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THERAPEUTIC ITINERARY OF PATIENTS WITH DIABETES *MELLITUS* IN THE BASIC NETWORK

Itinerário terapêutico do paciente com Diabetes Mellitus na rede básica

Itinerario terapéutico de pacientes con Diabetes Mellitus en la red básica

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ABSTRACT

Objective: to discuss the therapeutic itinerary of patients with Diabetes *Mellitus* in the public health care network of Sergipe and to identify the points of failure in this network. **Method**: This is a descriptive, cross-section study, carried out in a teaching and research hospital in the municipality of Aracaju, Sergipe. The sample consisted of 13 participants with diabetes, hospitalized in the hospital, from May 2015 to December 2016. Central trend analyses and associations were performed using fisher's exact test. **Results**: fowes identified failures in the therapeutic itinerary of the participants, regarding the route traveled between diagnosis to hospitalizations; the role of secondary health care; the low resolution of primary care of the problems presented in order to avoid the search for tertiary care. **Conclusion:** the interface of flows pre-established by the public health system, for comprehensive care to patients with chronic complications due to diabetes, is still ineffective.

DESCRIPTORS: Access to health services; Complications of diabetes; Health policy; Primary health care.

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RESUMO

Objetivo: conhecer o itinerário terapêutico dos pacientes com Diabetes *Mellitus* na rede de atenção à saúde pública de Sergipe e identificar os pontos de falhas nessa rede**. Método**: estudo descritivo, transversal, realizado em um hospital de ensino e pesquisa no município de Aracaju, Sergipe. A amostra foi composta por 13 participantes com diabetes, internados no referido hospital, no período de maio de 2015 a dezembro de 2016. Foram realizadas análises de tendência central e associações através do teste Exato de Fisher. **Resultados**: foram identificadas falhas no itinerário terapêutico dos participantes, quanto ao percurso percorrido entre diagnóstico até as internações; o papel da atenção secundária a saúde; a baixa resolutividade da atenção primária dos problemas apresentados a fim de evitar a procura da assistência terciária. **Conclusão**: a interface dos fluxos pré-estabelecidos pelo sistema público de saúde, para assistência integral aos pacientes com complicações crônicas por diabetes, ainda é insuficiente.

DESCRITORES: Acesso aos serviços de saúde; Complicações do diabetes; Política de saúde; Atenção primária a saúde.

RESUMEN

Objetivo: (Itinerario terapéutico de pacientes con diabetes mellitus en la red básica) conocer el itinerario terapéutico de los pacientes con Diabetes Mellitus en la red sanitaria pública de Sergipe e identificar los puntos de fallo en esta red. **Método:** estudio descriptivo, transversal, realizado en un hospital docente e investigador del municipio de Aracaju, Sergipe. La muestra consistió en 13 participantes con diabetes, hospitalizados en el hospital, desde mayo de 2015 hasta diciembre de 2016. Los análisis de tendencias centrales y las asociaciones se realizaron utilizando la prueba exacta del pescador. **Resultados**: se identificaron fallas en el itinerario terapéutico de los participantes respecto al camino recorrido entre el diagnóstico y las hospitalizaciones; el papel de la atención secundaria de la salud; la baja resolución de la atención primaria de los problemas presentados con el fin de evitar la búsqueda de atención terciaria. **Conclusión**: la interfaz de flujos preestablecida por el sistema público de salud, para la atención integral a pacientes con complicaciones crónicas por diabetes, sigue siendo ineficaz.

DESCRIPTORES: Acceso a los servicios de salud; Complicaciones de la diabetes; Política de salud; Atención primaria de salud.

INTRODUCTION

Diabetes Mellitus (DM) is a metabolic disorder of lipids, carbohydrates, and proteins, of heterogeneous origin, associated with deficits in insulin manufacturing and/or insulin action, causing hyperglycemia and long-term problems.[1]

The International Diabetes Federation (IDF) states that 1 in 5 people over the age of 65 has DM, and 1 in 2 individuals is still undiagnosed. Moreover, DM has a great impact on people's lives and is one of the leading causes of death in the world, especially in adults and the elderly. In Brazil, it is estimated that 20 million people will be living with DM in 2045, with a prevalence around 9.0% of the population.[2]

According to public policies nationwide, the diagnosis of DM is mostly made in primary care, which is the first access to health care. However, due to a variety of factors, the fragmentation and discontinuity in the line of care in health care services at different levels is notorious, resulting in the search for hospitalizations that could be avoided.[3]

From this perspective, the lines of care work as a guide that aims to meet the needs and orient users and professionals in relation to the paths and offers of the health system. In this sense, this flow called therapeutic itinerary regulates the entire process of the health condition throughout the natural history, including actions of promotion, prevention, rehabilitation, cure, and palliative care related to a particular disease.[4-5]

Therefore, understanding the existing flows for the care of patients with diabetes is of fundamental importance to understand the problems of the health care network, which, at some point in this pathway, leads to early hospitalizations. Thus, this study aims to know the therapeutic itinerary of patients with Diabetes Mellitus in the public health care network of Sergipe and identify the points of failure in this network.

METHODS

This is a descriptive, cross-sectional study, with quantitative approach, carried out in a teaching and research hospital in the city of Aracaju, Sergipe. This institution provides clinical, surgical and pediatric hospitalizations, covering the population of the capital and surrounding municipalities.

The sample was by convenience, with a sample consisting of 13 individuals with DM diagnosis proven in medical records and who were admitted to that hospital during the period from May 2015 to December 2016. Included in the study were individuals over 18 years of age, whose reason for hospitalization was some complication arising from this chronic condition. The exclusion criteria were individuals with cognitive limitations and those who participated in the pilot test, due to the unfeasibility of the questionnaires used.

To obtain information that would make it possible to adjust the collection instrument and the patient selection criteria, a

pilot test was carried out with three individuals, who were not included in the sample.

The data were obtained through the application of a structured questionnaire composed of objective questions, covering socio-demographic data, time of diagnosis, comorbidities, chronic complications, variables related to treatment, diabetes monitoring, actions taken by health professionals who monitor these patients, and information related to the route taken by the individual to the hospital.

For data analysis and tabulation, a database was created using Excel® software. The data were presented in absolute numbers and percentages, besides the measures of central tendency (maximum and minimum values, mean, median and standard deviation). Associations between categorical variables were tested using Fisher's exact test. The significance level adopted was 5% and the software used was R Core Team 2020.

All study participants signed the Informed Consent Form.

It is noteworthy that this study took into account the ethical aspects contained in Resolution No. 466/12 of the National Health Council that regulates research with human beings, in force in the country, being approved by the Ethics and Research Committee of the Federal University of Sergipe, on February 19, 2015, with consubstantiated opinion: 956.294 and under CAAE No. 38718714.9.0000.5546.

RESULTS

The population of this study consisted of adults and elderly aged between 36 and 86 years, with a mean of 65.8 years, most of them were female, n=eight (61.5%) and self-reported white skin color, n=seven (53.8%), who could not read/write, n=eight (61.5%). With regard to the support network within the family, n=11 (84.6%) stated that they did not have any type of support, Table 1.

Table 1 – Socio-demographic characterization of the participants

	Participants with DM	
	N	**%**
Age Group		
30-50	2	16,7
50-70	4	33,3
70-90	6	50,0
Sexo		
Female	8	61,5
Male	5	38,5
Etnia		
White	7	53,8
Black	1	7,7
Brown	5	38,5
Education		
cannot read/write	8	61,5
can read/write	5	38,5
Marital Status		
with partner	7	53,8
without a partner	6	46,2
Support Network		
Yes	1	7,7
Father	0	0
Mother	0	0
Brothers	0	0
Wife	0	0
Other	1	8,3
No	11	84,6
Did not answer	1	7,7

Legend: n - absolute frequency. % - relative percentage frequency. Fisher's Exact Test

As for the time of diagnosis, there is predominance in the range from 0 to 9 years, n=seven (53.8%), with a median of 9 years, and variation of 9 months to 30 years, presented in Table 2.

Regarding comorbidities, risk factors, complications and insulin use, the following prevail respectively: hypertension and sedentary lifestyle, n=nine (69.2%), nephropathy, n=six (42.2%), diseases related to diabetic foot, n=seven (53.8%) and insulin use, n=12 (92.3%).

All participants with diagnosis time ≥10 years, n=six (100%) had hypertension, sedentary lifestyle and were on insulin use. And retinopathy as a complication, corresponded to an index of n=five (83.3%).

As for the chronic complications of DM, the most relevant in this research were: diabetic foot, n=seven (53.8%) and nephropathy with n=six (46.2%), and when related to the time of diagnosis ≥10years n=six (100%), these complications are present in n=three (50%) of those surveyed.

In the occurrence of complications resulting from DM, n=-seven (53.8%) of patients seek emergency hospital (Table 3). The frequency of these appointments happens according to the municipal protocols of the primary care network, highlighting bi-monthly frequency n=five (38.5%) and monthly n=three (23.0%).

Among the various forms of scheduling appointments, the referral forms n=six (46.2%) and regulation by the municipality n=four (30.8%) are relevant.

Patients using oral antidiabetic drugs before hospitalization corresponded to n=11 (84.6%) and only n=one (7.7%) used insulin.

Regarding the frequency of self-monitoring of capillary blood glucose at home, it is worth noting that of the patients studied: n=five (38.5%) do not perform it; n=four (30.8%) perform it only when in crisis; n=three (23%) perform it every day; and only n=one (7.7%) perform it three times a day. Of those who perform self-monitoring, n=three (23%) said they buy the supplies at the pharmacy, while n=four (30.8%) get them at the primary health care unit (Table 3).

Noting that the measurement of BP benefited n=13 (100%) of the participants, all the other services mentioned as: orientation about diet, physical activity, the concept of the disease, and the use of medications, performed by health professionals in the

Table 2 – Distribution of factors related to the time of diagnosis regarding comorbidities, risk factors, complications and insulin use. Aracaju, Sergipe, Brazil, 2020. (n=13) Aracaju, Sergipe, Brazil, 2020 (n=13)

	Total	Tempo de Diagnóstico		p-valor
		<10 anos N=7 (%)	≥10 anos N= 6 (%)	
Diagnostic Time				
0 to 9 years old	7 (53,8)			
10 to 19	1 (7,7)			
20 to 29	2 (15,4)			
30 or more	3 (23,1)			
Number of comorbidities				
Up to 1	3 (23,1)	3 (42,9)	0 (0,0)	0,192
2 or more	10 (76,9)	4 (57,1)	6 (100)	
Comorbities*				
Overweight/obesity	7 (53,8)	2 (28,6)	5 (83,3)	0,103
Dislipidemia	8 (61,5)	3 (42,9)	5 (83,3)	0,266
Hypertension	9 (69,2)	3 (42,9)	6 (100)	0,070
Sedentary lifestyle	9 (69,2)	3 (42,9)	6 (100)	0,070
Complications*				
Nephropathy	6 (46,2)	3 (42,9)	3 (50)	1,000
Retinopathy	5 (38,5)	0 (0)	5 (83,3)	0,005
Neuropathy	1 (7,7)	0 (0)	1 (16,7)	0,462
AVC	2 (15,4)	0 (0)	2 (33,3)	0,192
Diabetic Foot	7 (53,8)	4 (57,1)	3 (50)	1,000
Insulin	12 (92,3)	6 (85,7)	6 (100)	1,000

Legend: n - absolute frequency. % - relative percentage frequency. Fisher's Exact Test.
*Possibility of more than one variable is present in the same patient

Table 3 – Variables related to treatment and monitoring of Diabetes Mellitus before hospitalization. Aracaju, Sergipe, Brazil, 2020 (n=13)

DM Treatment (Before hospitalization)		DM Patients	
		n	%
Health Services Used*	Emergency Hospital	7	53,8
	Service closest to your home	6	46,2
	SAMU	1	7,7
	HU Outpatient Clinic	1	7,7
Frequency of consultations	Every two months	5	38,5
	Monthly	3	23,0
	Every three months	2	15,4
	When they are in crisis	2	15,4
	Don't know	1	7,7
Scheduling form of the consultation*	Referral sheet	6	46,2
	City regulation	4	30,8
	It seeks the service	2	15,4
	Leaves with the next appointment booked	1	7,7
	Didn't know how to inform	1	7,7
Medications you use	Metformin	7	53,9
	Glibenclamide	3	23
	NPH Insulin	2	15,4
	Glucazide	1	7,7
Where you get the medicines*	Purchase at the pharmacy	8	61,5
	Basic Health Unit	8	61,5
	Receives at the pharmacy	5	38,5
Frequency of self-monitoring	They don't	5	38,5
	When they are in crisis	4	30,8
	Everyday	3	23
	Three times a day	1	7,7
Where do you buy supplies for the glucometer	No device	6	46,2
	Basic Health Unit	4	30,8
	Purchase at the pharmacy	3	23

Source: Own elaboration.
*Possibility of more than one variable is present in the same patient.

follow-up of the patients with diabetes included in this study, the actions of health professionals extended to n=12 (92.3%), Table 4.

As shown in Table 5, n=eight (61.5%) of the patients used their own transportation to get to the hospital, n=four (30.8%) were driven by: car of the service from which they were referred, SAMU and ambulance, while n=one (7.7%) used a cab. Of the referrals for hospitalization, n=five (38.5%) were made by the health professionals that accompany the patient in the Basic Health Units, n=four (30.8%) by the outpatient clinic of the Teaching and Research Hospital and n=four (30.8%) by an acquaintance who works in the hospital. When considering the therapeutic assistance that these patients received in their institutions of origin until hospitalization, it was observed that n=seven (53.8%) came from a public hospital and n=three (23%) were already being followed-up in the outpatient clinic of the teaching hospital where they were admitted at the time of the survey.

Table 4 – Distribution of actions performed by health professionals who follow up the user with DM. Aracaju, Sergipe, Brazil, 2020 (n=13)

Actions of the health professional	DM Patients			
	Yes		No	
	Frequency	%	Frequency	%
Measures BP	13	100	0	0
Examine your feet	12	92,3	1	7,7
Provides guidance on nutrition	12	92,3	1	7,7
Provides guidance on physical activity	12	92,3	1	7,7
Educates about what the disease is	13	100	0	0
Provides guidance on the use of medication	12	92,3	1	7,7
Requests for examinations	13	100	0	0

Source: Own elaboration, 2021

Table 5 – Variables related to the therapeutic itinerary of patients with DM regarding the means of transportation, access to the teaching hospital, institutions of origin, and actions to get vacancy. Aracaju, Sergipe, Brazil, 2017 (n=13)

Therapeutic Itinerary to the Teaching Hospital	DM Patients	
	n	%
Means of Transportation		
Own car	8	61,5
Service car from which he was referred	2	15,4
SAMU	1	7,7
Ambulance	1	7,7
Taxi	1	7,7
Access to the teaching hospital		
Health professional who accompanies you	5	38,5
Ambulatory	4	30,8
Acquaintance who works at the hospital	4	30,8
Home Institutions		
Public Hospital	7	53,8
Ambulatory of the teaching hospital itself	3	23,0
Emergency Service	1	7,7
Houses of support	1	7,7
Didn't know how to inform	1	7,7
Actions to Get Care		
Scheduling by the referring professionals	11	84,6
Go to the regulation center	1	7,7
Known	1	7,7

Source: Own elaboration, 2021

DISCUSSION

There was a prevalence of adults and elderly in the population diagnosed with DM over 50 years, a lower rate was found in a study from the interior of Sergipe.[6] As for gender, females were relatively higher, a similar result was obtained in a study conducted in Minas Gerais, which indicated a predominance of women.[7]

Regarding the time of diagnosis, there is a predominance of time of diagnosis ≤ 10 years, n=seven (53.8%). Differing from the present study, a research conducted in the Federal District showed a predominance ≤10 years of diagnosis in 65.5%, and those who had been diagnosed with DM for more than 10 years had associated comorbidities and risk factors. As a chronic and progressive disease, DM requires proper management at all

levels, especially in primary and secondary care, to avoid possible hospitalizations due to disease complications.[8]

As for insulin use, there is a large discrepancy between patients who used insulin before hospitalization, n=two (15.45%) and during hospitalization, n=12 (92.3%). The introduction of insulin in the treatment of DM2 is often delayed by therapeutic inertia, which leads to poor disease control and may result in the anticipation of chronic complications of DM.[9]

It was possible to identify that more than half of the patients reported seeking emergency hospital care due to the occurrence of some complication. At the same time, they pointed out that they benefit from monthly and bimonthly scheduled appointments and that the form of scheduling is done through referral or regulation, being performed according to the flow established by the protocol of Primary Care of the municipality of Aracaju.[10]

Considering that of the patients studied, n=10 (76.9%) were seen in primary care, monthly, bimonthly and quarterly, it was observed that n=seven (53.8%) seek emergency hospital when they have complications. This situation indicates important failures in the monitoring and follow-up of DM. A study observed that despite the patients' access to consultations and regular source of health care, as well as to medicines, it was not possible to identify changes in the users' health-related behaviors.[11]

It was observed that a significant percentage of the participants have guaranteed access to the Primary Care network and to the treatments offered by the service. However, it was not possible to identify how the continuity of health care in secondary care happens. These aspects may be related to failures in the system, resulting from deficient functionality and planning, as well as deficiency in the qualification and/or continuing education of health professionals involved in the health care process.

The National Policy of Primary Care (PNAB) reaffirms the role of PHC as the arrival access to the Unified Health System (SUS), the starting point for the organization of local systems, characterized by individual and collective care. Thus, the detection of the patient with DM in primary care makes it possible to discern the risk factors, early detection through screening tests, appropriate treatment, follow-up, as well as allowing and obeying the flow of care following the necessary criteria for reference and counter-reference.[11-12]

However, it is possible to realize that the restructuring of primary care needs to be more effective through the Family Health Strategy (FHS) as the gateway to the health system, in order to take responsibility for users with DM, coordinating their health needs within the care network, since most individuals are hospitalized from a public hospital and not through referrals made by primary care professionals. It is noteworthy that another study in Sergipe shows that Primary Care should be the priority strategy for action in the control of DM, following the actions of universality and integrality in health actions.[13]

Due to the need to restructure Primary Health Care (PHC) in Brazil, the Family Health Program (PSF) was established in 1994. In 1998, it gained national recognition, becoming understood as a strategy to change the care model, being linked to the network and consolidating itself as a priority access to the health system in the country, renamed Family Health Strategy (FHS).[14]

The FHS, which organizes the essential services in health care networks, has fundamental importance in the promotion and prevention actions, including diagnosis and treatment, besides being the open door for assistance to DM patients.

Considering that, of the patients studied, n=10 (76.9%) confirmed being seen monthly, bimonthly and quarterly in primary care, it was found that n=7 (53.8%) looked for an emergency hospital when they had complications. This situation indicates important failures regarding the monitoring and follow-up of DM. Thus, it can be seen that there is no follow-up in the flow of the healthcare network. The greater demand for high-complexity services is related primarily to the reception and resoluteness found.[15]

It was noticed that most of those surveyed sought the health service by using their own transportation, showing that they design the routes to be traveled, despite the technicians and managers trying to determine them based on pre-established norms, achieving, at most, a fragile regulation.

The access to services through a network of contacts or "fittings" allows us to question the effectiveness of the guiding principles of the SUS, that of equity and universality, which should direct the health system, since users who have informal access mechanisms have their needs met with greater agility compared to individuals who need the appointment centers and the system to use the services. These individually traced paths are representations of survival mechanisms in the midst of a fragmented health care network, far from integrality. Perhaps with the changes in the Health on Time Program, within the PNAB, which brings among its objectives, in art. 519-B, the expansion of opening hours of basic health units, we can think of a more resolutive future.[16]

One of the limitations of this study was the absence of an approach regarding referrals and access of patients with diabetes to the specialized network when it comes to continuity of health care.

CONCLUSION

This study detected that the time of DM diagnosis of the patients surveyed is directly related to the presence of comorbidities, risk factors, and the onset of chronic complications, and these complications are the main reasons for hospitalizations. And these happened within a context in which the care provided was not sufficiently effective in the pre-established flows by the primary care system and the interface with other levels of care, secondary and tertiary.

Thus, knowing the factors that are part of and those that interfere in the itinerary of these patients, from diagnosis to the various treatments needed to control the disease, provided a more comprehensive view of the path used in the health care network. It is noteworthy that more in-depth studies are needed on the effectiveness of the public health system, the principles of SUS, and the qualification of health professionals in the primary health care network.

With the expansion of knowledge about the therapeutic itinerary that is evidenced by this study, it is expected that it will be possible to contribute, first, to deepen the reflections regarding the performance of health care networks already implemented based on the principles of SUS. And second, after the identification of the points of failure in this network, that it serves as impulse and motivation for the search for solutions and the effectiveness of public policies.

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