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Differences Between Type 2 Diabetes Controlled and Uncontrolled Patients in Central Portugal's Primary Care

Características Dissociativas de Diabéticos Tipo 2 Controlados e Não Controlados nos Cuidados de Saúde Primários da Região Centro

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Abstract

Background and Aims: Since there is a lack of knowledge about the social determinants of diabetes as well as the reasons for its lack of control in Type 2 diabetic patients, we aimed to understand the differences between controlled and uncontrolled patients according to e.registered data in Primary Health Care in Central Portugal.
Methods: Observational, cross-sectional, size representative, random study, performed between April and June 2020. Sample size was calculated with a 5% margin error and a 90% confidence level in seven invited Primary Health Care Units in central Portugal. Diabetes control was defined for a < 7% mean of the last two HbA1c measurements.
Results: Older patients (≥ 65 years) were more likely to be controlled (OR = 2,56; p < 0.001; IC95%: 1.51 to 4.32) with the probability of being a controlled patient reducing 56% for each antidiabetic medicine prescribed (OR = 0.44; p < 0.001; IC95%: 0.32 to 0.59). Smoking was associated but didn't predict the chance of being a controlled or uncontrolled diabetic patient, even if smokers are more likely to be uncontrolled patients. The type and number of antidiabetic drugs increased with the probability of non-control (p < 0.001). Uncontrolled patients show a more recent e-registration set up (p < 0.001) and longer onset of diabetes diagnosis (p < 0.001).

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Conclusions: Characteristics associated with type 2 diabetes control were being older, not smoking, longer follow-up time and taking a shorter number of medicines. Higher socioeconomic levels and non-unitary families were factors associated with uncontrolled diabetes. E.registered data study allows the knowledge of doctors' data fulfilment but not of what patients need for diabetes control.

Keywords: type 2 diabetes; general practice; family practice; control; registries

Resumo

Contexto e Objetivos: Uma vez que é necessário aprofundar o estudo sobre os determinantes sociais da diabetes, bem como as razões para a o controlo e não controlo de diabéticos tipo 2, o nosso objetivo é perceber as diferenças entre diabéticos tipo 2 controlados e não controlados, de acordo com os dados disponíveis nos registos informático a nível dos cuidados de saúde primários no centro de Portugal.
Métodos: Estudo observacional, transversal, randomizado e com amostra representativa, realizado no período de Abril a Junho de 2020. A mostra foi calculada com 5% de margem de erro e para um intervalo de confiança de 90%, englobando utentes de 7 Unidades de Saúde Familiar do centro de Portugal. Utentes com médias das duas últimas HbA1c < 7% foram consideradas como controlados.
Resultados: Doentes mais velhos (≥ 65 anos) apresentavam maior probabilidade de controlo (OR = 2,56; p < 0,001; IC95%: 1,51 a 4,32). A probabilidade de controlo reduziu 56% por cada antidiabético prescrito (OR = 0,44; p < 0,001; IC95%: 0,32 a 0,59). Ser fumador foi associado, mas não foi preditor da probabilidade de controlo, embora fumadores tenham mais probabilidade de não controlo. O tipo e número de antidiabéticos aumenta com a probabilidade de não controlo (p < 0,001). Utentes não controlados apresentam data de introdução no programa de (p < 0,001) e maior intervalo de tempo até ao diagnóstico (p < 0,001).
Conclusões: Utentes mais velhos, não fumadores, com maior tempo de seguimento e medicados com menor número de antidiabéticos apresentaram-se controlados. Classes socioeconómicas mais altas, famílias não-unitárias foram fatores associados ao mau controlo. Os dados informáticos disponíveis permitem conhecer o grau de preenchimento da ficha de diabético, mas não o que o utente precisa para um bom controlo

Palavras-chave: diabetes tipo 2; medicina geral e familiar; controlo; registos

> INTRODUCTION

Worldwide, diabetes is an increasingly prevalent disease according to the International Diabetes Federation with a prevalence of 9.3% between 20 and 79 years of age. [1] Portugal faces a similar situation - data from the 2009 Prevadiab Study [2] estimates a prevalence of 13,3%. Type 2 diabetes is more prevalent in males (15,9%) than in females (10,9%) and its prevalence increases with age, reaching more than 25% in those aged 60-79 years. [3]
It is a leading cause of blindness, chronic kidney disease, and lower-limb amputations [3] and one of the main causes of death by coronary heart disease and stroke. [3] Adequate treatment can reduce the incidence of such outcomes, and regular clinical monitoring is extremely important in the follow-up. [3] There are several important national and international statements on the implementation of adequate screening and treatment. [5-8]
The control of type 2 diabetes can be defined as Haemoglobin A1c (HbA1c) lower than 7%, even though lesser values can be chosen according to special circumstances such as age, multimorbidity, and patient accordance. [9] The Portuguese official health authority (DireçãoGeral da Saúde) defined control as values lower than 6.5%. [10] The Portuguese Registry for Primary Care, refers that only 55.4% of diabetes patients have an HbA1c lower than 8.0% [11]
There is a knowledge gap about diabetes' social determinants, being low income cited as a cause since studies show it is more adequately controlled in higher socio-economic classes, even with an 8% HbA1c cut-off. [11,12,13] This study aims to understand the dissociative characteristics between controlled (HbA1C < 7%) and uncontrolled type 2 diabetic patients in Portuguese Primary Care - our research has revealed a lack of bibliographic literature. We hypothesized that controlled type 2 diabetic patients would be: older females, non-smokers, living in larger than unitary families, with higher socioeconomic status and with higher education levels. Controlled patients would also have a lower body mass index and lower abdominal perimeter, a higher number of consultations for diabetes management in the last year, and longer diagnosis. According to the most recent guidelines, controlled patients would also present fewer micro and macrovascular complications and lower anti-diabetic medication load.

> METHODS

An observational, cross-sectional, size representative, randomized study was performed between April and June 2020 in seven Primary Health Care Units (PHCU) in central Portugal, after ethical consent was granted from "Comissão de Ética da ARS do Centro", an official body of the Portuguese National Health Service. General Practice doctors, working in PHCU of the Portuguese

National Health Service were invited to collect data in two regions with Medical schools (in Universities of Coimbra and Covilhã). Each PHCU's informatic list of diabetic patients was collected, and the sample was calculated, in a sample calculator, with a 5% margin error and a 90% confidence level. The patients list was ordered alphabetically and patients of each PHCU were then randomly selected in a list generator randomizer. If there was no data available on a patient, the one immediately above would be studied and if no data was present again, the patient next on the list was studied. If both had no necessary data, then the previous random order was followed.

The sample size was calculated for a total of 8767 diabetic patients and cases were proportionally distributed for all units with a minimum number of 31 cases to be studied per PHCU. Data was collected by doctors of each PHCU with access to informatic registries and consisted of: age (afterwards defined as age group below vs at least 65 years), gender, type of family (unitary, mono-parental, enlarged, reconstructed, nuclear), number of persons in the household, Graffar Index Class, economic insufficiency [according to Portuguese rules for co-payment of consultations (yes or no)], educational level (more or less than the Portuguese 4th grade), with a Social Economic Deprivation Index (SEDI) being calculated as a sum of points of these three observations, body mass index, periumbilical perimeter, smoking status, number of appointments in the diabetes program in the last year, year of diabetes diagnosis, years since when diabetes e.registrations are available in the individual chart, mean of the last two HbA1c measurements if obtained until February 29th 2020, number of antidiabetic drugs and their classes (Insulin, biguanides, sulfonylureas, acarbose, iDPP4, iSGLT2, aGLP1 and others), presence of macrovascular complications (stroke, coronary disease, hearth failure and peripheral artery disease), microvascular complications (amputation, retinopathy, nephropathy and neuropathy) and diabetogenic drugs like thiazides, antidepressants and long-term corticosteroid therapy.

Diabetes control was consensually defined as a mean of the last two measurements of HbA1c < 7%.

All these data were present in the "SClinico", the Portuguese official e.clinical registrations program of each patient's file and his/her family's file. The "Diabetic program file" registry is conducted by the doctor and by the nurse. Prescription is performed on the Portuguese electronic prescription module, which has a history of prescribed medicines.

Data from 2019 till February the 29th 2020 was collected, when data collection had to stop due to the COVID-19 pandemic. Data statistics was performed in July 2020.

No knowledge was obtained about the degree of compliance with the program "SClinico".

> STATISTICAL METHODS

Association between controlled and uncontrolled diabetes mellitus patients in qualitative variables was studied using Fisher's exact test, a comparison between quantitative of non-normal distribution and ordinal data was made using a Mann-Whitney U test, and a comparison between quantitative normal distribution data was made using a Student's t-test. Variables that presented statistical significance at a 5% significance level were inserted into a logistic regression model to evaluate which ones could predict or classify controlled (and uncontrolled) patients. Analysis was conducted in IBM SPSS Statistics, version 24.

> RESULTS

The sample size (n = 236) was calculated for a total of 8767 diabetic patients. The studied sample had a minimum of 31 cases and a maximum of 85, a mean of 47, per PHCU.

For the studied variables, Table I shows the percentage of filling-in. Graffar Index Class and macro and microvascular complications had less than 50% of the observations filled in and the antidiabetic drug classes were

Table I - Variables percentage of filling in.

Variable	n	%
Age group	324	98.2
Gender	324	98.2
Type of family	297	90,0
Graffar index class	**93**	**28.2**
Socioeconomic level	305	92.4
Education level	324	98.2
Socioeconomic deprivation index	296	89.7
Smoking habits	323	97.9
Antidiabetic drug classes	**178**	**53.9**
Macrovascular complications	**84**	**25.5**
Microvascular complications	**57**	**17.3**
Diabetogenic drugs	104	31.5

present in 53.9% of the records. 62.3% of patients were controlled.

Table II shows the compared results between controlled and uncontrolled patients for all the non-numeric studied variables.

Significant differences were found:

– For age group, with older patients exhibiting higher control rates;
– For smoking habits, with smokers being significantly less controlled;
– For classes of antidiabetic drugs with more sulfonylureas, iDPP4, iSGLT2, and aGLP1 in uncontrolled patients.

The results for gender, type of family, socioeconomic level, education level, Graffar Index, SEDI Index and complications didn't show statistically significant differences.

Table III shows the results of the numeric variables according to the definition of type 2 diabetes control. Age, year of diabetes diagnosis, year of first clinical e-registries for follow-up, and number of antidiabetic drugs were significantly different. Controlled patients were older, more recently diagnosed, followed–up for more years, and treated with fewer medicines.

According to the results in Tables II and III, two models for understanding the reasons for differences in control were defined:

– The first one considering age (in years), smoking status, and number of antidiabetic drugs;
– The second one replacing age in years for the dummy variable age of 65.

The model that considers age groups presents both higher R2 (0.190 *versus* 0.188) and higher adjustment (Hosmer and Lemeshow p = 0.854 *vs.* p = 0.404).

Table II - Nominal and ordinal studied variables according to controlled or uncontrolled type 2 diabetes.

Variable	Group variable	Control	No control	Total	*p*
Age group	<65 years	49 (24.1)	54 (43.9)	103 (31,6)	<0.001 (*)
	≥ 65 years	154 (75.9)	69 (56.1)	223 (68.4)	
	Total	203	123	326	
Gender	Male	101 (49.8)	69 (56.1)	170 (52.1)	0.159 (*)
	Female	102 (50.2)	54 (43.9)	156 (48.0)	
	Total	203	123	326	
Type of Family	Unitary	56 (30.6)	26 (22.4)	82 (27,4)	0.159 (**)
	Monoparental	13 (7.1)	10 (8.6)	23 (7,7)	
	Enlarged	12 (6.6)	6 (5.2)	18 (6,0)	
	Reconstructed	0 (0)	1 (0.9)	1 (0,3)	
	Nuclear	102 (55.7)	73 (62.9)	175 (58.5)	
	Total	183	116	299	
Socio-economic level	No economic insufficiency	137 (60.9)	54 (67.5)	191 (62.6)	0.274 (*)
	With economic insufficiency	75 (38.7)	39(34.5)	114 (37.1)	
	Total	194	113	307	
Level of studies	≥ 4 years	85 (41,9)	46 (37.4)	131 (41.2)	0.248 (*)
	< 4 years	118 (58,1)	77 (62.6)	195 (59,8)	
	Total	234	90	324	
Graffar class	Median high	8 (13.3)	5 (15.2)	13 (14,0)	0.074 (**)
	Median	23 (38.3)	20 (60.6)	43 (46,2)	
	Median low	20 (33.3)	5 (15.2)	25 (26,9)	
	Low	9 (15.0)	3 (9.1)	12 (12,9)	
	Total	60	33	93	

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(continuation)

Variable	Group variable	Control	No control	Total	*p*
SEDI quartile	Low	30 (16.8)	15 (12.4)	45 (15.0)	0.905 (**)
	Median low	68 (38.0)	55 (40.5)	123 (41.0)	
	Median high	66 (36.9)	39 (32.2)	105 (30.5)	
	High	15 (8.4)	12 (9.9)	27 (9.9)	
	Total	179	121	300	
Smoking habbits	Yes	10 (5.0)	20 (16.3)	30 (9,2)	0.001 (*)
	No	192 (95.0)	103 (83.7)	295 (90.8)	
	Total	202	123	325	
Type of antidiabetic drug	Insulin	8 (4.6)	17 (11.8)	25 (7,4)	<0.001 (**)
	Biguanide	117 (60.3)	55 (58.2)	172 (51.0)	
	Sulfonylurea	9 (4.6)	10 (6.9)	19 (5.6)	
	iDPP4	38 (19.6)	40 (27.8)	78 (23.1)	
	iSGLT2	4(2.1)	4 (2.8)	8(2,4)	
	aGLP1	12 (6.2)	14 (9.7)	26 (7.7)	
	Other	5 (2.6)	4 (2,8)	9 (2.7)	
Macrovascular complications	Coronary disease	28 (44.4)	10 (34.5)	38 (41.3)	0.380 (**)
	Cardiac insuficiency	22 (34.4)	14 (48.5)	36 (39.1)	
	Stroke	13 (20.6)	2 (6.9)	15 (16.3)	
	Peripheral artery disease	0 (0)	3 (10,0)	3 (3.3)	
	Total	63	29	92	
Microvascular Complications	Amputation	5 (7,1)	4 (21.1)	9 (10.1)	0.376 (**)
	Nefropathy	35 (50,0)	7 (36.8)	42 (47.2)	
	Neuropathy	12 (17,1)	4 (21.1)	16 (18.0)	
	Retinopathy	18 (25,7)	4 (21.1)	5 (5.6)	
	Total	70	19	89	
Diabetogenic medicines	Yes	67 (33.5)	39 (32.2)	106 (33.0)	0.457 (*)
	No	133 (66.5)	82 (67.8)	215 (67.0)	
	Total	200	82	321	
Kind of diabetogenic medicines	Anti-depressors	10 (86,7)	5 (13,1)	15 (14.3)	0.972 (**)
	Tiazides	54 (80.6)	32 (84.2)	86 (81.9)	
	Chronic corticotherapy	3 (4.5)	1 (2.6)	4 (3.8)	
	Total	67	38	105	

Note 1: (*)χ^2; (**)Mann-Whitney U; Note 2: Control according to the mean of the last two HbA1c until february 2020; cut-off of 6,99%. Note 1: (*)χ^2; (**)Mann-Whitney U; Note 2: Control - mean of the last two HbA1c until February 2020 <7%; cut-off of 6,99%.; no-control: mean of the last two HbA1c until February 2020 ≥7%;- Note 3: SEDI: Socioeconomic Deprivation Index.

Table III - Numerical variables according to control or no control of type 2 diabetes.

Variable	Control according to ADA (<7%)	n	Mean	±sd	*p*
Age in years	Control	203	71.14	10.44	<0.001 (*)
	No control	123	66.40	11.92	
Number of people in the household	Control	199	2.21	1.23	0.158 (*)
	No control	122	2.40	1.13	
Body Mass Index	Control	203	29.99	7.0	0.423 (*)
	No control	122	29.47	4.7	
Periumbilical perimeter	Control	196	103.49	12.41	0.964 (**)
	No control	119	103.33	11.38	
Number of consultations for diabetes in the last 12 months until february 2020	Control	203	2.83	1,01	0.112 (*)
	No control	123	3.02	1.12	
Year of Type 2 diabetes diagnosis	Control	187	2011	6.80	0.002 (*)
	No control	119	2008	9.37	
Year of beginning of follow-up	Control	182	2012	6.11	0.004 (*)
	No control	110	2014	4.97	
Mean last two HbA1c until February 2020	Control	203	6.34	0.36	<0.001 (*)
	No control	123	7.86	0.99	
Number of antidiabetic drugs	Control	184	1.57	0.73	<0.001 (*)
	No control	123	2.14	0.89	

Note: (*) t de student; (**) Man-Whitney U

Older patients (65 or more) are more likely to be controlled (OR = 2.56; p < 0.001; IC95%: 1.51 to 4.32). The likelihood of being a controlled patient reduces about 56% for each antidiabetic medicine that is taken (OR = 0.44; p < 0.001; IC95%: 0.32 to 0.59). Smoking habits are associated but do not predict the chance of being a controlled diabetic patient.

> DISCUSSION

This paper constitutes an innovation since there weren't any published papers on the dissociative characteristics between controlled and uncontrolled type 2 diabetic patients using e.registries in a specific program used in Portuguese Primary Care facilities.

In a size representative sample, gender distribution was similar to the one known for Portugal; [3] 69.1% of patients older than 65 had type 2 diabetes control and 47.6% of the patients younger than 65 had diabetes control.

Reasons for such findings need to be studied but we can speculate about fear of disease and death, as well as enablement, getting to know more about it, since the number of consultations and the education level was not different between controlled and non–controlled patients. Inline and significantly different, for those uncontrolled, more recent diagnoses and beginning of follow-up were found. [14-16]

We had hypothesized that females would have more significant control. It is a fact that women have more regular medical appointments. However, no significant result was found. Over the last year, men had a mean of 3.0 ± 1.1 and women 2.8 ± 1.0 consultations in the diabetes program (p = 0.231). Diabetes-related problems and discussions could be undertaken in other medical appointments, probably increasing patient enablement and empowerment. Although not significantly, the number of consultations was higher in those uncontrolled (3.02 ± 1,12 *vs.* 2.83 ± 1.0 [p = 0. 11]).

Living with company, implying possible support for better feeding and more physical exercise, was thought by the authors as a positive factor for control. We found

that among those who were living in unitary families, 68.3% were controlled and that 65.0% of those accompanied were controlled (p=0,159), the crude numbers being 2.2 ± 1.2 and 2.4 ± 1.1 for controlled and uncontrolled diabetics. So the type of family was not different. A significant difference was found in those living in unitary families grading in a higher SEDI percentile distribution than those living in families of more than one ($p < 0.001$). The Graffar Index didn't reveal similar results. The understanding of family socioeconomics should be of medical interest for better diabetes control, as uncontrolled type 2 diabetes appear to be more frequent in those in a median or upper-median socioeconomic family. [12,13]

A prevalence of 33.3% for control was found in smokers and a prevalence of 65.1% was found in non-smokers ($p = 0.001$). We have not studied the intensity (package units/year) nor have we studied present smoking habits as it was not the aim of our study. Smoking habits and diabetes are considered strong risk factors for the worst macrovascular outcomes. [5,7,8]

Except for biguanides, uncontrolled diabetic patients had significantly more different drugs prescribed and more antidiabetic medicines prescribed per person. Uncontrolled also had more prescriptions of iDPP4, iSGLT2, and aGLP1. The most recent treatment recommendations may still to be put in place. [9] Still, these numbers match with the official norms of the Portuguese health authority, a Governmental entity linked to the Ministry of Health. [17] Even though uncontrolled diabetic patients receive more medication, it remains to be understood why, even being on a greater number of medications and being on more classes of antidiabetic drugs, those patients are not controlled. That could be due to a delay in the pharmacologic prescription of new antidiabetic classes of medicines, a form of inertia, or to other causes like under-enablement or under-empowerment or socio-cultural determinants. [12,13,18]

Just as in a 2006 Portuguese study, [19] macrovascular complications are probably in default, even though present in 27,9% of this sample. Although not significantly, coronary disease and stroke were more frequent in controlled patients, with heart failure being the most prevalent situation in uncontrolled ones. These macrovascular outcomes may be related to Hypertension, which is commonly associated with type 2 diabetes. [20] What is still to be remarked is the low frequency of Peripheral Artery Disease, that in this study stands near the low interval of its estimated prevalence in Portugal (3% when compared to 10%). [21] Lack of medical inferior limb arterial pressure measurement, use of specific medications (e.g. medicines acting in the Renin-Angiotensin-Aldosterone system or calcium blockers), or absence of such disease is what must be studied to follow international recommendations. [7-9]

Microvascular Complications were not differently distributed between controlled and uncontrolled type 2 diabetic patients and were present in 27,3% of this sample. The more frequent complication classified was nephropathy, easily diagnosed by dipstick. For uncontrolled patients, more amputations were registered which is of concern and implies more precocious diagnostic, more intensive and indicated therapy. In fact, according to Organization for Economic Cooperation and Development, Portugal is one of the countries where amputations are more frequent. [22]

So far this is the first paper to study this reality the way it was performed. Another Portuguese study followed a different approach in 2006 focusing on the associated blood biochemical values. [16] In an old convenience sample it showed that 40.5% of patients had no record of microalbuminuria and 43.3% had no information about an ophthalmology appointment for retinal study. Diabetic complications were present in 38.7% of patients. The most frequent ones are cardiopathy (31%), nephropathy (29%), retinopathy (24%), and neuropathy (16%). So it seems that some very limited progress has been made since 2006 in the knowledge of such data. [16]

The time spent filling in registries in E. Registration programs, as well as time for analyzing the team's registered data wasn't taken into account, but pressure for scheduling more appointments and consequently reducing consultation time may influence the degree of filling information and actively searching for complications. E. Registration programs don't take into account data from the application of results of specific questionnaires. [14-16,23] In fact both doctors and nurses contribute to the data input process in Portugal. Taking care of a type 2 diabetes patient is indeed a health team effort to increase knowledge and ability to make the right decisions to allow control. Several questions arise: What does a diabetic patient gain from a medical appointment on type 2 diabetes? Should conversation be adapted to the information needs of a diabetic patient instead of the "usual" speech about eating better, exercising, and treatment compliance? Who can help him/her at home or in his/her surroundings? Is the put-in time to obtain this kind of knowledge worthwhile or should we only rely on medicines' efficacy? And in this case, should every diabetic patient be treated and followed up as if he or she was still in a clinical trial? What is the role of society to reduce unhealthy feeding

and exercise habits? What is the knowledge about type 2 Diabetes of those who suffer from it?

Even though the prevalence of type 2 diabetes control is 62.3%, intensive lifestyle interventions are important and should always be incentivized with an accurate sense of how they must be implemented. This is something our e.registries do not show. Results are promising when procedures are directed to the target's needs and no registries are available for issues like enablement, empowerment, and quality of life of type 2 diabetic patients. [14-16,23]

As a limitation for results, no knowledge was obtained about the degree of compliance with the e. Registrations by doctors and nurses. The studied data are used as indicators to evaluate doctors and PHCU performance. Other factors such as concomitant follow-up of the patients included in this study at a secondary care diabetes consultation or by a nutritionist were not considered. These results only show data from 2 specific regions from central Portugal and don't allow us to extrapolate conclusions to national results.

> CONCLUSION

62,3% of type 2 diabetic patients were controlled. Controlled diabetic patients were older, non-smokers, with longer follow-up, and medicated with fewer antidiabetic drugs. Higher socioeconomic levels and non-unitary families were factors associated with uncontrolled diabetes. Therapy inertia was not discovered, uncontrolled diabetic patients receiving more medicines of more different classes, although time-frame medication is unknown.

More studies must be done on the social and knowledge characteristics of controlled and not controlled type 2 diabetic patients to achieve better control and so less micro and macrovascular complications and less mortality.

The study of e. Registered data allows the knowledge of doctors' data fulfilment and may allow the understanding of some reasons for control or lack of control, but don't take into account patients' needs, enablement, empowerment, quality of life of type 2 diabetic patients, and therapeutic compliance. <

Access to study data and author's individual contributions/*Acesso aos dados do estudo e contribuições individuais dos autores*

This work's data will be available upon request./*Os dados deste trabalho serão disponibilizados mediante solicitação.*

LMS: Concept, data analysis, writing of the manuscript, scientific revision and approval./*Conceção, análise dos dados, redação do manuscrito, revisão científica e aprovação.*

AA: Data gathering, scientific revision and approval./*Coleta de dados, revisão científica e aprovação.*

ASM, BL, MIQ, TC, TF, RSC, JP: Data gathering, text and scientific revision and approval./*Coleta de dados, revisão do texto e revisão científica e aprovação.*

MR: writing of the manuscript, scientific revision and approval./*Redação do manuscrito, revisão científica e aprovação.*

AT: writing of the manuscript, scientific revision and approval./*Redação do manuscrito, revisão científica e aprovação.*

BO: Data analysis, text and scientific revision and approval./*Análise dos dados, revisão do texto e revisão científica e aprovação.*

Conflicts of interests/*Conflitos de Interesses:*

The authors declare that they have no conflicts of interests./*Os autores declaram a ausência de conflitos de interesses.*

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