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Infodemiology on capillary blood glucose self-monitoring protocols on the Brazilian internet

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Abstract

Self-Monitoring of Blood Glucose (SMBG) is an important tool in controlling blood glucose and managing *Diabetes mellitus* (DM) and input dispensing protocols are guided by treatment guidelines and specific regulations. The objective of this infodemiological study was to analyze publications on the Brazilian internet about SMBG protocols by Municipal and/or State Health Departments available on Brazilian websites. For the search, the Google tool was used and 286 URLs were identified. The research identified 23 protocols available on government websites, revealing that 10 (43.47%) are from the Southeast region, all protocols defined the diagnosis of *Diabetes mellitus* (DM) type 1, type 2 DM using insulin and gestational DM (GDM), in 11 protocols (47.8%) the monthly supply of capillary blood glucose test strips is provided by the pharmacy and the quantity varies from 30 to 120 strips depending on the type of diabetes and insulin use. The protocols analyzed emphasize the importance of DM education, with 60.8% of them incorporating educational programs. Despite the dynamics of information on the internet, the need for transparency in the inclusion criteria and maintenance of the supply of BGTS is highlighted, qualifying care for patients with DM. The development and dissemination of protocols strengthens the transparency of the SUS, assists in the organization of document flows between the professionals involved and equitable access to inputs.

Keywords: *Diabetes Mellitus.* Self-Monitoring of Blood Glucose. Internet-Based Intervention. Infodemiology.

INTRODUCTION

The evolution of glycemic control tools has been fundamental to achieving a better adjustment of the treatment of *Diabetes mellitus* (DM), by making it more precise and individualized and by facilitating decision-making by health professionals and patients[1]. From this perspective, the development of the Self-Monitoring of Blood Glucose (SMBG) has revolutionized the management of DM[2].

SMBG stands out as an integral part of the set of therapeutic interventions to control the disease. This strategy provides people with DM with better self-knowledge of the disease, as well as providing important information for the healthcare team and for adjusting glycemic goals and individualized pharmacological treatment for each patient[3].

Revista O Mundo da Saúde

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Glucose monitoring is very useful in evaluating glycemic control, as a complement to the measurement of glycated hemoglobin (HbA1c), by allowing patients themselves to identify capillary blood glucose (CG) at different times of the day and quickly correct hyperglycemic peaks or episodes of hypoglycemia[4].

SMBG is recommended for patients with all types of DM. In these individuals, the use of the method promotes a reduction in the risk of hypoglycemia and expands understanding of the effect of different foods, stress, emotions and exercise on blood glucose. Furthermore, it can be useful in making decisions about the dose of insulin to be administered in real time[5]. It also allows insulin adjustments retrospectively, during medical appointments, based on the results obtained over weeks and months. These results can be recorded manually by the person with DM during this period or transferred directly to a computer using specific software[6].

Therefore, the protocols that guide the health team in dispensing supplies to people with DM are drawn up in accordance with the treatment guidelines, with Ordinance No. 2,583/2007 and with the cost-effective relationship of using the supplies, with the aim of of waste due to inappropriate and unnecessary use[7]. These documents help guide the dispensing of supplies for the treatment and monitoring of people with DM and are generally available on the internet for public access.

The growing number of online searches using popular search engines provides important information about the different types of users and their behavior in relation to the information learned. The literature establishes a relationship between studies that evaluate Internet pages and epidemiology[8,9-10], which resulted in a new area of investigation, called "infodemiology", defined as the science of determinants and distribution of information in electronic media, specifically the Internet, or in a population, to generate useful data for health and public policies. Indicators in this area are generated from methods to analyze research, communication and Internet publishing behavior in real time, to establish a relationship between population behavior and trends[11].

From this perspective, based on infodemiology, the present study contributes to the advancement of knowledge in view of the need to evaluate access to information on input supply protocols for the SMBG prepared by the country's Health Departments, available on the internet for consultation by health professionals or the population. In view of the above, the present study aims to analyze publications on the internet about SMBG protocols at home, published by Municipal and/or State Health Departments available on Brazilian websites.

METHODOLOGY

This is an infodemiological, descriptive and cross-sectional study that used Internet pages that provide information on SMBG protocols in Brazil as a research source. The choice of this type of study is due to the fact that infodemiological studies analyze the distribution of information from search engines, in electronic media, thus focusing on the analysis of the demand for information and data in real time, aiming to establish a relationship between population behavior and trends[8-11].

For the search, the *Google* tool (http://www.google.com.br) was used, which was chosen because it has indexing programs that enable navigation and storage of all available information. In this way, the “Advanced search” mode, “pages in Portuguese” option and “Brazil” country were used, with the purpose

REVISTA O MUNDO DA SAÚDE

DOI: 10.15343/0104-7809.202347e15212023I

of obtaining only national SMBG protocols,

The search was carried out on May 8, 2022 at 6:05 pm by the three researchers, with the following keywords: "self-monitoring protocol"; "capillary glycemia"; "glycemic OR program" and thus enabling the analysis of websites that actually contained aspects related to the topic under study.

Subsequently, the resulting URLs (Uniform Resource Locators [electronic addresses]) were incorporated into the *Microsoft Excel* spreadsheet to carry out the analysis of the addresses found, which occurred in two stages. The first stage focused on selecting URL categories with SMBG protocols and in the second stage of the study, SMBG protocols were selected to analyze their content.

Among the selection criteria, we established as inclusion criteria pages in Portuguese and published in Brazil. The exclusion criteria were: duplicate URL (identical electronic address), those that redirected the dissemination of courses or other events and those whose content did not refer to the SMBG protocols and unavailable URL, as well as promotional documents, videos, theses, monographs , dissertations and scientific articles (Figure 1). For data analysis, descriptive statistics were used through frequencies and percentages, using *Microsoft Excel* software.

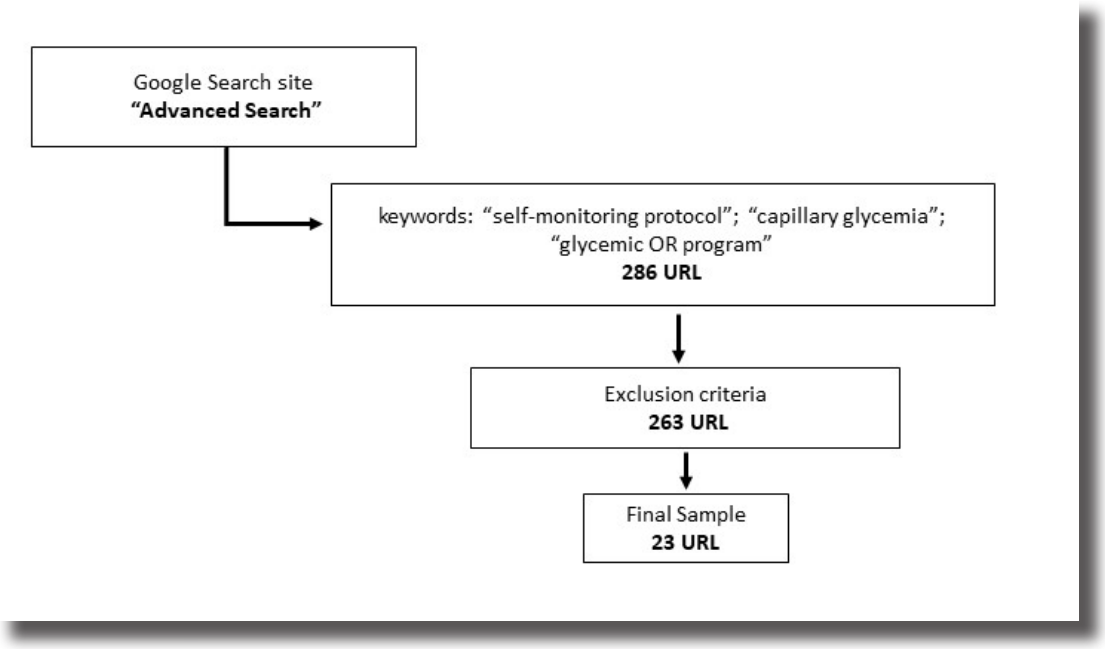

Figure 1 - Flowchart for selecting URLs in self-monitoring of capillary blood glucose protocols (SMBG). Ribeirão Preto, SP, Brasil, 2022.

In the flowchart presented in Figure 1, it is possible to observe that 286 URLs were located. In this way, through the address or URL, each page was accessed and pre-analyzed individually, with the floating reading of the SMBG protocols, the material was explored, the results were organized and their descriptive analysis was defined with the definition of 9 categories. : 1. identification; 2. origin; 3. inclusion criteria; 4. required documentation; 5. criteria for maintenance; 6. exclusion criteria; 7. inputs made available; 8. pickup location; 9. professionals involved (Table 1).

REVISTA O MUNDO DA SAÚDE

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Table 1 - Categories identified and information evaluated in self-monitoring of capillary blood glucose protocols (SMBG). Ribeirão Preto, SP, 2022.

Category	Evaluated information
Identification	URL and title of protocols.
Origin	City, State, date of publication of the protocol, whether it was prepared by the Municipal Health Department or State Health Department.
Inclusion criteria for obtaining self-monitoring inputs	Have a diagnosis of: type 1 *diabetes mellitus* (DM1), type 2 *diabetes mellitus* (DM2) using insulin, type 2 *diabetes mellitus* on insulin therapy due to surgical stress and gestational *diabetes mellitus* (GDM).
Documentation required for registration or first access to self-monitoring inputs	Requirement of: receipt form, ID, CPF, national health card, proof of address, pregnant woman's card, test results (fasting blood glucose, glycated hemoglobin and creatinine), mandatory participation in physical activities and education groups in diabetes.
Criteria for maintaining the supply of self-monitoring inputs	Have multi-professional follow-up, renew the medical prescription, present a request form for inputs at each withdrawal, capture blood glucose values from the glucometer when removing the inputs, requirement to present a SMBG spreadsheet, period for renewing the request form of inputs, periodically present results of fasting blood glucose, glycated hemoglobin and creatinine tests.
Exclusion criteria for providing self-monitoring inputs	Present disuse or misuse of supplies, lack of monitoring and removal of supplies, change of municipality, end of pregnancy, end of surgical stress, interruption of treatment and death.
Inputs made available and described in the protocol and their respective quantities	Supply of lancing device, glucometer, sharps collector. Description of the quantity to be delivered of: lancets, insulin pen needles, reagent strips for DM2 patient intermediate insulin, reagent strips for DM2 patient rapid and intermediate insulin, reagent strips for DM1 patient, reagent strips for GDM patient, syringes available for application insulin and sharps collector.
Input pick-up location	The existence of information on the location for collection, such as a health unit or health unit pharmacy, central pharmacy.
Professionals involved	Assessment of which professionals are involved in the input supply process (Doctor, nurse, pharmacist, nutritionist, among others from the multidisciplinary team).

This study was carried out in a virtual environment with public and unrestricted access. According to Resolution No. 510/2016, research that uses information with public and unrestricted access, as well as research that uses public domain information will not be registered or evaluated by the Research Ethics Committee (CEP) and the National Research Ethics Committee (CONEP) system[12]. Searches on public pages on the Internet that do not require registration or authorization from the administrator to access the content do not require ethical evaluation and registration of consent.

RESULTS

286 URLs were identified. After applying the exclusion criteria, 23 URLs remained. Thus, these URLs were analyzed, as they were framed as a document prepared by a Municipal or State Health Department, with a set of information and standards defined for the supply of BGTS for people with DM.

In relation to Brazilian regions, there were 7 (30.4%) protocols in the South region, 10 (43.47%) in the Southeast region, 2 (8.69%) in the Central-West region, 1 (4.34%) in the North region and 3 (13.04%)

REVISTA O MUNDO DA SAÚDE

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in the Northeast region. As for the year of publication, it ranged from 2011 to 2021, however in two protocols the date was not found (Table 2).

Table 2 - Distribution of self-monitoring of capillary blood glucose (SMBG) protocols, according to location, title, year of publication and URL. Ribeirão Preto, SP, 2022.

City	State	Title	Year	URL
Florianópolis	Santa Catarina	Capillary blood glucose self-monitoring program	2011	http://www.pmf.sc.gov.br/arquivos/diario/pdf/15_06_2011_18.45.53.f9bb05bf6cfbf8fe8b2223623d5458be.pdf
Maceió	Alagoas	Update of the protocol for self-monitoring of capillary blood glucose in patients with insulin-dependent diabetes	2012	http://www.maceio.al.gov.br/wp-content/uploads/admin/pdf/2016/08/PROTOCOLO_DIABETES.pdf
Dourados	Mato Grosso do Sul	Optimization of glycemic self-monitoring through standardization of dispensing of inputs to patients with *Diabetes mellitus*	2015	http://www.dourados.ms.gov.br/wp-content/uploads/2015/11/Protocolo-02.docx
Vila Velha	Espírito Santo	Protocol for self-monitoring of capillary blood glucose for insulin-dependent patients	2016	https://www.vilavelha.es.gov.br/midia/paginas/Protocolo%20para%20o%20automonitoramento%20da%20glicemia%20capilar(1).pdf
Campo Grande	Mato Grosso do Sul	Protocol for dispensing glycemic self-monitoring supplies and treatment supplies to patients with Diabetes mellitus in the Campo Grande municipal health network	2017	http://www.campogrande.ms.gov.br/sesau/wp-content/uploads/sites/30/2015/04/PROTOCOLO-DE-AUTOMONITORAMENTO-GLICEMICO-16JAN2017-REV-OK.pdf
Estado Minas Gerais	Minas Gerais	State protocol for dispensing supplies for monitoring diabetes within the scope of SUS-MG.	2017	https://docplayer.com.br/81841659-Deliberacao-cib-sus-mg-no-2-512-de-19-de-julho-de-2017.html
Maringá	Paraná	Protocol for inclusion of SUS patients with diabetes in the glycemic self-monitoring program in the city of Maringá	2018	http://www2.maringa.pr.gov.br/sistema/arquivos/47ce1f10ea65.pdf
São José dos Pinhais	Paraná	Capillary blood glucose monitoring protocol	2018	http://www.sjp.pr.gov.br/wp-content/uploads/2018/06/Tiras-Glicemia-protocolo.pdf ttp://www.sjp.pr.gov.br/wp-content/uploads/2018/06/Tiras-Glicemia-protocolo.pdf
Brusque	Santa Catarina	Normative instruction no. 001/2018 self-monitoring of capillary blood glucose – SMBG	2018	https://www.diariomunicipal.sc.gov.br/site/?r=site/acervoView&id=1580598
Videira	Santa Catarina	Nursing care for diabetic and hypertensive users protocol for releasing supplies for self-monitoring of capillary blood glucose	2018	https://static.fecam.net.br/uploads/834/arquivos/1311233_PROTOCOLO_HIPERTENSAO_E_DIABETES.pdf
Porto Velho	Rondônia	Protocol for inclusion and exclusion of insulin-dependent diabetic users registered for glycemic self-monitoring in the city of Porto Velho	2019	https://semusa.portovelho.ro.gov.br/uploads/arquivos/2020/01/23266/1579709222pdf-protocolo-oficial-para-inclusa-o-e-exclusa-o-de-usua-rios-diaba-ticos-insulinodependentes.pdf
Santa Teresa	Espírito Santo	Protocol for self-monitoring of capillary blood glucose	2019	https://www.diariomunicipales.org.br/arquivos/publicacoes/2019/08/1565284842_portaria_smsa_086_farmcia_bsica_padronizao_e_protocolo_automonitoramento_glicemia_capilar.pdf

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REVISTA O MUNDO DA SAÚDE

DOI: 10.15343/0104-7809.202347e15212023I

... continuation Table 2

City	State	Title	Year	URL
Várzea Paulista	São Paulo	Capillary blood glucose monitoring protocol	2020	https://portal.varzeapaulista.sp.gov.br/wp-content/uploads/2020/07/PROTOCOLO-DE-MONITORAMENTO-DA-GLICEMIA-CAPILAR.pdf
Estado Bahia	Bahia	Home blood glucose self-monitoring protocol	2020	http://www.saude.ba.gov.br/wp-content/uploads/2020/02/Protocolo-automonitoriza%C3%A7%C3%A3o-domiciliar-da-glicemia.pdf
Colatina	Espírito Santo	Capillary blood glucose self-monitoring protocol	2020	https://diariomunicipal.es.gov.br/?r=site/acervoView&id=307106
São José do Rio Preto	São Paulo	Capillary Blood Glucose Self-Monitoring Program, within the scope of the Municipal Health Department of São José do Rio Preto	2020	http://saude.riopreto.sp.gov.br/transparencia/arqu/assifarm/2019/protocolo_monitoramento_glicemia.pdf
Ribeirão Preto	São Paulo	Capillary blood glucose self-monitoring - protocol for dispensing capillary blood glucose self-monitoring supplies to patients with diabetes mellitus	2021	https://www.ribeiraopreto.sp.gov.br/portal/pdf/saude-h-01202104.pdf
Lapão	Bahia	Protocol for dispensing glycemic self-monitoring supplies to patients with diabetes mellitus in the municipal health network of Lapão-BA	2021	http://www.procedebahia.com.br/publica/documentos/PRCIO9LY.J5VU-20210921-135953--!--003_PROTOCOLO_dispensacao_insumos_1.pdf
Guarapari	Espírito Santo	Glycemic self-monitoring protocol	2021	https://www.diariomunicipales.org.br/arquivos/publicacoes/2021/03/1616703094_protocolo_de_automonitoramento_glicmico.pdf
Belo Horizonte	Minas Gerais	Update of the reagent strip request flow for patients with *Diabetes Mellitus* who use insulin or with Gestational Diabetes in PHC	2021	https://prefeitura.pbh.gov.br/sites/default/files/estrutura-de-governo/saude/2021/nota-tecnica-assistencial-001-2021-tiras-reagentes.pdf
Estado de São Paulo	São Paulo	GSM - glycemic self-monitoring program	2021	https://www.prefeitura.sp.gov.br/cidade/secretarias/upload/saude/Automonitoramento_Glicemico_7_4_2021.pdf
Capão da Canoa	Rio Grande do Sul	Protocol for self-monitoring of capillary blood glucose at home	S/D*	http://www.capaodacanoa.rs.gov.br/uploads/paginadinamica/23567/PROTOCOLO_PARA_AUTOMONITORAMENTO_DA_GLICEMIA_CAPILAR_EM_DOMICILIO.pdf
Porto Alegre	Rio Grande do Sul	Diabetes supplies for home	S/D*	http://www2.portoalegre.rs.gov.br/sms/default.php?p_secao=1091

Regarding the inclusion criteria, all evaluated protocols listed people with type 1 DM, type 2 DM using insulin and gestational DM as eligible to be part of the Program. It was found that in relation to DM2 in insulin therapy, 6 (26.1%) protocols included patients under surgical stress. The documentation required for inclusion in the program was: signature of the glucometer receipt form in 20 protocols, presentation of personal documents (RG/CPF) in 19, the National Health Card in 21, proof of Residence in 20, the of the Pregnant Woman (in the case of GDM) in 1, the results of fasting blood glucose tests in 5, Glycated Hemoglobin in 8 and Creatinine in 1, and putting an end to participation in health groups in 14.

Regarding maintenance in the SMBG Program, criteria related to medical prescription (every 3 or 6 months) were required in 16 protocols (69.6%) and the delivery of the SMBG spreadsheet in 13 (56.5%). It is no-

REVISTA O MUNDO DA SAÚDE

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teworthy that the requirement to have glycated hemoglobin, fasting blood glucose and creatinine tests was little addressed in the protocols. Table 3 shows the other criteria required to maintain the supply of BGTS.

The exclusion criteria found for the program were: end of pregnancy, change of municipality, death of the patient, misuse of supplies, interruption of treatment, absence of withdrawal of supplies, disuse of supplies, end of surgical stress and are shown in table 3 The inputs provided were the glucometer in 22 protocols, the lancets in 20, the lancing device in 4 and the sharps collector in 3.

Table 3 - Distribution of the absolute number (n) and proportion (%) of self-monitoring of capillary blood glucose (SMBG) protocols at home, regarding maintenance and exclusion criteria. Ribeirão Preto, SP, 2021.

Maintenance criteria	n	%
Renewal of medical prescription at least (every 3 months or every 6 months)	16	69.6
Requirement to submit the SMBG spreadsheet	13	56.5
Be in multidisciplinary monitoring (more than 3 professionals)	12	52.2
Present input request form at each withdrawal	12	52.2
Renew the input request form at least every 6 months	9	39.1
Capture blood glucose values from the glucometer upon inputs pickup	8	34.8
Requirement of the Glycated Hemoglobin test upon renewal	6	26.1
Requirement of fasting blood glucose test upon renewal	5	21.7
Requirement of the Creatinine test upon renewal	1	4.3
Exclusion criteria	**n**	**%**
End of pregnancy	17	73.9
Change of municipality	16	69.6
Patient death	15	65.2
Improper use of inputs	14	60.9
Treatment interruption	13	56.5
Lack of inputs pickup	13	56.5
Disuse of inputs	9	39.1
End surgical stress	1	4.3

When analyzing the monthly supply of Blood Glucose Test Strips (BGTS), it was decided to classify patients with DM2 using intermediate-acting insulin, patients with DM2 using rapid and intermediate-acting insulin, patients with DM1 and patients with GDM. In table 4 it is possible to observe that 5 (21.7%) of the protocols determined up to 30 strips/month for patients with type 2 DM using intermediate-acting insulin, 9 (39.1%) up to 120 strips/month in the case of rapid and intermediate insulin use, while 6 (26.1%) mention the supply of up to 120 strips/month for type 1 DM and finally, 7 (30.4%) provide up to 120 strips/month in GDM. In about 4 protocols there is no information in this regard.

Regarding the location of collection of supplies, 10 (43.5%) of the protocols are in the health unit, in 11 (47.8%) in a municipal pharmacy, 2 (8.7%) in the basic health unit. health or at the Central Pharmacy (Table 5). As for the professionals of the multidisciplinary team

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involved, 8 (34.8%) mentioned the doctor and the nurse; in 5 (21.7%) the doctor, nurse and pharmacist and in 01 (4.3%) no professional was mentioned (Table 5).

Table 4 - Distribution of the absolute number (n) and proportion (%) of self-monitoring of capillary blood glucose protocols (SMBG) according to the type of *diabetes mellitus* and number of reagent strips. Ribeirão Preto, SP, 2022.

	Patient with DM2 using intermediate-acting insulin		Patient with DM2 using rapid and intermediate insulin		Patient with DM1		Patient with GDM	
Quantity of reagent strips	N	%	N	%	N	%	N	%
Up to 15/month	1	4.3	-	-	-	-	-	-
Up to 30/month	5	21.7	3	13	1	4.3	1	4.3
Up to 50/month	4	17.4	-	-	-	-	-	-
Up to 60/month	2	8.7	-	-	-	-	-	-
Up to 80/month	1	4.3	-	-	-	-	-	-
Up to 90/month	1	4.3	2	8.7	3	13	4	17.4
Up to 100/ month	-	-	1	4.3	2	8.7	1	4.3
Up to 120/ month	3	13	9	39.1	6	26.1	7	30.4
Up to 150/ month	1	4.3	2	8.7	3	13	2	8.7
Up to 180/ month	2	8.7	1	4.3	5	21.7	3	13
Up to 200/ month	-	-	1	4.3	1	4.3	1	4.3
No quantity stated	3	13	4	17.4	2	8.7	4	17.4

Table 5 - Distribution of the absolute number (n) and proportion (%) of self-monitoring of capillary blood glucose (SMBG) protocols according to the input pick-up location type and the participation of health professionals. Ribeirão Preto, SP, 2022.

Input pick-up location	n	%
Central Pharmacy	2	8.7
Basic Health Unit Pharmacy	8	34.8
Pharmacy of the Basic Health Unit or Central Pharmacy	1	4.3
Basic Health Unit or Central Pharmacy	2	8.7
Health Unit	10	43.5

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REVISTA O MUNDO DA SAÚDE

DOI: 10.15343/0104-7809.202347e15212023I

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Healthcare professionals involved	n	%
Doctor	1	4.3
Doctor and nurse	8	34.8
Doctor and pharmacist	3	13.0
Doctor, nurse and pharmacist	5	21.7
Doctor, nurse, pharmacist and nutritionist	3	13.0
No professionals stated	1	4.3
Multiprofessionals (4 professionals, in addition to a doctor and nurse)	2	8.7

DISCUSSION

According to data from the International Diabetes Federation (2019), there are approximately 463 million people between 20 and 79 years old living with DM in the world, it is also estimated that there will be a greater than 51% increase in people living with DM by 2045, that is, more than 700 million inhabitants. Brazil is the 5th country with the highest prevalence of people with DM (16.8 million) with an increase of up to 54% (26 million people living with DM)[13].

Therefore, the annual global health expenditure on DM is estimated at 760 billion dollars. It is projected that expenses will reach 825 billion dollars in 2030 and 845 billion by 2045. In this way, the importance of public policies aimed at providing the necessary inputs for the management of DM in patient-health professionals co-participation is highlighted, as well as the need for wide dissemination of these policies and their respective projects, such as the AMGC protocols, on websites and in the main social networks, since millions of people with DM are looking for more information about the disease and their rights[13].

The SMBG is a relevant topic and has been highlighted since 2006, with the publication of Federal Law No. 11,347 and the publication of Ordinance No. 2,583 in 2007, defining the list of medicines and supplies to be made available by the SUS. These documents also guide the inclusion and exclusion criteria for access to these inputs[7,14-15]. From now on, there was the possibility of better organization and standardization of actions by the Municipal and State Health Departments for the financing, acquisition and distribution of these inputs for people with DM registered in the Capillary Blood Glucose Self-Monitoring Program.

The location using the Google search tool showed that 23 protocols relating to the SMBG Program were available on websites of Municipal and State Health Departments, pointing to the lack of dissemination of information relating to this topic on the internet. When analyzing the number of states and municipalities that make up the country and even fifteen years after the creation of Law No. 11,347/2006 and the publication of Ordinance No. 2,583/2007[7,14-15], which defines the list of medicines and supplies, the search identified few federated entities with their protocol for supplying supplies for DM self-monitoring being published on the internet.

Another relevant data is the distribution of protocols across Brazilian regions. Of the 23 protocols located, most came from the Southeast 10 (43.7%) and South 7 (30.4%)

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regions, and only 6 (26%) protocols from the North, Northeast and Central-West regions. The Brazilian territory is marked by profound regional inequalities resulting from historical legacies that demarcate its uses and the political and economic conformation of the country, which probably justifies the scarcity of SMBG protocols and, therefore, the impaired supply of inputs necessary for the management of DM in these regions[16].

Even with 5,570 municipalities, especially small ones, not having a sufficient number to focus on the issue of self-monitoring and the development of protocols, the majority of documents recovered were from municipalities located in interior regions. The relevance of adopting municipal standards is reinforced with the elaboration of protocols for the supply of inputs for self-monitoring of DM, which consider the local epidemiological reality, assist in the management of care and costs with DM[17] and also its dissemination on websites government. SMBG is cited as an ideal method of glycemic control in the documents analyzed. The DM Care Line protocols define that people with DM using insulin carry out self-monitoring as a way to check the variation in the glycemic curve and make decisions and conduct their treatment[18-19]. In this aspect, the SMBG protocols guide reality and aim to propose more concrete, integrative and uniform actions. Documents of this nature guide Brazilian municipalities to supply inputs to the SMBG.

The protocols analyzed adopted inclusion, maintenance and exclusion criteria for the program and proof of residence in the municipality was common to all, which can be explained by the issue of financing pharmaceutical assistance being a state and municipal responsibility. In relation to being included in DM education programs, even provided for in Law No. 11,347/2006, it was shown in 60.8% of the documents researched. To achieve diabetes treatment goals and maximize quality of life, according to the American Diabetes Association[20], education and support for diabetes self-management, medical nutritional therapy, routine physical activity, and smoking cessation counseling are essential. when necessary and psychosocial care. It is further recommended that people with diabetes should participate in diabetes self-care education and receive the necessary support to facilitate knowledge, decision-making and mastery of diabetes self-care skills[20].

Criteria such as proof of the disease, through a medical report, clinical and laboratory exams, as well as the prescription of insulin, were also listed by all municipalities included in the research, certainly aiming to guarantee the diagnosis, safe and effective prescription and considering the ordinance from the Ministry of Health. It is noteworthy that the requirement to have glycated hemoglobin, fasting blood glucose and creatinine tests was little addressed in the protocols, and could be an important tool for professionals to define therapeutic goals and monitor this patient.

It is worth noting that the establishment of inclusion and maintenance criteria in the SMBG Program makes the therapeutic itinerary to be followed clear to the person with DM, as well as providing transparency and continuity to the process. For team professionals, it is configured as a therapeutic strategy to qualify care[21]. Multidisciplinary care involves the doctor, nurse, pharmacist, nutritionist, physical education professional, occupational therapist, dental surgeon, psychologist, physiotherapist, among other important professionals, who during their care for the patient can guide and address the SMBG, which can be pointed out in the protocol with definition of actions regarding self-monitoring.

Internet information is dynamic and subject to daily changes, depending on changing human behavior, so the methods used cannot reliably measure trends[22] monitoring to help with planning, dissemination and communication about SMBG protocols. This issue can be considered a limitation of the study, however, minimized by the careful se-

Revista O Mundo da Saúde

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arch to identify protocols.

Finally, there is legislation to distribute inputs free of charge to people with DM in Brazil, but the criteria vary from one municipality to another. This study portrays this reality. When comparing with international literature, our findings do not show education in structured programs, on the other hand, in other countries, we have reimbursement or not for patients who pay for their tapes[23-24].

CONCLUSION

The study evaluated the number of SMBG protocols published in the country, and their distribution among the federative entities, the criteria for inclusion, maintenance and exclusion in the program, how the BGTSs are distributed, the location of collection of inputs and multidisciplinary participation. There is a perceived need to instigate the sectors involved and the local management of the municipalities to publicize the information to the public, as well as the professionals involved in the SMBG Programs, in addition to reviewing each one for adjustments.

The development and dissemination of these protocols strengthens the transparency of the SUS, helps to improve document flows between the professionals involved, helps to clarify doubts and promotes more equitable access to inputs for SMBG through the SUS.

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REFERENCES

1. Cardoso H, Carvalho D, Pape E, Carrilho F, Raposo JF, Melo M, et al. Consenso Nacional para a Utilização do Sistema de Monitorização Flash da Glicose. Rev Portuguesa de Diabetes 2018; 13:143-153. Disponível em: http://www.revportdiabetes.com/wp-content/uploads/2019/01/RPD-DEzembro-2018-Consenso-Nacional-p%C3%A1gs-143-153.pdf.
2. Tauschmann M, Hovorka R. Technology in the management of type 1 diabetes mellitus - current status and future prospects. Nat Rev Endocrinol 2018; 14:464-475. doi: https://doi.org/10.1038/s41574-018-0044-y
3. American Diabetes Association. Standards of Medical Care in Diabetes. Diabetes Care 2020; 36: 1:224. doi: https://doi.org/10.2337/cd20-as01
4. Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes: 2019-2020. São Paulo: SBD; 2019. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2021/08/Diretrizes-Sociedade-Brasileira-de-Diabetes-2019-20201.pdf
5. Kovatchev B, Cobelli C. Glucose Variability: Timing, Risk Analysis, and Relationship to Hypoglycemia in Diabetes. Diabetes Care 2016; 39:502-510. doi: https://doi.org/10.2337/dc15-2035
6. Bolinder J, Antuna R, Geelhoed-Duijvestijn P, Kröger J, Weit- gasser R. Novel glucose-sensing technology and hypoglycaemia in type 1 diabetes: a multicentre, non-masked, randomised controlled trial. Lancet 2016; 388:2254-2263. doi: https://doi.org/10.1016/S0140-6736(16)31535-5
7. Ministério da Saúde (BR). Portaria nº 2.583 de 10 de outubro de 2007. Define elenco de medicamentos e insumos disponibilizados pelo SUS nos termos da Lei nº11347, de 2006, aos usuários portadores de diabéticos mellitus. Diário Oficial da União. Brasília: Ministério da Saúde; 2007.

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8. Eysenbach G. Infodemiology and infoveillance: framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the Internet. J Med Internet Res 2009; 11:e11. doi: https://doi.org/10.2196/jmir.1157
9. Silva EV, Castro LLC. Infodemiologia: uma abordagem epidemiológica da informação. Rev Espaç.saúde 2007;8:39-43.Disponível em: https://pesquisa.bvsalud.org/portal/resource/pt/lil-464829
10. Westin UM, Tibos CM, Évora YDM. Infodemiologia e câncer de pulmão: análise das informações na internet. UNINGÁ Rev 2016; 25:32-36. Disponível em: http://revista.uninga.br/index.php/uningareviews/article/view/1744
11. Eysenbach G. Infodemiology and infoveillance tracking online health information and cyberbehavior for public health. Am J Prev Med 2011; 40:154-158. doi: https://doi.org/10.1016/j.amepre.2011.02.006
12. Ministério da Saúde (BR). Conselho Nacional de Saúde. Resolução Nº 510, de 7 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais cujos procedimentos metodológicos envolvam a utilização de dados diretamente obtidos com os participantes ou de informações identificáveis ou que possam acarretar riscos maiores do que os existentes na vida cotidiana, na forma definida nesta Resolução. Diário Oficial da União. Brasília: Ministério da Saúde; 2016.
13. International Diabetes Federation. IDF Diabetes Atlas. Brussels/Belgium: International Diabetes Federation; 2019. Disponível em: https://diabetesatlas.org/idfawp/resource-files/2019/07/IDF_diabetes_atlas_ninth_edition_en.pdf
14. Ministério da Saúde (BR). Lei n° 11.347 de 27 de setembro de 2006. Dispõe sobre a distribuição gratuita de medicamentos e materiais necessários à sua aplicação e à monitoração da glicemia capilar aos portadores de diabetes inscritos em programas de educação para diabéticos. Diário Oficial da União. Brasília: Ministério da Saúde; 2006.
15. Santos ECB, Teixeira CRS, Zanetti ML, Santos MA, Pereira MCA. Health services users with diabetes mellitus: from knowledge to the use of healthcare rights. Rev. Latino-Am. Enfermagem 2011; 19:285-329. doi: https://doi.org/10.1590/S0104-11692011000200009
16. Albuquerque MV, Viana ALA, Lima LD, Ferreira MP, Fusaro ER, Iozzi FL. Regional health inequalities: changes observed in Brazil from 2000-2016. Ciênc. saúde colet 2017; 22:1055-1064. doi: https://doi.org/10.1590/1413-81232017224.26862016
17. Ministério do Planejamento, Orçamento e Gestão, Instituto Brasileiro de Geografia e Estatística (BR). População: Pirâmide etária 2010. Rio de Janeiro: IBGE; 2017. Disponível em: https://cidades.ibge.gov.br/brasil/panorama.
18. Ministério da Saúde (BR). Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Diretrizes para o cuidado das pessoas com doenças crônicas nas redes de atenção à saúde e nas linhas de cuidado prioritárias. Brasília: Ministério da Saúde; 2013.
19. Paraná (BR). Secretaria de Estado da Saúde do Paraná. Superintendência de Atenção à Saúde. Linha guia de diabetes mellitus. Curitiba: SESA; 2018. Disponível em: https://www.maringa.pr.gov.br/sistema/arquivos/a0893e874d6b.pdf
20. American Diabetes Association. Facilitating behavior change and well-being to improve health outcomes: standards of medical care in Diabetes 2022. Diabetes Care 2022; 45:82. doi:https://doi.org/10.2337/dc22-S005
21. Lisboa CSF, Lopes EC. Automonitorização da glicemia: construção de uma proposta de documento orientador. Bol. saúde 2017; 26:65-74. Disponível em: https://docs.bvsalud.org/biblioref/2020/10/1122759/automonotorizacao.pdf
22. Moretti FA, Oliveira VE, Silva EMK. Acesso a informações de saúde na internet: uma questão de saúde pública. Rev Assoc Med Bras 2012; 58:650-658. doi:https://doi.org/10.1590/S0104-42302012000600008
23. Agiro A, Xie Y, Bowman K, DeVries A. Leveraging benefit design for better diabetes self-management and A1C control. Am J Manag Care 2018; 24:30-36. Disponível em: https://pubmed.ncbi.nlm.nih.gov/29461848/
24. Yi WM, Van Wieren Jones EM, Hansen BK, Vora J. The Impact of Self-Monitoring Blood Glucose Adherence On Glycemic Goal Attainment in an Indigent Population, With Pharmacy Assistance. Pharmacy and Therapeutics 2019; 44:554–559. Disponível em: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6705474/

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