Cogitare Enfermagem

TECHNOLOGICA INNOVATION

CONSTRUCTION AND VALIDATION OF EDUCATIONAL TECHNOLOGY ON INSULIN THERAPY: METHODOLOGICAL STUDY

HIGHLIGHTS

1. The importance of technology in Primary Care.
2. Validation of the technology based on the needs of professionals.
3. Technology provides essential content for insulin therapy orientation.
4. Benefits in the care process and therapeutic communication.

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ABSTRACT

Objective: to build and validate educational technology on insulin therapy for educational practices of health professionals. **Method:** methodological study conducted in three stages: construction, between May and September 2019; and content validation and appearance validation, August 2020 to August 2021, in a Public University of Amapá, Brazil. Content validation and appearance validation were performed in single steps with 16 health professionals and with five professionals from other areas respectively. **Results:** The educational technology was named Serial Album on Insulin Therapy and was available in printed format. It presented a Content Validity Index of 0.91 and an Appearance Validity Index of 1.00. **Conclusion:** the technology was validated and can be used by primary care health professionals in health educational practices, with a view to promoting teaching-learning about the use of insulin, benefiting the process of care and communication in health care.

DESCRIPTORS: Diabetes Mellitus; Insulin; Educational Technology; Primary Health Care; Health Promotion.

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INTRODUCTION

Diabetes Mellitus-DM is a disease of growing incidence and prevalence and with chronic and devastating complications for the person, family, and society. It is a health problem of high magnitude due to its morbidity and mortality, considered a hidden epidemic and a global health emergency of the 21st century. In 2021, in the world, 537 million adults had DM; it is estimated that by 2045, the number of people with DM will be 783 million. In the Central and South American region, in 2021, there were 32.5 million, and by 2045, an estimated 48.9 million. Brazil ranks third for childhood diabetes and sixth for adult-onset diabetes in the world[1].

It is a progressive disease that requires treatment with continuous assessment of dosage and association of medications that are slightly insufficient to maintain glycemic control recommended as a goal for people with DM. It comprises pharmacological and non-pharmacological treatment whose objective is to control blood glucose levels, reduce complications, and improve quality of life[2-3]. In the pharmacological treatment, insulin is indicated for people with DM1 as well as for people with DM2[4] as a second- or third-line treatment option when the therapeutic targets are not met with the use of oral antidiabetic drugs and their associations, or as the first option when fasting glucose is higher than 300 mg/dL at monitoring or at diagnosis[2,4].

In the discussion about insulin therapy and the types of insulin (ultrarapid, rapid, intermediate, prolonged, premixes) and devices with distinct characteristics and indications (syringe/needle, pen, insulin pump)[3], the steps, attention, and care to be taken have been the subject of interest and concern by both health professionals and researchers in the field of teaching and care.

The reorientation of the care model in the context of the Unified Health System-SUS care networks emphasized primary care, the gateway and organizer of health services[5-6], which is responsible for monitoring people with DM, aiming to reduce complications, disabilities, and hospitalizations resulting from the disease[3]. The follow-up is essential, because insulin is one of the drugs classified by the Institute for Safe Medication Use Practices (ISMP) as potentially dangerous (MPP) or high surveillance (MAV). Therefore, when handled improperly, it presents catastrophic clinical outcomes of risk and therapeutic failure[3].

The availability of specific information for health professionals, family caregivers, and people with DM, to bridge the gap of inappropriate handling as well as the knowledge deficit related to the basic procedures for application, contributes greatly to reducing catastrophic outcomes related to insulin administration[3,7].

Considering that primary care health professionals manage and/or guide people with DM to use insulin, and that there are few guidelines and published studies available to help these professionals and their patients regarding the safe use of insulin therapy, the need was felt to qualify the professionals' guidance through a technology that could support them in their consultations, considering everything from the definition of insulin to the proper disposal of waste. The care involving insulin use is considered complex and requires committed and skilled health professionals to act in this context[8].

From this perspective, educational technologies are products that arise from materialized processes, either from experience or from research. As devices, they have been applied as mediators of educational practices, built, and validated for different target audiences: students; community; professionals[9]. Moreover, health educational practices supported by technologies enable people to live healthier life stages[10]. Thus, the objective of this study was to construct and validate an educational technology on insulin therapy for educational practices of health professionals.

METHOD

This is a methodological study with a quantitative approach and conducted in three stages: construction; content validation; and appearance validation. The study followed the theoretical-methodological reference model of Pasquali[11], consisting of theoretical, empirical, and analytical poles. However, the methodological procedures focused on the theoretical and analytical poles[11] were used.

Thus, the theoretical pole related to the construct of interest is intended for semantic analysis, which ensures intelligibility, and for analysis by judges, who evaluate the technology itself, highlighting the relevance of the items. The analytical pole, on the other hand, is directed to the application of the statistical treatment of data to estimate the validity and credibility of the technology produced[12].

The construction stage took place in the period from May to September 2019. The stages of content and appearance validation were developed online by Google Forms from August 2020 to August 2021, at the Federal University of Amapá - Unifap. The construction stage was subsidized by the integrative review method[13], guided by the following research question in the PICo method: what is there in the scientific and non-scientific literature about educational technologies for health professionals in primary care that is related to teaching people with DM about the use of insulin? Where: P: Population (health professionals); I: Interest (educational technologies related to insulin therapy); Co: Context (Primary Health Care - PHC).

The identification and selection of material occurred in the databases/libraries: Latin American and Caribbean Literature on Health Sciences (Lilacs); Medical Literature Analysis and Retrieval System Online (Medline); Nursing Database (Bdenf), in addition to the Google Scholar tool (academic), Brazilian Diabetes Society (SBD- in Portuguese) and Ministry of Health, as they are complementary sources for this type of study[14]. The search was guided by descriptors in health sciences (DECs) in combinations, namely: "type 1 diabetes mellitus", "insulin therapy", "type 2 diabetes mellitus", "insulin", "health technology". The period of the time space extended from the year 2010 to June 2019, and the languages of the selected studies were Portuguese, English, and Spanish. A total of 1,220 potentially relevant articles were identified for the review, of these, 88 were selected for reading in full, remaining 20 articles in the final sample. Twenty technical papers were identified, including manuals, folders, cards, and prototypes of a dummy for insulin application. However, none of them offered the set of essential topics that could subsidize health professionals in PHC for safe guidance on insulin use.

According to the mapped content and the synthesis, a search on Google Images was performed to illustrate the following topics: types of insulin; preparation of insulin dose; areas for insulin application; types of needles, syringes, and pens; adequacy of the area for application rotation; insulin dispensing; insulin storage; disposal of insulin syringes and pens; and complications of inappropriate insulin use. The Power Point 2019 program was used to create the layout with text and illustrative images, subsequently, the CANVA media for the layout with verso and obverse, containing the summary of the content.

The sample size was defined by convenience, respecting the recommendations of Pasquali[14], who recommends six to 20 evaluators. For the selection of judges, we adopted the recommended criteria, which were found in the literature related to validation studies in educational technologies[10-11].

A total of 21 content and appearance judges participated in the study. The selection, which was made by judgment through a search on the Lattes Curriculum Platform, followed the following inclusion criteria: doctoral and/or master's degrees in the health area, professional experience with DM (clinical, teaching, or research), and article published in an indexed journal around interest of the study. The judges who did not return the evaluation

instrument within 30 days were excluded[15-16].

A total of 39 content judges with whom contact was established by email were identified. Of these, 22 responded with the intention to participate. We found 15 appearance judges, 12 of whom responded with the intention to participate. However, only 16 content judges and five appearance judges participated by returning the instruments and suggestions.

The two groups of judges were sent, via e-mail, an invitation letter to participate in the validation process. The letter explained the characteristics and demands of the study as well as its objective. With those who responded and agreed to participate, the evaluation process was started through Google Docs. Initially, an e-mail was sent with the link to the Informed Consent Form, whose signature and confirmation allowed access to the evaluation instrument, and the PDF file with the prototype screens that simulated the usability of the "Insulin Therapy" Serial album.

The assessment instrument for the two groups of judges was composed of two parts: sociodemographic characteristics and personal data. For the content judges, the Content Validation Index (CVI) was applied, consisting of the evaluation of the domains (objectives, structure, organization, and relevance). For the appearance judges, the Health Educational Technology Appearance Validation Instrument-Ivates (in Portuguese) was applied, consisting of 12 evaluation items[17].

The Content Validation Index (CVI) was analyzed by: Item Content Validation Index (CVI -I) which determines adequacy/agreement of the judges for each item; Judge Content Validation Index (CVI -J) which determines proportion of items that obtained adequacy/agreement of each judge; and Scale Content Validation Index (CVI -E), which determines average of the proportions of items that obtained adequacy/agreement of each judge (average of CVI -J). An index of 0.80 or higher was considered desirable for content validation[15]. For IVATES, CVI was considered ≥0.78 excellent; between 0.60 and 0.77 good; and <0.59 as poor[16].

The analyses were carried out with MS Excel and IBM SPSS - version 26 for Windows[18]. Absolute and relative frequencies were used to characterize the judges' responses and the Binomial Test was used to verify agreement for content and appearance validation. A significance level of five percent (5%)[16] was considered.

The study was approved by the Research Ethics Committee of the Federal University of Amapá under Opinion No. 4,304,109.

RESULTS

The TE Serial album - insulin therapy was made in hard cover, with 33 pages, front and back, 297 x 420mm, printed in light blue and green colors, white background, 150g/m2 matte Couche paper, and bound with a 9mm spiral. The content was summarized in the following themes: concept of insulin therapy, types of insulin, distribution and storage, devices used for its application, insulin preparation, application sites, disposal of needles and syringes, and complications related to inappropriate use (Figure 1).

Figure 1- Serial album of insulin therapy: First Version and Final Version (Macapá, Amapá, Brazil, 2020).

Source: authors (2021).

Note: Original version of the picture available only in Portuguese language.

The content evaluation was carried out by 16 specialists residing in Brazil, female (100%), most of them with more than 15 years of professional experience (62.5%), six (37.5%) with 16 to 26 years of experience, and four (25.0%) with more than 26 years of experience. Regarding degrees, six (37.5%) had a Specialization, four (25.0%) a Master's, and six (37.5%) a PhD. Regarding scientific publications, 14 (87.5%) had publications around Diabetes Mellitus, six (37.5%) in Care and Educational Technology, and five (31.3%) in Content Validation.

Among the appearance judges, there were five specialists residing in Amapá, one (20%) female and four (80%) males. Regarding professional area, three (60%) are from Social Communication, one (20%) is a Pedagogue and Social Communicator, and one (20%) is from Advertising - Marketing.

Table 1 presents the Content Validity Index (CVI) of the content judges for each item of the questionnaire - CVI-I. Of the ten items related to the "Objectives", six were considered adequate by the 16 expert judges (CVI-I = 1.00). The remaining four items were considered, by seven judges, as partially adequate (CVI-I ≥ 0.88), values above the minimum defined to consider the items valid (CVI-I > 0.80).

As for the 10 items of the "Structure and Presentation" dimension, seven were considered, by the 16 judges, as adequate (CVI-I > 0.80). Three items presented CVI-I < 0.80. Item 2.5 - "The information is well structured in concordance and spelling" - was considered adequate by half of the experts, the rest considered it inadequate or partially adequate (CVI-I = 0.50, p = 0.007). The judges suggested that this item should be corrected for spelling, which was accepted. Item 2.6 - "The illustrations are adequate" - was rated partially adequate (CVI I = 0.75) by four judges, who recommended increasing the size of some figures and improving color and text layout. These suggestions were accepted, and the recommended adjustment was made for the album. And finally, item 2.9 - "The

number of pages is adequate" - was considered by four judges as partially adequate, but no changes were suggested. Therefore, the album was revised, resulting in a final version with 33 pages.

It is worth mentioning that, regarding items 2.6 and 2.9, with CVI-I = 0.75, the Binomial test indicated that this CVI -I is not significantly lower than 0.80 (p = 0.402), not interfering in the result of the validation (Table 1).

As for the four "Relevance" items, all were considered adequate by the judges (CVI -I = 1.00).

Table 1 - Frequencies of answers of the expert judges for each item of the CVI-I questionnaire. Macapá-AP, Brazil, 2022 (n = 16)

Items	*1.I %	*2.P.A %	*3.A %	*4.T.A %	CVI-I	P
OBJECTIVES						
1.1 It is consistent with the needs to care and teach during the consultation of the person with Diabetes Mellitus for the effective use of insulin.(1)	-	1 (6.7)	5 (33.3)	9 (60.0)	0.93	0.964
1.2 Is consistent with teaching the management and care of insulin therapy. (1)	-	-	7 (46.7)	8 (53.3)	1.00	1.000
1.3 Facilitates the health care professional's orientation to the person with DM on insulin therapy.	-	-	5 (31.3)	11(68.8)	1.00	1.000
1.4 Can be circulated in the scientific environment in health care.	-	2 (12.0)	9 (56.0)	5 (31.0)	0.88	0.859
1.5 Can be circulated in the scientific environment in the field of DM and care-education technology.	-	2 (12.0)	9 (56.0)	5 (31.0)	0.88	0.859
1.6 It enables the establishment of a common and standardized language among professionals.	-	-	10 (62.0)	6 (37.0)	1.00	1.000
1.7 It can be implemented in the daily clinical practice of the health professional.	-	-	7 (43.0)	9 (56.0)	1.00	1.000
1.8 Enables decision making by the professional.	-	2 (12.0)	7 (43.0)	7 (43.0)	0.88	0.859
1.9 Allows sharing of information about insulin therapy between health professional and the person with DM.	-	-	5 (31.0)	11 (68.0)	1.00	1.000
1.10 Meets the goal of helping the health professional about insulin therapy during the consultation of the person with DM on insulin.	-	-	5 (31.3)	11 (68.8)	1.00	1.000
STRUCTURE AND PRESENTATION						
2.1 The technology is appropriate for orienting and teaching about insulin therapy during the consultation of a person with DM.	-	-	10(62.5)	6 (37.5)	1.00	1.000
2.2 The information is presented clearly and objectively.	-	1 (6.3)	11(68.8)	4 (25.0)	0.94	0.972
2.3 The information presented is scientifically correct.	-	3(18.8)	5 (31.3)	8 (50.0)	0.81	0.648
2.4 The care-education technology presents a logical sequence.	-	3(18.8)	6 (37.5)	7 (43.8)	0.81	0.648
2.5 Information is well structured in concordance and spelling.	1 (6.3)	7(43.8)	5 (31.3)	3 (18.8)	0.50	0.007

2.6 The illustrations are adequate.	-	4(25.0)	8 (50.0)	4 (25.0)	0.75	0.402
2.7 The size of the illustrations is adequate.	-	1 (6.3)	8 (50.0)	7 (43.8)	0.94	0.972
2.8 The information on the cover page of the serialized album is clear and adequate.	-	2 (12.5)	7 (43.8)	7 (43.8)	0.88	0.859
2.9 The number of pages is adequate.	-	4 (25.0)	7 (43.8)	5 (31.3)	0.75	0.402
2.10 Is the care-educational technology easy to read and understand?	-	1 (6.3)	5 (31.3)	10 (62.5)	0.94	0.972
RELEVANCE						
3.1 The care-education technology is relevant and supports health professionals on insulin therapy.	-	-	4 (25.0)	12 (75.0)	1.00	1.000
3.2 The care-education technology is relevant to the care of the person with DM about insulin therapy.	-	-	2 (12.5)	14 (87.5)	1.00	1.000
3.3 The care-education technology is relevant to health professionals' clinical practice.	-	-	3 (18.8)	13 (81.3)	1.00	1.000
3.4 The care-education technology contains significant items to support professionals in teaching insulin therapy to the person with DM.	-	-	5 (31.3)	11 (68.8)	1.00	1.000

Source: authors (2021).
1 n= 15 - there were two "Not applicable" answers; CVI-I - proportion of items that obtained agreement from each judge; p - p-value from Binomial Test. *I- Inadequate; *P.A- Partially Adequate; *A- Adequate; *T.A- Totally Adequate.

Table 2 shows the percentages of items considered adequate by each judge (CVI -J) and the Scale Content Validation Index (CVI-E). Of the 16 experts, 12 considered more than 80% of the items adequate (CVI -J > 0.80), and four considered all items adequate (CVI -J = 1.00). Four experts presented ratings with CVI -J lower than 0.80 (between 0.73 and 0.79), but in this case, the Binomial test indicated that these CVI-J values are not significantly lower than 0.80 (p > 0.05). The Scale Content Validation Index (CVI -E = 0.91) obtained a value higher than the minimum acceptable (0.80). The content was validated regarding objectives; structure/presentation; and relevance.

Table 2- Percentages of items considered adequate by each specialist (CVI-J) and of the scale (CVI-E). Macapá, Amapá, Brazil, 2022. (n = 16)

Specialists	Total of items evaluated	No. of adequate items (answers 3 or 4)	CVI-J (% of adequate items)	P
1	24	23	0.96	0.995
2	24	23	0.96	0.995
3	24	18	0.75	0.344
4	24	24	1.00	1.000
5	24	23	0.96	0.995
6	24	24	1.00	1.000
7	24	22	0.92	0.967
8	24	23	0.96	0.995
9	24	19	0.79	0.540

10	24	23	0.96	0.995
11	24	24	1.00	1.000
12	24	20	0.83	0.736
13	22	16	0.73	0.267
14	24	24	1.00	1.000
15	24	19	0.79	0.540
16	24	23	0.96	0.995
		CVI-E	0.91	

Source: authors (2021).

CVI-J - proportion of items that obtained agreement from each judge; CVI-E - average of CVI-J; p - Binomial Test value.

Table 3 presents the Content Validity Index (CVI) of the five appearance judges regarding: drawing style; family setting; and procedural messages with album pictures for each questionnaire item - CVI-I. The 12 items related to the three dimensions were considered adequate by the judges (CVI-I = 1.00), obtaining validation throughout.

Table 3 - Distribution of the items of the Instrument for the validation of educational technology appearance in health-Ivates according to the percentage of agreement of the experts. Macapá, Amapá, Brazil, 2022, (n=5)

Items	*1.TD%	*2.D%	*3.PD%	*4.A%	*5.TA%	CVI-I	P
STYLE OF DESIGN							
1.1 Are the illustrations appropriate for the target audience?	-	-	-	2(40.0)	3(60.0)	1.00	1.000
1.2 Are the illustrations clear and easy to understand?	-	-	-	1(20.0)	4 (80.0)	1.00	1.000
1.3 Are the illustrations relevant to the target audience's understanding of the content?	-	-	-	3(60.0)	2 (40.0)	1.00	1.000
1.4 Are the colors of the illustrations appropriate for the type of material?	-	-	-	2(40.0)	3 (60.0)	1.00	1.000
1.5 Are the shapes of illustrations appropriate for the type of material?	-	-	-	2(40.0)	3 (60.0)	1.00	1.000
FAMILY SCENERY							
2.1 Do the illustrations portray the daily life of the intervention's target audience?	-	-	-	3(60.0)	2 (40.0)	1.00	1.000
PROCEDURAL MESSAGES WITH PICTURES							
3.1 Is the arrangement of the pictures in harmony with the text?	-	-	-	2(40.0)	3 (60.0)	1.00	1.000
3.2 Do the figures used elucidate the content of the educational material?	-	-	-	3(60.0)	2 (40.0)	1.00	1.000
3.3 Do the illustrations help expose the topic and are they in a logical sequence?	-	-	-	3(60.0)	2 (40.0)	1.00	1.000

3.4 Are the illustrations in an adequate quantity for the educational material?	-	-	-	4(80.0)	1 (20.0)	1.00	1.000
3.5 Are the illustrations in appropriate sizes for the educational material?	-	-	-	3(60.0)	2 (40.0)	1.00	1.000
3.6 Do the illustrations help in obtaining a change in the behavior and attitudes of the target audience?	-	-	-	2(40.0)	3 (60.0)	1.00	1.000

Source: authors (2021).
CVI - proportion of items that obtained agreement from each judge; p - p-value of the Binomial Test.
*T. D. Totally Disagree; * D. Disagree; *P.D Partially Disagree; *A. Agree; *T.A Totally Agree.

Table 4 illustrates the agreement per judge (CVI-J) and the Scale Content Validation Index (CVI-E). All five judges agreed with all 12 items (CVI-J = 1.00). The Scale Content Validation Index (CVI -E = 1.00) indicates that the appearance was validated for drawing style, familiar setting, and procedural messages with pictures.

Table 4- Percentages of items considered adequate by each judge (CVI-J) and CVI of the scale (CVI-E) (n=5) five. Macapá, Amapá, Brazil, 2022

Specialists	Total of items evaluated	No. of items with agreement (answers 4 or 5)	CVI-J (% of items with agreement)	p
1	12	12	1.00	1.000
2	12	12	1.00	1.000
3	12	12	1.00	1.000
4	12	12	1.00	1.000
5	12	12	1.00	1.000
		CVI-E	1.00	

Source: authors (2021).
CVI-J - proportion of items that obtained agreement from each participant; CVI-E - average of CVI-J; p - Binomial Test value.

DISCUSSION

This study built and validated a serialized album on insulin therapy. It is noteworthy that printed educational technologies such as serial albums can promote user awareness, encourage self-care, and consequently improve the quality of clinical care[19].

Research carried out in PHC with caregivers of DM elderly individuals under insulin therapy to identify the knowledge of these caregivers found a deficit in the insulin preparation and application technique[20]. Another study with people with DM being followed-up in the PHC, to analyze the steps of insulin therapy, found that most of them did not perform the steps properly[3]. These data reflect the experience of part of the DM population in PHC care conditions. However, people with DM, at all levels of health care, have guidance deficits or lack of knowledge about insulin therapy[21]. Therefore, guidance during the consultation is a fundamental means of health promotion and prevention[22].

In this context, it is essential to teach all the steps about the use of insulin in the treatment of DM. Thus, the application of educational technologies enables the construction of knowledge, helping in daily decision making, and furthermore, when these technologies are built effectively and aimed at health promotion, they can change the reality of a population, and must be built in the context of the target audience[23].

The construction stage of the serialized album technology, according to the content mapped and synthesized from the review, supported the theoretical part, indicating the scarce scientific production on insulin therapy with specific topics, without addressing the necessary steps for the safe and effective use of insulin, which contributed to ensure the content to be presented in the album. This aspect is corroborated by other studies related to the production and validation of educational technologies[19,23].

The following technologies on insulin therapy were identified: therapeutic toy, insulin therapy booklet for children with type 1 DM, low-cost simulator, and educational manual for type 1 DM 2[24-27]. However, none of these ETs relates the whole process for the safe use of insulin therapy in PHC. The serialized album validated in this study bridges the identified gap and offers the illustrated content of pertinent guidelines for the safe use of insulin therapy.

The validation step of the album by expert judges of content and appearance sought the production of a quality technology that could support educational practices of health professionals for people with diabetes on insulin therapy. Thus, this study had the participation of judges from different places in Brazil, whose purpose was to obtain different evaluations about the album, because different knowledge becomes essential for the construction of educational strategies that meet the needs of health education[28]. The research also contributed to bring updated information, in addition to providing a view of the Brazilian regions related to the teaching and guidance of people with DM using insulin therapy. Considering the regional specificities, it was found that in the North region, the use of insulin pen in PHC is still scarce, thus, the importance of validating ETs with orientations in accordance with the reality of the various health scenarios is evidenced[29].

In general, the serialized album on insulin therapy was evaluated as adequate by the expert judges, evidencing it as an ET with validated content and appearance that meet the objectives for which it was developed. Only for the structure and presentation dimension in the content evaluation instrument there were suggestions for changes presented by the experts in three items regarding: spelling and grammar correction (item 2.5), size of three figures (item 2.6), and reduction in the number of pages (item 2.9). The suggestions were heeded. We emphasize the importance of the health ET meeting the identified need and being relevant to the context in which it was developed, being essential that the researcher inserts himself in the social context of the target audience, knowing their needs and particularities[30].

In the evaluation of the CVI-E, the two instruments used for content and appearance validation showed the consistency and reliability of the serialized album as an ET for health professionals to use in their PHC consultations. The characteristics indicated as most attractive by the judges were: easy-to-handle tool, low cost, clear visual communication and safe information on insulin therapy, dispensability of electrical resources and internet network, and it can be used in urban and rural centers.

As a limitation of this study, we point out the difficulty in receiving the return of the evaluation instrument by the judges.

CONCLUSION

The serialized album can be used by primary care health professionals in health educational practices to promote teaching and learning about the use of insulin, thus benefiting the process of care and communication between health professionals and people with DM.

The construction and validation of a serial album, based on the real needs of professionals who assist people with DM using insulin in the PHC network, contributes, in the medium term, to the promotion of individual care in the coordination of proper care regarding the use of insulin and, in the long term, to the improvement of metabolic control, reducing the risk of complications related to the disease and promoting quality of life.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Ribeiro ASR, Silva JG da, Santos KC, Pena LDS, Pena FP da S**; Drafting the work or revising it critically for important intellectual content - **Ribeiro ASR, Ferreira CRS, Pena JL da C, Pena FP da S**; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Ribeiro ASR, Pena FP da S**. All authors approved the final version of the text.

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