Esc Anna Nery 2021;25(1):e20200046

RESEARCH | PESQUISA

www.scielo.br/EAN

Telehealth in a reference center in Diabetes Mellitus: a cross-sectional analysis

Telessaúde em um centro de referência em Diabetes Mellitus: uma análise transversal

Telesalud en un centro de referencia en Diabetes Mellitus: un análisis transversal

Ana Carolina Schroder[1]
Ana Paula Vanz[2]
César Geremia[3]
Carolina Sturm Trindade[1]
Simone Travi Canabarro[1]

1. Universidade Federal de Ciências da Saúde de Porto Alegre. Porto Alegre, RS, Brasil.

2. Faculdades Integradas de Taquara. Taquara, RS, Brasil.

3. Hospital Nossa Senhora da Conceição. Porto Alegre, RS, Brasil.

Abstract

Objective: To analyze a telehealth tool of a reference center in Diabetes Mellitus from the caregivers' perspective. Method: A cross-sectional study, with a quantitative approach, developed at a reference center in Diabetes Mellitus, with caregivers of children and adolescents who used the *Hot-Line* and responded to the online questionnaire, from November 2018 to February 2019. Results: The sample consisted of 90 participants, 76 (84.4%) were female, and the highest kinship was the maternal 68 (75.6%). Regarding the reasons for the telephone callings, 31 (34.4%) refer to general guidelines, 41 (45.6%) to the insulin dose adjustment, 6 (6.7%) to the acute hypoglycemia, 6 (6.7%) acute hyperglycemia, 2 (2.2%) to the days of disease and 4 (4.4%) refer to the test results. The participants presented a high level of satisfaction with the use of the telephone line. Conclusion and implications for practice: The call center produces immediate benefits to patients, being effective in the management of the disease. It should be emphasized that the use of telehealth as a form of health promotion contributes to the prevention of health problems in a fast, satisfactory way and without the displacement of the patient and his family.

Keywords: Diabetes Mellitus; Telemedicine; Nursing; Child; Adolescent.

Resumo

Objetivo: Analisar uma ferramenta de telessaúde de um centro de referência em Diabetes Mellitus sob a ótica dos cuidadores. Método: Estudo transversal, com abordagem quantitativa, desenvolvido em um centro de referência em Diabetes Mellitus, com cuidadores de crianças e adolescentes que utilizaram a *Hot-Line* e responderam ao questionário online, no período de novembro de 2018 a fevereiro de 2019. Resultados: A amostra foi constituída de 90 participantes, sendo 76 (84,4%) do sexo feminino, tendo como o maior parentesco o materno 68 (75,6%). Quanto aos motivos das ligações, 31 (34,4%) referem-se às orientações gerais, 41 (45,6%) ao ajuste de dose de insulina, 6 (6,7%) à hipoglicemia aguda, 6 (6,7%) à hiperglicemia aguda, 2 (2,2%) aos dias de doença e 4 (4,4%) referem-se aos resultados de exames. Os participantes apresentaram um alto índice de satisfação com o uso da linha telefônica. Conclusão e implicações práticas: O teleatendimento produz benefícios imediatos aos pacientes, sendo resolutivo no manejo da doença. Cabe ressaltar que o uso da telessaúde como forma de promoção da saúde contribui para a prevenção de agravos de maneira rápida, satisfatória e sem o deslocamento do paciente e sua família.

Palavras-chave: Diabetes Mellitus; Telemedicina; Enfermagem; Criança; Adolescente.

Resumen

Objetivo: Analizar una herramienta de telesalud de un centro de referencia en Diabetes Mellitus desde la perspectiva de los cuidadores. Método: Estudio transversal, con un enfoque cuantitativo, desarrollado en un centro de referencia en Diabetes Mellitus, con cuidadores de niños y adolescentes que utilizaron la Hot-Line y respondieron al cuestionario en línea, de noviembre de 2018 a febrero de 2019. Resultados: La muestra estaba compuesta por 90 participantes, de los cuales 76 (84,4%) eran mujeres y 68 (75,6%) eran la madre. En cuanto a las razones de los enlaces, 31 (34,4%) se refieren a las directrices generales, 41 (45,6%) al ajuste de la dosis de insulina, 6 (6.7%) a la hipoglucemia aguda, 6 (6,7%) a la hiperglucemia aguda, 2 (2,2%) a los días de enfermedad y 4 (4,4%) se refieren a los resultados de las pruebas. Los participantes presentaron un alto nivel de satisfacción con el uso de la línea telefónica. Conclusión e implicaciones para la práctica: La teleasistencia produce beneficios inmediatos a los pacientes, y es resolutivo en el manejo de la enfermedad. Es importante destacar que el uso de la telesalud como forma de promoción de la salud contribuye a la prevención de agravios de manera rápida, satisfactoria y sin el desplazamiento del paciente y su familia.

Palabras clave: Diabetes Mellitus; Telemedicina; Enfermería; Niño; Adolescente.

Corresponding author:
Ana Carolina Schroder
E-mail: anaschroder97@gmail.com

Submitted on 03/13/2020.
Accepted on 07/07/2020.

DOI:https://doi.org/10.1590/2177-9465-EAN-2020-0046

INTRODUCTION

The number of individuals who have chronic conditions has increased over the years. One of the most important chronic diseases is Diabetes Mellitus (DM). DM is considered a heterogeneous group of metabolic disorders that presents hyperglycemia as a common symptom, as a consequence of defects in both the action and secretion of insulin in the body.[1] Because of its high prevalence and incidence worldwide, DM is configured as an epidemic. It is estimated that 451 million people worldwide have this pathology and that, if the trend persists, 693 million will have diabetes by 2045.[2] In Brazil, the rates of DM are also increasing, with the potential to become a serious public health problem. Considering the phases of childhood and adolescence, data suggest that there are approximately 88,300 cases of children and adolescents with type 1 diabetes mellitus (DM1), contributing to the country occupying the third position in global ranking on incidence and prevalence in the under-20 age group.[2]

DM1 is the form that most affects childhood, being characterized by the total destruction of beta cells in the pancreas, with autoimmune origin.[3] With respect to type 2 Diabetes Mellitus (DM2), although representing a lower amount, the number of children presenting this pathology is becoming increasingly common. This can be explained by high levels of childhood obesity, lack of physical activity, and lifestyle.[4]

In view of the continuous and uncomfortable changes for the child, resulting in a restriction in the quality of life and causing a direct impact on the relationship and coexistence with the family, the degree of complexity in the care provided by the multidisciplinary team is increased, requiring, in turn, different means of assisting the chronic condition. It is ideal that care be expanded and that new ways and technologies be found to contemplate the needs and particularities of pediatric patients during daily life, which fall upon the family.[5]

Faced with this reality, the recognition and appreciation of the use of technologies in health is increasing, since they make it possible to expand and improve the assistance to patients in health services. In this context, among the various types of technology available in telehealth, are the telephone lines, also called Hot-Line, which allow to provide information through communication between different subjects in order to monitor the health condition.[6,7]

Interventions through a Hot-Line can bring numerous advantages. Among them, the ease of access, no matter the geographical distance between the user and the specialized service, the significant reduction in the use of emergency services, the reduction in the length of stay in hospital, as well as the number of readmissions, since it is possible to approximate the assistance to the patient, with guidelines focused on the clinical condition at the time of the call.[8,9] All these benefits favor a greater control, when it comes to financial costs for the health system as a whole, since the health expenses for diabetic patients can reach three times more than for those without diabetes.[10]

Because it is an illness that brings about significant changes for the patient and his/her family, health education acquires a fundamental importance in the daily life of children and adolescents as a way of helping in self-care and facing challenges for the proper control of DM.[11]

The educational practices, considered one of the ways of acting through the use of telephone lines, represent a strategy of learning, support and independence, contributing to a reduction of complications and encouraging adherence to treatment. In this context, the participation of the multiprofessional team provides an involvement and differential for the adequate management of diabetes, being essential for the creation of links and to stimulate lifestyle changes, directly impacting the success and development related to treatment and disease.[12,13]

Thus, the present study aims to analyze a telehealth tool of a reference center in Diabetes Mellitus from the perspective of caregivers.

METHOD

This is a descriptive, cross-sectional study with a quantitative approach, carried out at a Reference Center in Diabetes Mellitus, located in a capital city in the south of the country. The site is a reference in Latin America in preventive counselling of complications, through treatment practices offering new technologies and health education for children and adolescents with diabetes. Patients are cared for by a multidisciplinary team composed of endocrinologists, nephrologists, pediatricians, ophthalmologists, gynecologists, psychiatrists, nurses, nutritionists, psychologists, odontologists, social workers and physical educator.

The population participating in the study consisted of caregivers responsible for the child and/or adolescent assisted in the *Hot-line* service. This telephone service provides guidance to patients and/or their caregivers to treat and solve diabetes crises without the need to leave home.

The inclusion criteria were: to be a caregiver of children and adolescents diagnosed with DM who used the telehealth tool *(Hot-Line)* during the research period. The exclusion criteria were: to be a participant without internet access to answer the questionnaire online and/or without a cellular phone number.

After attending, the participant was informed that he would receive a message via cell phone, containing the invitation with the explanations regarding the research project, the Free and Informed Consent Term and the link to direct him to the online questionnaire.

The online questionnaire, answered by the participant, determined the resolutiveness and satisfaction regarding the service offered through this service. The instrument consisted of three main axes: profile of the family member and of the child or adolescent, resolutiveness of assistance and satisfaction with the telephone line.

The first axis referred to the sociodemographic profile of the family member and the child or adolescent and included factors such as age, gender, family income, education and marital status. Axis 2 identified the reason for the call through the *Hot-Line* and, according to the reason, the research volunteer was led to the specific questions of their care. In axis 3, the questionnaire

addressed the evaluation of the degree of satisfaction with the care through this service.

The data analysis was performed by the Statistical Package for Social Science (SPSS) software, version 25.0, and the quantitative variables were evaluated in a descriptive way taking into account the simple frequency, mean (for variables with normal distribution) and standard deviation. The inferential statistics were made with the chi-square, t-test and Pearson correlation tests. Statically significant differences were considered when the p-value was below 0.05.

The study met all the ethical and scientific grounds relating to research involving human beings, recommended by Resolution No. 466 of the National Health Council, established on December 12, 2012.[14] The project was submitted for review and approved by the Ethics and Research Committee under the opinion number 2,828,424 on October 29, 2018.

RESULTS

During the data collection period, 316 records of Hot-Line attendance composed the initial study sample. However, of these, 90 caregivers and/or caregivers of children and adolescents answered the research instrument. The average age of the caregivers was 40.28 +8.71 years. The sociodemographic characteristics of the research participants are described in Table 1 below.

In addition to the information from the caregivers, data was also collected regarding the 90 children and adolescents who received care through the service's telephone line. The prevailing gender among the children was male (58.9%), with a mean age of 12.33 +6.40 years, 97.8% of the patients with DM1. Regarding the time of diagnosis, it can be observed that 28 (31.4%) are 5 years old or older. With regards to the origin, it was observed the predominance in the context of the Metropolitan Region of Porto Alegre (58.8%). However, because the service is a reference in the treatment of Diabetes in the southern region, there were phone calls from the border and interior of the state, and from the state of Santa Catarina.

The health professionals who answered most calls from the Hot-Line were physicians 69 (76.7%), followed by nurses 20 (22.2%) and 1 (1.1%) nutritionists. The reasons for the calls during the service are shown in Table 2.

For the Dose Adjustment reason, there were 41 responding caregivers. It is worth mentioning that the insulin dose was adjusted by orientation through telephone contact. Forty (97.6%) stated that the adjustment helped in glycemic control. In case of hypoglycemia, 25 (61.0%) decreased the dose, 5 (12.2%) increased the dose, and for 11 (26.8%) the dose remained the same. In case of hyperglycemia, 5 (12.2%) decreased the dose, 27 (65.9%) increased the dose, and for 9 (22.0%) the dose remained the same. After the adjustment, 28 (68.3%) of the patients did not need to call the reference service again.

As for Acute Hyperglycemia, 6 respondents answered the questionnaire. Of these, only 1 (16.7%) was missing from school and needed to consult another health service, being referred to the emergency and later hospitalized. As for Diabetic Ketoacidosis (DCA), 2 (33.3%) of the patients were treated for the clinical condition.

As for Acute Hypoglycemia, 6 participants answered the research. Of these, 4 (66.7%) presented new episodes of hypoglycemia, with numerical variation between 1 and 10 new episodes after connection. Two (33.3%) of the patients presented loss of consciousness and needed to consult another health service, 1 (16.7%) to the Specialized Center and 1 (16.7%) to the emergency. Only 1 (16.7%) had school absences. No patient needed hospitalization.

Regarding the reason Days of Disease, 2 patients answered the research. Two (100.0%) consulted another health service, and 1 (50.0%) required hospitalization. One patient (50.0%) needed

Table 1. Sociodemographic profile of the caregivers who answered the research, Porto Alegre - RS, 2019

Variables	N(%)
CAREGIVER/RESPONSIBLE	
Kinship	
Mother	68 (75.6)
Father	12 (13.3)
Others	10 (11.1)
Gender	
Female	76 (84.4)
Male	14 (15.6)
Family Income	
≥ 1 to < 2 MW*	39 (43.3)
≥ 2 to < 4 MW	13 (14.4)
≥ 4 to < 6 MW	10 (11.1)
Without own income	9 (10.0)
< 1 MW	8 (8.9)
≥ 6 MW	7 (7.8)
Do not inform	4 (4.4)
Education	
Completed high school level	39 (43.3)
Completed higher education	14 (15.6)
Uncompleted high school level	11 (12.2)
Completed elementary school	10 (11.1)
Uncompleted higher education	9 (10.0)
Uncompleted elementary school	7 (7.8)
Marital Status	
Married/Stable relationship	56 (62.2)
Single	24 (26.7)
Other	10 (11.1)

Source: Research data (2019). *MW = Minimum Wage

to call the reference service again, seeking new information. One patient (50.0%) presented severe hypoglycemia, and the two patients (100.0%) presented vomiting, abdominal pain and ketone breath in the evolution of the clinical picture.

Table 3 shows the degree of satisfaction of the caregivers of patients assisted through the *Hot-Line* available at the reference center. It can be observed that most of the research participants consider good/optimal the orientation received by telephone contact.

The t test between the caregivers' mean age and the degree of satisfaction evaluations did not present a statistically significant difference (p=0.914), showing a general result, in which the satisfaction evaluation was independent of the caregiver's age. The evaluation was independent of gender (p=0.202), when compared to the degree of satisfaction, using the chi-square test.

Table 2. Reasons for the call during care for caregivers participating in the survey, Porto Alegre - RS, 2019

Reason for the Call	N(%)
Dose Adjustment	41 (45.6)
General Orientations	31 (34.4)
Acute Hyperglycemia	6 (6.7)
Acute Hypoglycemia	6 (6.7)
Exam Results	4 (4.4)
Days of Disease	2 (2.2)

Source: Research Data (2019).

Table 3. Level of satisfaction regarding the call center available at the reference center in DM, Porto Alegre - RS, 2019

Degree of Satisfaction	N(%)
Orientation	
Good/Optimal	79 (87.8)
Regular/unsatisfactory	11 (12.2)
Utility	
Good/Optimal	80 (88.9)
Regular/Unsatisfactory	10 (11.1)
Assistance	
Good/Optimal	76 (84.4)
Regular/Unsatisfactory	14 (15.6)
Professional	
Good/Optimal	75 (83.3)
Regular/Unsatisfactory	15 (16.7)
Time	
Good/Optimal	74 (82.2)
Regular/Unsatisfactory	16 (17.8)

Source: Research data (2019).

When compared the kinship with the degree of satisfaction, there was no statistically significant difference (p=0.303).

There is a difference between education levels and satisfaction regarding orientation (p=0.032) and utility (p=0.046), confirmed by the chi-square test, showing that the caregivers with a more complete schooling showed a higher satisfaction regarding the orientation received and the utility of the *Hot-Line*.

The variables of characterization such as marital status, race, time of disease, frequency of calls, professional responsible for care and reason for the call, when compared with the degree of satisfaction, showed no significant difference (p>0.05).

DISCUSSION

In this study, it can be seen that the profile of the caregivers and/or caregivers who use the telephone line was mostly female 76 (84.4%), with the greatest kinship being maternal 68 (75.6%). This finding confirms that mothers are, most of the times, the ones who assume more responsibilities in the follow-up and participation in the care, mainly in face of the chronic disease in childhood.[15,16]

Among the pediatric patients with diabetes seen through the Hot-Line, the predominant sociodemographic profile was male adolescents, diagnosed with DM1 and, having as the time of diagnosis of the disease, between 5 years or more. Because the mean age of the patients is 12.33 years, the agreement with the same age group in another study is highlighted.[17] In this direction it is important that parents and caregivers know the treatment of children and adolescents, as well as to be aware of the symptoms and management in the DM.

Regarding the sociodemographic profile of children diagnosed with diabetes, there are differences in the literature regarding the gender of higher prevalence. Some studies corroborate the findings of this study, showing the predominance of the male gender.[11,18] However, there is another study in the state of Santa Catarina, which showed the predominance of the female gender.[19] And a retrospective study developed in a pediatric endocrinology outpatient clinic in São Paulo highlighted that the frequency of both genders was equal.[20]

DM1 is the most prevalent type in childhood and adolescence, presenting with a deficiency in insulin secretion due to partial or total destruction of pancreatic beta cells.[1] This study corroborates the findings of Kharroubi[1] and shows agreement with the statistics in 88 patients (97.8%).

As for the time of disease, it is clear that most children were diagnosed more than five years ago. This characteristic was the opposite when verified in another study, where the mean time of diagnosis was less than five years.[21] In the pediatric range, peaks of DM1 incidence occur. The first is known to occur between 4 and 6 years of age and is related to exposure to infectious agents, and the second from 10 to 14 years of age, which is related to puberty and to increased secretion of growth hormone, a hormone that antagonizes the action of insulin.[19]

Many are the care needed for diabetes control in children and adolescents, with the family being a crucial factor in managing

and adhering to treatment. From the perspective of child and adolescent care, the issue surrounding educational programs and proposals for the prevention of chronic diseases should be broad, encompassing boys and girls from an early age to adolescence. Living with the disease and the therapy derived from it in the case of DM requires a differentiated approach to cognitive and emotional resources that can make families capable of developing their skills to care for children.

Glycemic monitoring is the best way to prevent acute complications, especially hypoglycemia and chronic complications over time. For this to occur, it is necessary to incorporate knowledge about the signs and symptoms of hypoglycemia and hyperglycemia in pediatric patients, in addition to acting quickly, and accessible contact with the health care team is essential.[22]

The most prevalent reason for calling, of which 45.6% of caregivers acquired assistance through call center, was to adjust the insulin dose to adjust the glycemic control of children and adolescents. A systematic review discusses that the possibility of providing additional telehealth support could qualify diabetes self-care skills, minimizing complications, improving outcomes, and leading to a decrease in emergency and hospitalizations.[23]

The use of telemedicine has become an important alternative for health care, including care for diabetic patients, and has the potential to overcome barriers imposed by distance, time, and eventual expence.[24] The Brazilian Diabetes Society brings information that health services improve patient monitoring and treatment compliance by adopting the use of information technology, which consequently reduces visits to health units.[25]

The literature suggests that telehealth can improve the management of diabetes, impacting the quality of life and well-being of individuals. In a study of children and adolescents, it was observed that the group that used telemedicine showed an improvement in both blood glucose and glycated hemoglobin when compared to the group that did not use it.[26]

An important aspect of using telehealth tools is their ability to promote health education to pediatric patients and their families. The present study made it possible to identify that 34.4% of the links were specific for general orientations. Another fundamental aspect for disease control is education for the diabetic patient, delaying or preventing the emergence of complications and promoting quality of life.[27]

The multidisciplinary team must continually seek ways to share knowledge and information to promote qualification in diabetes management in the skills needed for self-care, encouraging patients to adopt new practices and behavior changes.[21] The Brazilian Diabetes Society points out that the main objectives of diabetes education are to reduce barriers among patients with DM, their families, communities, and healthcare professionals; build self-care capacity; improve clinical outcomes; prevent acute and chronic complications, and provide quality of life.[25]

It is important to emphasize that nursing plays a fundamental role in the process of health education, through a relationship of trust, bringing professionals together and stimulating the active participation of patients in the care plan. The importance of the level of understanding about the disease should be recognized, aiming to guarantee the understanding of the orientation received. This is intensified when considering telephone contact as a way to disseminate knowledge. Telephone follow-up allows access to information quickly, becoming a facilitating tool for caring.[6]

The *U.S. Center for Medicare and Medicaid Services* defines the term "Patient Satisfaction" as the perspective and vision of care received, which can be significant for comparing health care organizations.[28] Patient satisfaction is considered a crucial component of the quality of care that the patient receives and is directly connected with increased treatment compliance and clinical outcome.[29]

At the time of the call, 87.8% of the caregivers say that the orientation received was optimal/good. Eighty (88.9%) of the caregivers consider the usefulness of the Hot-Line as optimal/good. Similar data were found in a study that sought to examine the engagement and satisfaction with interactive response system calls for chronic disease management, where 88% of patients were "very satisfied" with this support and 100% reported that the guidance offered was useful.[30]

Resolution 2.227/2018 of the Federal Council of Medicine establishes the ethical norms for this type of care, being the most updated resolution of Telemedicine in Brazil. Among the presented, the teleconsultation stands out, a "remote medical consultation, mediated by technologies, with doctor and patient located in different geographic spaces", with previous establishment of a face-to-face relationship.[31] In the specialized center, because it is a health service that attends patients with diabetes, there is the periodicity of face-to-face consultations every 4 months, thus ensuring the legal aspect of the *Hot-Line*. Since the resolution establishes that, in places with specialized care in "chronic diseases, it is recommended face-to-face consultation at intervals not exceeding 120 days", so that telemedicine is available as a complement of care.[31]

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

It can be seen that there was a high level of satisfaction with the use of the telephone line, demonstrating its effective role in the daily life of families, with orientations provided for the clinical condition at the time of the call, assisting in self-care and adequate control of DM. Thus, it is recommended actions of continued education with the health team, aiming the qualification of the service through the *Hot-Line* and potentializing the care provided to the families.

Besides this aspect, it should be noted that the results obtained represent a specific fraction within the theme addressed, considering that sample size was a limiting factor of the research. Future works may be developed in order to confirm and expand the findings.

Finally, it is believed that the results of this research may stimulate reflections on the use of telehealth in services, with the aim of improving the quality of care for patients, contributing to the promotion of health and prevention of aggravation in children and adolescents with diabetes.

AUTHORS´ CONTRIBUTIONS

Study design. Data collection or production. Data analysis and interpretation of results. Writing and critical review of the manuscript. Approval of the final version of the article. Responsibility for all aspects of the content and integrity of the published article. Ana Carolina Schroder.

Data analysis and interpretation of results. Writing and critical review of the manuscript. Approval of the final version of the article. Responsibility for all aspects of the content and integrity of the published article. Ana Paula Vanz. Carolina Sturm Trindade

Study design. Interpretation of results. Writing and critical review of the manuscript. Approval of the final version of the article. Responsibility for all aspects of the content and integrity of the published article. César Geremia

Study design. Data analysis and interpretation of results. Writing and critical review of the manuscript. Approval of the final version of the article. Responsibility for all aspects of the content and integrity of the published article. Simone Travi Canabarro

ASSOCIATE EDITOR

Gerson Luiz Marinho

REFERENCES

1. Kharroubi AT, Darwish HM. Diabetes mellitus: the epidemic of the century. World J Diabetes. 2015 jun;6(6):850-67. http://dx.doi.org/10.4239/wjd.v6.i6.850. PMid:26131326.
2. International Diabetes Federation. IDF Diabetes Atlas. 8th ed. Brussels, Belgium: IDF; 2017 [citado 2018 dez 13]. Disponível em: https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/134-idf-diabetes-atlas-8th-edition.html
3. Prytula Greco-Soares J, Dalbosco Dell'Aglio D. Relações entre qualidade de vida e diabetes mellitus tipo 1 na adolescência. Contextos Clín. 2016 jul;9(2):156-67. http://dx.doi.org/10.4013/ctc.2016.92.02.
4. Simões H, Serra F, Duarte S. Diabetes Tipo 2 na infância e adolescência – novos doentes, novos desafios. Revista Portuguesa de Diabetes. [Internet]. 2015; [citado 2018 dez 13];10(2):90-7. Disponível em: http://www.revportdiabetes.com/wp-content/uploads/2017/11/RPD-Vol-10-nº-2-Junho-2015-Artigo-de-Revisão-págs-90-97.pdf
5. Barbosa D, Sousa F, Leite J. Scoring interventions in family relations regarding the care for the child with a chronic condition. Texto Contexto Enferm. 2015;24(1):87-95. http://dx.doi.org/10.1590/0104-07072015001820013.
6. Becker T, Teixeira C, Zanetti M. Nursing intervention in insulin administration: telephone follow-up. Acta Paul Enferm. 2012;25(spe 1):67-73. http://dx.doi.org/10.1590/S0103-21002012000800011.
7. Tuckson RV, Edmunds M, Hodgkins M. Telehealth. N Engl J Med. 2017;377(16):1585-92. http://dx.doi.org/10.1056/NEJMsr1503323. PMid:29045204.
8. Kirsch SD, Wilson L, Harkins M, Albin D, Del Beccaro M. Feasibility of using a pediatric call center as part of a quality improvement effort to prevent hospital readmission. J Pediatr Nurs. 2015 mar;30(2):333-7. http://dx.doi.org/10.1016/j.pedn.2014.08.005. PMid:25193689.
9. Snoswell C, Smith A, Scuffham P, Whitty J. Economic evaluation strategies in telehealth: obtaining a more holistic valuation of telehealth interventions. J Telemed Telecare. 2017;23(9):792-6. http://dx.doi.org/10.1177/1357633X16671407. PMid:27789615.
10. International Diabetes Federation. IDF Diabetes Atlas [Internet]. 7th ed. Brussels, Belgium: IDF; 2015 [citado 2018 dez 13]. Disponível em: https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/13-diabetes-atlas-seventh-edition.html
11. Pennafort V, Silva A, Queiroz M. The perception of nurses regarding educational practices for children with diabetes in hospital care. Rev Gaúch Enferm. 2014;35(3):130-136. https://doi.org/10.1590/1983-1447.2014.03.43313.
12. Souza L, Figueiredo W, Machado M. As práticas de educação em diabetes vivenciadas no sus: uma discussão da literatura com ênfase na atenção primária à saúde. Rev APS. 2017;3(20):423-33. https://doi.org/10.34019/1809-8363.2017.v20.15801.
13. Gabarra L, Crepaldi M. A comunicação médico - paciente pediátrico - família na perspectiva da criança. Psicol argum. 2011;29(65):209-18. http://doi.org/10.7213/rpa.v29i65.20335.
14. Resolução n. 466/2012 de 12 de dezembro de 2012 (BR). Trata de pesquisas em seres humanos e atualiza a resolução 196. Diário Oficial da União [periódico na internet], Brasília (DF), 12 dez 2012 [citado 2018 dez 13]. Disponível em: https://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf
15. Borsoi S, Scheidt I, Cordeiro G, Mascarenhas L. Análise da qualidade de vida em cuidadores de crianças e adolescentes com Diabetes tipo 1. Multitemas. 2018;23(55):25-39. http://dx.doi.org/10.20435/multi.v23i55.1743.
16. Piran P, Khademi Z, Tayari N, Mansouri N. Caregiving burden of children with chronic diseases. Electron Physician. 2017;9(9):5380-7. http://dx.doi.org/10.19082/5380. PMid:29038725.
17. Lopes CLS, Pinheiro PP, Barberena LS, Eckert GU. Diabetic ketoacidosis in a pediatric intensive care unit. J Pediatr (Rio J). 2017;93(2):179-84. http://dx.doi.org/10.1016/j.jped.2016.05.008. PMid:27770618.
18. Silva A, Apolonio M, Alcantara C, Queiroz M. Características socioculturais e clínicas de adolescentes com Diabetes Mellitus tipo 1. Cogitare Enferm. 2016;21(4):1-8. http://dx.doi.org/10.5380/ce.v21i4.45699.
19. Vargas D, Andrade B, Bork B. Perfil clínico e epidemiológico de crianças e adolescentes com Diabetes Mellitus 1 atendidos na atenção secundária em Blumenau-SC. ACM Arq Catarin Med. [Internet]. 2016; [citado 2018 dez 13];45(3):58-70. Disponível em: http://www.acm.org.br/acm/seer/index.php/arquivos/article/view/111
20. Maruichi M, Takamune D, Noronha R, Schechtman H, Belhaus M, Kochi C et al. Características de crianças e adolescentes portadores de Diabetes Mellitus tipo 1 ao diagnóstico. Comparação entre dois períodos com dez anos de diferença em serviço universitário. Arq Méd Hosp Fac Ciênc Med Santa Casa São Paulo [Internet]. 2012; [citado 2018 dez 13];57(2):55-8. Disponível em: http://arquivosmedicos.fcmsantacasasp.edu.br/index.php/AMSCSP/article/view/281/293
21. Moreira T, Bandeira S, Lopes S, Carvalho S, Negreiros F, Neves C. Difficulties concerning Diabetes Mellitus Type 1 in children and adolescents. Rev Rene. 2016;17(5):651-8. http://dx.doi.org/10.15253/2175-6783.2016000500010.
22. Okido A, Almeida A, Vieira M, Neves E, Mello D, Lima R. As demandas de cuidado das crianças com Diabetes Mellitus tipo 1. Esc Anna Nery [online]. 2017;21(2):e20170034. https://doi.org/10.5935/1414-8145.20170034.
23. Armstrong K, Moore MM. The impact of outpatient telehealth compared to standard care on emergency room visits and hospital admissions in pediatric diabetes patients: a systematic review protocol. JBI Database Syst Rev Implement Reports. 2018;16(1):63-70. http://dx.doi.org/10.11124/JBISRIR-2016-003328. PMid:29324558.
24. Giani E, Laffel L. Opportunities and challenges of telemedicine: observations from the wild west in pediatric type 1 diabetes. Diabetes Technol Ther. 2016;18(1):1-3. http://dx.doi.org/10.1089/dia.2015.0360. PMid:26756102.
25. Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes 2017-2018. São Paulo: Editora Clannad; 2017 [citado 2018 dez 13]. Disponível em: https://www.diabetes.org.br/profissionais/images/2017/diretrizes/diretrizes-sbd-2017-2018.pdf
26. Guljas R, Ahmed A, Chang K, Whitlock A. Impact of telemedicine in managing Type 1 diabetes among school-age children and adolescents: an integrative review. J Pediatr Nurs. 2014;29(3):198-204. http://dx.doi.org/10.1016/j.pedn.2013.10.013. PMid:24269308.
27. Barbosa SA, Camboim FEF. Diabetes mellitus: cuidados de enfermagem para controle e prevenção de complicações. Temas em

Saúde. [Internet]. 2016; [citado 2018 dez 13];16(3):404-417. [citado 2018 dez 13]. Disponível em: http://temasemsaude.com/wp-content/uploads/2016/09/16324.pdf

28. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: a systematic review and narrative analysis. BMJ Open. 2017;7(8):e016242. http://dx.doi.org/10.1136/bmjopen-2017-016242. PMid:28775188.
29. Serrano CI, Shah V, Abràmoff MD. Use of expectation disconfirmation theory to test patient satisfaction with asynchronous telemedicine for diabetic retinopathy detection. Int J Telemed Appl. 2018;2018:1-14. http://dx.doi.org/10.1155/2018/7015272. PMid:30405712.
30. Piette JD, Marinec N, Gallegos-Cabriales EC, Gutierrez-Valverde JM, Rodriguez-Saldaña J, Mendoz-Alevares M et al. Spanish-Speaking Patients' Engagement in Interactive Voice Response (IVR) chronic disease self-management support calls: analyses of data from three countries. J Telemed Telecare. 2013 fev;19(2):89-94. http://dx.doi.org/10.1177/1357633x13476234. PMid:23532005.
31. Resolução CFM n. 2.227/2018 (BR). Define e disciplina a telemedicina como forma de prestação de serviços médicos mediados por tecnologias. Diário Oficial da União [periódico na internet], Brasília (DF), 6 fev 2019: Seção 1: 58 [citado 2018 dez 13]. Disponível em: https://portal.cfm.org.br/images/PDF/resolucao222718.pdf