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REVISION

Improving diabetes self-management during the COVID-19 pandemic: a scoping review

Melhorando a autogestão do diabetes durante a pandemia de COVID-19: uma revisão de escopo

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ABSTRACT

Objective: To synthesize the available evidence on nursing-based actions to improve diabetes self-management during the COVID-19 pandemic. **Method:** Scoping review using the Joanna Briggs Institute methodology (JBI) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). The research covered academic studies and gray literature from seven primary and six secondary databases. Two independent reviewers assessed the studies, and the data were analyzed descriptively. **Results:** A total of 1,322 titles were identified, of which 31 studies were included. All studies were published in 2020, mainly in English. Teleconsultation was a relevant strategy to help patients manage diabetes and their general health. **Conclusion:** The review indicates that the nursing-based actions carried out during the COVID-19 pandemic to improve diabetes self-management are not different from what has been consolidated, but some adaptations have been undertaken. The need for self-care, social support, and a collaborative and patient-centered approach is reinforced.
Descriptors: Coronavirus; Self-Management; Diabetes Mellitus.

RESUMO

Objetivo: Sintetizar evidências disponíveis sobre ações de enfermagem para melhorar a autogestão do diabetes durante a pandemia de COVID-19. **Método:** Revisão de escopo usando a metodologia Joanna Briggs Institute (JBI) e o *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR). Identificaram-se estudos acadêmicos e literatura cinzenta de sete bases de dados primárias e seis secundárias. Dois revisores avaliaram os estudos e os dados foram analisados descritivamente. **Resultados:** Foram identificados 1.322 títulos, dos quais 31 estudos foram incluídos. Os estudos foram publicados em 2020, principalmente em inglês. A teleconsulta foi uma estratégia relevante para ajudar os pacientes a controlar o diabetes e sua saúde. **Conclusão:** A revisão indica que ações de enfermagem realizadas durante a pandemia para melhorar a autogestão do diabetes não foram diferentes do que está consolidado, mas algumas adaptações foram realizadas. A necessidade de autocuidado, apoio social e uma abordagem centrada no paciente é reforçada.
Descritores: Coronavirus; Autogestão; Diabetes Mellitus.

INTRODUCTION

At the end of December 2019, an unexpected outbreak of pneumopathy caused by the coronavirus Sars-CoV-2, known as COVID-19, emerged. The exponential growth of affected patients has made it a major threat to global public health, culminating in the World Health Organization (WHO) declaration of pandemic status. Metabolic comorbidities make patients susceptible to COVID-19, exacerbating the infection[1].

Diabetes mellitus (DM) is an independent predictor of morbidity and mortality in patients with the new coronavirus[2]. From this perspective, optimizing glycemic control and COVID-19 preventive measures are vital. Besides, integrated and timely measures that contribute to disease self-management and self-care, uninterrupted follow-up of treatment, and adherence to the care plan must be articulated[3]. Given the above, diabetes self-management is

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considered a continuous process that facilitates the individual's knowledge and skills to control the disease successfully[4].

Blockages during the pandemic compromised the regular follow-up of diabetic patients, putting their glycemic control at risk and compromising their self-care. Besides, the uncertainty that goes along with the COVID-19 pandemic causes the perception of an immediate threat, reinforcing the need for new strategies for diabetes management[5].

Individual and community measures are key to mitigating the pandemic's escalation, given the challenges of the pandemic and the fact that people with diabetes are a vulnerable group. Therefore, specific, integrated, and timely interventions are of utmost importance in the current times. Some therapeutic goals may not be easy to achieve. Therefore, strategies are needed to protect the health of such patients, including self--management interventions, enhanced support of health services, and dissemination of preventive measures[3].

Health professionals are the first line of defense in the pandemic, providing preventive and therapeutic strategies to vulnerable groups, including education and counseling. Counseling involves active, individualized, and client-centered guidance and listening. It presupposes the ability to establish a relationship of trust, aiming to mobilize the patient's internal resources so that he becomes an active subject in determining his or her own health[6].

A previous search of literature reviews on the subject was conducted by the authors in scientific databases (Medline via PubMed, LILACS, and Web of Science), and no published or on-going literature reviews were yet done on nursing-based actions to improve diabetes self-management during the COVID-19 pandemic, reinforcing the novelty of the present review. Therefore, this scoping review was conducted to synthesize the available evidence on nursing-based actions to improve diabetes self-management during the COVID-19 pandemic.

METHOD

Study design

This scoping review was registered with the Open Science Framework (OSF) (osf.io/fdyp2). The review protocol was developed based on the Joanna Briggs Institute's (JBI) methodology[7] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist[8].

The nine steps recommended in the JBI's methodology were followed: (1) definition and alignment of objectives and questions, (2) development and alignment of the inclusion criteria with the objectives and questions, (3) description of the planned approach to evidence screening, selection, data extraction, and presentation of evidence, (4) evidence search, (5) evidence selection, (6) evidence extraction, (7) evidence analysis, (8) presentation of results, and (9) summarization of the evidence concerning the purpose of the review, making conclusions and noting any implications of the findings[7].

Search strategies

The review was guided by the following question: What nursing-based actions have been taken to improve diabetes self-management during the COVID-19 pandemic? This question was created using the Population-Concept-Context (PCC) framework[7]: Population: patients with diabetes, Concepts: nursing care and self-management, and Context: the COVID-19 pandemic. The inclusion criteria were defined using the PCC framework: Population: articles involving patients with diabetes, Concept: articles on health care, nursing care, and self-management; and Context: articles about the COVID-19 pandemic. Primary, empirical, quantitative, and qualitative studies of any design and published in any language were considered eligible.

The search strategies were developed by a librarian aiming at optimal sensitivity and refinement. The following databases were searched on November 6, 2020: Medline, Lilacs, Web of Science, Scopus, CINAHL, Cochrane Library, and Embase. The following sources were used to retrieve gray literature: Google Scholar, Brazilian Digital Library of Theses and Dissertations, CAPES Catalog of Theses and Dissertations, OpenGrey, NYAM Library, and ProQuest Dissertations and Theses. The retrieval of documents on Google Scholar was carried out on the first ten pages with a 2019-2020 frame considering the time of the outbreak of COVID-19. Controlled and uncontrolled terms were used to achieve high sensitivity and to expand the search results, as shown in Table 1.

Initially, a search strategy using controlled vocabularies was pilot tested, but it has resulted in limited results. Thus, the research team used controlled and uncontrolled vocabularies (Table 1).

Table 1 - Search terms used based on the PCC strategy. Fortaleza, CE, Brazil, 2022

PCC	Controlled vocabularies	Uncontrolled vocabularies
Population	Diabetes Mellitus	Diabetes; Diabetic; Diabetes Education; Diabetic Patient.
Concepts	Nursing	Nurse; Nursing Service; Nursing Support
	Self-Management	Selfcare; Selfmanagement; Selftreatment; Self Management; Self Treatment; Self-care; Self Care; Patient Compliance; Patient Adherence; Patient Adherence; Therapy Adherence; Therapy Compliance; Treatment Adherence; Treatment Compliance; Therapeutic Adherence; Welfare.
Context	Coronavirus Infections	Coronavirus Disease 2019; SARS-CoV-2 Infection; SARS-CoV-2; 2019-nCoV disease; 2019-nCoV Infection; COVID19; COVID-19; COVID 2019; nCoV 2019 Disease; nCoV 2019 Infection; Novel Coronavirus 2019 Disease; Novel Coronavirus 2019 Infection; Novel Coronavirus Disease 2019; Novel Coronavirus Infection 2019; Wuhan Coronavirus Disease; Wuhan Coronavirus Infection; Severe Acute Respiratory Syndrome Coronavirus 2; 2019 New Coronavirus; 2019 Novel Coronavirus; 2019-nCoV; HCoV-19; Human Coronavirus 2019; nCoV-2019; Novel 2019 Coronavirus; Novel Coronavirus 2019; SARS Coronavirus 2; SARS-CoV-2; Wuhan Coronavirus; Wuhan Seafood Market Pneumonia Virus.

Source: Elaborated by the authors, 2022.

Besides, during the search and prior analysis of the results, it was clear that other terms could be added. However, when testing them, the search results were not modified quantitatively, or, in other cases, they generated results that did not fit the research question. Then, a highly sensitive search strategy was built to achieve consistent results and minimize possible losses, based on the Peer Review Electronic Search Strategy (PRESS) guidelines[9]. The three search strategies created are shown in Supplementary Material 1.

After the execution of the three search strategies, all titles and abstracts were screened by two independent reviewers. Next, the full texts were read by the same reviewers independently to confirm eligibility. Any inconsistencies were discussed with an additional reviewer. The results obtained in the databases were exported to the Rayyan® reference manager, developed by the Qatar Computing Research Institute (QCRI) to remove duplicates and for two independent researchers' selection and screening processes. A third reviewer resolved discrepancies. Additionally, manual searches were performed in reference lists of the included studies to identify additional documents.

Data extraction and quality assessment

Data were extracted to a spreadsheet by two reviewers independently. The characteristics of the individual studies extracted for this review included country, year of publication, design, objectives, and main findings. In addition, the studies' evidence level was established based on the JBI criteria[7]. A third reviewer confirmed the selection and extraction processes.

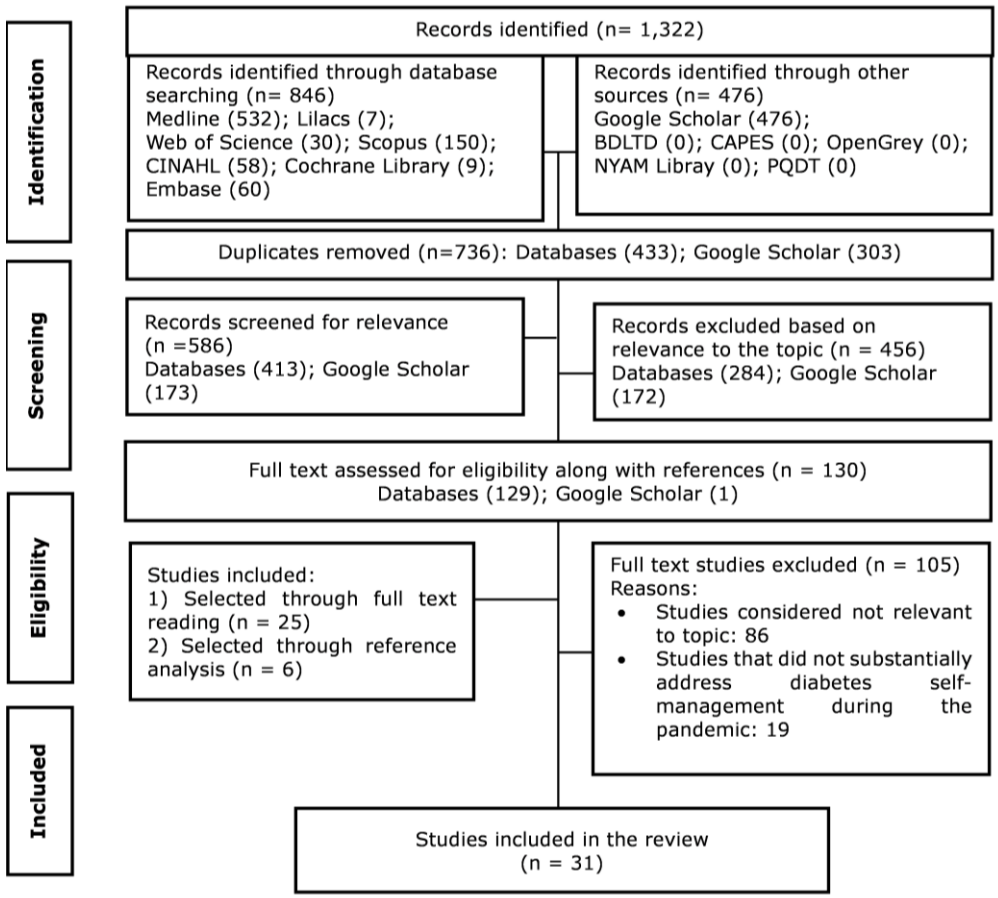
Data synthesis

The results presentation and discussion were carried out descriptively by two researchers who elaborated main themes and independently completed the data analysis and synthesis. This step was carried out to increase the rigor of the analysis and the reliability of the results. Discrepancies were solved through discussions with the third member of the research team.

RESULTS

The search identified 1,322 potentially relevant studies in the databases and other sources, of which 736 duplicates were removed. Then, 586 publications were analyzed by their titles and abstracts, and 426 studies were excluded for not meeting the inclusion criteria. One hundred thirty articles and reference lists were fully evaluated for eligibility. In the end, 25 articles and 6 publications from the reference lists were selected, totaling 31 articles[10-40]. Figure 1 shows the process of study selection.

Most of the studies originated in India (n = 5) and the United Kingdom (n = 6), followed by the United States (n = 3) and Australia (n = 2). All studies were published in 2020, predominantly in English (n = 30). The studies' levels of evidence and other characteristics are shown in Supplementary Material 2.



Source: Elaborated by the authors, 2022.

Figure 1 - PRISMA-ScR flow diagram outlining the process of study selection. Fortaleza, CE, Brazil, 2022

Information from the studies about diabetes self-management actions can be summarized into the following areas: dietary counseling[10-12,15,19,20,22-25,27,29,31,33-35,37-39], physical activity recommendations (towards improved immunity and controlled stress and anxiety) [10-13,15,20,22,24,25,27,29-31,33-35,37,39], glycemic monitoring[10,11,14,15,17,20,23-25,27-31,33-35,37], hypoglycemia management[10,11,22,37], medication adherence[10,11,17,21,24,27,28], COVID-19 prevention and control measures[13,22,23], and use of social media to gain health information[18,20]. Furthermore, the findings pointed to remote monitoring (telehealth) as a tool to improve adherence to self-care practices during the COVID-19 pandemic, with a focus on maintaining a healthy diet, practicing physical activities, adhering to glycemic monitoring and drug therapy, attending psychosocial care activities, reducing stress, anxiety, and depression, and preventing diabetes-related complications[10-12,15,19,24-27,28,30,31,36,40].

DISCUSSION

This review identified different nursing-based actions to improve diabetes self-management during the COVID-19 pandemic. However, since the coronavirus subject area is new, most studies have discussed COVID-19 preventive measures instead of actions specifically directed toward diabetes self-management, revealing a literature gap.

The impact of pandemic preventive measures on healthcare access and diabetes self-management has been evident. Social distancing measures combined with lockdowns have reinforced the need for healthcare professionals to educate patients better and encourage them to monitor their blood glucose levels, maintain healthy nutrition and enhanced lifestyle, have an adequate supply of medications, and acquire knowledge on what to do if they become infected[41].

More than ever, it is time to search for social measures to improve the population's diet and

lifestyle. Besides, individually targeted health promotion measures aiming at weight management, behavioral changes, and psychology services must be implemented. Specialized care should not be limited to managing advanced/complex cases. Health professionals must take responsibility for implementing strategies for optimal treatment of less complex cases[42], as clinically stable patients follow up on an outpatient basis in primary and secondary services.

The reviewed studies discuss recommendations for promoting a healthy lifestyle during the pandemic. Patients with diabetes must keep enough medications and glucose monitoring devices stored at home[10-11,19-20,22,24,29-35,37,39-40]. The diet should be low in carbohydrates and fats, with optimal protein consumption, and composed of four to six meals daily (including snacks, lunch, and dinner). Physical activity improves immunity, although it is prudent to avoid crowded places such as gyms and swimming pools[22]. Home exercises with an exercise bike, treadmill, or running are recommended[10]. One of the studies emphasizes that regular physical activity in a safe home environment is an important strategy for young people with type 1 diabetes[43] and vulnerable patients to severe COVID-19.

In keeping with the above, it is known that COVID-19 has affected the population's lifestyle and led to changes in their daily habits. The situation resulting from the COVID-19 pandemic likely triggered bad eating habits, thus increasing the consumption of sugary foods and snacks and sedentarism, worsening diabetes control. Such outcomes must be considered, and care plans for patients with diabetes must be individualized[44]. Since fluctuations in blood glucose levels are expected to occur more frequently, nurses must instruct their patients to perform frequent blood glucose monitoring.

Authors[24,27] have also presented recommendations for older adults with diabetes, who are especially vulnerable to the complications of COVID-19[45]. Older adults must be monitored intensively to prevent diabetes from getting worse, and since they may have other comorbidities, they require effective strategies to avoid exposure to the new coronavirus[46]. Elderly people, in addition to diabetes, may have other conditions such as obesity, hypertension, and cardiovascular disease. Thus, healthcare professionals must implement preventive and control measures against COVID-19 to reduce the risk of contamination of these individuals and make family members aware of the increased risk of complications in this group, as their condition is related to a poor prognosis.

Some studies covered interventions for pregnant type 1 diabetic women[14], children[16], young adults[33], and adults[28]. Such studies emphasized blood glucose monitoring, insulin administration, and early identification of ketoacidosis. On the one hand, more attention should be paid to diabetic patients on insulin therapy[46] since there are reasons to suspect that blocking conditions may deleteriously affect glycemic control. Nevertheless, on the other hand, this was not seen in a large cohort of individuals in the UK. In general, there was a small but significant improvement in important metrics, including target HbA1c[47]. Another survey reports a significant increase in the frequency of children and adolescents presenting severe ketoacidosis during the pandemic when social distancing was enacted. This illustrates the need to encourage children and their families to continue to seek and receive healthcare during the pandemic[48]. It is known that type 1 diabetes demands continuous use of insulin, and the lack of glycemic control can lead to ketoacidosis, requiring greater awareness and self-management. Families must be involved in the interdisciplinary team's therapeutic planning since a part of this population comprises children and adolescents who need family support.

Concerning foot care, studies[36-37] demonstrate that patient education and remote assistance are important to promote self-management and prevent complications. It is known that poor management of diabetic foot causes prolonged morbidity, hospitalization, amputations, and death. However, given the COVID-19 crisis, it has been difficult to maintain high care standards for patients with diabetic feet [49]. Great challenges exist in raising people's awareness of the self-management of diabetes. In this challenging context, healthcare professionals must develop reliable and continuous monitoring strategies that ensure interpersonal communication according to each patient's needs.

Another aspect mentioned by some studies was the increased use of digital health technologies and telehealth for diabetes monitoring and management during the COVID-19 pandemic[26,50]. Remote patient education and counseling can improve the patient's understanding of the diabetic foot and other risks related to the disease. Besides, the collaboration between different professionals allows a cohesive and quality approach

to improve self-examination and detect signs of ulceration or infection[49].

The studies have also presented guidelines on how to deal with psychosocial issues[11,34,40], stress reduction[12,27,37], anxiety and depression[15,38-39], emotional support[16], and mental health[24,30]. All health professionals and society must focus on mental health and preventive measures for COVID-19 to prevent chronic psychiatric illnesses. People with pre-existing psychological illnesses need extra care and precautions to prevent relapse or complications[51]. In general, the health team must be aware of the impact of the pandemic on mental health and extend support to people through remote or face-to-face strategies. Using teleconsultation to raise awareness of people with diabetes on disease management is a challenge[10-16,18-19,25-28,30-32,35-37,40]. Telecommunication strategies such as telehealth and video consultations are key in exchanging vital information for diagnosis and treatment, especially during the pandemic. Telehealth can be a revolutionary step in treating diabetes, and patients can have immediate access to adequate care through these resources[52] and the entire population with diseases associated with COVID-19 complications, such as diabetes.

Despite the above arguments, it is important to consider that some patients already struggling with self-care may also be struggling with technology use. Losing face-to-face contact can lead to demotivation and greater disconnection[42]. In the era of general restrictions on face-to-face communication, nurses and other healthcare professionals are even more required to show empathy and have skills to support patients remotely in their doubts and encourage self-care behaviors.

The main findings of this scoping review can be synthesized in the following recommendations for patients with diabetes: (1) isolation and contact precautions to restrain the advance of the virus; (2) adhering to a healthy diet plan composed of three meals and a snack; (3) staying active, ideally through physical activities at home; (4) increasing the frequency of glucose self-monitoring; (5) taking antidiabetic drugs; (6) knowing how to solve acute problems, such as diabetic ketoacidosis and hypoglycemia; (7) reducing risks by adhering to foot care and other preventive measures against complications; (8) adopting strategies to reduce stress, anxiety, and depression; (9) replenishing prescriptions and monitoring supplies and medications to avoid running out of the drugs; and (10) using digital technological resources and telemonitoring to receive guidance and counseling during the pandemic.

The limitations of this scoping review include the fact that we may not have identified all relevant studies in the published literature despite our efforts to be as comprehensive as possible in the three search strategies used. Besides, despite using three reviewers to standardize the data selection and extraction processes, there is always the possibility of bias when interpreting the literature.

CONCLUSION

The current scoping review indicates that the nursing-based actions that have been recommended and carried out during the COVID-19 pandemic to improve diabetes self-management are not different from what has been consolidated, but some adaptations have been undertaken as a response. The need for self-care, social support, and a collaborative and patient-centered approach is reinforced. Future investigations assessing the impact of the pandemic on people diagnosed with diabetes and on the healthcare provided to them must be carried out, as there is a lack of research in this area.

CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

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