact of living alone led the patient to seek more knowledge about self-application, as he did not have help from anyone

else, contributing to self-care.

In terms of family income, it is possible to observe that 10% earn up to one salary, and 86.7% of patients earn 1-3 salaries. In the study by André et al.[11] guidelines on the disposal of waste generated in the homes of insulin users, 15.4% of their sample had a monthly income between 0-1 minimum wage, which is similar to what was found in this study.

According to André et al.[11], the purchasing power found in the study is a significant condition in the treatment of DM and may be a limiting factor in controlling the disease, since food and self-care are considered high costs for some patients, thus, low purchasing power becomes a determining factor for individuals with DM to neglect diet and other treatment recommendations.

Regarding the age of diagnosis of DM1, 43.3% of respondents received the diagnosis before the age of 29, which is an understandable finding since, generally, the diagnosis for this condition occurs in childhood and adolescence.

The type of insulin most used by patients in Cuité-PB was intermediate-acting NPH insulin (40%). In the study by Penaforte et al.[12], 48.9% of participants used intermediate-acting NPH insulin, while Coelho et al.[13] 56.3% of those affected also used this type of hypoglycemic agent, similar to data from present research. Insulin glargine, in turn, was the second most used and is capable of providing a reliable constant basal insulin concentration lasting 24 hours, without peaks and, consequently, with a lower risk of hypoglycemia [14].

Regarding the practice of non-medication habits/measures, 83.3% of patients practice healthy eating and 16.7% do not maintain this eating pattern. Regarding physical activity, 40% of respondents say they practice physical activity while 60% are sedentary. As it is a small city, the municipality of Cuité still maintains its rural roots, which ends up having a major influence on eating habits, as inhabitants maintain small vegetable gardens that increase food quality. It must also be taken into account that the majority of the sample is over 70 years old, which makes it very difficult to practice regular exercise.

In the study by Hodniki et al.[15], 67.44% of patients did not practice physical activity. Regular physical exercise and following a dietary plan play a great role in controlling and preventing DM complications. However, these are difficult goals to achieve in elderly patients and those with comorbidities [16].

Regarding the storage location, 100% of those interviewed store insulin in the refrigerator, which is the correct approach to allow the conservation of the physicochemical and biological characteristics of parenteral hypoglycemic agents. Therefore, it is worth

highlighting that insulins will maintain their stability and biological action as long as the guidelines regarding conservation and transport are followed, and must be removed from refrigeration 30 minutes before application and kept at 2ºC to 8ºC during use [17].

In this research, only 3.3% leave their bottles within reach of children, corroborating the study by Marini et al.[18] carried out in the city of Itapira-SP.

For the application of insulin, it was seen that 60% self-applied insulin, similar to the studies by Pereira et al.[19] and Moreira et al.[20].

Self-care for people with DM-1 is closely related to the use of insulin, as these patients have difficulty controlling their disease with non-pharmacological measures [21]. The lack of knowledge and information on the part of the user leads to unsafe practices of insulin therapy, which include the reuse of syringes and needles and their inappropriate disposal [22]. Therefore, the pharmacist has a crucial role in the use of this medication and handling of syringes appropriately, in addition to instructing these people correctly and ethically and professionalism [23].

The most used sites for application are the arms (56.7%) and abdomen (30%), which differed from a study conducted in Southwest Bahia, where, among 40 insulin users, 95% administered the injections in the abdominal region[24]. Regarding application rotation, 73.3% of interviewees stated that they rotated the application, similar to the study by Pires et al.[25], in which 80% of users rotated the application site.

Regarding the times of needle reuse in the applications of the 30 patients involved in the research, only 10 stated that they reused the application needle, of which 70% reused the needle 2 times, 20% 3 times and 10% 4 times. These findings are similar to those of a study conducted at a Primary Healthcare Unit in Belo Horizonte, MG[26].

When reusing a disposable syringe more than once, individuals are subject to infections resulting from the transmission of infectious agents, as the needle, after a few reuses, appears damaged and can accumulate residue in its lumen [27].

Regarding the disposal of insulin users, 60% dispose of it in normal trash, 10% bury it, and 30% dispose of it in the healthcare establishment.

It is worth noting that the disposal of vials and needles used to treat diabetes mellitus in general waste represents both a danger to public health and also becomes a harmful practice for the environment, contributing to the increase in environmental pollution.

Given the risks inherent to this waste, they must be stored in rigid, puncture-resistant containers and, immediately after filling, they are sent to the UBS or the municipality's basic pharmacy for proper disposal [4].

The findings of this study contribute significantly to both science and clinical practice

by expanding the understanding of factors that influence diabetes management in specific populations. The comprehensive analysis of the socioeconomic, educational, and behavioral characteristics of insulin-dependent patients highlights critical areas for intervention, such as education on self-care, proper insulin handling, and disposal practices. This information not only guides the development of targeted public health strategies but also reinforces the need for healthcare professionals to adopt a multidisciplinary approach to patient education and support.

CONCLUSION

The profile of insulin users in Cuité-PB was predominantly composed of men with low income and low education. The study observed that the majority of respondents rotated injection sites and performed self-injection.

A very important and concerning aspect identified in this research was the lack of guidance on the proper disposal of sharp objects—syringes and needles—by insulin-dependent patients, with these waste materials being discarded with regular trash, which poses potential risks to public health and the environment.

In this regard, the data from this research can be used to develop public policies in the municipality of Cuité-PB, aimed at educating and informing the insulin-dependent population about the correct ways to manage insulin use, which will provide protection and promote the health of individuals with type 1 diabetes, especially among the poorer social segments.

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