ORIGINAL ARTICLE

Nursing Diagnoses in People with Diabetes Mellitus After Participation in an Educational Program

Lilian Cristiane Gomes ⒾⒹ, Autran José da Silva Júnior ⒾⒹ

Department of Nursing, University Center of the Guaxupé Educational Foundation (UNIFEG), Guaxupé, Minas Gerais, Brazil

Abstract

Objective: To identify the nursing diagnoses in people with diabetes mellitus who participated in an educational program about the disease.

Method: This is an exploratory-descriptive research, with a quantitative approach, through the study of multiple cases, in a sample of 18 people with type 2 diabetes mellitus. In the form of an individual interview, each participant responded to the data collection instruments, before the beginning and after the end of the program, in addition to having their feet and shoes evaluated and their weight and height were measured to calculate the body mass index, as well as the capillary blood glucose. For the identification of nursing diagnoses, data from the final assessment were considered.

Results: Twelve nursing diagnoses and five domains were identified, with a variation between two and nine diagnoses per participant and a mean of 5.4. The health promotion diagnoses and the nutrition and safety/protection domains stand out.

Conclusion: The identification of care needs, through the nursing diagnoses, will allow the search for new strategies for the design of other educational and clinical monitoring programs, in order to maintain and/or maximize motivation and engagement in healthy behaviors, with a view to effective diabetes mellitus control and improving quality of life.

Keywords: Diabetes mellitus, health education, nursing care, nursing diagnoses, primary care

Introduction

Diabetes mellitus (DM) has become an impacting public health problem globally due to its alarming levels of prevalence: about half a billion people, aged 20-79 years, currently live with the disease (International Diabetes Federation [IDF], 2021). This means that, worldwide, 1 in 10 people is diagnosed with DM. The increased prevalence trend, with projections of around 643 million and 783 million for 2030 and 2045, respectively, is due to, among other factors, population aging and represents a 46% increase in the current estimate (IDF, 2021; Muzy et al., 2021). It is believed that out of every five adults with DM, four live in low- and/or middle-income countries, such as Brazil (IDF, 2021). In a recent Brazilian study on the prevalence of DM, a national contingent of 9.2% was estimated, with the Southeast region having the highest proportion (12.8%) (Muzy et al., 2021).

In addition to its epidemic nature, DM demands a complex treatment as it involves changes in lifestyle and a drug regimen that can cover different drugs, including insulin, with different action profiles and multiple dosages (Sociedade Brasileira de Diabetes [SBD], 2020). Although it can cause chronic, disabling, and costly complications, DM is a condition sensitive to primary health care (Muzy et al., 2021) and, in this direction, health education is the key strategy for effective disease control and for the prevention of its complications (Souza & Vasconcelos, 2017).

In general, the nurse is the first contact professional in health services and plays a key role in the health education of people with DM by identifying their needs and knowledge gaps, encouraging self-care, and developing priority care plans with the participation of individuals through the nursing consultation (Gomes et al., 2021; Moraes et al., 2020). The identification of care needs is established through nursing diagnoses (ND), which are the starting point for nurses' clinical decision-making (Serra et al., 2020; Sousa et al., 2017), including for the evaluation of the educational process itself as they guide the choice of the most appropriate interventions to achieve the expected results (Becker et al., 2008; Serra et al., 2020).

Cite this article as: Gomes, L. C., & da Silva Júnior, A. J. (2022). Nursing diagnoses in people with diabetes mellitus after participation in an educational program. *Mediterranean Nursing and Midwifery*, 2(1), 14-19.

Thus, the present study aims to identify the ND in people with DM who participated in an educational program about the disease, in order to support the planning of a new program, based on the approach of specific themes and concerning the ND, for the clinical nursing follow-up of these patients.

Material and Methods

Study Design
This is an exploratory-descriptive research, with a quantitative approach, through the study of multiple cases (Silva & Mercês, 2018).

The sample consisted of 18 adults with type 2 DM (DM2), who participated in an educational program developed at the Center for Health and Physical Education Studies (CESEF) of the University Center of the Guaxupé Educational Foundation (UNIFEG) University, during the period of October 2017 to April 2019, from the matrix project entitled "Evaluation of an educational program for people with DM2, with a focus on the practice of physical activities and foot care."

The matrix project was approved by the Research Ethics Committee of University Center of the Guaxupé Educational Foundation under Certificate of Presentation of Ethical Appreciation no. 66007917.8.0000.5092 and Opinion no. 2.029.352, on May 3, 2017. Consent was obtained from the participants before collecting data by signing the informed consent form (ICF), in compliance with Brazilian legislation.

Data collection
In a private room at the study site, in the form of an individual interview, and after signing the ICF, each participant responded, before the beginning (T0) and after the end of the program (T6), to the Brazilian versions of the following data collection instruments, namely, Diabetes Knowledge Scale (Torres et al., 2005) and Diabetes Self-Care Activities Questionnaire (Michels et al., 2010), in addition to having their feet and shoes evaluated through a structured script based on the literature, and their weight and height were measured to calculate the body mass index (BMI), as well as the capillary blood glucose (CBG), with technique and standardized equipment. The time interval between the initial (T0) and final (T6) assessments was 6 months for each participant. It should be emphasized that in the initial assessment (T0), an instrument for collecting sociodemographic and clinical data was also applied to characterize the sample.

Main Points
- Twelve nursing diagnoses and five domains were identified after participating in an educational program on diabetes mellitus.
- The health promotion diagnoses and the nutrition and safety/protection domains stood out.
- The identification of the nursing diagnoses will allow the search for new strategies in order to maintain and/or maximize motivation and engagement in healthy behaviors, with a view to effective diabetes mellitus control and improving quality of life.

Data Analysis
Numerical data were analyzed using descriptive statistics (number, percentage, mean, and standard deviation), using the Statistical Package for the Social Sciences software Statistical Package for the Social Sciences 22.0 (IBM Corp.; Armonk, NY, USA).

From the results obtained by the data collection instruments, by calculating the BMI, measuring CBG, and examining the feet and shoes, in the final assessment (T6), empirical indicators for the identification of ND emerged (Brito et al., 2021). Then, the steps of clinical judgment and Risner's diagnostic reasoning were performed (Risner, 1986) and the classification of ND in the light of Taxonomy II of the North American Nursing Diagnosis Association International (NANDA-I, 2018).

Results

Regarding the sociodemographic and clinical characterization, it is noteworthy that the studied sample consisted of 94% (n =17) of females, mean age of 61 years (standard deviation [SD] =12), average length of schooling of 5.7 years (SD =4.9), 50% were retired/pensioners, mean time of diagnosis of 8 years (SD =9), and lack of prior participation in diabetes counseling groups (100%). As for drug treatment (n =17), the use of oral antidiabetics (OADs) prevailed (n =14; 82%), followed by the association between OADs and insulin (n =2; 12%) and only insulin (n =1; 6%).

In the final evaluation (T6), 33.3% of the sample was classified as obese and 11.1% as overweight, with an average BMI of 28.6 kg/m^2 (SD =5.2), and CBG mean was 112.7 mg/dL (SD =11.5). The mean score of knowledge about DM was 13.5 (SD =1.3). Regarding self-care activities, the dimensions with the lowest averages were "blood glucose monitoring" (2.0; SD =2.6), "general nutrition" (3.8; SD =3.0), and "care with the feet" (4.2; SD =1.5). Upon examination of the feet, the most frequent alterations were: flat feet (n =16; 88.9%), hair thinning (n =14; 77.8%), calluses (n =11; 61.1%), dryness of the skin (n =8; 44.4%), decreased or non-palpable peripheral pulses (n =4; 22.2%), and plantar insensitivity (n =2; 11.1%).

From these findings, 12 ND were identified, with a variation between 2 and 9 ND per participant, and a mean of 5.4 ND. Of the grand total, four were real (with a focus on the problem), four were at risk, and four were health promotion (NANDA-I, 2018). The domains with the highest number of ND identified were nutrition and security/protection, both with four ND (Table 1).

Discussion

The sociodemographic and clinical characteristics, as well as the knowledge and performance of self-care activities with DM, were explored in previous studies conducted in the same studied sample (Gomes et al., 2021; Moraes et al., 2020). These variables were similar to those of other Brazilian population samples of people with DM2 (Marques et al., 2019; Novais et al., 2019; Piza et al., 2018; Torres et al., 2018), except

Table 1.
Numerical and Percentage Distribution of Nursing Diagnoses Identified in the Studied Sample, According to the Domains and Classes of NANDA-I Taxonomy II. Guaxupé, Minas Gerais, Brazil, 2019

Domains, Classes, and Titles of nursing diagnoses ($N=18$)	n	%
Domain 1: Health promotion—Class 2: Health control		
Willingness for improved health control	12	66.7
Domain 2: Nutrition—Class 1: Intake		
Willingness for improved nutrition	8	44.4
Obesity	6	33.3
Overweight	2	11.1
Domain 2: Nutrition—Class 4: Metabolism		
Unstable blood glucose risk	15	83.3
Domain 4: Activity/rest—Class 4: Cardiovascular/pulmonary responses		
Ineffective peripheral tissue perfusion	4	22.2
Domain 4: Activity/rest—Class 5: Self-care		
Willingness to improve self-care	12	66.7
Domain 5: Perception/cognition—Class 4: Cognition		
Willingness for improved knowledge	18	100
Domain 11: Security/protection—Class 1: Infection		
Risk of infection	3	16.7
Domain 11: Security/protection—Class 2: Physical injury		
Risk of impaired skin integrity	11	61.1
Impaired skin integrity	4	22.2
Risk of peripheral neurovascular dysfunction	2	11.1
Source: survey data collection.		

for knowledge, which was superior to that found in other studies that used the same instrument (Caixeta et al., 2020; Figueira et al., 2017; Teston et al., 2018).

Regarding the ND, the average identified per participant in this study (5.4) was different from that found in other studies, for which the averages were, respectively, 7.3 (Lacerda & Lima, 2017), 9.5 (Becker et al., 2008), and 11.6 (Sousa et al., 2017). However, the diagnostic classification was similar to other investigations in at least eight ND, with the highest frequency being impaired skin integrity, observed in seven studies (Becker et al., 2008; Brito et al., 2021; Franzen et al., 2012; Lacerda & Lima, 2017; Moura et al., 2014; Sabogal et al., 2017; Sousa et al., 2017), risk of unstable blood glucose, in six studies (Franzen et al., 2012; Moura et al., 2014; Muñiz et al., 2019; Sabogal et al., 2017; Scain et al., 2013; Silva et al., 2013), in five studies, obesity (Becker et al., 2008; Muñiz et al., 2019; Sabogal et al., 2017; Scain et al., 2013; Silva et al., 2013) and risk of infection (Becker et al., 2008; Franzen et al., 2012; Lacerda & Lima, 2017; Scain et al., 2013; Sousa et al., 2017), and in four studies, risk of impaired skin integrity (Brito et al., 2021; Franzen et al., 2012; Lacerda & Lima, 2017; Sousa et al., 2017).

In the studied sample, ND were identified belonging to 5 domains among the 13 covered by Taxonomy II of NANDA-I (NANDA-I, 2018), prevailing ND belonging to the nutrition and safety/protection domains, with four NDs in each. In the first, the risk for unstable blood glucose (83.3%) and willingness for improved nutrition (44.4%) stand out. An integrative review study on ND in diabetic patients emphasizes that the risk of unstable blood glucose is one of the main diagnoses

to be considered in the prevention of acute and chronic complications of the disease (Serra et al., 2020).

For the participants of this study, the main risk factor for the aforementioned ND was inadequate monitoring of blood glucose, possibly due to the lack of free access to a glucometer and other supplies, as most of them are undergoing drug treatment with OADs (82%). Brazilian legislation determines that for users with DM undergoing oral therapy, "capillary blood glucose can be performed at the health unit itself during regular assessment visits defined by the team, according to the established protocol" (Moraes et al., 2020). However, it is noteworthy that handling the glucometer and other inputs requires the development of technical skills, which can be complex for people with low education, such as the sample studied. An integrative review study on self-monitoring of blood glucose at home revealed that due to socioeconomic (cost of tapes and/or lancets) or psychomotor (fear of needles, pain caused by digital puncture, or lack of dexterity with the glucometer) issues, many patients did not perform this procedure (Teixeira et al., 2009). It is also believed that the educational intervention time has not been satisfactory to consolidate the skills necessary for self-monitoring of blood glucose because the sample consists mostly of elderly people, who may have some difficulty or functional limitation in performing this activity.

The willingness for improved nutrition (nutrition domain) as well as the willingness to improve self-care (activity/rest domain), willingness to improve health control (health promotion domain), and willingness to improved knowledge (cognition/perception domain), identified, respectively,

in 44.4%, 66.7%, 66.7%, and 100% of the sample, are listed by NANDA-I Taxonomy II as health promotion diagnoses (NANDA-I, 2018). They translate human responses regarding motivation and the desire to increase well-being and reach human health potential. These responses are expressed by a willingness to improve specific health behaviors and can be used in any health condition (NANDA-I, 2018).

An integrative review study, which aimed to identify the relationships between the ND and the priority themes (TP) of the National Health Promotion Policy (PNPS), found, among others, the ND disposition for improved nutrition related to TP adequate and healthy food (Maciel-Diniz et al., 2017). In Brazil, in order to overcome the biomedical model of health care and to expand its concept to align with the epidemiological transition of recent decades, through which chronic-degenerative diseases started to emerge, the Unified Health System has been guided by policies to improve care and health management, including the PNPS, established in 2006, redefined in 2014 and updated in 2017, through ministerial ordinances (Carvalho et al., 2021; Maciel-Diniz et al., 2017; Ramos et al., 2018).

"Health promotion is understood as a process of training subjects for health care, seeking autonomy in the individual and collective scope, in order to improve the determinants of the health-disease process and, consequently, the quality of life." (Carvalho et al., 2021). It is also conceived as a competence attributed to nursing and one of the means of production of health, especially when made possible by the health education strategy which, in addition to empowering individuals and enabling the improvement of their quality of life, contributes to minimizing the damage caused by disease (Carvalho et al., 2021; Maciel-Diniz et al., 2017; Ramos et al., 2018).

In this sense, the identification of four health promotion ND in the present sample, although belonging to different domains, was an expected result, considering the participation in an educational program centered on self-care. It is possible that the aforementioned program, established through a dialogical relationship between participants and professionals and having their experiences as the starting point of the teaching-learning process, has contributed to increasing people's motivation and willingness to engage and/or improve health behaviors.

This data differs from the literature, in which it was possible to observe a scarcity of studies carried out among Brazilian adults/elderly people with DM2 and which identified health promotion diagnoses. Unlike the present investigation, many studies have identified ND that express human responses and/or unfavorable health behaviors, such as deficient knowledge (Becker et al., 2008; Franzen et al., 2012; Muñiz et al., 2019; Silva et al., 2013), sedentary lifestyle (Becker et al., 2008; Muñiz et al., 2019; Silva et al., 2013), ineffective health control (Becker et al., 2008; Franzen et al., 2012; Moura et al., 2014; Muñiz et al., 2019; Sabogal et al., 2017; Scain et al.; 2013; Silva et al., 2013), and risk-prone health behavior (Franzen et al., 2012; Moura et al., 2014; Scain et al., 2013).

It is important to emphasize that the educational program, developed with the sample, included the guided and supervised practice of physical training, facilitating adherence to an active and healthy lifestyle, in addition to improving knowledge and arousing interest to achieve better health results.

Also in the nutrition domain, two other ND identified were obesity (33.3%) and overweight (11.1%), similar to what was found in other studies with Latino diabetic patients (Becker et al., 2008; Franzen et al., 2012; Muñiz et al., 2019; Sabogal et al., 2017; Scain et al., 2013). Obesity and overweight are conditions commonly associated with DM2 and the guideline "AADE7 Self-Care Behaviors™," from the American Association of Diabetes Educators (AADE), advocates the control of body weight as an integral part of the management of DM, from behavioral patterns of self-care ("eating healthily," "staying active" and "reducing risks") established to guide educational interventions, with a view to optimizing health and quality of life (Association of Diabetes Care and Education Specialists [ADCES], 2018). Although the proposed educational program was based on these behavioral patterns, as well as on other aspects of the disease, it is possible that the intervention time was not sufficient to promote significant changes in the participants' weight and/or body composition.

Another domain of considerable relevance for the diabetic population is safety/protection, as these people are more likely to develop physical injuries (Serra et al., 2020). In this domain, the risk for impaired skin integrity (61.1%) and impaired skin integrity (22.2%) stood out, whose main risk factors/related were the metabolic alterations inherent to DM, alteration in sensitivity, and impaired circulation (NANDA-I, 2018). These ND denote the risk for complications such as the diabetic foot, which can develop from pre-ulcerative lesions resulting from repetitive trauma and structural changes in the feet associated with loss of protective sensation, which lead to abnormal pressure points, arising thus the blisters, calluses, and subcutaneous hemorrhage. Pre-ulcerative lesions can progress to ulcers, which can be complicated by infection and necrosis, often requiring amputations (Becker et al., 2008; Gomes et al., 2021).

In this context, three other NDs deserve attention: ineffective peripheral tissue perfusion (22.2%: activity/rest domain), risk of infection (16.7%: safety/protection domain), and risk of peripheral neurovascular dysfunction (11.1%: security/protection domain). Therefore, these last five NDs alert to a favorable situation for the occurrence of the diabetic foot and give rise to a detailed evaluation of the feet and shoes as a necessary practice in the routine of care and in DM education programs. Periodically evaluating insulin application sites is equally important to identify susceptibility to infection and take appropriate preventive measures (Gomes et al., 2020, 2021).

Based on the above, it is undeniable that the identification of ND allows the choice of interventions that are more appropriate and consistent with the real needs of people with DM, enabling the development of a more satisfactory care plan.

The use of standardized language such as the DE facilitates nursing care notes and communication between health team members (Silva et al., 2013).

As limitations of the present study, there are the small sample size and the impossibility of performing a complete physical examination to identify other ND, due to the structural and material conditions of the study site, which is not characterized as a formal care setting, as well as prioritizing the time of contact with the participants to carry out the activities of the educational program. On the other hand, the potential of this study to highlight the science of nursing and the need for nurses to improve their diagnostic skills, as well as in the application of nursing classifications, should be considered.

The sample has a sociodemographic and clinical profile similar to that described in the literature, and the human responses found are based on their health status. Twelve ND were identified in five domains, of which nutrition and safety/protection stand out, both with the highest number of ND. Regarding the types of ND, health promotion prevailed, demonstrating that the educational program achieved its purpose with regard to the empowerment of participants for self-care. On the other hand, other NDs point out the demand of these patients for educational support and nursing care.

Thus, the identification of care needs, through the ND, will allow the search for new strategies for the design of other educational and clinical monitoring programs, in order to maintain and/or maximize motivation and engagement in healthy behaviors, with a view to effective DM control and improving quality of life.

References

Association of Diabetes Care and Education Specialists (2018). Addressing obesity in diabetes. ADCES Practice Paper (pp. 1–7). (Retrieved from https://www.diabeteseducator.org/docs/default-source/practice/practice-documents/practice-papers/addressing-obesity-in-diabetes.pdf

Becker, T. A. C., Teixeira, C. R. S., & Zanetti, M. L. (2008). Nursing diagnoses for diabetic patients using insulin. *Revista Brasileira de Enfermagem, 61*(6), 847–852. [CrossRef]

Brito, F. M., Oliveira, JdS., Leadebal, O. D. C. P., Fernandes, MdGdM., & Santos, K. F. Od (2021). Nursing diagnoses representative of the demand for care in hospitalized elderly people [Diagnósticos de Enfermagem Representativos da Demanda de Cuidados em Pessoas Idosas Hospitalizadas]. *Revista de Pesquisa Cuidado é Fundamental Online, 13*, 912–918. [CrossRef]

Caixeta, A. C. M., Magalhães, E. A., Duarte, M. DdR., Gonçalves, O., Ramos, S. B., & Santos, B. MdO. (2020). O Paciente com Diabetes Mellitus Tipo 2 com Glicemia Descompensada: Onde Está a Falha? *Brazilian Journal of Health Review, 3*(2), 2829–2846. [CrossRef]

Carvalho, P. O., Andrade, L. S., Oliveira, W. A., Masson, L., Silva, J. L., & Silva, M. A. I. (2021). Essential health promotion competencies in nursing training: An integrative review. *Acta Paulista de Enfermagem, 34*, eAPE02753. [CrossRef]

Figueira, A. L. G., Boas, L. C. G. V., Coelho, A. C. M., Freitas, M. C. F., & Pace, A. E. (2017). Educational interventions for knowledge on the disease, treatment adherence and control of diabetes mellitus. *Revista Latino-Americana de Enfermagem, 25*, e2863. [CrossRef]

Franzen, E., Scain, S. F., Záchia, S. A., Schmidt, M. L., Rabin, E. G., da Rosa, N. G., Menegon, D. B., dos Santos, L. B., & Heldt, E. (2012). Outpatient nursing consultation and nursing diagnoses related to demographic and clinical characteristics. *Revista Gaucha de Enfermagem, 33*(3), 42–51. [CrossRef]

Gomes, L. C., Moraes, N. M., Souza, G. F. P., Brito, F. I., Antonio Júnior, M. E., Cipriano, A. E., Marques, T. R., & Silva Júnior, A. J. (2021). Contributions of an educational program in the prevention of foot injuries in people with diabetes mellitus. *Journal Health NPEPS, 6*(1), 62–86. [CrossRef]

Gomes, L. C., Tsuda, L. C., & Pace, A. E. (2020). Knowledge and practices of people with diabetes mellitus about the drug therapy and their acute complications. *Enfermagem Brasil, 19*(4), 290–301. [CrossRef]

International Federation of Diabetes (2021). *IDF diabetes atlas* (10th ed). (Retrieved from https://diabetesatlas.org/idfawp/resource-files/2021/07/IDF_Atlas_10th_Edition_2021.pdf

Lacerda, N. F. R. S., & Lima, P. V. (2017). Nursing diagnosis identified in elderly people with diabetes mellitus. *Id on Line Revista Multidisciplinar e de Psicologia, 11*(38), 432–444.

Maciel Diniz, C., de Lima Ferreira, G., & Cavalcante Martins, M. (2017). Nursing diagnoses associated with the national policy for health promotion. *Investigación y Educación en Enfermería, 35*(1), 78–85. [CrossRef]

Marques, M. B., Coutinho, J. F. V., Martins, M. C., Lopes, M. V. O., Maia, J. C., & Silva, M. J. D. (2019). Educational intervention to promote self-care in older adults with diabetes mellitus. *Revista da Escola de Enfermagem da U S P, 53*, e03517. [CrossRef]

Michels, M. J., Coral, M. H. C., Sakae, T. M., Damas, T. B., & Furlanetto, L. M. (2010). Questionnaire of Diabetes Self-Care Activities: Translation, cross-cultural adaptation and evaluation of psychometric properties. *Arquivos Brasileiros de Endocrinologia e Metabologia, 54*(7), 644–651. [CrossRef]

Moraes, N. Md, Souza, G. F. Pd, Brito, F. Id, Antonio Júnior, M. E., Cipriano, A. E., Costa, N. S. V., Rezende, T. Md, Silva Júnior, A. Jd, & Gomes, L. C. (2020). Knowledge about diabetes mellitus and self-care activities before and after an educational program: A pilot study. *Open Journal of Nursing, 10*(2), 101–116. [CrossRef]

Moura, P. Cd, Braga, L. M., Domingos, C. S., Rodrigues, N. V., Correia, M. D. L., & Oliveira, L. V. A. (2014). Diagnoses and nursing Interventions in hypertensive and diabetic individuals according to Orem's theory. *Revista da Rede de Enfermagem do Nordeste, 15*(6), 1040–1046. [CrossRef]

Muñiz, G. M., Gómez, B. A., Becerril, L. C., & Solano, G. S. (2019). Lifestyle of the elderly person living with diabetes and characterization of nursing diagnoses. *Texto and Contexto - Enfermagem, 28*, e20170552. [CrossRef]

Muzy, J., Campos, M. R., Emmerick, I., Silva, R. S. D., & Schramm, J. M. A. (2021). Prevalence of diabetes mellitus and its complications and characterization of healthcare gaps based on triangulation of studies. *Cadernos de Saúde Pública, 37*(5), e00076120. [CrossRef]

North American Nursing Diagnosis Association International (2018). *Diagnósticos de Enfermagem da NANDA-I: Definições e Classificação* (11th ed). Artmed.

Novais, M. D. A., Spaggiari, T. C., Pace, A. E., & Gomes, L. C. (2019). Self-care practices with the feet of patients with diabetes mellitus in outpatient follow-up. *International Journal of Endocrinology and Diabetes, 2*(1), 106–111.

Piza, L. D. F., Eleotério, B. D., & Gomes, L. C. (2018). Evaluation of the feet of elderly people with diabetes mellitus: Descriptive study. *Enfermagem Brasil, 17*(3), 245–252. [CrossRef]

Ramos, C. F. V., Araruna, R. D. C., Lima, C. M. F., Santana, C. L. A., & Tanaka, L. H. (2018). Education practices: Research-action with nurses of Family Health Strategy. *Revista Brasileira de Enfermagem, 71*(3), 1144–1151. [CrossRef]

Risner, P. B. (1986). Diagnosis: Analysis and synthesis of data. In J. W. Griffith-Kenney & P. J. Christensen (Eds.) *Nursing Process application of theories, frameworks, and models* (2th ed., pp. 124-151). St Louis: Mosby.

Sabogal, I. M. U., Arciniegas, C. N. M., Uribe, E. F. P., Ramírez, A. N., Gómez, D. L. Q., & Mariño, M. A. G. (2017). Nursing process in the person with diabetes mellitus from a perspective on self-care. *Revista Cubana de Enfermería, 33*(2), 404–417.

Scain, S. F., Franzen, E., dos Santos, L. B., & Heldt, E. (2013). Accuracy of nursing interventions for patients with type 2 diabetes mellitusin outpatient consultation. *Revista Gaucha de Enfermagem, 34*(2), 14–20. [CrossRef]

Serra, E. B., Ferreira, A. G. N., Pascoal, L. M., & Rolim, I. L. T. P. (2020). Nursing diagnoses in diabetic patients: An integrative Review. *Revista Enfermagem UERJ, 28*, e48274. [CrossRef]

Silva, L. A. G. P. D., & Mercês, N. N. A. D. (2018). Multiple case study applied in nursing research: A case report. *Revista Brasileira de Enfermagem, 71*(3), 1194–1197. [CrossRef]

Silva, L. H. Ad, Carmona, E. V., Beck, A. R. M., Lima, M. H. M., & Araújo, E. Pd (2013). Nursing diagnoses of diabetic patient medical charts: A descriptive study. *Online Brazilian Journal of Nursing, 12*(1), 62–72. [CrossRef]

Sociedade Brasileira de Diabetes (2020). *Diretrizes da Sociedade Brasileira de Diabetes 2019–2020*. (Retrieved from http://www.saude.ba.gov.br/wp-content/uploads/2020/02/Diretrizes-Sociedade-Brasileira-de-Diabetes-2019-2020.pdf

Sousa, J. A. V., Grden, C. R. B., Sloboda, D. A., Paula, A. C. M., Silva, J. H. O., & Sicorra, T. R. (2017). Clinical nursing care for elderly institutionalized diabetics. *Revista de Enfermagem UFPE On Line, 11*(4), 1609–1615. [CrossRef]

Souza, V. P., & Vasconcelos, E. M. R. (2017). Health educacion as a strategy for the control of diabetes mellitus: Integrative literature Review. *Revista Baiana de Saúde Pública, 41*(1), 177–195. [CrossRef]

Teixeira, C. RdS., Zanetti, M. L., Landim, C. A. P., Becker, T. A. C., Santos, E. C. Bd, Franco, R. C., & Citro, R. (2009). Automonitorização da Glicemia Capilar no Domicílio: Revisão Integrativa da Literatura. *Revista Eletrônica de Enfermagem, 11*(4), 1006–1017. [CrossRef]

Teston, E. F., Peternella, F. M. N., Sales, C. A., Haddad, MdC., Cubas, M. R., & Marcon, S. S. (2018). Effect of the consultation of nursing on knowledge, quality of life, attitude towards disease and self-care among persons with diabetes. *Reme Revista Mineira de Enfermagem, 22*, e-1106. [CrossRef]

Torres, H. C., Pace, A. E., Chaves, F. F., Velasquez-Melendez, G., & Reis, I. A. (2018). Avaliação Dos Efeitos de um Programa Educativo em Diabetes no Controle Metabólico: Ensaio Clínico Randomizado Por Conglomerados. *Revista de Saúde Pública, 52*(8), 1–11. [CrossRef]

Torres, H. C., Virginia A, H., & Schall, V. T. (2005). Validation of diabetes mellitus knowledge (DKN-A) and attitude (ATT-19) questionnaires. *Revista de Saúde Pública, 39*(6), 906–911. [CrossRef]