



## **Care for Patients with Type II Diabetes in Primary Care**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors SDSCH, ACLG and NAO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors MGS, JCCSJ and RCOD managed the analysis of the study. Authors WNA, RCA, JMS and YMH managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Objective:** To evaluate the influence of Medical Residency Program Health in Family and Community (MRPHFC) on the quality of care and prevention of type II diabetes mellitus (DM II) provided by basic health units (BHU) in Gurupi-TO.

**Methodology:** Descriptive, cross-sectional and retrospective research carried out in 12 BHU in the urban area of Gurupi-TO, to compare the primary care provided in the BHU that have the medical residency program, with those who do not have the program, through of the QualiAB 2016 tool that evaluates the conduct of the servers, 107 medical health professionals, nurses, nursing technicians and community health agents were surveyed, 61 in BHU with MRPFCH and 46 without. The data were tested by the chi-square test to verify if there is a difference in the service considering  $p \leq 5\%$  or 0.05.

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**Results:** The BHU with MRPFCH performance presented more significant results in most of the items studied.

**Conclusion:** The presence of MRPFCH programs contributes significantly to quality improvement in preventive care that is extremely important in the prevention and management of chronic comorbidities in patients with DM II.

*Keywords: Diabetes mellitus; primary health care; health personnel; family Health.*

## 1. INTRODUCTION

Primary care (PC) is the gateway to the Unified Health System (SUS). This is as considered the structuring pillar of the national health system and aims at priority care, expanding access and advancing in the process of universalization of health services, improving the resolvability [1].

Among the main diseases found in the scope of PHC is diabetes mellitus (DM), one of the chronic diseases prioritized worldwide [2], being a serious public health problem because it has high morbidity and mortality, high spending on health care, being considered common and of increasing incidence [3,4]. It is estimated that every 6 seconds, a person dies because of diabetes and its complications [5].

In 1995, diabetes reached 4% of the adult population worldwide and in 2025 reached 5,4% [3]. The International Diabetes Federation (IDF) states that there were 415 million (1 in 11 adults) of diabetics in 2015 and 46,5% without knowing the disease [5]. Currently, this population is about 387 million and in 2035, it is projected to be 471 million [6], and for 2040 about 642 million (1 in 10 adults) [5].

In Central and South America, the prevalence of diabetes is 26,4 million people and estimated for 2030 of 40 million and that Brazil will move to 6th position with 11,3% prevalence of DM [7]. In 2012, diabetes reached 10,3% of the Brazilian population [8], in 2013 reached 9 million Brazilians [2] and in 2014 about 11,9 million people between 20 and 79 years old.

Currently, Brazil has 14.3 million people with diabetes and of this 50 % still without a diagnosis. The estimate by 2035 is that approximately 19,2 million of the Brazilian population will be diabetic and in 2040 there will be 23,2 million people [5].

In a study conducted by Iser2 and collaborators, 60,202 residents were interviewed in order to estimate the prevalence of self-reported diabetes in Brazil, among the major regions of the country,

the lowest prevalence was in the North Region (4,3%). In Tocantins, there was an increase in the mortality rate due to diabetes higher than the North Region and Brazil between 1996 and 2009 [9].

In the system of registration and follow-up of hypertensive and diabetic patients from Tocantins, 3,166 cases of type II diabetes were recorded between January 2002 and April 2013, of these the capital Palmas, had the highest record with 389 cases (12,28%), followed by Porto Nacional (7,48%), Miracema do Tocantins (4,42%), Paraíso do Tocantins (4,35%), Araguaína (4,26%) and Gurupi with 2,93% [10].

Believed that the diabetic population has been increasing due to greater: longevity, urbanization, sedentary lifestyle, consumption of saturated fats and consequent obesity [5, 6].

The Brazilian primary health network can treat about 60 to 80% of cases of Systemic Arterial Hypertension (SAH) and DM only with prevention and health promotion, as they are always almost associated [11].

The multidisciplinary team of the Family Health Strategy has as its object the integrality in care, having as a pillar the control of chronic non-communicable diseases, mainly, through the bond established between the multidisciplinary team and the community, which is decisive for the success of diabetic treatment [3].

Basic health units (BHU) work directly with diabetics in their daily lives and are faced with this serious problem that only increases. Diabetes is a universal phenomenon and represents an important public health problem and whose interest has become evident only in recent decades.

No society, however or less developed, is immune to this epidemic. Thus, based on this conjuncture, characterized by a large number of diabetics who demand health care and health professionals who need to meet them at risk to

health, this study was proposed that aimed to evaluate the quality of the service performed in Gurupi BHU, comparing the quality of service provided in the BHU that have the a MRPHFC. With those, they do not have, through the QualiAB tool [12].

## 2. MATERIALS AND METHODS

A descriptive, cross-sectional and retrospective study conducted in 12 BHU in the municipality of Gurupi-TO from December 2017 to March 2018 with 21 family health teams, 10 (ten) had an MRPHFC.

The sample consisted of 107 servers. All participants approached directly in the unit to which it was crowded.

The collection carried out in offices and auditorium in the 12 BHU of the municipality, where the instrument for evaluation and monitoring of primary care services QualiAB2016 applied. Questions 61, 66 and 67 that deal with the evaluation of activities and tests for people with type II DM were analyzed for this research.

The data were inserted in a computerized spreadsheet of the Excel 2016 program and the chi-square test was applied, with a significance level of  $p < 0.05$  or 5%, using the EPI INFO 3.2.2 program to verify possible differences in the quality degree of the service chosen between the BHU and without the MRPHFC.

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## 3. RESULTS

We surveyed 107 health professionals, 61 in UBS with MRPHFC and 46 without. Were interviewed physicians, nurses, nursing technicians and community health agents (Table 1).

The study by Backesl et al. [12] points out the need for knowledge of the reality of the area of activity of health professionals, considering the social, political and cultural interactions of spaces

related to the family nucleus and outside the home.

The community health agent is a representative of the community within the health unit, it is the one who understands the reality of the population, recognizes and identifies its essays and can communicate clearly with it, thus being a fundamental piece for work developed at BHU, since there is a direct relationship between CHA with the entire rest of the health team [12].

It is understood, therefore, that the difference in the amount of CHA responding to the questionnaire related to BHU with MRPHFC directly impacts the result, because there is greater insight into the reality of the communities where they are inserted, promoting a greater possibility of effective follow-up to diabetic patients, in addition to understanding the specific needs of the community related to this disease.

Question 61 of the QualiAB questionnaire deals with 16 items on actions regularly developed in the BHU focused on Adult Care, but only item 1 that deals specifically with regularly scheduled actions on diabetes, and perception statistics obtained revealed a significant difference ( $p > 0.05$ ) between the availability of service offered in units with MRPHFC when compared to those without MRPHFC (Table 2).

Question 66 of the QualiAB questionnaire deals with 14 (fourteen) items about routine activities performed in case of patients with Type II Diabetes. There was a statistically significant difference between the two categories of BHU in the requirements evaluated in items 1, 2, 5, 8 and 10, which deal about non-adoption of care according to the primary care protocol aimed at patients with DM II; follow-up adopts the protocol of basic care; performing annual examination of total cholesterol and fractions; control, evaluation and guidance of foot care and; supply of glycometer, respectively to items, as observed in Table 3.

## 4. DISCUSSION

The elaboration and institution of specific care protocols for diseases in health units demonstrated as strong tools for their control. In general, these protocols aim at improvements in the approaches applied in the community about the disease in question, thus, the planning of methods directed both to affected and non-affected patients is included. The first step in this

sense is given by the institution of health education practices for the community, oriented to the signs and symptoms present in different phases of the disease, stimulating the search for care and consequently the institution of prophylactic measures to the development of the disease, as well as timely diagnosis and treatment [13].

**Table 1. Distribution of the type of professionals surveyed in the UBSs studied**

Professional category	BHU WMR*		BHU WMR**		n, total by category	% total by category
	n.	%	n.	%		
Community health agent	45	73,77%	25	54,35%	70	65,42%
Nurse	7	11,47%	8	17,39%	15	14,02%
Nursing technician	3	4,91%	6	13,04%	9	8,41%
Doctor	6	9,85%	7	15,22%	13	12.15%
	61	100%	46		107	100%

\*WMR: With Medical Residency; \*\*WMR: Medical Residency

**Table 2. Comparison of activities planned and developed regularly on health problems or problems performed in basic health units with and without Medical Residency in Family Health and Community in Gurupi Tocantins, Brazil, 2019**

Item	BHU WMR*		BHU WMR**		X <sup>2</sup>	P
	n.	%	n.	%		
1. Diabetes Sim	42	91.30%	56	91.80%	0.0085	0.9266

\*WMR: With Medical Residency; \*\*WMR: Medical Residency

**Table 3. Comparison of routine activities performed with patients with type ii diabetes, in the Basic Health Units with and without Medical Residency in Family Health and Community in Gurupi Tocantins, Brazil, 2019**

Item		BHU WMR*		BHU WMR**		X <sup>2</sup>	P
		n.	%	n.	%		
1. Attendance does not follow the primary care book	Yes	2	4,35%	14	22,95%	7,1363	0,0075
	No	44	95,65%	47	77,05%		
2. Follow-up follows the primary care book	Yes	39	84,78%	42	71,19%	3,7098	0,0497
	No	7	15,22%	17	28,81%		
3. Diet orientation	Yes	42	91,30%	49	80,33%	2,4845	0,1150
	No	4	8,70%	12	19,67%		
4. Treatment and/or prevention of obesity	Yes	33	71,74%	38	62,30%	1,0477	0,3060
	No	13	28,26%	23	37,70%		
5. Annual examination of total cholesterol and fractions, triglycerides	Yes	40	86,96%	36	59,02%	9,9484	0,0016
	No	6	13,04%	25	40,98%		
6. Periodic request for exams	Yes	40	86,96%	45	73,77%	2,7916	0,0948
	No	6	13,04%	16	26,23%		
8. Control, evaluation, and guidance of foot care	Yes	41	89,13%	38	62,30%	9,7746	0,0018
	No	5	10,87%	23	37,70%		
9. Training for self-application of insulin	Yes	32	69,57%	38	62,30%	0,6127	0,4338
	No	14	30,43%	23	37,70%		
10. Supply of glycometer	Yes	31	67,39%	23	37,70%	9,2452	0,0024
	No	15	32,61%	38	62,30%		
11. Group activities (walking, blood pressure measurement, others)	Yes	2	4,35%	9	14,75%	3,0789	0,0793
	No	44	95,65%	52	85,25%		
12. Physical activity orientation	Yes	9	19,57%	20	32,79%	2,3203	0,1277
	No	37	80,43%	41	67,21%		
13. Guidance and support for smoking cessation	Yes	3	6,52%	11	18,03%	3,0556	0,0805
	No	43	93,48%	50	81,97%		

\*WMR: With Medical Residency; \*\*WMR: Medical Residency

In this context, it is perceived given the data that patients treated in BHU with MRPHFC, in almost all cases interviewed, are not submitted to care for DM II without the application of protocols, while, in the BHU that does not have this program, there is an incidence of care without specific protocol for DM.

In addition to health information, the use of protocols for these care scans allows better management in conduct, such as the basis of diets singular to DM II that meet the needs of the target population of BHU care, as well as the development of strategies for carrying out physical activities and drug input [13,14].

The perception of the interviewees about better performance on the routine activities performed with patients with type II diabetics in units with implanted MRPHFC stems from the need for readjustment to which provided for the implementation of the MRPHFC-Gurupi, as established a readjustment of technical teams, the physical structure and there was the standardization of the work routine in which it broadly promoted the application of current public policies focused on the basic level of care, that is, it focused on actions capable of reducing risks of illness and health protection.

The Ministry of Health published, among many others, the Primary Care Notebook – Strategies for the care of people with chronic disease – Diabetes Mellitus [13-15,16], and from this publication, an understanding of the standardization of diagnosis and follow-up of diabetic patients in the national public health network. Together, the result is the improvement in the organizational sector, promoting healthiness to users of SUS primary care.

A study conducted in Minas Gerais analyzed 226 medical records of patients who underwent the Myocardial Perfusion Scintigraphy procedure from 2010 to 2015, which aimed to associate the main risk factors for Arterial Disease coronary artery with your diagnosis. The research allowed us to identify that diabetes mellitus, dyslipidemia, and systemic arterial hypertension were the factors most related to the development of the disease, thus evidencing the importance of research and screening of such comorbidities in the promote health prevention measures [17].

Another variable that presented a significant difference between those analyzed in question 66 of the questionnaire was number 8, which

deals with the control, evaluation, and orientation of foot care. The clinical evolution of decompensated diabetes is present with the development of distal neuropathies in extremities, promoting the decrease or loss of their sensitivity. This absence of tactile and painful sensitivity associated with lack of care can generate one of the classic most signs of DM II, diabetic foot [15,18].

Diabetic foot is a complication of great importance within the clinical picture of diabetic patients, since, in addition to distal neuropathy, excess sugars in the blood circulation promotes the occurrence of distal vasculopathy. The lower blood supply of these peripheral tissues and the development of an injury, often painless, evolves with severe infectious conditions and may lead to tissue necrosis, having as main treatment the amputation of limbs [19,20].

Care for distal limbs, especially of the feet, should be one of the most important points in the follow-up of diabetic patients, given the possible negative outcome for the patient's quality of life, having deleterious reflexes also in the physical independence of the patient, reducing the acceptance of the proposed treatment, with lower chances of adequacy and performance of non-pharmacological measures of therapy, such as the change of life habits, with the introduction of physical exercises in the routine beyond the healthy eating [21].

Thus, preventive care is extremely important in patients with DM II. As observed in the research, the BHU with MRPHFC were more effective in this continuous follow-up, and they're also a significant difference in the supply of glycometers to patients, observed in item 10 of question 66. Glycemic control demonstrated as a high-value tool in prevention, both microvascular complications and peripheral nerve dysfunctions [22,23].

Regarding routine activities performed in case of patients with Type II Diabetes, question 67 of the QualiAB questionnaire deals with 11 (eleven) items. In items 3 (three), 4 (four), 5 (five), 6 (six) and 7 (seven) a significant difference was observed between the BHU with and without the MRPHFC implanted as can be observed in Table 4.

Decompensated Diabetes Mellitus is a major risk factor for the development of other chronic comorbidities which, in the largest part of the cases, presents insidious onset but with negative

**Table 4. Comparison of routine tests requested from patients with type ii diabetes, in the Basic Health Units with and without Medical Residency in Family Health and community in Gurupi Tocantins, Brazil, 2019**

Item		BHU WMR*		BHU WMR**		$\chi^2$	P
		n.	%	n.	%		
1. Fasting glycemia	Yes	42	91,30%	52	85,25%	0,9018	0,3423
	No	4	8,70%	9	14,75%		
2. Urine I	Yes	41	89,13%	48	78,69%	2,0435	0,1529
	No	5	10,87%	13	21,31%		
3. Microalbuminuria	Yes	31	67,39%	28	45,90%	4,8960	0,0269
	No	15	32,61%	33	54,10%		
4. Serum creatinine	Yes	36	78,26%	36	59,02%	4,4125	0,0357
	No	10	21,74%	25	40,98%		
5. Total cholesterol, fractions (LDL and HDL)	Yes	39	88,64%	41	51,25%	5,8946	0,0152
	No	5	11,36%	19	31,67%		
6. Triglycerides	Yes	41	89,13%	41	67,21%	7,0355	0,0080
	No	5	10,87%	20	32,79%		
7. Glycated hemoglobin every 3 months until it reaches control, then every 6 months	Yes	34	73,91%	37	60,66%	2,0645	0,1508
	No	12	26,09%	24	39,34%		
8. Background examination of eyes	Yes	28	60,87%	23	37,70%	5,6411	0,0175
	No	18	39,13%	38	62,30%		
9. Electrocardiogram - ECG	Yes	2	5,41%	7	11,48%	1,0174	0,3131
	No	35	94,59%	54	88,52%		

\*WMR: With Medical Residency; \*\*WMR: Medical Residency

prognoses for the patient. Monitoring through laboratory examinations of markers for these possible comorbidities is essential in the scope of primary health care, given the preventive nature of public health in Brazil [13, 15,23].

The set of chronic comorbidities related to the high risk of cardiovascular events related to DM II is composed of systemic arterial hypertension, chronic renal failure, and dyslipidemia, and the diagnosis of one represents a factor of risk for the others [13,15,23,24]. Question 67 addresses the complementary tests that compose the routine directed at patients with DM II and evaluated in this research to identify a possible relationship of a better use of these resources in the BHU that have the MRPHFC about those that do not rely on this program.

A significant difference can be observed regarding routine tests directed to the diagnosis and follow-up of kidney disease and dyslipidemia, since in the units where the medical residency program develops there is a higher incidence of examinations: microalbuminuria and serum creatinine, and these laboratory parameters are linked to the development of kidney disease [25] and; total

cholesterol and fractions and triglycerides, these being markers of dyslipidemia [26,27].

It is also noteworthy the performance of the background examination, known as funduscopy, being an examination aimed at screening retinopathies since changes in the microvascularization of a decompensated diabetes can cause damage to the ocular retina [23]. However, the performance of electrocardiogram, besides not presenting a significant difference between the units, also demonstrated certain neglect in the performance of this examination, which is an important tool in the monitoring of the hypothetical diagnosis of complications and cardiovascular alterations [28].

## 5. CONCLUSION

This research showed the influence of the Medical Residency Program in Family and Community Health regarding the effectiveness of taking measures aimed at controlling DM II within the routine adopted by a Basic Health Unit. Because it is a chronic condition, public policies are required to control and follow-up diabetic patients, which allow a better evaluation of other systems and thus reduce comorbidities associated with DM II, both at the macrovascular level, microvascular level.

## CONSENT

As per international standard or university standard was written patient consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

The research was carried out strictly obeying Resolution No. 466/2012 of the National Health Council and approved by the Ethics and Research Committee of the University of Gurupi (ERC - UnirG) under opinion n. 2.555.519/2017.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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