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INTEGRATIVE REVIEW OF THE LITERATURE

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EFFECTIVENESS OF PATIENT-DIRECTED NURSING PROTOCOLS WITH DIABETIC COMPLICATIONS

Eficácia dos protocolos de enfermagem direcionados ao paciente com complicações diabéticas

Eficacia de los protocolos de enfermería dirigidos al paciente con complicaciones diabéticas

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ABSTRACT

Objective: To investigate the scientific literature on the effectiveness of nursing protocols directed to patients with diabetic complications. **Method:** Integrative review, conducted from August to September 2019, following the recommendations of the PRISMA. The databases used were: Web of Science and Scopus, through the crossovers: "Diabetes Mellitus AND Nursing AND Protocols" and "Amputation AND Nursing AND Protocols". A total of 672 articles were identified and 17 were selected. **Results:** Most studies were published in English and conducted in the United States. Glycemic control, ketoacidosis and self-care protocols were verified, which presented good results for their purpose. One article superficially addressed nursing care directed to people with amputation. **Conclusion:** Nursing protocols directed to patients with diabetic complications were effective. **DESCRIPTORS:** Diabetes mellitus; Amputation; Protocols; Nursing care; Nursing.

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RESUMO

Objetivo: Investigar na literatura científica a eficácia dos protocolos de enfermagem direcionados ao paciente com complicações diabéticas. **Método:** Revisão integrativa, realizada de agosto a setembro de 2019, seguindo as recomendações do PRISMA. As bases de dados utilizadas foram: *Web of Science* e *Scopus*, através dos cruzamentos: "*Diabetes Mellitus AND Nursing AND Protocols*" e "*Amputation AND Nursing AND Protocols*". Identificaram-se 672 artigos, sendo selecionados 17. **Resultados:** A maior parte dos estudos foram publicados em inglês e realizados nos Estados Unidos. Verificaram-se protocolos de controle glicêmico, da cetoacidose e do autocuidado, os quais apresentaram bons resultados para o que se propõem. Um artigo abordou superficialmente os cuidados de enfermagem direcionados a pessoas com amputação. **Conclusão:** Os protocolos de enfermagem direcionados ao paciente com complicações diabéticas apresentaram-se eficazes.

DESCRITORES: Diabetes mellitus; Amputação; Protocolos; Cuidados de enfermagem; Enfermagem.

RESUMEN

Objetivo: Investigar en la literatura científica la efectividad de los protocolos de enfermería dirigidos a pacientes con complicaciones diabéticas. **Método:** Revisión integradora, realizada de agosto a septiembre de 2019, siguiendo las recomendaciones de PRISMA. Las bases de datos utilizadas fueron: Web of Science y Scopus, a través de los crossovers: "Diabetes Mellitus AND Enfermería AND Protocolos" y "Amputación AND Enfermería AND Protocolos". Se identificaron un total de 672 artículos y se seleccionaron 17. **Resultados:** La mayoría de los estudios se publicaron en inglés y se realizaron en los Estados Unidos. Se verificaron los protocolos de control glucémico, cetoacidosis y autocuidado, que presentaron buenos resultados para su propósito. Un artículo abordó superficialmente la atención de enfermería dirigida a personas con amputación. **Conclusión:** Los protocolos de enfermería dirigidos a pacientes con complicaciones diabéticas fueron efectivos.

DESCRIPTORES: Diabetes Mellitus; Amputación; Protocolos; Cuidado de enfermería; Enfermería.

INTRODUCTION

Diabetes mellitus (DM) is one of the fastest growing chronic diseases in the world, thus representing a relevant public health problem due to the magnitude of its complications.[1] It is usually diagnosed late due to the lack of characteristic signs and symptoms as well as knowledge gaps about the disease, as it presents itself in a silent, complex and heterogeneous way.[2]

Around 387 million people have diabetes worldwide and estimates show that this number will reach 471 million in 2035. Nationally, in 2014, 11.9 million diabetics were diagnosed, between 20 and 79 years old, with the number expected to reach 19 million by the year 2035.[3]

In people with diabetes, increased blood glucose levels increase the risk of microvascular, macrovascular and additional complications, such as retinopathy, cardiovascular diseases and nephropathy, in addition to peripheral neuropathy, which can cause ulcerations in the limbs and lead to amputations.[4] Amputation is one of the main diabetic complications found in the Brazilian context.[5]

Lower limb amputations are considered as a sentinel event, since the risk of development is influenced by different conditions: glycemic control, blood pressure and smoking. Furthermore, it depends on the ability of health systems to identify risk, stratify it, treat high-risk feet and ulcers.[3]

Amputation surgery aims to extract the injured part and increase expectations for the improvement of the affected area.[5] In this perspective, the work of nurses and other health professionals is paramount in strengthening care, through guidelines and health education, in order to strengthen patients' adherence to treatment and achieve greater success.[6]

In order to provide more qualified care to patients with diabetic complications, professionals use health technologies. In this context, the assistance protocols are revealed, understood as the determination of a characteristic condition of the assistance, outlining aspects of the operational activities and particularities about the way of carrying out the actions. Therefore, they are tools that can be effective in reducing the divergences among professionals during delivery of health care, providing more security to professionals and patients, allowing the production of process and results indicators, improving the quality of service and the appropriate use of resources.[7]

Given the above, the present study aimed to investigate in the scientific literature the effectiveness of nursing protocols targeted at patients with diabetic complications.

METHOD

The research is characterized as an integrative review, carried out from August to September 2019. This type of study has a systematic character in the search for articles and in the review of the different results, aiming at understanding the topic addressed, taking into account the variety of studies selected by the researcher.[8] Therefore, the research seeks to answer the following question: Are the nursing protocols for patients with diabetic complications effective?

The studies were selected according to the recommendations of the Main Items for Reporting Systematic Reviews and Meta-analyzes - PRISMA (Figure 1), through four phases. In the first phase (identification phase), the following descriptors were cross-checked with the Boolean operator "AND": 1) Diabetes Mellitus AND Nursing AND Protocols; 2) Amputation AND Nursing AND Protocols. The databases used were Web of Science and Scopus as they offer a comprehensive overview of the production of scientific research in the world.

In the second phase, called Selection, the following filters were applied: Language (English, Portuguese and Spanish) and articles with less than five years of publication. The next phase, Eligibility, dealt with reading the titles and abstracts of the studies to select those that met the inclusion criteria: a) Creation, development or use of health protocols; b) Target audience: People with diabetes or diabetic complications, in addition to health professionals.

The articles were selected for the last phase, Inclusion, in which the studies were read in full to apply the exclusion criteria: a) Studies that did not answer the guiding question; b) repeated articles; and c) previous note.

Thus, of the 672 articles identified in the initial search in the databases, 17 were selected to compose the present research. The search and analysis of the articles were carried out by two independent reviewers.

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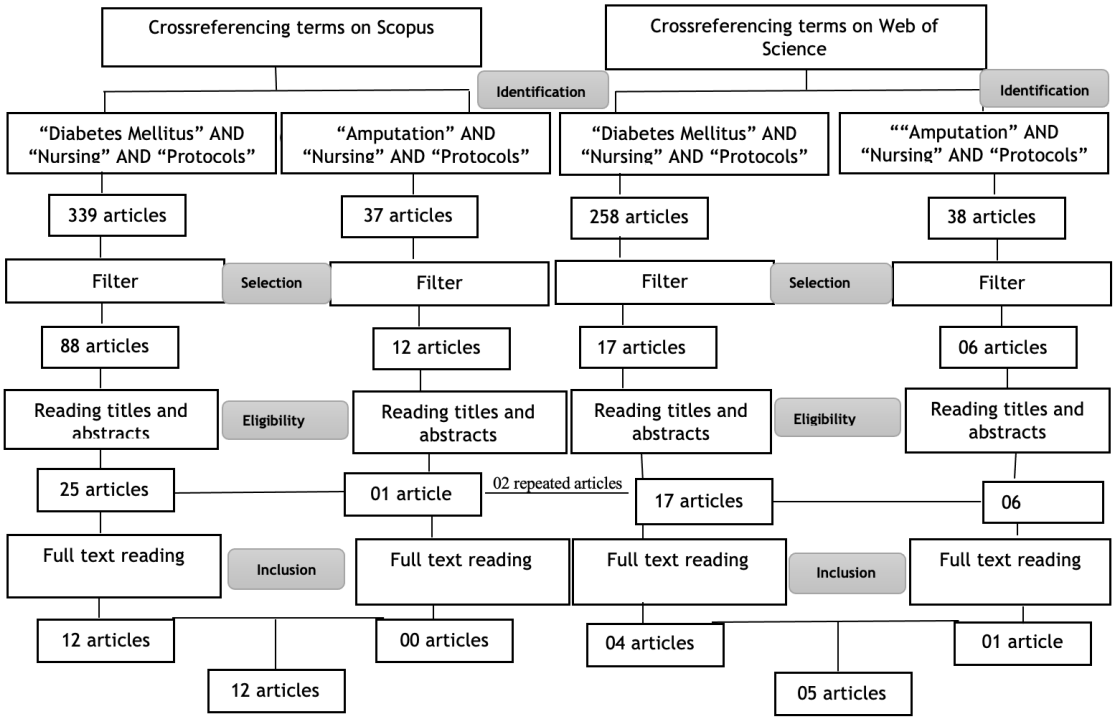
Figure 1 - Diagram of the study selection flow, according to the Prisma scale. Recife, PE, Brazil, 2019.



Among the 17 selected articles, three were published in Portuguese, the others were published in English, between 2014 and 2018. 41.2% studies were carried out in the USA and three studies in Brazil, as shown in Chart 1.

RESULTS AND DISCUSSION

Chart 1 - Description of studies according to the year of publication, place of performance and protocol covered. Recife, PE, Brazil, 2019

Author 1, Year	Location	Protocol
Helmle, 2018[9]	Canada	Electronic basal bolus insulin therapy protocol
Kamei, 2018[10]	Japan	Telenursing protocol in home monitoring
Gupta, 2017[11]	USA	Infusion protocol
Rohrbach, 2017[12]	USA	Standardized titration protocols
Fernandes, 2016[13]	Brazil	Compass Protocol
Manders, 2015[14]	Netherlands	Hospital treatment protocol for diabetics
Passarelli, 2016[15]	USA	Insulin Infusion Protocol managed by nurses
Brown, 2016[16]	USA	Insulin titration protocols
Segal, 2015[17]	Israel	Nurse-guided blood glucose protocol
Marelli, 2015[18]	Italy	Protocol managed by nurses to prevent hypoglycemia
Torres, 2014[19]	Brazil	Staged Diabetes Management Protocol
Dodson, 2014[20]	USA	Hyperglycemia protocol in the ICU
Laxy, 2018[21]	Germany	Long-term pragmatic protocol
McTavish, 2015[22]	New Zealand	Weight-based hypoglycemia treatment protocol for adults with type 1 diabetes
Coto, 2014[23]	USA	Standardized glycemic protocol
Zgibora, 2018[24]	USA	Protocols for redesigning diabetes primary care
Santos, 2018[25]	Brazil	Pre and post-amputation hospital protocols

Chart 2 presents the objectives and the target audience of the articles selected in this study, indicating that many protocols are designed for a multidisciplinary team and / or for the binomial professional / diabetic patient to operationalize. It was found that one of the articles addressed, although superficially and indirectly, nursing care directed to people with amputations due to diabetic complications.

Chart 2 - Characterization of studies according to objective and target audience. Recife, PE, Brazil, 2019

Variables	Description
Objective	Conduct a qualitative assessment of the perceived impact of a new electronic base based on evidence of bolus insulin therapy[9]
	Determine the use of a telenursing protocol in home monitoring[10]
	Assess unified hyperglycemia and insulin, diabetic ketoacidosis in an infusion protocol[11]
	Compare the safety and efficacy of 2 insulin titration methods used in hyperglycemic crises[12]
	Carry out the construction, content validation and cultural adequacy assessment of the Compasso protocol to promote adherence to diabetes self-care practices via telephone intervention[13]
	Investigate the feasibility, safety and efficacy of the hospital treatment protocol for diabetics directed by nurses[14]
	Evaluate the performance of an insulin infusion protocol[15]
	Describe a new model of chronic diabetes care[16]
	Comparatively evaluate the efficacy and safety of blood glucose and control by a protocol guided by a nurse with therapy guided by a doctor[17]
	Evaluate the effectiveness of a protocol managed by nurses to prevent hypoglycemia during subcutaneous administration[18]
	Analyze the nursing consultation with the application of the Staged Diabetes Management Protocol in two family health units in the city of Picos-PI[19]
	Determine whether the addition of bolus of fast-acting insulin for enteral coverage improves glycemic control[20]
	Assess the loyalty of general practitioners to a long-term pragmatic protocol[21]
	Determine whether a weight-based hypoglycemia treatment using glucose effectively treats adults with type 1 diabetes mellitus[22]
	Examine whether there is a direct relationship between the cost of hospitalization, length of stay, excess days of hospitalization and blood glucose levels, using a standardized glycemic protocol[23]
	Assess changes in HbA1c, blood pressure and LDLc levels[24]
	Contextualize pre-and post-amputation hospital services and protocols, and evaluate the referral process of the amputee for rehabilitation and prosthesis usage in the Unified Health System, followed by post-discharge[25]
Target public	Nurses, doctors, pharmacists, residents and medical assistants[9]
	People with chronic diseases[10]
	ICU professionals[11]
	Adults treated for at least 4 hours with an intravenous insulin infusion[12]
	Diabetic patients[13,18,21,24]
	Diabetic nurses / patients[14]
	Patients using insulin[15,16]
	Hospitalized and non-critical diabetic patients / Nurse[17]
	Diabetic patients of the family health strategy[19]
	People with type 1 diabetes [22,23]
	Doctors, physiotherapists, nutritionists, nurses and nursing technicians[25]

Chart 3 presents the main findings of the studies selected in the literature review, especially regarding the good effectiveness of the protocols used.

Chart 3 - Main findings of the studies identified in the literature review. Recife, PE, Brazil, 2019

Main results
The themes and the relevance of adopting a systemic approach to support the use of electronic hospital glycemic management protocols in complex social organizations are emphasized[9]
It is observed that activity limitation and palpitations were related to chronic obstructive pulmonary disease, amyotrophic lateral sclerosis and fatigue with diabetes. Acceptance and adherence were high with daily monitoring, encompassing "Feelings of security" and "Understanding one's own condition"[10]
The protocol maintained the acceptable target range without hypoglycemia for patients admitted to the ICU without requiring complex nursing calculations[11]
Progress was observed in the secondary results of intensive care units, length of stay and infusion duration in the fixed rate titration method[12]
The protocol is considered validated and culturally appropriate to provide adherence to self-care practices in diabetes through telephone intervention[13]
Protocol assessments revealed significant decreases in mean blood glucose levels, consecutive hypoglycemia and hyperglycemia in the intervention when compared to the control group[14]
The instrument allows appropriate control of blood glucose within the acceptable clinical range of 80-199 mg / dL, but not within the narrowest range of 140-180 mg / dL, with little incidence of hypoglycemia[15]
Safety was observed due to the lack of hypoglycemia related to the protocol adjustment. There were no admissions or emergency consultations due to hypoglycemia[16]
The protocol conducted by nurses is not inferior to the treatment conducted by the doctor in terms of efficacy and safety. The value of nursing competence was positively influenced[17]
The nursing-guided protocol based on carbohydrate intake decreased the incidence of hypoglycemia in diabetic patients who received subcutaneous insulin in the hospital[18]
The use of the protocol in nursing consultations made it possible to distinguish the sample and will serve as a standardization of the service, to establish a humanized and holistic care[19]
The research provides information on an effective way to keep glucose in the ideal pattern within an intensive care unit, in addition to decreasing hypoglycemia rates[20]
Adherence to several factors in the research protocol was mixed. Background changes in health policy need to be considered, as they have the potential to reduce differences in treatment intensity and lead to incremental effects[21]
The weight-based protocol of 0.3 g / kg of glucose appears to be more effective in treating symptomatic hypoglycemia in adults with type 1 diabetes than the current most common recommendation of 15 g of glucose or 0.2 g kg of glucose dose[22]
The use of a standardized glycemic protocol improves blood glucose, controls and decreases the cost of medical care[23]
Diabetes educators who adopt standardized protocols in primary care can effectively strengthen treatment and improve blood glucose control[24]
Hospital services and protocols follow the Brazilian Guidelines, however, behaviors such as assessment and treatment of stump pain and phantom pain, as well as compressive bandaging should be encouraged[25]

Despite the limitations inherent to the integrative review, we believed it identified important nursing protocols aimed at patients with diabetic complications. Most focus on glycemic control, such as a study developed in Japan,[10] in which telenursing was used for home monitoring, aimed at people with chronic diseases, including diabetes mellitus. In this research, the focus was on monitoring in the home environment to the detriment of glycemic control at the hospital level, as occurs in most studies, obtaining good efficacy for increasing acceptance and adherence to treatment.

Other focuses identified in the protocols were the control of ketoacidosis and the encouragement of self-care. In this sense, other Brazilian authors, [13] have proposed a protocol to promote adherence to self-care practices in diabetes via telephone intervention, an innovative technique with relatively low cost, which obtained acceptable validity indicators for application with diabetic people.

Regarding the protocols to be applied in the hospital, one of the identified articles[25] contextualizes the pre and post-amputation hospital services and protocols and assesses the process of referring the amputee for rehabilitation and prosthesis using the Unified Health System (SUS), followed by post-hospital discharge. It also highlights weaknesses in assistance during the evaluation and treatment of stump pain or phantom limb pain, as well as compressive bandaging, practices that deserve attention because they are deficient.

Thus, it is revealed that most protocols are aimed at the biomedical model, focused on the disease and its treatment. Therefore, it is necessary to reassess the practices aimed at that public, in order to understand the patient as the protagonist

of self-care practices, which encourages the development of skills so that nurses and other health professionals form connections, and offer assistance of a qualified person focused on the needs of the person with diabetes.[26-27]

Despite the exposed data, two studies[10,25] addressed the multi-professional team with nurses, doctors and physiotherapists, among other health professionals, in the use and application of protocols aimed at diabetic patients. These tools designed for the multidisciplinary team can facilitate the process of humanized and integral assistance to the patients in question. Another study developed in the United States,[24] which deals with protocols for redesigning assistance to patients with diabetes in primary care, showed that standardization in using these instruments strengthens treatment adherence and improves blood glucose levels.

Regarding the superficial approach of nursing care directed to people with amputation in an article, it is considered to be a worrying indicator, as this health problem is frequent. In this sense, a gap in the scientific knowledge of the area seems to have been identified, and care protocols must also be developed, aimed at patients amputated due to diabetic complications, as a way of enabling progress in assisting such patients.

Regarding the main results found, it is important to highlight the evidence of the benefits achieved through the follow-up protocols that guide the assistance directed to people with diabetes. In this context, it was observed that the protocol helps promote and adhere to self-care practices in diabetes.[13] Therefore it was demonstrated that the adherence to protocols is related to the improvement of blood glucose, in addition to the fact that, trained nurses develop a safer job which is not inferior to the care provided by a medical doctor, when caring for diabetic patients.[14]

In one of the articles[15], it is revealed that 60.7% of hypoglycemic events were associated with violations of the protocol. This data indicates the importance of these technologies to guide health care provided by professionals. Thus, protocols are primary tools in health care, defined as the specification of a characteristic condition of care that considers a chain of operational instructions on how to act, with the purpose of guiding professionals in determining care, allowing the best understanding and help avoid mistakes.[7]

It is in this scenario that nursing care is provided, gaining prominence by providing systematic and safe assistance to patients, through care protocols. In this manner, the assessment instruments and care protocols appear as an option to adapt and improve the quality of nursing care, since they define practices based on scientific evidence, determining priorities in routines and conduct aimed at minimizing costs.[28]

CONCLUSION

The present study analyzed the scientific production of the last 5 years and concluded that the nursing protocols directed to the patient with diabetic complications were effective. However, there were gaps in nursing care protocols aimed at people with amputations due to diabetic complications, as well as protocols that distance themselves from the hegemony of the biomedical model.

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