



PROFILE OF TYPE 2 DIABETICS INSULIN-APPLICANTS FOLLOWED IN A MULTI HEALTH CENTER, SALVADOR, BAHIA, BRAZIL

PERFIL DE DIABÉTICOS TIPO 2 INSULINO-REQUERENTES
ACOMPANHADOS EM UM MULTICENTRO DE SAÚDE, SALVADOR, BAHIA,
BRASIL

Rebeca Laísa Santos de Souza¹
Camila Martins Macêdo Belo²
Ana Teresa Sobreira Lima Verde³
Carla Hilário da Cunha Daltro⁴
Roberto Sousa Mercês⁵
Angélica Nogueira Ayres⁶
Thaize Lorena Soares Sena⁷
Ana Luísa Castro Nascimento de Aguiar⁸

Manuscrito recebido em: October 15, 2021.

Aprovado em: November 23, 2021.

Publicado em: December 13, 2021.

¹ Medical Student at UniFTC University Center.

ORCID: <https://orcid.org/0000-0001-6287-7885> E-mail: rebe.laisa@hotmail.com

² Medical Student at UniFTC University Center.

ORCID: <https://orcid.org/0000-0003-2729-2106>

E-mail: camilamedftc@gmail.com

³ Resident in Clinical Medicine at the Federal University of Ceará. Bachelor of Medicine from the Bahia School of Medicine and Public Health.

ORCID: <https://orcid.org/0000-0001-6329-6441>

E-mail: anateresa.sobreira@gmail.com

⁴ Doctor in Medicine and Health from the Federal University of Bahia. Professor at the Postgraduate Program in Medicine and Health and at the Postgraduate Program in Food, Nutrition and Health at the Federal University of Bahia. Member of the technical chamber of endocrinology of the Regional Council of Medicine of Bahia and an endocrinologist at the Center for Treatment and Surgery of Obesity.

ORCID: <https://orcid.org/0000-0003-1115-688X>

E-mail: carlahcdaltro@gmail.com

⁵ Bachelor of Nursing from the Faculty of Technology and Science. Nurse at the Institute of Health and Citizenship.

ORCID: <https://orcid.org/0000-0002-5913-2943>

E-mail: rsmerces@yahoo.com.br

⁶ Bachelor of Psychology from IUNI Educational.

ORCID: <https://orcid.org/0000-0002-0165-0502> E-mail: angelicanayres@hotmail.com

⁷ Specialist in Clinical Nutrition: Metabolism, Practice and Nutritional Therapy by Estácio de Sá University. Nutritionist at the Health and Citizenship Institute.

ORCID: <https://orcid.org/0000-0001-6551-8829>

E-mail: thaize03@hotmail.com

⁸ Master in Medicine and Health from the Federal University of Bahia. Physician at the Municipal Health Department of Salvador and at the Bahia State Health Department.

ORCID: <https://orcid.org/0000-0001-9590-7809>

E-mail: aluisacna@gmail.com



Abstract

Objective: To describe the clinical and epidemiological profile of patients with insulin-inuming Type 2 Diabetes Mellitus followed by a multidisciplinary team in a Multicenter Health Unit in Salvador-BA, Brazil. **Method:** Epidemiological, cross-sectional, retrospective, descriptive study with patients treated in the Multicenter Health Unit from October/2017 to October/2019. The clinical and sociodemographic variables were collected from medical records and expressed in absolute and relative frequencies, mean and standard deviation (SD), in addition to median and interquartile range (IR). **Results:** We evaluated 163 patients with mean (SD) of age of 61.2 (\pm 10.6) years, with a predominance between 51 and 60 years (39.3%), 66.3% of which were female. The median time of diagnosis was 10 (3) years and 78.8% had been using insulin for less than 5 years. Half of the patients accepted their diabetic condition, 53.2% did not adequately correct hypoglycemic episodes, 68.1% glycated hemoglobin above the targets set by the Brazilian Diabetes Society and 59.9% had microalbuminuria. In addition, 96.3% did not exercise, 2.5% had an appropriate food profile, 71.0% were diagnosed with Systemic Arterial Hypertension, and 70.8% did not have the cholesterol fraction Low Density Lipoprotein (LDL) value in the goal established by the Brazilian Society of Cardiology. **Conclusion:** In this sample of insulin-applicant diabetic patients, most patients were female, had other comorbidities associated with DM, low adhering to hygienic dietary measures, elevation of glycated hemoglobin and signs of diabetic nephropathy.

Keywords: Diabetes Mellitus, Type 2; Patient Care Team; Health Profile; Insulin.

Resumo

Objetivo: Descrever o perfil clínico e epidemiológico de pacientes com Diabetes Mellitus (DM) tipo 2 insulino-requerentes acompanhados por equipe multidisciplinar em um Multicentro de Saúde em Salvador-BA, Brasil. **Método:** Estudo epidemiológico, transversal, descritivo de pacientes atendidos em um Multicentro de Saúde no período de outubro/2017 a outubro/2019. As variáveis clínicas e sociodemográficas foram coletadas de prontuários e expressas em frequências absolutas e relativas, média e desvio padrão (DP), além de mediana e intervalo interquartil (IIQ). **Resultados:** Foram avaliados 163 pacientes com média (DP) de idade de 61,2 (\pm 10,6) anos, com predomínio entre 51 e 60 anos (39,3%), sendo 66,3% do sexo feminino. A mediana de tempo de diagnóstico foi de 10 (3) anos e 78,8% usavam insulina há menos de 5 anos. Metade dos pacientes aceitava sua condição de diabético, 53,2% não corrigiam adequadamente os episódios hipoglicêmicos, 68,1% possuíam hemoglobina glicada acima das metas estipuladas pela Sociedade Brasileira de Diabetes e 59,9% tinham microalbuminúria. Além disso, 96,3% não praticavam exercícios físicos, 2,5% possuíam perfil alimentar apropriado, 71,0% tinham diagnóstico de Hipertensão Arterial Sistêmica, e 70,8% possuíam o valor da fração de colesterol Low Density Lipoprotein (LDL) acima da meta estabelecida pela Sociedade Brasileira de Cardiologia. **Conclusão:** Nesta amostra de pacientes diabéticos insulino-requerentes, a maioria dos pacientes era do sexo feminino, apresentava outras comorbidades associadas ao DM, baixa adesão às medidas higienodietéticas, elevação da hemoglobina glicada e indícios de nefropatia diabética.

Palavras-chaves: Diabetes Mellitus Tipo 2; Equipe de Assistência ao Paciente; Perfil De Saúde; Insulina.



INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease of high prevalence in our country. Studies show that, in Brazil, this would be 6.2%¹. Throughout its course can cause in the individual several functional limitations, predisposition to infections, risk of cardiovascular diseases, distress from requiring a restricted diet and feeling of shame due to the use of insulin injections, among other problems^{2,3}.

It is important to highlight that most diabetic patients do not achieve good metabolic control⁴ and this fact exposes this population even further to the risk of disabling chronic complications, such as diabetic neuropathy, retinopathy and nephropathy, in addition to cardiovascular diseases^{1,5}.

Clinical experience shows that the treatment of Diabetes Mellitus, to try to achieve its multiple goals, must go far beyond medical prescription. It requires a multidisciplinary approach to contemplate the different facets involved, leading to better therapeutic adherence^{6,7}, furthermore the need for behavioral change on the part of the patient to achieve the desired goals.

The need in clinical practice to achieve these goals and the intention to bring the diabetic patient closer to the health team were the driving forces for the creation of multidisciplinary services to care for people with this comorbidity^{2,3,8,9}.

Given the above, knowing the clinical profile of these patients is a step to glimpse the context in which this population is inserted and try to direct specific measures aimed at improving the quality of the service provided. Thus, this study aimed to describe the clinical and sociodemographic profile of patients with type 2 diabetes mellitus insulin-requiring patients followed by a multidisciplinary team in a specialized care unit in Salvador-Bahia.



METHODOLOGY

This is an epidemiological, cross-sectional, retrospective, descriptive study, with a consecutive sample and data from medical records. Information was collected from patients diagnosed with type 2 diabetes who were chronically using insulin and were being monitored at the “Multicenter Vale das Pedrinhas”, located in Salvador - BA. This is a specialized health unit where the “insulin treatment center” was created, is a weekly service with a multidisciplinary team consisting of an endocrinologist, nurse, nutritionist and psychologist.

Diabetics treated by the same team from October 2017 to October 2019 were included, and those without tests within the stipulated period for data collection or those who did not use insulin therapy were excluded. The sample consisted of 234 patients, however, 71 patients were excluded due to incomplete data in the medical records. The main difficulty encountered in filling in the data was the time interval between the medical appointment and the return after performing the necessary complementary exams, within the stipulated period for collection. The patient care record, created by the team, highlighting the screening parameters for acute and chronic complications of the disease was the instrument used to collect data from the medical records. They were standardized in an initial and return form and filled out during the appointments at the “Insulin treatment center”, which occurred weekly. All patients agreed to participate in the study and have their data collected, with the Free and Informed Consent Term being written in the body of the Informed Consent Form (FICF), signed by them, assuring that their identification would be preserved. The sample was contacted as its components attended routine appointments at the service.



- Studied variables:

Sociodemographic characteristics: gender, age group, regular physical exercise (yes or no) and dietary profile (yes or no). Physical exercise for at least 30 minutes twice a week was considered a regular practice, to be added to the activities of daily living and the appropriate food profile, corresponding to compliance with individual dietary guidelines guided by the nutritionist, respecting the amount and proportions of carbohydrates, proteins, fats and fiber, in addition to not skipping meals;

Clinical characteristics: the description of vital data, waist circumference, weight and height collected from the service form; adherence to treatment and self-care; comorbidities (previous diagnosis of systemic arterial hypertension or continuous use of antihypertensive drugs); data related to DM: acceptance of the DM diagnosis (yes or no); time of DM diagnosis in years; episodes of hypoglycemia and whether the correction was properly made with 15 g of simple carbohydrate; insulin use (self-application and correct application of insulin, rotation of the application site, NPH and regular insulin dose, time of insulin use and acceptance of its use); glycemic map (six capillary glycemic values including pre and postprandial); food record (six meals on two consecutive days, in the week of care); adherence to drug treatment (determined by the regular use of prescribed drugs, including insulin, without interruption, omission, or change in prescribed doses) and recommended dietary determinations (non-omission of meals, proportionality and quality of food, use of the replacement list of foods); laboratory tests: LDL-cholesterol (low density lipoproteins) in the target for age, glycated hemoglobin (HbA1c) by the HPLC (High Performance Liquid Chromatography) method and microalbuminuria performed until October 2019.

Good adherence to treatment determined by the regular use of prescribed drugs, including insulin, without interruption, omission, or change in prescribed doses.



- Data collection technique:

The patient had direct and more frequent access to the service, with prior appointments, and in a single shift was seen sequentially by the four professionals. The specific forms filled out during the consultations were later used for data collection, after signing the consent form.

On the day of care, the patient brought information about capillary blood glucose and food records in standardized forms, delivered in a previous consultation.

Upon arrival at the multicenter, vital data, weight, height and capillary blood glucose were checked. The nurse checked the dose of insulin used by the patient (provided a sample, so that the patient simulated the amount administered), if the application was performed correctly (hand and application site hygiene, the position of the syringe and the performance of the skin fold), the application sites and the rotation of the site; questioned about the practice of physical exercises and foot care. In addition, it recorded whether there were episodes of hypoglycemia and the way the patient corrected them. Subsequently, the psychologist recorded their perception of self-care on the part of the patient and questioned their acceptance of the disease and treatment.

Then, the patient migrated to another care room. The nutritionist measured the abdominal circumference, analyzed the food maps and verified adherence to previously recommended dietary determinations, individually, in an appointment prior to the follow-up at this specific clinic.

The endocrinologist periodically performed a physical examination, with an emphasis on evaluating the feet, tracking possible chronic complications (monitoring the date of the last assessment with the ophthalmologist, cardiologist and angiologist), in addition to making sure that microalbuminuria, LDL and HbA1c were periodically performed. Moreover, the capillary blood glucose map brought by the patient was analyzed.



In a joint moment, a nutritionist and an endocrinologist promoted the crossing of information from the food diary and glycemic diary for the two days recorded by the patient and explained at the same time the factors that influenced the results and which adjustments were necessary to reach the desired glycemic and lipid goals. As needed, adjustments were made in the doses of insulin and/or prescribed medications. And dietary guidelines were reinforced. A new appointment was scheduled depending on the controls achieved.

Blood samples taken periodically to monitor glycemic control, lipids and other parameters were collected at the center and analyzed in the same laboratory, almost entirely. The desired glycemic target was in line with the determination of the Brazilian Society of Diabetes, as well as the lipid target is in accordance with the determinations of the Brazilian Society of Cardiology, differentiated by age and by the presence of cardiovascular events¹⁰.

The present study was approved by the Research Ethics Committee of the Hospital Santa Izabel - Santa Casa de Misericórdia in Bahia, under protocol number 3905.89, and authorized by the People Management Coordination of the Municipal Health Department.

For data analysis and tabulation, the SPSS statistical package was used. Categorical variables were expressed as simple, absolute and relative frequency, and quantitative variables as mean and standard deviation (SD) or median and interquartile range (IIQ), according to the distribution of the variable.

RESULTS

During the study period, of the 234 patients who were seen at the “insulin treatment center”, only 163 had more than one medical appointment and brought a laboratory evaluation within the period stipulated for collection, thus being eligible for the study. Of these, 66.3% (108) were female. The mean age was 61.2 (10.6) years, with a predominance of the age group from 51 to 60 years, 39.3% (64) individuals. Table 1 shows the clinical and sociodemographic characteristics of the studied sample.



Comorbidities associated with diabetes were present in 87.7% (143) of the patients studied, with Systemic Arterial Hypertension being the most frequent (71.0%), followed by high LDL-cholesterol (69.9%) and microalbuminuria (59.9%) (Table 1).

Regarding lifestyle, the majority (96.3%) of the patients did not practice physical exercise and did not have adequate dietary habits (97.5%) (Table 1).

Table 1 – Clinical and sociodemographic characteristics of 163 insulin-requiring diabetics treated at the Health Unit. Salvador-BA. 2017-2019.

Characteristics	n (%)
Sex (n=163)	
Female	108 (66,3)
Male	55 (33,7)
Age Group(n=163)	
30 – 40	7 (4,3)
41 – 50	15 (9,2)
51 – 60	64 (39,3)
61 – 70	45 (27,6)
71 – 86	32 (19,6)
Blood pressure(BP) (n=162)	
Systolic BP at first Medical appointment <140 mmHg	56 (34,6)
Systolic BP at first Medical appointment ≥140 mmHg	106 (65,4)
Diastolic BP on first Medical appointment <90 mmHg	98 (60,5)
Diastolic BP on first Medical appointment ≥90 mmHg	64 (39,5)
Diagnosed comorbidities	
Blood pressure (n=162)	
Yes	115 (71,0)
No	47 (29,0)
LDL-cholesterol (n=161)	
Above the recommended goal	114 (70,8)
At the recommended Target	47 (29,2)
Microalbuminuria (n=142)	
Yes	85 (59,9)
No	57 (40,1)
Life style	
physical exercise practice (n=163)	
Regular	6 (3,7)
Does not perform	157 (96,3)
Adequate food profile (n=161)	
No	157 (97,5)
Yes	4 (2,5)

Note: missing data result from incomplete filling of data for some patients.



Table 2 provides information about the time of diagnosis and treatment of the evaluated patients. Approximately half of diabetics had one to ten years of diagnosis of diabetes (50.3%) and accepted the disease (50.9%). Most had HbA1c levels above the recommended target by the Brazilian Society of Diabetes and did not ingest the amount of 15g of carbohydrates recommended for proper correction of a hypoglycemic episode.

Table 2 – Information on time of diagnosis and treatment of 163 insulin-applicant diabetics treated at the Health Unit. Salvador-BA, 2017-2019.

Characteristics	n (%)
Time of diagnosis (n=161)	
1 to 10 years	81 (50,3)
11 to 20 years	50 (31,1)
21 to 39 years	30 (18,6)
Accepts diabetes diagnosis (n=161)	
Yes	82 (50,9)
No	79 (49,1)
Properly corrects hypoglycemia (n=158)	
Yes	74 (46,8)
No	84 (53,2)
HbA1c on Target (n=163)	
Yes	52 (31,9)
No	111 (68,1)

Note: missing data result from incomplete filling of data for some patients

Regarding the use of insulin and its variables, 67.1% (108) of 161 patients accepted its use; and when outpatient follow-up began, 78.8% (123) of 156 patients had a median of 4 (2 - 5) years of use. Of the total of 162 medical records, 30.1% (49) patients used between 16 and 30 units of NPH insulin, with a median of 28 (12 - 39) units. When analyzing regular insulin, used by the minority, 28.2% of patients, 91.4 (149) of 163 patients used less than 11 units/day. As for patient autonomy and precision in administering the prescribed dose, more than half, 70.0% (112) of 161 individuals performed the self-application of insulin and 63.1% (99) of these patients did not perform the application correctly. Rotation of application sites was performed by 56.9% (91) of 160 patients (Table 3).



Table 3 - Information regarding the use of insulin by the 163 patients seen at the Health Unit. Salvador-Bahia, 2017-2019.

Characteristics	n (%)
Self-application (n=160)	
Yes	112 (70,0)
No	48 (30,0)
Correct application (n=157)	
Yes	58 (36,9)
No	99 (63,1)
Rotation of application site (n=160)	
Yes	91 (56,9)
No	69 (43,1)
Accept the use of insulin (n=161)	
Yes	108 (67,1)
No	53 (32,9)
Insulin use time (n=156)	
1 to 5 years	123 (78,8)
6 to 10 years	24 (15,4)
> 10 years	9 (5,8)
Daily dose of NPH insulin (n=163)	
< 16 units	45 (27,6)
16 to 30 units	49 (30,1)
31 to 45 units	43 (26,4)
46 to 60 units	17 (10,4)
> 60 units	9 (5,5)
regular daily insulin dose (n=163)	
0 to 10 units	149 (91,4)
11 to 20 units	9 (5,5)
21 to 40 units	5 (3,1)

Note: missing data result from incomplete filling of data for some patients.

DISCUSSION

This study demonstrated that most insulin-requiring diabetic patients treated at this health unit were 50 years old or older, female and frequently presented comorbidities such as systemic arterial hypertension and hypercholesterolemia. A large percentage did not perform physical exercise, did not have an adequate dietary profile and, in addition, laboratory tests showed high HbA1c and the presence of microalbuminuria.



The predominance of women in diabetes center has been frequently described^{2,11,12,13}. Many authors believe that the predominance of females in studies related to diabetes is due to greater concern among women with their own health, and greater demand for care^{11,12}. The fact that most patients belong to the age group between the fifth and sixth decade of life was also observed in other studies^{11,12}. This is expected considering the period of life most affected by type 2 diabetes and only a few years after diagnosis, treatment with oral antidiabetics is added or replaced by insulin therapy¹⁰.

Diabetes Mellitus can lead to a reduction in life expectancy, with cardiovascular diseases being the main cause of death in this population¹⁰. We found that many patients evaluated in this study had systemic arterial hypertension and hypercholesterolemia, high HbA1c and microalbuminuria, which are well-known risk factors for cardiovascular disease¹⁰. A similar scenario was described by Montenegro Júnio et al.² and Velozo J. et al.¹³, who showed, respectively, a prevalence of arterial hypertension of 72.3% and 82% in the diabetic population. This evidence is noteworthy because it is a sample with a high risk of cardiovascular complications and to which all preventive efforts should be directed.

In this sample, most individuals had between 1 and 10 years of diagnosis. In a study carried out in Finland, of 50% of insulin-requiring patients, 56.3% of patients had more than 10 years of diagnosis¹⁴. In our sample, the need for insulin could be attributed to the longer time of diabetes diagnosis, but other factors, in addition to the loss of function of pancreatic beta cells, may have influenced, such as glucotoxicity¹⁵, as the patients in the unit did not had access to consultation with an endocrinologist, therefore, many were quite uncompensated in the opening of the Multicenter, in 2014.

Also with regard to this topic, it was observed during the first medical appointment with the specialist, even before the creation of the "Insulin treatment center", the clinical inertia in starting insulin therapy¹⁶. It is important to consider that the Unified Health System does not provide new classes of medication, which could delay, in some cases and for some period, the use of insulin. Furthermore, as around 40% of diabetic people are unaware of their condition¹⁷, the time of diagnosis may be underestimated.



On average, half of the patients did not accept the diagnosis of diabetes. The acceptance of their own health condition is inversely related to the averages of HbA1c¹⁸. A percentage of the sample also did not accept the fact of needing the use of insulin. We believe that awareness by psychology is a key element in the educational chain, acting on this acceptance, encouraging self-care and helping patients to establish objective goals.

The need for continuing education was also evident with regard to episodes of hypoglycemia. Although the concept was reinforced in the first consultation at the clinic and in follow-up consultations, in addition to being the topic of educational lectures at the multicenter, when faced with an acute episode of hypoglycemia, approximately half of the patients did not know how to correct it properly. Other strategies such as the delivery of educational pamphlets can be given to the patient to minimize this situation.

It is well established that glycemic control is essential to reduce morbidity and mortality in diabetic patients, as well as to improve their quality of life^{3,10}, however, there are many challenges to achieve this goal⁴. As an example of the insulin application technique, where in this study many failures were detected in this process (despite the fact that most patients perform the self-application). These data influence the treatment, increasing the time for dose adjustment and requiring more medical appointments so that the prescription is put correctly into practice, in addition to the risk of complications associated with incorrect applications.

The presence of nurses helping to acquire these skills is of great importance, making medical care more agile and standardizing the team's language⁶. When analyzing the rotation of site of the insulin application, only half of the patients adopted this practice. In the study carried out by Cunha GH, et al.¹⁹, 92.7% of the patients systematically changed the insulin application site. Although our patients receive this guidance, we often hear from them that the application to the abdomen is less painful.



It is known that the regular practice of physical exercise improves glycemic control, reduces the need for drug treatment and helps to control complications¹³. Most patients in this sample did not perform any type of physical exercise. We must seek other incentives in addition to verbal encouragement to increase adherence to this important pillar of treatment.

Regarding eating habits, most did not have the correct dietary profile, with an excess of carbohydrates and little fiber and protein predominating. The diet of northeastern people rich in farinaceous²⁰ is an example of habits found that can make it difficult to acquire a healthier menu. Therefore, the role of the nutritionist in the individualization of dietary needs³ is of fundamental importance, in order to facilitate understanding and reduce the chance of unconscious eating errors.

The main limitation of this study, inherent to the fact that it is retrospective, is due to the incompleteness of the data described in the standardized forms, instruments used for data collection. Regarding the sample size, the exclusion of many patients was due to not returning to appointments with test results during the data collecting period. Another point that was not explored was the justification for poor adherence to regular physical exercise practices.

CONCLUSION

The clinical profile of patients treated at the “insulin treatment center” was characterized by a predominance of females, in the elderly age group, and with a high prevalence of comorbidities commonly associated with diabetes. This population had little adherence to dietary hygiene measures, with the majority of HbA1c and LDL-cholesterol levels outside the goals stipulated by the Brazilian society of diabetes, and therefore at risk of developing macro and microvascular complications secondary to the underlying disease. This characterization of insulin-requiring patients in a specialized service is necessary, so that more preventive measures can be applied, seeking other strategies that aim to reduce the risk of cardiovascular outcomes.



ACKNOWLEDGMENT

To the medical director Marcus Andrade for his support in making the project viable and to the entire multidisciplinary team of the Vale das Pedrinhas Health Multicenter located in Salvador-BA, Brazil.

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