Actions aimed at the *Diabetes Mellitus* control in Primary Health Care: a proposal of evaluative model

Ações voltadas ao controle do Diabetes Mellitus na Atenção Básica: proposta de modelo avaliativo

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ABSTRACT The article corresponds to the assessment of the feasibility to evaluate the actions directed to the control of *Diabetes Mellitus* (DM) in Primary Health Care (PHC), and presents a proposal of an evaluation model. Documental analysis, literature review and meetings with experts guided the elaboration of the model. For its validation, the consensus conferencing technique was used. The matrix of analysis and judgment is composed of 19 indicators aggregated in two dimensions. Actions aimed at the control of DM in PHC are susceptible to evaluation. The application of the proposed evaluative model will increase the knowledge of the mechanisms and processes involved in the operationalization of the actions, contributing to its improvement.

KEYWORDS Health evaluation. *Diabetes Mellitus*. Primary Health Care.

RESUMO *O artigo corresponde à apreciação da viabilidade para avaliação das ações voltadas ao controle do Diabetes Mellitus (DM) na Atenção Básica (AB) e apresenta uma proposta de modelo avaliativo. Análises documentais, revisão de literatura e reuniões com especialistas orientaram a elaboração do modelo. Para sua validação, utilizou-se a técnica de conferência de consenso. A matriz de análise e julgamento é composta por 19 indicadores agregados em duas dimensões. As ações voltadas ao controle do DM na AB são passíveis de avaliação. A aplicação do modelo avaliativo proposto permitirá ampliar o conhecimento dos mecanismos e processos implicados na operacionalização das ações, contribuindo para seu aperfeiçoamento.*

PALAVRAS-CHAVE *Avaliação em saúde. Diabetes Mellitus. Atenção Primária à Saúde.*

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Introduction

Diabetes Mellitus (DM) is one of the most prevalent chronic diseases in the world and constitutes one of the greatest public health challenges of the 21st century. In the 2000s, there were 151 million people with DM worldwide. By 2015, the total number of people with *diabetes* has already reached 415 million, which corresponds to a prevalence of 8.8%. In addition to increasing rates of mortality, DM is worrying because of the economic cost associated with the disease. If the global epidemic of DM continues to increase, there will be, most likely, a massive growth in health expenditures in the coming years. Currently, about 12% of global health expenditures are already attributed to the care of people with *diabetes* and their complications[1]. Several studies have shown that *diabetes* imposes a great economic burden on individuals and families, national health systems and countries[2,3].

Brazil already ranks fourth among the countries with the largest number of people living with DM, with approximately 14.3 million, behind only China, India and the USA[4]. In 2011, the prevalence of self-reported DM among adults (over 18 years old) living in brazilian capitals was 6.3% (95% CI: 5.9-6.7), increasing significantly with age, overweight and obesity[5]. DM is part of the group of Non-Transmissible Chronic Diseases (NTCD) and is responsible for the first cause of mortality in the Country, with 61.85% of all deaths, according to the Chapter of the ICD-10, in 2015[6]. In the last decades, a reduction in mortality by NTCD was observed, especially in relation to chronic cardiovascular and respiratory diseases. This reduction is attributed to the implementation of health policies that have led to the expansion of access to Primary Health Care (PHC) in health and the reduction of smoking. However, the mortality rate from *diabetes* continues to increase[7].

DM is a health problem considered to be a Sensible Condition to Primary Care. Evidences show that good management of this disease in PHC prevents hospitalizations and deaths from cardiovascular and cerebrovascular complications[8]. In order for actions aimed at DM control to develop effectively and efficiently, PHC should act as a gateway to the health system and care coordinator. Practices centered on the biomedical model; in the precarious functioning of the reference and counter-referral mechanisms; the lack of knowledge of PHC professionals regarding the access flows to other points of attention; in deficits in the formation of the teams, the disengagement of the professionals with the fulfillment of the technical norms and with the expected results; in precarious working conditions, including instability of labor relations, precarious salaries, problems in the quantitative team/population ratio, and the lack of equipment and other inputs are some of the impediments to adequate health care[9,10].

To understand how and to what extent actions aimed at DM control are implemented, to identify the contextual factors that influence the degree of implementation and to recognize the facilitating factors and the main obstacles faced for the development of effective actions, relevant and timely evaluation processes should be developed. Given the importance of evaluation studies for decision-making and the responsibility of municipal management on the implementation of actions aimed at DM control, it is opportune to propose an evaluation model that can support planning, implementation of actions, organization and the reorientation of this intervention in the municipalities.

The present article corresponds to the evaluation of the feasibility to evaluate the actions directed to the control of DM in PHC and aims to present a proposal of an evaluation model, consisting

of: theoretical model, logical model and a matrix of analysis and judgment, as well as recommendations for subsequent evaluative surveys.

Methodology

This study is based on the methodology proposed by Thurston and Ramaliu[11], with a qualitative approach, in a survey conducted between August 2014 and July 2015, which included: a review of the literature and official documents on the object evaluated; delimitation of the program through the identification of its objectives and the activities to be carried out; modeling of the program with stakeholders, considering expected results, expected impacts and determinants; preliminary understanding of how the program operates; development of a matrix of analysis and judgment; identification of evaluation users; agreement on the procedure for an evaluation.

Initially, a documentary analysis and literature review was carried out to delimit the program and identify its objectives. In *chart 1*, health policies, legislation and norms related to the research object used in documentary analysis are presented.

Chart 1. Laws, ordinances, guidelines and protocols used in the elaboration of the theoretical and logical models of actions aimed at the control of DM in PHC

Year	Legislation	Deliberations/Objectives
2001	Ordinance nº 95, of January 26, 2001	Approves the Operational Rule for Health Care -Noas-SUS 01/2001.
	Plan for the Reorganization of Attention to Hypertension and *Diabetes Mellitus*	It technically subsidizes the professionals of the Basic Attention network with the perspective of reorganizing the attention to arterial hypertension and to *Diabetes Mellitus*.
2002	Ordinance nº 371 / GM, March 4, 2002	Establishes the National Program of Pharmaceutical Assistance for Arterial Hypertension and *Diabetes Mellitus*, an integral part of the National Plan for Reorganization of Attention to Arterial Hypertension and *Diabetes Mellitus*.
2006	Law nº 11.347, of September 27, 2006	Provides for the free distribution of drugs and materials necessary for its application and monitoring of capillary glycemia for diabetic patients enrolled in diabetic education programs.
	Basic Attention Notebook n ° 16	Protocol based on scientific evidence worldwide aimed at health professionals, especially family health teams, to confront the DM.
2007	Ordinance nº 2,583, of October 10, 2007	Defines the list of drugs and supplies made available by the Unified Health System, pursuant to Law nº 11.347, of 2006, to users with *Diabetes Mellitus*.
2008	Guidelines and Recommendations for the Comprehensive Care of NTCD (Pact for Life Series, v.8)	It promotes reflection on the assistance model oriented to respond to the needs of people with NTCD.
2010	Ordinance nº 4.279, of December 30, 2010	Establishes guidelines for the organization of the Health Care Network within SUS.
2011	Ordinance nº 2.488, of October 21, 2011	Approves the National Policy of Basic Attention.
2012	Strategic actions plan for the confrontation of NTCD in Brazil 2011-2022	It promotes the development and implementation of effective public policies for the prevention and control of NTCDs and their risk factors and strengthens health services for chronic diseases.

Chart 1. (cont.)

2013	Ordinance nº 1,555, of July 30, 2013	Provides for the rules for financing and execution of the Basic Component of Pharmaceutical Assistance under the SUS.
	Guidelines for care of people with chronic diseases in Health Care Networks and Priority Care Lines	Establishes guidelines for the care of people with chronic diseases in the Network of Care for People with Chronic Diseases.
	Basic Attention Notebook n ° 36	Strategies for coping with NTCDs: *Diabetes Mellitus*.

For the modeling of the program, a Theoretical Model (TM) and a Logical Model (LM) of the actions directed to the control of DM in PHC were elaborated. TM is a hypothetical-deductive system that represents the model-object theory, explaining how the program ideally works. Its operationalization is expressed through LM, a visual scheme that presents the functioning of the program and provides an objective basis regarding the causal relation between its elements[12,13].

The preliminary theoretical and logical models were structured based on the theoretical framework adopted, taking into account the social context in which the object is inserted. The initial proposals of the two models were presented and extensively discussed in workshops with the participation of the members of the Extension and Research Nucleus in Health Evaluation (Nepas), of the Postgraduate Program in Public Health of the Federal University of Santa Catarina (UFSC), composed of professors from the department, health professionals from different areas, and masters and doctoral students from the area of health evaluation. In the light of the agreed theoretical and logical models, the Matrix of Analysis and Judgment (MAJ) was elaborated, containing indicators, measures, parameters, the maximum expected score, as well as the respective sources of evidence. The review of the literature also helped to select the components of the analysis matrix and to identify indicators used in previous studies[14-16].

For the validation of the proposed evaluative model, consisting of the theoretical, logical models and the MAJ, and considering the content and plausibility of the causal relationships established among its various components, two workshops were carried out with the participation of key informants, guided by the technique of consensus conference[17]. In order to compose the consensus workshops, managers and health professionals linked to the service within the scope of the PHC were invited, chosen by virtue of their area of expertise and experience in relation to the object of study, and researchers with experience in the field of: health assessment, *diabetes*/chronic non-communicable diseases and qualitative research. In all, they participated in the workshops, as key informants: (02) family doctors and community; (03) dentists; (02) nurses; (01) pharmaceutical; (01) nutritionist.

Key informants received the preliminary proposal for TM, LM and MAJ, via electronic mail, and were asked to express their agreement or disagreement regarding the proposed evaluative model. After this stage, a physical meeting was schedule where the result of the first stage was presented with the aim of promoting open debate on each of the pre-established dimensions and sub-dimensions, together with the criteria, indicators and measures proposed. At that moment, from the reflection and the joint

debate, it was established that the evaluative model focused on municipal management and that the main users of the evaluation would be the professionals responsible for implementing the program, that is, PHC managers and health professionals. After the physical meeting, all contributions were analyzed and systematized, identifying the points of greatest agreement and disagreement found in the responses. Some suggestions were incorporated into the evaluation model initially proposed. There were also suppressions, additions or complements of criteria or indicators based on the arguments of the discussions and justifications presented. In the third and last stage, the participants received again, via electronic mail, the proposed models and MAJ, now with the changes/modifications resulting from previous steps. Here, the experts had the opportunity to express their opinion about whether or not their initial opinions were upheld. The items that presented greater consensus became part of the definitive evaluation model.

The elaborated MAJ allows the descriptive analysis of all its components. Each indicator received between one and four measurements, taking into account quantitative and qualitative data. The parameters of judgment were based on normative aspects, on the review of the literature and on the agreements reached with the specialists. The assignment of the points was discussed among the researchers involved, from LM and the reading of the primary and secondary data obtained in the study.

All key informants agreed to participate in the research, expressing their consent through the signing of the Informed Consent Form (ICF). The research was submitted and approved by the Ethics Committee in Research with Human Beings of the Federal University of Santa Catarina/CCS, in accordance with the norms established by Resolution nº 466/2012, of the National Health Council, with Certificate of Presentation for Ethical Appreciation (CAAE) nº 45623615.3.0000.0121.

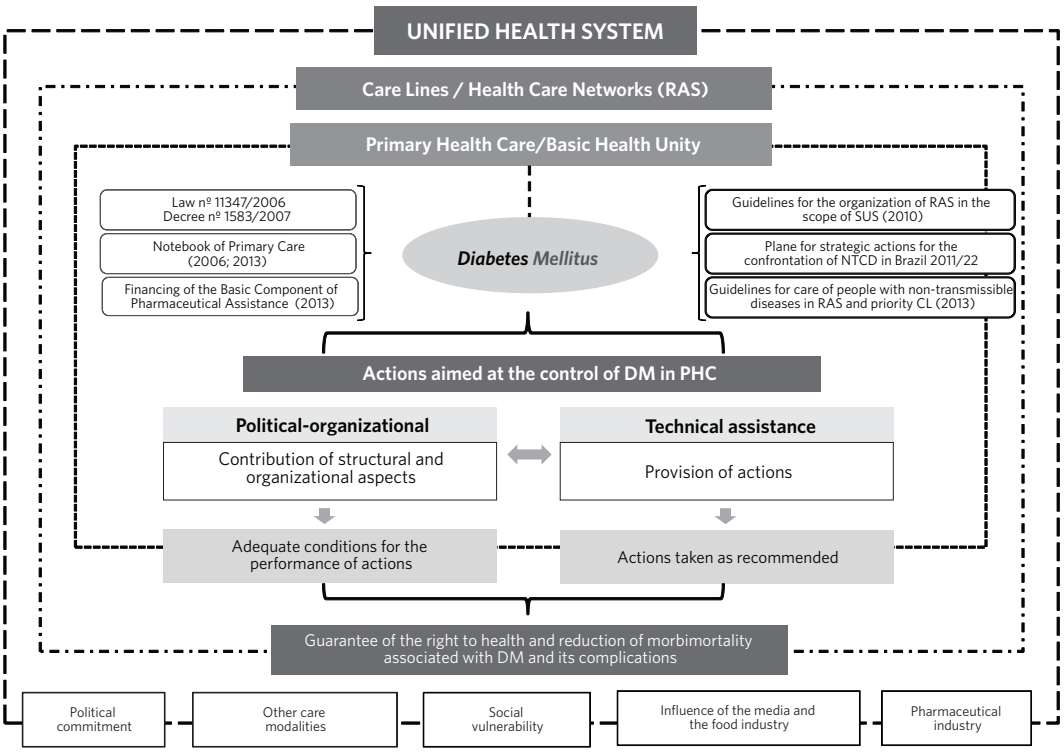
Results and discussion

Actions aimed at control of the DM are not structured as a specific program, such as the National Tuberculosis Control Program, for example. However, the documents analyzed made it possible to identify the objectives; of the target audience; of the activities to be carried out; resources and infrastructure needed to ensure the operationalization of these activities; and expected results. The goals to be achieved, however, depend on local characteristics and reality.

DM is considered one of the Care Lines (CL) of the Unified Health System (SUS). CLs can be understood as systematically developed recommendations, guided by clinical guidelines, in order to guarantee health care. They define the actions and services that should be developed in the different points of attention (primary, secondary and tertiary) of a Health Care Network (RAS) and express the care flows that must be guaranteed to the user, in order to health needs[18].

The TM of the actions aimed at the control of DM in the proposed PHC is shown in *figure 1*. The implementation of the CL should be from the Basic Health Units (BHU), which have the responsibility for coordinating the care and planning of the RAS.

Figure 1. Theoretical model of actions aimed at the control of *Diabetes Mellitus* In Primary Care



This way, PHC plays a central role in this process as it is the point of attention with greater capillarity within RAS. In the TM, the various governmental initiatives are presented to standardize the actions directed to the control of DM in the sphere of PHC. Initially, through some strategies and measures that allowed the expansion of access and quality of the PHC, through the registration and the linking of the users to the BHU, allowing the systematic follow-up of cases, prevention of complications and updating of health professionals. More recently, the Strategic Action Plan for Coping with Non-Transmissible Chronic Diseases (NTCD) in Brazil, 2011-2022, has been published to promote the development and implementation of effective public policies and strengthen health services for prevention and the control of NTCDs and their risk factors, in addition to establishing guidelines for the care of people with chronic diseases in health care networks and care lines[19-21].

For the actions developed in the PHC to impact the health situation, in its determinants and constraints, it is fundamental that the service infrastructure, the work process of the health professionals and the diagnostic and therapeutic offer effectively respond to the health needs of the population and are articulated with the rest of the network[21]. In the proposed TM, the actions aimed at the control of DM in PHC are divided into two dimensions: Political-Organizational (PO) and Technical Assistance (TA). The PO dimension addresses the areas in which health management must act to ensure the contribution of the structural and organizational aspects necessary for the proper implementation of actions. TA is related to the provision of actions by health professionals working in the BHU. In order for actions aimed at DM control to achieve the expected results, in addition to adequate

conditions, it is necessary for the health teams to organize their work process and carry out the actions as recommended. The actions of the municipal health management and of the health professionals who work in the BHU are interrelated and are fundamental for the attention to the people with DM to be resolutive. The set of actions aimed at the control of DM in PHC aims to guarantee the right to health for people with *diabetes* and the reduction of the morbimortality associated with the disease and its complications.

The incidence and prevalence of DM, as well as the degree of implementation of actions aimed at the control of DM in PHC and the achievement of the expected results are conditioned by contextual factors. The brazilian scenario presents marked social, economic and cultural differences that have repercussions on the health needs of the population between the different regions and municipalities. This scenario is aggravated by the interests of private supply and by market pressures in the health area. Among the contextual factors that may influence the implementation of actions and their results, the following stand out: political commitment, existence of other care modalities, influence of the media, food and pharmaceutical industry and social vulnerabilities.

Political commitment is understood as the responsibility of municipal public management for the development of strategies that operationalize the policies and programs considered to be priorities for the municipality. In order for the principles and guidelines of SUS to be met, the administrative and organizational structures of the Municipal Health Secretariats should be understood as a primary and non-transferable responsibility of municipal managers and be consistent with the Municipal Health Plan and the Annual Health Program. Part of the problems faced in the health system, at the municipal level, is due to the lack of clarity regarding the competencies and responsibilities of managers to guarantee the right to health in the governmental agenda[22].

Segmentation of the health system and disbelief in it lead many people to seek private health insurers. The private sector offers health plans with different levels of care, being stratified according to the different socioeconomic situations of the users, which makes it highly fragmented and process-centered. These plans often offer services parallel to those offered by SUS, with overlapping consumption. With this, health insurers end up increasing total health spending without replacing public funding. In addition, health plan holders often use the SUS to receive vaccines, drugs, high-cost services, and high-complexity procedures. The disorderly supply of outpatient medical care in the private sector makes it difficult to plan and schedule local health in the public service, since municipal health management is responsible not only for those who use public services but for the whole of society[23,24].

The eating habits and practices of the contemporary world are constructed on the basis of sociocultural determinations on which the media and industry exert great influence. At the same time as they stimulate the consumption of so-called 'light, healthy and rich foods in a huge variety of nutrients', they sell the image of beautiful, lean and healthy people, inciting the consumption of fast-food snacks, rich in carbohydrates and fats saturated. Changes in dietary patterns, associated with sedentary lifestyle, can be considered as being responsible for the increased incidence and prevalence of diseases such as obesity and *diabetes*[25,26].

Given the significant market for medicines and pharmaceuticals in the Country, the SUS works with the National List of Essential Medicines (Rename), a list that guides the supply of medicines for

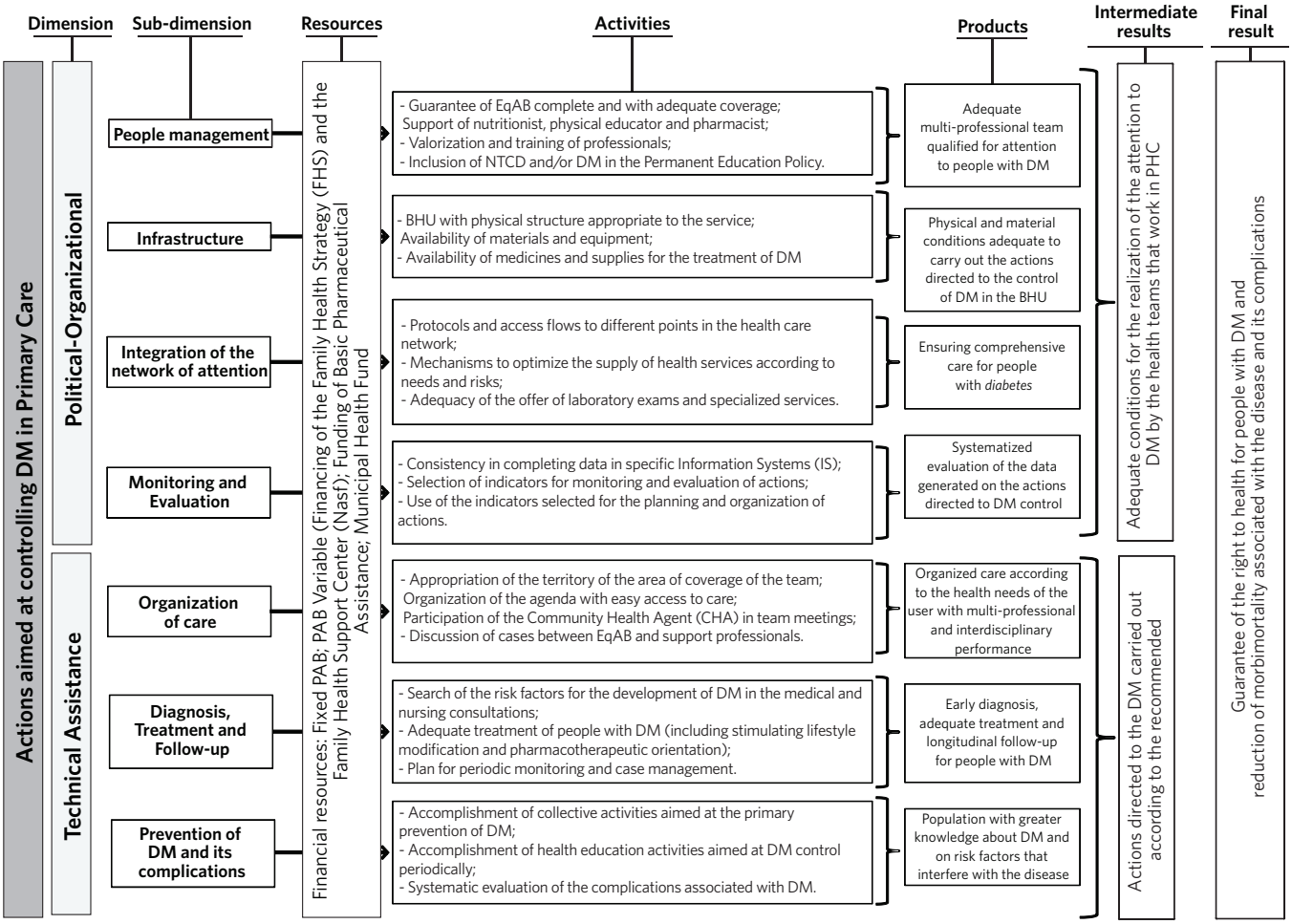
the treatment of the main health problems of the population. However, the lobbying of the pharmaceutical industry and trade often causes users and prescribers to consider essential the use of the new products launched in the market, becoming frequent their claim through the judicial system. The request of insulin analogues and the new oral anti-diabetic agents (methyl glinides, glitazones, gliptins, cts.) is an example of such a situation. The judicialization of health has broken the logic of integrality of actions by withdrawing part of the resources destined to the purchase of drugs essential for the fulfillment of judicial demands, affecting in a significant way the municipal public budgets throughout the Country[27,28].

Inequality in living conditions in our society favors the emergence of people or populations in situations of greater social vulnerability, as they are excluded from the system and from basic social benefits, such as health, education, work and leisure, and lose the freedom of given the limited range of opportunities. The greater the number of people living in situations of vulnerability, the greater the morbidity and mortality. Thus, health actions should be planned by prioritizing individuals and families in situations of greater need and vulnerability, in order to maximize available resources and propose interventions that are in accordance with the identified needs[29,30].

The economic impact of DM about the present society is enormous. It focuses not only on health systems, but, also, on individuals and their families, and has generated a loss of quality of life, with a high degree of limitation in work and leisure activities[3]. It was a consensus among specialists that actions focused on the control of DM in PHC are the responsibility of the municipal health management. In order to be effectively and efficiently developed, the structural and organizational aspects necessary for the operation of the BHUs, as well as the guarantee of adequate conditions for the provision of actions by health professionals should be considered as priorities for the prevention of this aggravation, to reduce morbidity and mortality and the costs associated with the disease.

In order to explain how the intervention object of this study should be implemented and what the expected results should be, in addition to providing an objective basis for the causal relationship between the elements of this intervention (dimensions, subdimensions, resources, activities, products, intermediate and final), a LM proposal is proposed for actions aimed at DM control in PHC (*figure 2*).

Figure 2. Logical model of the actions directed to the control of *Diabetes Mellitus* in Primary Care



In the proposed ML, the PO dimension has the sub-dimensions: 'People Management', 'Infrastructure', 'Integration of the Network of Attention and Monitoring and Evaluation'. In order for actions aimed at DM control to be carried out in an adequate manner, municipal health management must have motivated and qualified professionals in sufficient quantity to ensure adequate coverage of existing demand. It should also ensure that the BHUs have adequate physical structure, equipment and materials in sufficient quantity so that professionals can carry out their activities. It is hoped, also, that the management will organize the access flows to guarantee the integrality of the attention in all the points of the network and to carry out the monitoring and the systematic evaluation of the offered actions to reach established goals.

The TA dimension includes actions related to the work process of the Primary Care Referral Teams (EqAB) and the sub-dimensions: 'Organization of Care'; 'Diagnosis, Treatment and Monitoring'; 'Prevention of DM and its complications'. In order to plan and execute actions aimed at DM control, the EqAB should take into account the territory of action and the characteristics of the population under its responsibility. The therapeutic approach employed and the accompaniment provided are fundamental for the prevention of DM and its complications, as well as for

the maintenance of the quality of life of people with the disease[32].

In the LM, the activities considered essential in all the proposed subdimensions were listed and the expected products were presented for each of them. As intermediate and final results, it is expected that the municipal health management guarantees adequate conditions for PHC teams to carry out actions aimed at DM control as recommended, in order to guarantee to the people with DM the right to health, with a view to reducing disease-related morbidity and mortality and its complications.

The matrix of analysis and judgment counts on 7 subdimensions and 19 indicators, listed in *chart 2*, with their respective measures, parameters, the maximum expected score for each of its components and the sources of evidence.

In the sub-dimension 'People Management' it is highlighted that the expansion of public policies and the municipalization of health care have led to the need for an increase in the number of professionals with a specific profile for action in public health services. In order for health care to be adequately performed, there must be complete EqABs in sufficient quantity to meet the existing demand, following the recommendations of the MH. In addition, support from other health professionals – such as nutritionists, physical educators and pharmacists – is essential for the EqAB, to broaden the scope and scope of actions aimed at DM control in PHC. The high turnover of PHC professionals interferes with the care process and makes it difficult to form the bond, which are considered fundamental to longitudinal monitoring. In order to fix the professionals in the BHU, it is considered necessary to increase their value, in order to promote a balance between the needs and expectations of health professionals and those of the service.

Another important aspect in the attention to people with DM is the good management of the clinic. The qualification and updating of the professionals of PHC regarding the organization and functioning of the care flows of the municipal network and the care necessary to control DM or NTCDs regularly, are considered fundamental[32]. The indicators listed in this subdimension were: 'coverage of PHC professionals'; 'permanence of the professionals'; 'professional qualification'.

The 'Infrastructure' of the BHU must be adequate to meet local demand according to the needs of the population. The 'physical structure of the BHU' should allow for accessibility and have adequate facilities for health actions for the entire population. In order for the attention to people with DM to be carried out properly, material conditions and specific technological contribution are necessary for the organization of the work process and the effectiveness of care. The supply and regular maintenance of the 'materials and equipment' necessary to carry out all the actions aimed at the control of DM, as well as the continuous supply of the list of 'medicines and supplies' necessary for the treatment of DM, the application of insulin and Self-monitoring of Capillary Blood Glycemia (AMGC) are considered essential to ensure continuity of care and to achieve therapeutic results.

The majority of people with DM can and should be accompanied by the EqAB, however, cases that exceed the limit of action within the PHC should be referred to other levels of attention[32]. For the 'Integration of the Attention Network', it is considered fundamental the existence of instruments that enable the 'normalization of care' necessary for the coordination of care, such as: protocols and therapeutic guidelines aimed at the control of NTCDs and/or DM; access flows between the different points of the care network; technologies oriented to 'regulating access to specialized services', with strategies to optimize supply. In addition, it is fundamental the 'adequacy of the provision of specialized services' to the health needs of people with DM, especially in relation to the provision of laboratory tests and consultations with focal specialists (endocrinologist and ophthalmologist).

Chart 2.Matrix of Analysis and Judgment of the actions directed to the control of DM in PHC, containing dimensions, sub-dimensions, indicators, measures, parameters and sources of evidence

		Indicator	Measures	Parameter	Source
Political-Organizational Dimension	People management	Coverage of professionals	Number of people residing in the area covered by the EqAB	Between 2500 and 3500 people without areas of social interest (10 pts); Between 2500 and 3500 people with an area of social interest (5 pts); More than 3500 peoples (0 pts)	DA Interview DO
			Perception of EqAB regarding the number of people residing in the area of coverage	Appropriate and convergent (10 pts); Partially convergent (5pts); Inadequate or divergent (0 pts)	
			Support from physical educator, nutritionist, pharmacist to EqAB	Of the 3 professionals (10 pts); OF 2 professionals (5 pts); Of 1 or none (0 pts)	
			Perception about the workload of support professionals available to EqAB.	Appropriate and convergent (10 pts); Partially convergent (5pts); Inadequate or divergent (0 pts)	
		Permanence of professionals	Length of stay of the doctor in the EqAB	Good: 2 years or more (20 pts); Regular: from 1 to 2 years (10 pts); Bad: <1 year (5 pts)	Interview
			Perception of EqAB regarding its professional valuation	Appropriate and convergent (20 pts); Partially convergent (5pts); Inadequate or divergent (0 pts)	
		Qualification of professionals	Training on the organization/operation of the municipal network	Yes (10 pts); No (0 pts)	Interview DO
			Update on NTCD or DM	Yes (10 pts); No (0 pts)	
	Infrastructure at BHU	Physical structure of BHU	% of items included in checklist 'BHU with accessibility to users'	Transformation in score following the ratio (maximum 10 pts).	Interview DO
			Perception about user accessibility to BHU	Appropriate and convergent (10 pts); Partially convergent (5 pts); Inadequate or divergent (0 pts)	
			% of items included in the checklist 'BHU with adequate physical structure'	Transformation in score following the ratio (maximum 10 pts).	
			Perception about the adequacy of the physical structure of the BHU	Appropriate and convergent (10 pts); Partially convergent (5 pts); Inadequate or divergent (0 pts)	
		Materials and equipment	% of items included in the checklist 'Materials and equipment for actions aimed at DM control'	Transformation in score following the ratio (maximum 10 pts)	Interview DO
			Perception of the EqAB regarding the materials and equipment available for the actions directed to the control of DM in BHU	Appropriate and convergent (10 pts); Partially convergent (5 pts); Inadequate or divergent (0 pts)	
			Periodic maintenance of materials and equipment at BHU	Yes (10 pts); Partial (5 pts); No (0 pts)	
		Medications and supplies	% of items included in the checklist 'Provision of medicines for the treatment of DM in BHU'	Transformation in score following the ratio (maximum 7,5 pts)	Interview DO
			% of items included in the checklist 'Supply of inputs for the application of insulin and AMGC in BHU'	Transformation in score following the ratio (maximum 7,5 pts)	
			Perception regarding the supply of all medicines and supplies provided for the treatment of DM	Appropriate and convergent (7.5 pts); Partially convergent (3 pts); Inadequate or divergent (0 pts)	
			Strategies adopted to guarantee the supply of medications and supplies in case of absences	Yes (7,5 pts); Partial (3 pts); No (0 pts)	

Chart 2. (cont.)

Political-Organizational Dimension	Integration of the network of attention	Normatization of Attention	Use of protocol and guidelines aimed at the attention to the people with DM (doctor and nurse)	Yes (10 pts); Partial (5pts); No (0pts)	Interview DO
			Use of protocol with access flows between the different points of the care network (doctor and nurse)	Yes (10 pts); Partial (5pts); No (0pts)	
		Regulation of access to specialized services	Mechanisms for regulating access to specialized services	Yes (10 pts); No (0pts)	Interview DO
			Strategies to optimize the supply of specialized services	Yes (10 pts); Partial (5pts); No (0pts)	
		Adequacy of supply to specialized services	Perception of waiting time for laboratory tests	Appropriate (10 pts); Partially appropriate (5 pts); Inadequate (0 pts)	Interview DO
			Perception of waiting time for consultation with endocrinologist	Appropriate (10 pts); Partially appropriate (5 pts); Inadequate (0 pts)	
			Perception about waiting time for consultation with ophthalmology in the care network	Appropriate (10 pts); Partially appropriate (5 pts); Inadequate (0 pts)	
	Monitoring and Evaluation	Availability of information	Systematic updating of the IS to register users/families	Yes (30 pts); Partial (15 pts); No (0 pts)	Interview DO
		Monitoring of actions aimed at DM control	Indicators of monitoring of the actions directed to the control of DM in the municipal network	Yes (15 pts); Partial (7 pts); No (0 pts)	Interview DO
			Planning and organization of actions aimed at DM control based on the evaluation of selected indicators	Yes (15 pts); Partial (7 pts); No (0 pts)	
Technical-Assistance Dimension	Organization of care	Appropriation of territory	% of micro areas covered by CHAs	Transformation into score following the ratio (maximum 20 pts)	Interview DO Prom
			Perception of the actions of CHAs in the appropriation of the territory	Adequate and convergent (20 pts); Partially convergent (10 pts); Inadequate or divergent (0 pts)	
			Updated mapping of PHC markers, including people with DM	Yes (20 pts); No (0 pts)	
		Organization of the Agenda	Prioritizing care for people with DM	Yes (20 pts); Partial (10 pts); No (0 pts)	Interview DO Prom
			Guarantee of follow-up visits for people with DM	Yes (20 pts); No (0 pts)	
			Emergency care for people with DM in the event of an accident	Yes (20 pts); Partial (10 pts); No (0 pts)	
		Interdisciplinary action	Participation of CHAs in team meetings	Always (20 pts); Sometimes (10 pts); Never (0 pts)	Interview DO Prom
			Discussion of cases between EqAB and support professionals.	Always (20 pts); Sometimes (10 pts); Never (0 pts)	
			Interlocution of different professionals in the organization of educational activities.	Always (20 pts); Sometimes (10 pts); Never (0 pts)	
		Early diagnosis of DM	Search of risk factors for the development of DM in medical and nursing care	Always (20 pts); Sometimes (10 pts); Never (0 pts)	Interview DO Prom

Chart 2. (cont.)

Technical-Assistance Dimension	Diagnosis, Treatment/ Follow-up	Early diagnosis of DM	Request for exams for early diagnosis of MD in people aged 45 years or older and/or with BMI> 25, associated with at least one more risk factor	Always (20 pts); Sometimes (10 pts); Never (0 pts)	Interview DO Prom
			Request for exams for early diagnosis of DM in pregnant women	Always (20 pts); Sometimes (10 pts); Never (0 pts)	
		Appropriate treatment	Orientations about the Lifestyle Modification (LM) in writing	Always (20 pts); Sometimes (10 pts); Never (0 pts)	Interview DO Prom
			Dispensing with guidance for the appropriate use of drugs for DM treatment	Adequada (20 pts: com orientação na maioria dos casos); Parcialmente adequada (10 pts: orientação em parte dos casos); Inadequada (0 pts: sem orientação)	
			Prescriptions of R Insulin with guidance for dose adjustment according to HGT	Adequado (20 pts: na maioria dos casos); Parcialmente adequado (10 pts: em parte dos casos); Inadequado (0 pts: dose fixa na grande maioria dos casos)	
			Frequency of requesting laboratory tests (FG and/or Hb1Ac) for people with DM	Adequada (20 pts: a cada 6 meses, se compensado); Parcialmente adequada (10 pts: uma vez por ano, independentemente de se está compensado ou não); Inadequada (sem uma periodicidade definida)	
		Systematic follow-up	Use of a specific instrument to follow up people with DM	Yes (20 pts); Parcialmente (10 pts); No (0 pts)	Interview DO Prom
			Active Search for missing persons with DM	Yes (20 pts); Parcialmente (10 pts); No (0 pts)	
			AMGC among people who use insulin	Adequada (20 pts: maioria sabe interpretar os resultados do HGT); Inadequada (0 pts: maioria não sabe interpretar os resultados do HGT)	
	Prevention of DM and its complications	Health education activities	Periodic activities aimed at the primary prevention of DM	Yes (20 pts); No (0 pts)	Interview Prom
			Periodic activities aimed at DM control	Yes (20 pts); No (0 pts)	
		Prevention of complications associated with DM	Systematic assessment of diabetic foot in people with DM	Yes (20 pts); Parcialmente (10 pts); No (0 pts)	Interview Prom
			Systematic evaluation of the oral cavity in people with DM	Yes (20 pts); Parcialmente (10 pts); No (0 pts)	
			Periodic referral of people with DM for eye fundus evaluation	Yes (20 pts); Parcialmente (10 pts); No (0 pts)	

Source: Own elaboration.

CHA – Community Health Agent; DA – Documentary Analysis; AMGC – Self-monitoring of Capillary Blood Glycemia; NTCD – Non-Transmissible Chronic diseases; DM – *Diabetes Mellitus*; Interview – Interview; EqAB – Primary Care Referral Team; FG – Fasting Glycemia.

Monitoring and evaluation of actions aimed at DM control aim to support decision-making processes, subsidize the identification of problems and assist in the reorientation of the actions developed within PHC. The evaluation of the health situation of the population and the results of the interventions carried out is largely due to the monitoring of the activities carried out in the daily life of the services. For this purpose, it is considered necessary to record and qualify the information in the Information System (IS) of the PHC, as well as the definition of indicators to monitor the actions developed to control the DM and to plan and organize the care of according to the demographic, clinical and epidemiological profiles of the community.

In the analysis of the 'Organization of care', the aspects related to the 'appropriation of the territory' by the EqAB and were considered and to the characteristics of the population under their responsibility, necessary for the implementation of the actions directed to DM control. The 'organization of the agenda' of health professionals should ensure easy access to people with DM for treatment and follow-up and attendance to intercurrences, in order to promote the link and enable the continuity and longitudinality of care. It is also considered that the EqAB and the professionals of support must act with interdisciplinary approach and in a multi-professional way in the planning and the development of the activities, in order to favor the interlocution of knowledge and experiences to help in the resolution of the situations experienced in the daily life of the BHU.

In the sub-dimension 'Diagnosis, Treatment and Monitoring', it is expected that the EqAB are aware of the presence of risk factors for the development of the disease and the early detection of DM in the population assigned to the territory. The treatment of the person with DM aims at metabolic control and the prevention of complications associated with DM, taking into account the risk level of each person. The basis of the treatment is the stimulation to adopt healthier life habits, almost always added pharmacological treatment. The implementation of a plan for periodic follow-up and case management is essential to evaluate the evolution of the disease and adherence to the prescribed treatment. In this sub-dimension, the following indicators were listed: 'early diagnosis of DM'; 'adequate treatment of people with DM'; 'monitoring and follow-up'.

For 'Prevention of DM and its Complications', 'collective activities' that stimulate the adoption of healthier life habits should be seen by EqAB as a low density technology effective to the primary prevention of DM, as well as other NTCDs. In addition, due to the difficulty of those with DM in following the prescribed treatment, both the medical and the non-medical, the 'health education activities aimed at the control of DM' should be considered part of the integral treatment. These activities are aimed at increasing the understanding of people about the disease, assisting them in developing greater autonomy and overcoming the various obstacles that hamper disease control. It is also considered fundamental that the EqAB include in the routine of monitoring of the people with DM the 'systematic evaluation of the diabetic foot, buccal cavity and fundus of the eye'. The latter, in the impossibility of being performed in the BHU, should be referred to be performed at another level of attention. These actions are necessary to prevent the complications associated with the disease and to maintain the quality of life of people with DM.

The distribution of the points in the MAJ was performed so that the TA dimension had a weight 50% higher than the PO, due to the importance of the assistance actions in the DM control. For the issue of value judgment and analysis of the indicators, sub-dimensions and established dimensions, the percentage difference between the expected and observed maximum score

will be calculated, considering the following cutoff points: (1) critical: <50.0%; (2) unsatisfactory: ≥ 50.0 and <70.0%; (3) satisfactory: ≥70.0 and <85.0%; (4) appropriate ≥ 85.0%. Such percentages allow compliance with the proposed criteria of judgment for each of the components that make up the MAJ and allow the evaluation of the degree of implementation of the actions directed to the control of DM in PHC.

Final considerations

The methodology adopted for the construction of an evaluative model of the actions aimed at the control of DM in PHC allowed a rich discussion among the participants about the object and the causal relation between its components, increasing the knowledge of all those involved regarding the operationalization of the program. The results showed that the actions aimed at the control of DM in PHC are subject to evaluation, since the elements identified in LM are consistent with the conditions that the intervention has to achieve the expected results. In this sense, conducting a case study for the evaluation of actions aimed at the control of DM in PHC is an interesting methodological option, since it allows to increase the knowledge of the mechanisms and processes involved in the operationalization of the program, in order to contribute to the improvement of this.

As a major benefit, it was verified that evaluation tools were developed with the active participation of the interested parties, and there was an exchange of experiences between the different professional categories. The achievement of the degree of implementation of the two dimensions proposed, considering the context in which they are inserted, can subsidize the decision of the municipal managers and the practices of the professionals of the EqAB, since it allows the identification of the aspects to be prioritized to reach the results expected. The evaluation model was developed to be applicable in medium and large municipalities, with the intention of investigating cases of greater complexity in public management, due to the singularities and diversities of the municipalities with such conformation and to establish an internal comparison between the results found. ■

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