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ORIGINAL ARTICLE

LOWER URINARY TRACT SYMPTOMS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Introduction: Lower Urinary Tract Symptoms(LUTS) are a complication of Diabetes Mellitus (DM) and although it negatively impactsthe quality of life, it is not considered in care programs for this population. **Objective:** To survey the occurrence of LUTS in a population with Type 2 DM and assess its association with clinical history. **Method:** Cross-sectional study. Interview with 60 patients from a private DM clinic using a tool with sociodemographic and clinical data and symptoms of bladder storage and voiding in the last 30 days. Statistical analysis was performed using the computer program IBM SPSS Statistics, v20.0.**Results:** Most of the participants were retired with high education, good dietary, and intestinal pattern, sedentary, obese, or overweight, with high glycated hemoglobin rates. Of the total, 25% had stress urinary incontinence, 60% had at least one symptom of overactive bladder, 41.7% had at least one symptom of incomplete bladder voiding, 70.1% had at least one LUTsymptom. An association was found between urinary symptoms and time since DM diagnosis. **Conclusion:** The population with type 2 DM has a high occurrence of LUTS, with a predominance of symptoms of overactive bladder, associated with the time of DM diagnosis.

Keywords: Diabetes Mellitus. Urinary Incontinence. Urinary Retention. Diabetes Complication. Secondary Prevention. Nursing.

INTRODUCTION

Diabetes Mellitus (DM) is a condition characterizedby hyperglycemia due to some failure in the action or secretion of insulin, or even both. Type 02 DM (DM2) is the most common form, with about 90% of cases, it is caused by deficiencies in insulin action and secretion and the regulation of hepatic glucose production [(1)]. Among the DM complications are Retinopathies, Nephropathies, Neuropathies, and less addressed in the literature or by health programs, Cystopathy, which comprises a set of Lower Urinary Tract Symptoms (LUTS) that may affect this population[(1)].

LUTSs are divided into storage symptoms, meaning malfunction to store urine until the appropriate time, and voiding symptoms, which result in high post-void residue or retention. Storage symptoms are urgency, increased urinary frequency, urinary incontinence and nocturia. Among the symptoms of voiding is hesitancy to start to urinate, incontinence stress and reduced urine flow rate[(2,3)].

Urinary incontinence (UI) is the most prevalent LUTS and has a negative impact on the quality of life, which may affect self-esteem, social and professional life, and even cause social isolation. UI is classified as Stress Urinary Incontinence, when the loss takes placeparallel with an increase in abdominal pressure, such as sneezing and coughing, Urgent Urinary Incontinence (UUI), when the loss is preceded by urinary urgency, and Mixed Urinary Incontinence (MUI), when the two mentioned subtypes occur[(4,5)].

Researchers have shown that DM is a risk factor for LUTS because of micro and macrovascular changes resulting from poor glycemic control, however, the approach to the prevention and treatment of such disorders is not included in health programs for people with DM[(6-8)]. It is the responsibility of the

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professionals who work with this clientele to use preventive measures, as well as manage the symptoms already shown. The prevention and treatment of LUTSs are carried out simply and efficiently through the application of behavioral changes and pelvic muscle training, which can be implemented in programs without additional financial resources[9,10]. We hope that this publication will raise awareness among professionals who work with the population with DM to include the urinary approach in their actionsto prevent and treat this type of complication.

Given the exposed reality, this article aimed to surveythe occurrence of LUTS in a population with DM2 and evaluate its association with clinical history.

METHOD

Cross-sectional study with a quantitative approach wasconducted in aprivate Diabetes outpatient clinic in the city of Curitiba. The study was approved by the Research Ethics Committee under opinion 2,266,831 and followed all the recommendations of466/12 Resolution. Data collection was conducted in September 2017, from Monday to Friday, from 8 am to 12 pm and from 2 pm to 6 pm, by the authors of the study.

This was a convenience sample, where all patients who attended the medical appointment in the data collection time frame were informed about the research and invited to participate. Those who expressed interest in participating were sent to a private room, before or after their scheduled appointment, signed the Informed Consent Form and answered the interview questions.

The data collection instrument was a questionnaire created for this purpose, where symptoms of storage and voiding, described by the International Continence Society [2], were listed, so that the patient could inform if they had them in the last 30 days. Besides symptoms, the instrument was composed of sociodemographic questions, disease history and lifestyle habits. The questions were asked, clarified, and completed by the researchers as an interview, which lasted an average of 20 minutes.

The specific variables investigated were: sex, age, marital status, education, occupation, Body Mass Index (calculated by informed height and weight), physical activity, volume and type of fluids ingested daily, voiding pattern (frequency and consistency - described based on the Bristol scale), time of diagnosis, previous and current treatments, glycated hemoglobin (for those who had this information in the system) and lower urinary tract symptoms: stress incontinence, increased urinary frequency, nocturia, low voiding volume, hesitancy, weak stream, decreased urinary frequency, feeling of incomplete voiding, repeated lower urinary tract infection, vaginal itching or discharge, and dysuria.

The study included 60 people with DM2, over 18 years old, linked to the place of study and who had a medical appointment on the days outlined for data collection. People with type 1 Diabetes Mellitus were excluded.

The collected data were inserted in an Excel database and analyzed using the computer program IBM SPSS Statistics, v20.0. The results were described by means, medians, minimum values, maximum values, and standard deviations (quantitative variables) or by frequencies and percentages (categorical variables). To compare the groups characterized by voiding dysfunction, to quantitative variables, the Student's t-test for independent samples or the non-parametric Mann-Whitney test was used. The normality of the variables was assessed using the Kolmogorov-Smirnov test. Regarding categorical variables, comparisons were made using Fisher's exact test or the Chi-square test. Statistical significance was considered for $p<0.05$.

RESULTS

The average age of participants was 60.1 years (SD 12.1), 55% were men. The most frequent marital status was married (73.3%), followed by widower (15%). High School and Higher Education were predominant, with 33.3% each. As for occupation, 53.3% were retired or in household activities.

Considering the Body Mass Index (BMI), 45% were overweight and 38.3% were obese. Regular physical activity was not practiced by

71.7%. Of the 28.3% who practiced physical activity, they did it three to five times a week, walking being the most reported activity (15% of the total number of patients).

The average volume of liquid ingested daily by the participants was 1900 ml, and this volume ranged from 700 ml to 5000 ml. The types of liquids referred to as the most consumed were water, tea, and juice. Coffee, mate, and soda were less mentioned (20%, 5% and 1.7% respectively). The number of daily meals reported was from four to six in 60% of the sample, 40% ate three times or less a day. All participants reported eating vegetables, bread, and meat every day. As for the evacuation pattern, 83.4% of the participants evacuated from one to three times a day, 10% evacuated less than three times a week. A total of 73.3% reported stool consistency between 03 and 04, according to the Bristol scale, that is, soft consistency, not dry.

As for the history of the disease, the average time of diagnosis of the participants was 8.6 years (SD 7.6). The most adopted treatment was oral hypoglycemic agents (78.3%), 10% used insulin and 11.7% associated insulin with oral hypoglycemic agents. The glycated hemoglobin (HbA1c) of the participants had an average of 7.5 (SD 1.4), and 62.7% had values above 7.0.

Regarding DM complications, 33.4% had a decline in distal sensitivity, 16.7% had visual changes and 3.4% had some renal dysfunction.

Among the investigated LUTSs, as shown in Table 01, 25% of the patients reported stress incontinence, 60% had at least one symptom of overactive bladder, 41.7% had at least one symptom of incomplete voiding and 70.1% had at least one symptom of any investigated dysfunction. Table 01 specifies the symptoms investigated for each dysfunction, as well as the frequency of each symptom.

Table 1. Urinary Symptoms Reported by Type 2 Diabetes Mellitus Patients at a Diabetes Clinic. Curitiba. 2017

Urinary Symptoms	**n.**	**%**
Stress incontinence	15	25.0
Increased urinary frequency (>7x/day)	32	53.3
Low volume at each void	14	23.3
Nocturia (two or more urinations per night)	15	25.0
Decreased urinary frequency (< 03 x/day)	13	21.7
Delay to start the urine stream	2	3.3
Considers low urinary flow	16	26.7
Feeling of not emptying the bladder completely	16	26.7
Post-micturition dribble	20	33.3
Frequent pain or burning when urinating	4	6.7
Genital pruritus/secretion (<02 x since diagnosis)	9	15.0
Urinary Infection History (Up to 2 times a year)	11	28.3
Some type ofLUTS	43	71.7
TOTAL	60	100

Figure 1 summarizes the findings of the main voiding dysfunctions found in the sample, showing that the most present symptoms were overactive detrusor, when analyzed alone.

The association between voiding dysfunctions and other analyzed variables was sought. No statistically significant association was found between symptoms of urine loss stress incontinence, overactivedetrusor, incomplete voiding, or any symptom of voiding dysfunction with the variables age, level of glycated hemoglobin, the volume of fluid intake, type of treatment or having other complications from Diabetes Mellitus Type 2.

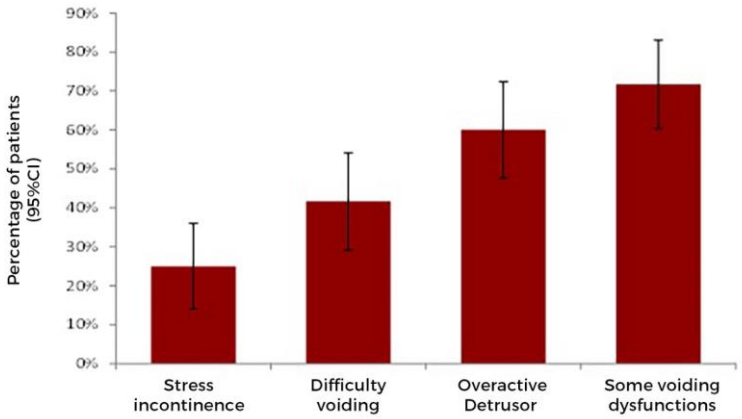

Figure 1. Percentage of Lower Urinary Tract Symptoms in People with Type 2 Diabetes Mellitus. Curitiba. 2017.

As shown in Table 2, a statistically significant association was found between time since diagnosis and overactivedetrusor. The average time of diagnosis was longer for those who had one or more symptoms of this dysfunction. Symptoms of incomplete voiding and stress incontinence were not statistically associated with time since diagnosis.

Table 2. Association between one or more symptoms of the overactivedetrusor and the age, time since diagnosis, glycated hemoglobin, and ingested fluid volume variables. Curitiba. 2017

Variable	OveractiveDetrusor	n	Average	Median	Minimum	Maximum	Standard deviation	P-value*
of (years)	No	24	56.6	60.0	29.0	70.0	10.0	
	Yes	36	62.4	63.0	30.0	82.0	12.9	0.067
Time of diagnosis (years)	No	24	5.5	3.5	0.0	17.0	5.2	
	Yes	36	10.6	9.0	0.3	30.0	8.3	**0.013**
HbA1c	No	23	7.3	7.1	5.0	11.4	1.5	
	Yes	36	7.6	7.5	5.2	11.4	1.4	0.474
Liquid volume	No	24	1763	2000	1000	4000	674	
	Yes	36	2039	2000	700	5000	1038	0.595

*Student's t-test for independent samples (age and HbA1c) or non-parametric Mann-Whitney test (time of diagnosis and liquid volume); $p<0.05$

Figure 02 shows the behavior of the variable "time since diagnosis" between the group with and without overactivedetrusor symptoms.

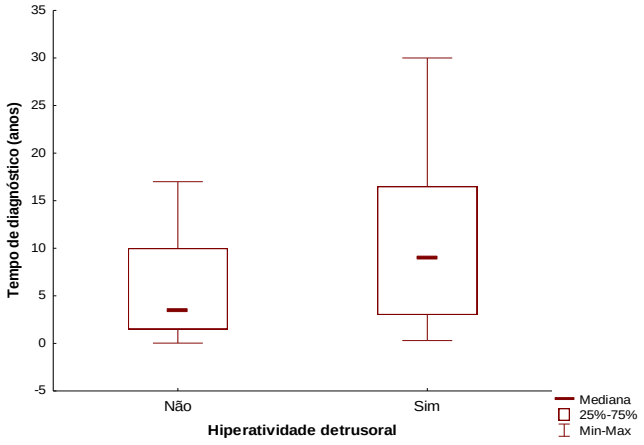

Figure 2: Association between overactivedetrusor symptoms and time since diagnosis of Type 2 Diabetes Mellitus. Curitiba. 2017.

DISCUSSION

The findings showed a high occurrence of LUTS in the studied sample, with overactive bladder symptoms being the most prevalent and associated with the time since DM diagnosis.

The age of the participants is compatible with other published studies and is related to DM2, which tends to express itself with advancing age. A study that interviewed 1237 men showed that in the population of this age group, Diabetes Mellitus has more impact on the onset of UI than age itself[11].

The similar distribution between men and women corroborates the literature checked[12]. The predominant occupation (retired) reflects the age group and high education level may be related to the service type, aimed at private care or by health plans.

The overweight and obesity observed among participants may work as a bias when considering that they are independent risk factors for LUTS. Obesity is strongly associated with Stress Urinary Incontinence due to the overload on the pelvic muscles[13]. A sedentary lifestyle may also be considered as a contributing factor to the rates found. Physical activity is among the lifestyle habits that contribute to the prevention and treatment of Urinary Incontinence. The literature points to lower rates of UI in people without obesity/overweight and who practice physical activity regularly[14].

Insufficient water intake or excessive intake of potential bladder irritants are risk factors for Urgency Urinary Incontinence [15]. However, these habits were not prevalent in the studied sample that presented a reasonable average of water intake and a low intake of caffeinated or carbonated liquids. Food intake was also a positive health behavior factor, since all participants ate vegetables daily.

Constipation was not significant among the participants. This was investigated for being a risk factor, both for Stress Urinary Incontinence, due to muscle stress in the evacuation, and for Urgent Urinary Incontinence, by triggering involuntary contractions of the detrusor[16].

Stress urinary incontinence was found in 25% of the sample. Similar findings to those observed in the general population[5]. SUI was not associatedwith the time of diagnosis or the presence of other DM complications. Differently, recent studies have shown an association between DM Metabolic Syndrome and SUI[6].

Urgent Urinary Incontinence symptoms were present in 60% of the sample, an average higher than that of the general population [4]. An association of these manifestations with the time of diagnosis was found. A Japanese study that evaluated more than 818 patients with DM2, found an association between cerebrovascular accident and Urgent Urinary Incontinence manifestations. Demonstrating the coexistence of risk factors in this population[7].

A review published in 2015, which includes 21 publishings, considerably points to a higher prevalence of Urinary Incontinence in the population with DM compared to people without DM[8]. Although in this sample no associations were found between LUTSs and other complications of DM, other studies found an association between cardiovascular autonomic neuropathy and urinary incontinence in women with type 1 DM [17].

The association between time of disease and symptoms of overactive bladder and high levels of glycosylated hemoglobin in a large portion of the sample point to poor glycemic control. Findings show that poor glycemic control is associated with UI in patients with long-standing type 1 DM and is consistent with the effects found in other types of diabetic complications[18]. Researchers who evaluated a male sample also showed in their results that time to diagnosis and poor glycemic control may increase the risk of UI among patients with T2DM[19].

The time since diagnosis and the prevalence of oral hypoglycemic agents for glycemic control found in the study corroborate other published articles in which 47.9% of patients had DM for ≥10 years and 66.4% were on non-insulin therapy, including hypoglycemic agents oral and lifestyle changes[20].

Other authors have demonstrated that patients with DM have different patterns of progressive vesical LUTS according to the stage of the DM [21]. A recently published study found a 43.2% prevalence of UI in diabetic

women, 80.6% had stress UI and 77.6% urgent UI, showing a large number of patients with both types associated (mixed UI)[20].

As in the present study, other authors did not find evidence of a significant association between UI and Glycosylated Hemoglobin, type of treatment and complications of DM2[20].

Regarding Urinary Tract Infection, less than 30% of the sample self-reported having a persistent infection. In a study that evaluated the association of UTI with DM, 40.2% of patients had UTI, and its prevalence was higher in females (54.9%) than in males (23.8%). Most UTI cases in this study (89.3%) were found in DM patients with poorly controlled blood glucose, debating again poor glycemic control as a risk factor, beyond the isolated diagnosis[12].

Poor glycemic control tends to be directly related to gaps in understanding of people with type 2 DM regarding the pathophysiology of the disease and its potential complications. Qualitative research that interviewed elderly people with DM concluded that there is a lack of information about the disease by this population, as well as a failure in educational actions with this focus, in the health service [22].

As a suggestion for future publishing, we observed the need for cohort studies that allow the follow-up of groups with and without DM2, to compare symptoms and understand the time frame of symptoms.

As a limitation of the study, it is noteworthy that symptoms were observed only by self-report, being subject to memory or understanding bias.

It is expected to have contributed adding data about the emerging need to include the prevention and treatment of LUTS in DM programs, considering its social impact and the possibility of predicting other future complications.

CONCLUSION

A high occurrence of LUTS was observed in the sample with DM2under study, with 70% of the sample reporting at least one symptom in the last 30 days. The most prevalent LUTS was the overactive bladder, with 60% of the sample reporting at least one of its symptoms. An association was found between the time since DM diagnosis and symptoms of overactive bladder, indicating a possible poor glycemic control. Stress Incontinence and voiding symptoms were prevalent, but not associated with other variables under analysis.

DISFUNÇÕES DO TRATO URINÁRIO INFERIOR EM PACIENTES COM DIABETES MELLITUS TIPO 2

RESUMO

Introdução: A Disfunção do Trato Urinário Inferior (DTUI) é uma complicação do Diabetes Mellitus (DM) e embora cause impacto negativo na qualidade de vida, não é contemplada nos programas de atenção a essa população. **Objetivo:** Levantar a ocorrência de DTUI em uma população com DM Tipo 2e avaliar sua associação com a história clínica. **Método:** Estudo transversal. Entrevista com 60 pacientes de um centro privado de DM por meio de instrumento contendo dados sociodemográficos, clínicos e sintomas de armazenamento e esvaziamento vesical apresentados nos últimos 30 dias. Análise estatística por meio do programa computacional IBM SPSS Statistics, v20.0. **Resultados:** Amostra predominantemente aposentada com alta escolaridade, bom padrão alimentar e intestinal, sedentária, obesa ou em sobrepeso, com taxas de hemoglobina glicada elevadas. Do total, 25% apresentavam incontinência urinária aos esforços, 60% pelo menos um sintoma de bexiga hiperativa, 41,7% pelo menos um sintoma de esvaziamento vesical incompleto, 70,1% pelo menos um sintoma de DTUI. Foi encontrada associação entre os sintomas urinários e o tempo de diagnóstico de DM. **Conclusão:** A população com DM tipo 2 apresenta alta ocorrência de DTUI, com predominância de sintomas de bexiga hiperativa, associada ao tempo de diagnóstico de DM.

Palavras-chave: Diabetes Mellitus. Incontinência Urinária. Retenção Urinária.Complicações do Diabetes. Prevenção Secundária. Enfermagem.

DISFUNCIONES DEL TRACTO URINARIO INFERIOR EN PACIENTES CON DIABETES MELLITUS TIPO 2

RESUMEN

Introducción: la Disfunción del Tracto Urinario Inferior (DTUI) es una complicación de la Diabetes Mellitus (DM) y aunque cause impacto negativo en la calidad de vida, no es contemplada en los programas de atención a esa

población. **Objetivo**: obtener la incidencia de DTUI en una población con DM Tipo 2 y evaluar su asociación con la historia clínica. **Método**: estudio transversal. Entrevista con 60 pacientes de un centro privado de DM a través de un instrumento que contiene datos sociodemográficos, clínicos y síntomas de almacenamiento y vaciado vesical presentados en los últimos 30 días. Análisis estadístico por medio del programa computacional *IBM SPSS Statistics, v20.0*. **Resultados**: muestra predominantemente jubilada con alta escolaridad, buen patrón alimentario e intestinal, sedentaria, obesa o en sobrepeso, con niveles de hemoglobina glicosilada elevados. Del total, el 25% presentaba incontinencia urinaria a los esfuerzos, el 60% por lo menos un síntoma de vejiga hiperactiva, el 41,7% por lo menos un síntoma de vaciado vesical incompleto, el 70,1% por lo menos un síntoma de DTUI. Se encontró asociación entre los síntomas urinarios y el tiempo de diagnóstico de DM. **Conclusión**: la población con DM tipo 2 presenta alta incidencia de DTUI, con predominancia de síntomas de vejiga hiperactiva, asociada al tiempo de diagnóstico de DM.

Palabras clave: Diabetes Mellitus. Incontinencia Urinaria. Retención Urinaria. Complicaciones de la Diabetes. Prevención Secundaria. Enfermería.

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