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INTEGRATIVE REVIEW OF THE LITERATURE

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REPERCUSSION OF TELEMONITORING AS A SELF-CARE STRATEGY FOR DIABETES MELLITUS PEOPLE

Repercussão do telemonitoramento como estratégia para o autocuidado às pessoas com diabetes mellitus

Repercusión de la telemonitoría como una estrategia de cuidado personal para personas diabetes mellitus

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ABSTRACT

Objective: to analyze the scientific productions about telemonitoring and its repercussions in the self-care follow-up of people with type 2 diabetes mellitus (DM2). **Method:** this is an integrative literature review, performed in the VHL (LILACS, BDENF, MEDLINE) and PUBMED databases from June to July 2018, with a five-year time frame. **Results:** the sample consists of 10 articles on the theme and, from thematic associations, was named in two categories: Repercussion of the telephone strategy for self-care and Telephone strategy: control and effectiveness. **Conclusion:** the use of telemonitoring in the monitoring of people with T2DM had good repercussions and served as support, health education and monitoring of blood glucose levels. Thus, there were improvements in health behavior and satisfaction with the service received and, thus, demonstrated efficacy for self-care.

DESCRIPTORS: Diabetes mellitus type2; Telephone; Self care; Chronic desease; Nursing care.

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RESUMO

Objetivo: analisar as produções científicas sobre o telemonitoramento e suas repercussões no acompanhamento do autocuidado de pessoas com Diabetes Mellitus tipo 2 (DM2). **Métodos:** trata-se de revisão integrativa da literatura, realizada nas bases de dados BVS (LILACS, BDENF, MEDLINE) e PUBMED nos meses de junho a julho de 2018, com recorte temporal de cinco anos. **Resultados**: a amostra é constituída de 10 artigos sobre a temática e, a partir de associações temáticas, foi nomeada em duas categorias: repercussão da estratégia telefônica para o autocuidado e estratégia telefônica: controle e eficácia. **Conclusão**: o uso do telemonitoramento no acompanhamento de pessoas com DM2 teve boa repercussão e serviu como apoio, educação em saúde e monitoramento dos níveis glicêmicos. Dessa forma, houve melhorias no comportamento de saúde e satisfação com o serviço recebido e, com isso, demonstrou eficácia para o autocuidado.

DESCRITORES: Diabetes mellitus tipo 2; Telefone; Autocuidado; Doença crônica; Cuidados de enfermagem.

RESUMEN

Objetivo: analizar las producciones científicas sobre telemonitorización y sus repercusiones en el seguimiento del cuidado personal de personas con diabetes mellitus tipo 2 (DM2). **Método:** esta es una revisión de literatura integradora, realizada en las bases de datos VHL (LILACS, BDENF, MEDLINE) y PUBMED de junio a julio de 2018, con un marco de tiempo de cinco años. **Resultados:** la muestra consta de 10 artículos sobre el tema y, de asociaciones temáticas, se nombró en dos categorías: repercusión de la estrategia telefónica para el autocuidado y Estrategia telefónica: control y efectividad. **Conclusión:** el uso de la telemonitorización en el monitoreo de personas con DM2 tuvo buenas repercusiones y sirvió como apoyo, educación para la salud y monitoreo de los niveles de glucosa en sangre. Por lo tanto, hubo mejoras en el comportamiento de salud y la satisfacción con el servicio recibido y, por lo tanto, demostró eficacia para el autocuidado.

DESCRIPTORES: Diabetes mellitus tipo2; Teléfone; Autocuidado; Enfermidad crónica; Atención de enfermería.

INTRODUCTION

Diabetes Mellitus (DM) is a more common and frequent universal public health problem and, because there is no cure, it is indicated as one of the first causes of hospitalization in Brazil, being responsible for 72% of deaths. It is worrying because it causes chronic, physical, psychic and emotional disorders in people, in their lives, in family, in society in general and at work. In 2015, the indexes reveal that approximately 415 million people had this disease in the world. However, if current trends persist, it is possible that the estimate will reach 642 million cases in 2040.[1-3]

The technological advance in the treatment and monitoring of people with Diabetes has brought many benefits for the management of care and knowledge of glycemic variations. Such evolution allows supporting these people in order to supervise them by means of a technology and accompany them in their treatment, thus contributing to improve glycemic rates and collaborate with the maintenance of quality of life.[1,4]

It can be observed in the literature that most of these strategies have been applied individually, in consultations, or collectively, in groups of people experiencing the same problem, presenting satisfactory results.[5]

Since 1970, the telephone has been used for screening, follow-up of patients with chronic diseases such as DM2 or for health counseling.[6]

The literature presents the use of new tools to continue self-care practices, such as the telephone, internet, cell phone messages and videoconferences. Some terms are used in the health field, expanding possibilities of orientation and continuity of health care. They are: telemonitoring, telehealth, telemedicine, teleferencing and telephone follow-up.[7]

In this way, these tools have been used as a vehicle for communication, information and innovative educational strategy. It is also a way to accompany and stimulate self-care in order to prevent complications from chronic diseases, making people take responsibility for their health and gain autonomy to stay healthy.[8]

Self-care is understood as an individual attitude that people should have towards themselves for their health. This procedure includes the correct use of medication, which can be the oral hypoglycemic or insulin, the adoption of a healthy diet, avoiding overweight and preventing obesity, reducing smoking and alcoholism until its eradication, foot care and also physical activity.[9]

To this end, it is important to consider and respect the particularities of each person, as well as their beliefs, knowledge and skills for self-care, leading them to reflect on their ways of living and legitimize them as subjects responsible for their health. Furthermore, it is imperative to understand the situations in which these individuals feel vulnerable due to possible complications, reflecting on their life purposes, in accordance with the most motivating and effective health actions and practices in their daily lives. All these actions represent an invitation to rethink health and self-care and not an imposition on the subjects.[5,9-10]

In this sense, this study is justified thanks to the advance of science, knowledge, communication and information technology through the evolution of telecommunications, bringing well-being and benefits to man in solving problems in various areas and extending to the service of health. The technology has been used all over the world and, in this case, it reduces the distance between people, contributing with the innovation of care and support to people with chronic health problems, especially those who live with Diabetes.

Faced with the need to think about this technology in order to help people with DM2, one wonders: How has telemonitoring been constituted in literature as a strategy for self-care?

As a result of the disorders caused by the chronicity of DM, the difficulty of monitoring self-care and small literature on the subject, the objective was to analyze the scientific productions on telemonitoring and its repercussions on the monitoring of self-care of people with DM2.

METHODS

It is an integrative review of the literature, with a description based on the Preferred Reporting Items for Systematic Reviews (PRISMA) guideline,[11] which makes it possible to identify, analyze, and synthesize knowledge on a given subject in order to point out gaps in the literature. In this way, it allows the deepening of the knowledge of the investigated subject and enhances it, contributing to the improvement of clinical practice.[12-13]

The following steps were taken to design the study: 1. Preparation of the research question; 2. Establishment of criteria for inclusion and exclusion of studies; 3. Selection of articles; 4. Analysis of the results found; 5. Discussion and interpretation of results and, finally, 6. Presentation of the review.[12]

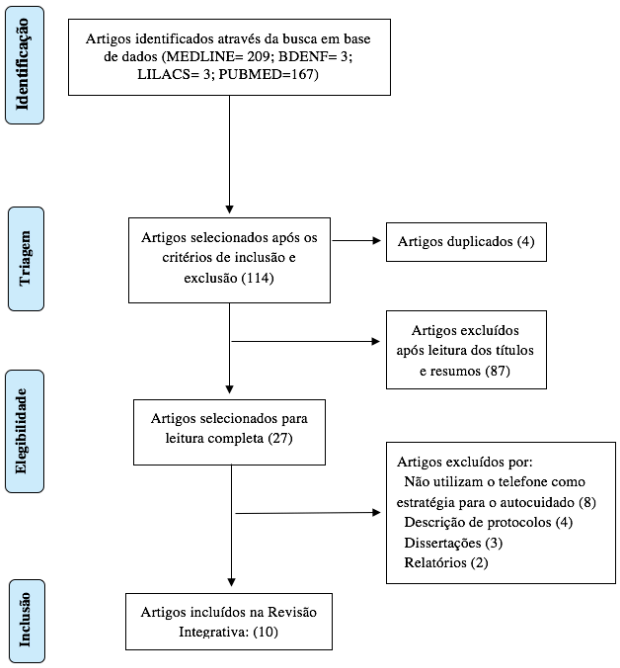
The search occurred in the months of June and July 2018, with access to the base systems of great relevance, through the Virtual Health Library (VHL), Latin American and Caribbean Literature in Health Sciences (LACLHC), Nursing Database (BDENF), Medical Literature Analysis and Retrieval System Online (MEDLINE) and the National Library of Medicine (PUBMED). The descriptors in Health Sciences (DeCS) and Medical Subjetc Headings (MeSH) were used: Type 2 Diabetes Mellitus, Telephone and Self Care, grouped by the Bolean operator and.

On the basis of the VHL, 215 articles were found, 209 studies at MEDLINE, three at BDENF and three at LILACS. In PUBMED, 167 studies were found. In order to refine the results obtained, the following inclusion criteria were applied: articles in English, Portuguese or Spanish and studies from the last five years (2013-2017). The cut-off point in time was performed with the purpose of analyzing more current and relevant productions for the subject under study. Excluded from the study were: publications that departed from the proposed theme, editorials, reflections, summaries of proceedings, dissertations, theses, monographs, books and reports.

The selection of studies was carried out independently by the main author of the article and reviewed by the other authors. An instrument, formulated for this research, was used to extract data with fields related to the identification of the study, such as author, name of the journal, date of publication, level of evidence, objective and result of the study.

Based on the results found and according to the inclusion and exclusion criteria of the studies, 80 articles were obtained in the VHL and 34 in Pubmed, totaling 114 articles. Of these, four were repeated in more than one database. The title and abstract of each article were exhaustively read in order to analyze the adequacy of the content to support this review, and 87 articles that did not meet the eligibility criteria were excluded. After this first screening, 27 of them were read in full, 17 of which were excluded for the reasons presented in Figure 1. Thus, 10 articles met the established selection criteria and were selected for the present comprehensive review.

Figure 1 - Selection flowchart of telemonitoring repercussions as a strategy for self-care for people with Diabetes Mellitus.



To classify the articles, the Evaluation System for Hierarchy of Evidence defined by Melnyk and Fineout-Overholt was chosen,[14] as shown in Table 1.

Table 1 – Melnyk and Fineout-Overholt classification of evidence levels.[14]

Level	Strength of Evidence
I	Evidence from a systematic review or meta-analysis of all randomised controlled trials or guidelines based on systematic reviews of randomised controlled trials
II	Evidence obtained from at least one well-designed randomized controlled clinical trial
III	Evidence from a well-designed controlled non-randomized study
IV	Evidence from a well-designed case-control study or cohort
V	Evidence from a systematic review of qualitative and descriptive studies
VI	Evidence of a single descriptive or qualitative study
VII	Evidence from the opinion of authorities and/or expert committee reports

RESULTS

According to the Medline analysis, nine articles were found, followed by one article on PubMed. As for the year of publication, from the period employed, there was alternation of publications over the years, with three articles in 2013, two in 2014, three in 2015 and two publications in 2016. Regarding the language of publication, the English language was predominant.

According to the origin of the countries, six studies were obtained from the United States, followed by one from Canada, one from Australia, one from Finland and one from China.

Most of the articles found used the intervention strategy to promote self-care by cell phone, through messages and/or questionnaires, calls associated with face-to-face interviews, use of communication software for real-time transmission (via bluetooth) of vital signs values, blood glucose and weight to health coaches.

Regarding the area of knowledge of the authors of the selected studies, it is observed that three of them are from the nursing area, five from medicine, one from psychology, one from pharmacy. In addition, one representative for physiotherapy, one for philosophy and one for epidemiology contributed to the studies. The importance of the multidisciplinary team in the context of care for the person with Diabetes is highlighted.

Regarding the analysis of the evidence levels of the studies, it was observed that seven articles presented level I evidence, only one level IV article and two level VI articles. There was a predominance of articles with a high level of evidence, through systematic review or meta-analysis, controlled randomized clinical trials. Two studies involving case-control or cohort and descriptive or qualitative study were identified.

In continuity, Table 2 is presented, with the synthesis of the selected articles, consisting of: title; authorship/year/periodic/level of evidence; objectives and results.

Title	Authors/Year/Periodic/ level of Evidence	Goals	Result(s)
How do mobile phone diabetes programs drive behavior change? Evidence from a mixed methods observational cohort study	• Nundy S, Mishra A, Hogan P, Lee SM, Solomon MC, Peek M. • 2014. • MEDLINE. Diabetes Educ • Level IV	To investigate the behavioural effects of a mobile phone-based intervention that combines automated text messaging with nurse support using an automated, interactive text messaging system.	The technology used was beneficial, versatile and low cost. Linked to nursing guidelines, it was able to promote behavior change and improve the quality of life of people with Diabetes Mellitus.
Do people with existing chronic conditions benefit from telephone coaching? A rapid review	• Dennis SM, Harris M, Llayd J, Davies GP, Faruqi N, Zwar N. • 2013. • MEDLINE. Austr Health Review • Website review. • Level I	Check the effectiveness of telephone coaching services for the management of patients with chronic diseases.	The results have shown improvements in health status, especially for vulnerable people who have difficulty accessing health services. In some literature found, there was no change in behavior.
Medical assistant coaching to support diabetes self-care among low-income racial/ethnic minority populations: randomized controlled trial	• Ruggiero L, Rilev BB, Hernandez R, Quinn LT, Gerber BS, Castillo A, et al. • 2014. • MEDLINE. West J Nurs Res. • Level I	Develop, implement and evaluate the effectiveness of a physician-tailored health care coaching intervention (MAC) in low-income racial/ethnic minority populations with type 2 diabetes.	All groups reported improvements in self-care over time, especially in the first semester, but no differences were found for glycated hemoglobin values.
Older adult self-efficacy study of mobile phone diabetes management.	• Quinn CC, Khokhar B, Weed K, Barr E, Gruber-Baldini AL. -2015. • Pubmed. Diabetes Technol Ther • Level I	To evaluate the self-efficacy of participants and the use of a mobile phone health intervention for an elderly group with DM2 over a four-week period.	The elderly have shown themselves to be empowered and confident with the use of technology to control diabetes. They have shown themselves to be easy to communicate with diabetes educators.
Telemonitoring and mobile phone-based health coaching among finnish diabetic and heart disease patients: randomize controlled trial	• Karhula T, Vuorinen AL, Rääpysjärvi K, Pakenen M, Ithonen P, Tepponen M, et l. • 2015. • Medline. J Med Internet Res • Level 1	Evaluate for 12 months the benefits of a mobile phone based health coaching program, obtaining support through a remote monitoring system, to improve the health-related quality of life and/or clinical measures of people with Type 2 Diabetes Mellitus and heart disease.	There was no improvement in the quality of life of the patients; however, there was a significant difference in the decrease of abdominal circumference, being a health benefit for patients with Type 2 Diabetes Mellitus.

Title	Authors/Year/Periodic/ level of Evidence	Goals	Result(s)
Developing a behavioral model for mobile phone-based diabetes interventions	• Nundy S, Dick JJ, Solomon MC, Peek ME. • 2013. • MEDLINE. Patient Educ Couns. • Level VI	Explore mechanisms through a diabetes program based on text messages and interviews. Check whether these strategies have changed the self-management of African-American patients.	The SMS reminders were of paramount importance for self-management practices, as well as promoting social support and modified health beliefs. All participants were assiduous in the interviews, which minimized the selection bias.
Health coaching reduces HbA1c in type 2 diabetic patients from a lower-socioeconomic status community: A randomized controlled trial.	• Wayne N; Perez DF; Kaplan DM; Ritvo P. • 2015. • PubMed. J Med Inter Res. • Level 1	To evaluate a health coaching intervention with and without the use of mobile phones to support health behavior change in patients with Type 2 Diabetes Mellitus.	With the intervention employed, there was a decrease in glycated hemoglonia (HbA1c). The phone proved to be an easily accessible tool to connect patients to healthcare professionals, monitoring their health behaviors and helping them self-manage the DM2.
Patterns of user engagement with mobile- and web-delivered self-care interventions for adults with T2DM: A review of the literature.	• Nelson LA, Coston TD, Cherrington AL, Osborn CY. • 2016. • MEDLINE. Curr Diab Rep. • Level VI	Describe user involvement with self-care interventions provided by the technology (mobile phones and internet).	Through the literature review, it can be seen that advanced age and low schooling made it difficult to get involved with this type of technology, impairing self-care practices. Users who viewed more than 10 messages had improved HbA1c rates and better glycemic control.
Development and feasibility of a text messaging and interactive voice response intervention for low-income, diverse adults with type 2 Diabetes Mellitus.	• Osborn CY, Mulvaney, SA • 2013. • MEDLINE. J Diabetes Sci Technol • Level I	Implement an intervention using a mobile phone with automated text messages, associated with interviews and phone calls to promote drug adherence to low-income patients diagnosed with DM2.	All participants reported that the interventions were beneficial. Although the context of the intervention was to promote drug adherence, this strategy could be used in other interventions to promote behavior change based on telephone use.
Management of type 2 diabetes in China: the Happy Life Club, a pragmatic cluster randomized controlled trial using health coaches	• Browning C, Chapman A, Yang H, Liu S, Zhang T, Enticott J et al. • 2016. • MEDLINE. BMJ Open. • Level I	To evaluate the effectiveness of a motivational intervention conducted by phone and face-to-face coaching, improved glycemic control, clinical, psychosocial and self-care outcomes of people with DM2 compared to usual care.	After 12 months of intervention, there were positive changes in HbA1c values in both groups (control and intervention). However, blood pressure and BMI were only within normal parameters in the intervention group. Greater psychic suffering observed in the control group.

It is noticeable that the use of telephony has been growing and has become part of people's lives, meeting different demands such as: medical and nursing consultations, postoperative follow-up, transmission of electrocardiogram and radiological images and training for health professionals. It is relevant to stress that telemonitoring can be used to control glycemic levels, improving knowledge and attitude for self-care, preventing chronic complications.[15-16]

It should be noted that the reading of the studies facilitated associations of content, allowing the categorization of topics as follows: Repercussion of telemonitoring for self-care and Telemonitoring: control and effectiveness.

DISCUSSION

Repercussion from telemonitoring to self-care

The use of telephone monitoring of people with DM2 is being used worldwide, successfully in different populations and with diverse strategies. International studies show the interventions carried out via mobile phone messages with applications, telephone calls and also through educational sites, but this one with little adhesion.[17-19]

Among the main results, the use of mobile phones to: motivate, alert, monitor and strengthen care, being able to promote behavior change and autonomy.[17,20-21] However, the results showed no change in behavior, but there were reports of satisfaction with the telephone service and significant improvements in the state of health.[22]

A randomized study, conducted in Canada, with patients living with poorly controlled DM2, showed that the intervention group received cellular monitoring support for a period of six months. It was shown that this group showed a rapid reduction in glucose hemoglobin levels, weight, and body measurements, in addition to feeling supported and motivated to self-care, with better disease management and empowerment to care for their health. However, with the cessation of this contact, self-care became deficient, increasing blood glucose levels. The control group received health guidance without the use of cell phones, with decreased glycated hemoglobin, but at lower rates and there was no reduction in weight and body measurements.[23]

Next, it is argued that the use of the telephone as a communication technology in health has been a facilitator, because it allows access to the services of health specialists quickly and easily, with a guarantee of continuity of care. A study[21] researched whether people who, for some reason, could not attend a consultation to simply answer questions or another specific demand, would benefit from telemonitoring, especially for the less advantaged population. This research showed that all participants reported useful interventions, increasing responsibility for their own health and feeling motivated to take care of themselves.

On the other hand, studies have shown that self-management of diabetes is an important factor in the treatment of this disease. Due to the high growth of chronic diseases, this type of technology is an alternative, presents improvement in the capacity of self-care and, consequently, improves the quality of life of these people.[20,24]

Randomization with DM2 patients and with heart disease, accompanied by this technology, improved blood pressure levels and cholesterol, but there are no reports of improvement in quality of life. These patients presented decrease in abdominal circumference and weight, especially in patients with DM2. It is perceived that people affected by DM2 had some heart disease due to complications of diabetes. Because they are chronic diseases, they need continuous monitoring.[18]

In this sense, the telephone service for people with chronic illnesses is a support that promotes knowledge about their illness. It can provide improvements in health status, especially for vulnerable people who have difficulties in accessing health services, because it is an easy, fast and low-cost technology.[24]

Another result pointed out that nurses play an important role in approaching these people, as lack of support can be a negative finding for improvements in health-related behaviors. In this case, it is important to establish bond and trust so that the guidelines are resolutive.[18,23]

However, it is necessary to develop strategies for each population, respecting its peculiarities and desires. The use of this technology may be able to provide guidance to people with diabetes, controlling the disease and avoiding the acute and chronic complications, which, once installed, impose high costs to the individual, family and health services.[8]

Telemonitoring: control and effectiveness

Telemonitoring has been used to improve health conditions and increase patient compliance for self-care. This measure is challenging; however, there are ways to facilitate care actions, as mentioned in the studies and by cell phone messages with reminders on the use of insulin, food, physical activity, water intake. These actions enable changes in self-care and increase health awareness and demystify beliefs about the disease.[16,18-19]

To evaluate the involvement of DM2 patients in technology via mobile phones and access to educational internet sites, it was demonstrated that this strategy brings positive results, capable of decreasing blood glucose and stimulating the autonomy of individuals in face of their choices, stimulating self-care practices and decision making.[25]

However, in elderly patients with low literacy, there was less involvement. Lower compliance was also perceived when accessing diabetes educational sites, due to a greater expenditure of time. The importance of observing the needs for each user involved in this strategy and adapting the intervention according to the difficulties encountered was highlighted. The performance of a professional with the intervention generates better results, because there is greater involvement and clarification about the strategy applied.[25]

It is a consensus among the authors that this type of intervention regularly generates self-awareness of health practices and improves the domains of self-care, such as: medication schedule, self-monitoring of blood glucose, foot care, physical activity and feeding practices.[19-20,26-27] It is assumed that this health technology will provide relevant subsidies for effective educational practice, enabling self-management control in people with diabetes.[8]

It is also evident that the telephone intervention led to a decrease in glycated hemoglobin (HbA1c) levels in association with health coaching, because through these professionals, patients felt welcomed and willing to express their feelings and difficulties for self-care practices.[22]

Furthermore, this technological support offers the person with DM2 knowledge about their disease, providing help, care, active listening, understanding and means to avoid complications caused by the unmanageability of the disease, in addition to assessing self-efficacy, understood in the individual's ability to perform a task with a specific objective. Therefore, the telephone can be a viable tool to guide these people in the use of self-care practices.[17]

CONCLUSION

The objective of this study was achieved, considering that telemonitoring, as communication and information technology, is a health education strategy used by different professionals. Telemonitoring aims to monitor, monitor and encourage people with DM2, as well as provide continuity of care, offering stimulus and guidance in health care.

The findings showed that telemonitoring was performed through software or cell phone messages that transmitted, in real time, the value of blood glucose and other vital signs, also associated with health trainers, as a strengthening of self-care. The results of the studies indicate that the use of this technology has been disseminated as a way to give continuity to the care, protecting the cost-benefit ratio of each person.

It is important to highlight the scarcity of studies produced in Brazil, since the telephone is an extremely important economic strategy, capable of strengthening communication and the professional-patient bond.

As a contribution, new studies are encouraged, especially by nurses, who are care providers. The use of an easily accessible technology, such as the telephone, helps in the search for continuity in this process and ensures that the care crosses barriers that may exist, offering these people conditions to live better within their reality, after acquiring knowledge to take care of life, making it co-responsible for self-care, acquiring autonomy to continue life and manage their health with well-being and comfort.

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