Nursing interventions in the care of diabetic older people

A literature Review.

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Bachelor's thesis

November 2023

Degree Program in Nursing

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Nursing Interventions in the care of diabetic older people

Jyväskylä: Jamk University of Applied Sciences, November 2023, 47 pages

Degree Program in Nursing. Bachelor's thesis.

Permission for open access publication: Yes

Language of publication: English

Abstract

Background: Diabetes has been associated with chronic conditions and long-lasting complications. Studies have established diabetes as a significant public health problem. The high prevalence of diabetes poses a threat in global advancement and an increase in mortality rate. Financial burden incurred from diabetes management and loss of productivity due to diabetes induced complications have an alarming impact on the patients, family members, national and international economy, and workforce.
Aim and purpose: To establish nursing interventions in the care of older people with diabetes from existing literatures. The purpose was to show what interventions nurses can adopt towards caring for older persons suffering from diabetes.
Methods: This study used literature review method. Two scientific databases Medline and CINAHL were used to sought data. Data was selected using critical appraisal. The selected articles were analyzed using inductive content analysis.
Results: Three main categories represented the outcome of the analyzed data. Patient teaching was the first main category, and it elaborated the type of professional instructions given to the diabetic older people by nurses which may not involve the collaboration of other healthcare professionals. The second main category was nursing care which demonstrated guided nursing care that requires the services of other healthcare professionals. The third main category was Follow up and medication which presented nursing care targeted at avoiding further complications caused by diabetes.
Conclusion: Research established that there are factors causing a strain in diabetes care and they began with insufficient nursing education, which should be instilled to improve the overall care of diabetes. Additionally, diabetes has been a wide and global issue hence, continuous research should be adopted to check on recent developments, side effects, current assessment, and monitoring procedures to ensure quality and holistic care.

Keywords/tags (subjects)

Older people, Older adults, Seniors, Geriatrics, Diabetes, Nursing interventions, Nursing care, Nursing support, Best practice, Nursing treatment.

Miscellaneous (Confidential information)

None

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1   Introduction

Globally, diabetes is one of the prevalent public health problems. There are many published studies (Adiewere et al., 2018; Maffi & Secchi, 2017; Pouya et al., 2019) that describe the high prevalence of this sickness and its adverse concern in public health. Consequently, there is a great need to properly understand the nursing interventions used in the care of not only older people with diabetes but everyone suffering from it. According to Pouya et al. (2019), the word diabetes prevalence rose above 9% in the year 2019 of whereby people living with diabetes type 2 had the highest percentage of 90% from the above overall percentage. Additionally, it increases the risk of developing illnesses that affect the visual, circulatory, excretory, and urinary systems (WHO, 2016; Pouya et al., 2019).

In 2016, the World Health Organization highlighted that acute complications can result from diabetes if poorly managed. For instance, acute complications such as ketoacidosis and other long-lasting complications. Chronic ailments including heart disease, chronic renal disease, and diabetic foot are all long-lasting complications associated with diabetes (Papatheodorou et al., 2018; WHO, 2016). Non-communicable diseases (NCDs) account for 41 million deaths worldwide each year which corresponds to 74% of all deaths worldwide of these mortalities. 2 million of these deaths are directly connected to diabetes and renal disease, while deaths brought on by cardiovascular diseases, which are substantial long-term consequences of diabetes, cause 17 million NCDs deaths annually (WHO,2022). The World Health Organization (2017) predicted that diabetes poses a threat to advancement and will be the seventh largest cause of death by 2030.

Among all diabetes burden of disease, the financial burdens incurred from direct medical expenses and lost productivity because of disabilities brought on by diabetes have an alarming impact on patients and their families as well as the national and international economy and workforce (American Diabetes association (ADA), 2018; Zhang & Gregg, 2017). Global diabetes medical treatment is predicted to cost $851 billion annually in direct costs (Zhang & Gregg, 2017). According to the International Diabetes Federation (2018), how much diabetes treatment costs worldwide is $727 billion which equates to 12% of global healthcare spending, and about 327 million persons with the disease are working age. To help curb healthcare costs, improve the quality of life and selfcare of diabetic older persons; this literature review aims at establishing nursing interventions in the care of older people suffering from diabetes.

2 Diabetes

Diabetes is defined as a chronic condition that develops when the body either generates insufficient insulin or cannot properly utilize the insulin that is produced (WHO, 2022). Pancreas, a composite organ with exocrine and endocrine glands generates hormones insulin and glucagon. When the pancreas detects a high blood sugar level (hyperglycemia), beta cells in the pancreas release insulin; at normal blood sugar levels, insulin continues to be secreted continuously (Cowap & Parry, 2015; Dunning, 2012).

Whenever the pancreas detects that blood glucose levels are too low (hypoglycemia), such as during fasting, in between meals, or during exercise, the pancreatic alpha cells release glucagon. When blood sugar levels are raised, glucagon secretion is inhibited. Basically, glucagon turns glycogen back to glucose while insulin aids in the conversion of glucose to glycogen (stored glucose) (Cowap & Parry, 2015; Dunning 2012).
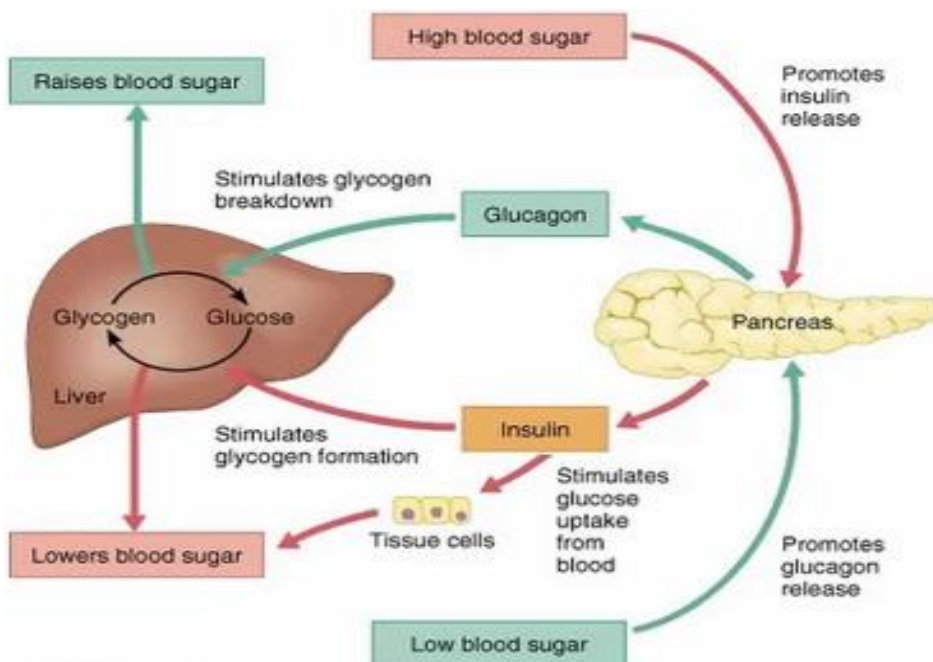
Figure 1. Illustration of insulin/glucagon regulation of blood sugar (ATrain Education, 2023).

Fat and protein reserves are mobilized and transformed into glucose to provide energy if there is insufficient insulin generated or if insulin action is flawed. To break down lipids and carbs, Pancreas secretes digesting enzyme into the duodenum through a pancreatic duct (exocrine function).

It immediately releases the chemicals glucagon and insulin into the blood (endocrine function). Several interrelated hormones, including insulin, glucagon, adrenalin, cortisol, and the incretins, as well as nutritional factors like liver and muscle glucose store, the type of food consumed, exercise frequency and intensity, and tissue sensitivity to insulin, all work together to maintain glucose homeostasis. (Dunning, 2012; Cowap & Parry, 2015).

The presence of diabetes is indicated by a number of factors, as highlighted by Ramachandran (2014). These include blood glucose readings higher than 11 mmol/l on multiple occasions, more than seven mmol/l of fasting plasma glucose, impaired results from oral glucose tolerance tests (OGTT), and more than 47.5 mmol/mol of glycosylated hemoglobin.

2.1   Types of Diabetes

Evidence supports that there are different forms of diabetes such as Maturity Onset Diabetes of Youth (MODY), Mitochondrial diabetes, Secondary diabetes, Diabetes following pancreatectomy, Gestational diabetes, Latent autoimmune diabetes in adults (LADA), type 1 and type 2 diabetes (Yki-Järvinen &Tuomi, 2022). Many researchers believe that out of these rare forms of diabetes, type 1 and type 2 diabetes are the main types of diabetes. However, research by Saeedi et al. (2019), showed that the three main forms of diabetes are gestational diabetes, type 2 diabetes, and type 1 diabetes.

Type 1 Diabetes

This is also called juvenile or onset diabetes. commonly known as an insulin-dependent form of the disease. Type 1 diabetes is caused by the death or malfunction of the pancreatic beta cells, which are responsible for making insulin. The body produces either too little or no insulin as a result of beta cell injury. Most type 1 diabetes instances involve the immune system attacking and killing beta cells in the wrong place (Diabetes teaching center, 2018). This study further pointed out that antibodies against insulin, anti-islet cell, or anti-GAD, which stand in for the autoimmune processes that have led to the loss of beta cells, are typically present in type 1 diabetes. Hence, a laboratory blood test can find the indicating symptoms of this destruction. It searches for markers. The markers include insulin autoantibodies (IAA)., glutamic acid decarboxylase antibodies (GADA), islet cell antibodies to membranous tyrosine phosphatase (ICA-512), and islet cell antibodies (ICA).

On the contrary, these multiple clinical tests ought not to be utilized in alone to avoid the misclassification of type 1 diabetes which is common in adults (Thomas et al., 2019) with type 2 diabetes being the initial diagnosis for more than 40% of people with type 1 diabetes after thirty years old (Thomas et al., 2019; Holt et al., 2021). As revealed by Holt et al. (2021), a lower diagnostic age is one of the most frequent characteristics.

Type 2 Diabetes

According to the Diabetes Teaching Center (2018), type 2 diabetes occurs when the tissues are insulin-resistant and Insufficient insulin levels prevent this resistance from occurring. It further noted that type 2 diabetes accounts for 95% of cases worldwide, making it the most common kind of the disease. In 2018, the Diabetes Teaching Center pointed out older age, obesity or overweight, passive life and heredity as the primary risk elements for type 2 diabetes.

Other risk factors includes increased blood pressure, Low levels of HDL, sometimes referred to as high-density lipoprotein (HDL), and high blood levels of fats(known as triglycerides), Prior pre-diabetes diagnoses, such as glucose intolerance or high blood sugar, a history of having kids who were above 9 pounds in weight or having diabetes while pregnant in women, near relatives who have a diabetic family history, having a heritage that is either African, Asian, Native American, Latino, or Pacific Islander (Yki-Järvinen &Tuomi, 2022).

Statistics by the Diabetes Teaching Center (2018) revealed that type 2 diabetes has a wide range of genetic or molecular reasons, resulting in increased blood sugar levels. It noted that type 2 diabetes could only occur if you are born with a genetic predisposition. Consequently, there is currently no one genetic test available to identify type 2 diabetes risk. Responding to treatment comes in a variety of ways because there are a large variety of hereditary factors. You could only need a diet modification to get better, or you might require a variety of medications (Diabetes Teaching Center, 2018).

Gestational Diabetes

Diagnosis of diabetes during pregnancy is referred to as gestational diabetes. The mother's body's ability to use insulin may be affected by pregnancy hormones, which could result in high blood sugar levels during pregnancy. At 24-28 weeks of pregnancy, women are routinely checked for gestational diabetes; however, if there are risk factors, earlier screening may be adopted (Rasmussen et al., 2020).

A family history of diabetes, being overweight, or being older than 25 are all risk factors for developing gestational diabetes. Asian, American Indian, Hispanic, and black women are more prone than other women to develop gestational diabetes. Notably, the majority of women will have normal blood sugar levels after giving birth, while 20–50% will acquire type 2 diabetes within 10 years. It is advised to screen frequently. The best prevention method is to maintain an active lifestyle, eat healthily, and manage weight (Saeedi et al., 2019., Diabetes teaching center, 2018). Table 1 below summarizes in detail diabetes subtypes and characteristics of these sub types.

Diabetes subtypes	characteristics
Type 1	- Childhood onset. - Insulin dependent. - The immune system kills beta cells by mistakenly targeting them
Type 2	- Mostly adult onset. - Characterized by insulin deficiency or insulin resistance. - Caused by presence of excess sugar in the body in the bloodstream. - Risk factors can include both unchanged and controllable factors.
Type 3	- Also called pregnancy diabetes - Insulin is affected by pregnancy. - Periodic checkup is encouraged 24-28 weeks.

	• Other factors such as race, family history, passive life and obesity can cause it.

Table 1. A summary of diabetes subtypes and characteristics

2.2   Epidemiology of diabetes

537 million adults worldwide have diabetes which indicates approximately 1 in 10 persons (International Diabetes Federation, 2021). It also estimated that by 2030 and 2045, the population will increase to 643 million and 783 million, respectively. The world population is extensively ageing. Hence, this development has significantly increased the number of old people suffering from diabetes (WHO, 2021).

In 2021, International Diabetes Federation (IDF) reported that Impairment in glucose tolerance puts 541 million adult persons at elevated risk of developing type 2 diabetes. Old age is often associated with a decline in body functions which may lead to increased presence of disabilities. However, as people age their risk of developing diabetes type 2 increases (Sinclair et al., 2013).

Diabetes prevalence varies widely among European nations, with age standardized comparative prevalence in 2023 ranging from2.4% in Moldova to 14.9%in Turkey. In Europe as a whole, the projected 2013 raw prevalence of diabetes was 8.5%, or 56million cases aged (20 to 79), while the age-standardized prevalence was 6.8% (type 1 and type 2 diabetes -known and undiagnosed). Between European high-income nations like Denmark, Finland and United Kingdom and low-income European nations like Kyrgyzstan. The estimated percentage of undiagnosed diabetes ranged from 36.6% to 29.3%. Based on a population-based survey conducted in 2010 TURDEP II that includes extensive phenotyping and diagnosis, Turkey was predicted to have the highest age-standardized diabetes prevalence in Europe at 14.9% (Tamayo et al., 2014)

The Finnish Diabetes Association (n.d.), reported that out of Finland's 5.5 million inhabitants. Diabetes type 1 affects 50,000 persons, whereas type 2 affects 400 000. There are about 50,000 cases of type 2 diabetes that have not yet been diagnosed. Studies have shown a progressive rise in the global prevalence of diabetes in recent years (Pouya et al., 2019, Maffi & Secchi, 2017).

Maffi & Secchi (2017) examined the high rate of renal disease, its associated complications, and the loss of eyesight experienced by people in developed countries are significantly associated with diabetes. The study further stated that renal replacement treatment is used in about 40% of both type 1 and type 2 diabetic patients. Although neuropathy is obviously the most common diabetes complication, retinopathy and advanced retinopathy has also been on increase, especially after 40yrs of diabetes. Based on epidemiology study, when compared to the general population, diabetes patients more especially women experienced a fivefold increase in death while cardiovascular mortality climbed to 20 to 30- fold (Maffi & Secchi, 2017). This shows that diabetes not only poses a great treat to the public health but also stand as a risk factor to some other deadlier diseases.

2.3 Older People and Diabetes

The term "older people" is frequently used to refer to people who are over the age of 65 and have reached retirement age. Although the United Nation has not yet established a set numerical threshold, it has decided that the older people are those who are 60 years or older, but also points out that it is also very individual how an older person is defined, this is in relation to the fact that many retired persons have been found to enjoy good health, and hence old age may not only be defined chronologically but also biopsychosocial aspect contribute to how individual age (United Nation, 2013).

Therefore, aging should be based on factors such as, biological indications, social functioning, and everyday activities of a person, hence in the care of older people suffering from diabetes, it is of utmost important not to focus the care plan on the treatment of high and low glucose level alone but also consider other care needs (Sinclair et al., 2013; United Nation, 2013).

The concept of older people has become more relevant in recent years with the populace aging and this affecting the whole society, especially the nursing field. That is why it is vital that the concept of older people is clearly defined. In this paper, the question of who an older person is will be tackled. The National planning framework (2021) definition of an older person together with (UNHCR, 2013) defined an older person by combining social-cultural variations and health-related considerations, and the Definition of an older person from the United Nations handbook.

According to UNHCR (2013), the definition can affect socio-cultural references, to define age in different societies, health condition of the person, and physical appearance. Studies by (Laiteerapong et al., 2018; UNHCR, 2013) bring forth a historical perspective that in different historical times, the definition of an older person has been changing. Also, considering social and cultural factors how society defines older people affects who and what kind of people are seen as ''older people''. These same points came forward in both sources used. By these definitions, it could be determined that subjective and objective factors affect how societies define who is an older person and how this kind of status is defined. What is defined as an older person is different in different social and cultural contexts and time periods.

Although there is no generally agreed definition of older people at the time of authoring this paper, some factors bring us closer to finding a more general definition for an older person. These factors are mostly health-related, physically, and socially related. United Nations (2013) and UNHCR (2013) both bring forward that, one can determine an older person based on health, physical looks, and social (like family hierarchy) factors. On these social factors, family-related factors matter the most because family status can affect who is seen as an older person when more younger generations come into being.

United Nations also depicts that the rate of aging is different based on location and circumstances that is war, poverty, and sickness affect the rate at which a person ages for example can age someone quicker. This creates before mentioned reasons considering health in the determination progress. Defining an older person is a process that many factors affect. It affects social, cultural, and health-related factors. One who is seen as an older person in one society may not be seen so in another. But some factors do affect making defining an older person universal in some ways like health and family relationship-related factors (UNHCR, 2013).

Laiteerapong et al. (2018) argued that It is challenging to develop broad guidelines for the care of the elderly diabetic community due to its significant diversity in regard to ethnicity or race, the duration of their diabetes, comorbidities, and functional level. It has been determined that about 25% of elderly diabetics have heart problems. Senior illnesses are also widespread; of those with diabetes over fifty percent experience chronic pain, and two thirds have at least a single functional impairment (Laiteerapong et al., 2018).

All recognized geriatric problems, such as cognitive decline, frailty, accidental weight loss, polypharmacy, and functional impairment, are made more likely by diabetes, including cardiovascular and microvascular complications, mortality, and functional impairment. Also, the evidence to support measures to prevent the geriatric problems linked to diabetes is less clear (Feng et al., 2018.; Laiteerapong et al., 2018). Routine screening for geriatric illnesses such as dementia, depression, falls, and hypoglycemia, noting that this may be particularly crucial in older persons due to the possible barrier that these conditions may offer to diabetes self-management (Sinclair et al. 2013).

Hyperglycemia, hypoglycemia, obesity, vascular problems, physical inactivity, and malnutrition are significant risk factors for cognitive impairment in older persons with diabetes (Tamura et al., 2020). Cognitive dysfunction and frailty are directly related to the mechanisms of aging. Cognitive impairment can then lead to verbal and visual malfunction. Weak processing of information, vascular dementia can eventually lead to the occurrence of Alzheimer disease. Since the normal body functioning of the patient is compromised, insulin processing, that is both resistance and its secretion, is also highly expected thus furthering and worsening the effects of diabetes (Tamura et al., 2020).

Other possible occurrences due to the decline of cognitive factors and frailty include chronic inflammation, poor glycemic functioning, the decline of the performance of a physical activity, oxidative stress, improper mitochondrial function, and due to lack of healthy eating, malnutrition leads to further damage in the body or the development of obesity (Tamura et al., 2020).

The proportion of adult diabetics who are 65 years of age or older is approximately 39.5%. Of people 65 years of age and older, 16% do not realize they have diabetes, and 20% to 21.4% have a confirmed diagnosis based on glycosylated hemoglobin (A1c), fasting plasma glucose, or oral glucose tolerance testing. Between 1997 and 2010 there was a 62% increase in the prevalence of diabetes among the elderly (Laiteerapong et al., 2018).

2.4 Nursing roles and diabetes

Professional nurses are tasked with leading a patient to a position of good health and general well-being. This means that, there is a vivid and elaborate evolvement of the nurse's roles throughout

the years which include more responsibilities like first aiding, caregiving, decision making, teaching, being part of a team to achieve possible best health for the patient and advocating for the overall health and well-being of the patients.

According to research by Jasemi (2017), nursing is not just a therapeutically focused profession but also a more comprehensive holistic one that involves patient-centred care, communication with patients and their families, and consideration of cultural and religious views in addition to patients' feelings and emotions.

The nurse's dual role as an educator and an advocate in diabetes care is crucial (Jasemi, 2017). The identification of risk factors that could have initiated the development of diabetes and the comprehension of the patient's lifestyle with respect to physical activity, dieting, or obtaining the contributing factors through efficient assessment and education serve as examples of these nurse's roles (Alotaibi et al., 2017).

By lowering the likelihood of being overweight or developing type 2 diabetes, the major goal of diabetes prevention is to make sure that insulin is being activated in our bodies. This clarified the significance of exercising. However, it is emphasized of course with relation to eating well and losing weight (Sanz et al., 2010). The promotion of physical activity not also aids in preventing diseases like diabetes but also reduces on cost in the healthcare system generally. The responsibility of educating and informing patients all fall under nursing intervention (Gillett et al.,2012).

Comprehending the functions of a nurse in the treatment of diabetes is essential for the healthcare system to advance progressively in diabetes management. But the main question is: Are the nurses competent to provide this care? Research by (Diabetes UK, 2019) claimed that there is a noticeable lack of professional understanding on this subject, and as a result, nurses who are meant to be experts in providing treatment are unable to control blood sugar levels in older diabetic patients to prevent hypoglycaemia and manage the illness.

Diabetes care is extensively individual and personalised care such that every patient has a unique care plan and insulin, and blood sugar level should be correctly calculated and with this, the result

should be accurate and intact. The Institute of Diabetes for Older People has appealed to improving nursing care by imposing strict rules in nursing homes (Anderson, 2014). This depicts the importance of not only equipping your knowledge and skills as a nurse in the care of diabetic patients, but also updating the necessary skills.

To effectively manage diabetes, it is crucial to thoroughly understand all aspects of insulin, including type, duration of action, dosage, calculation and balancing, concentration, technology used during injection, location, and position of the needle, including how far it should go, degrees at which the needle should be held, and overall technique. (Becker et al.,2012).

Transferring knowledge to older diabetic patients is a good idea for nurses as it can optimize care and provide clarification, hence reducing unfavourable outcomes (Wayne, 2014). Additionally, it is important to note that older patients' diabetes care is a bit more complex as the clinical and physical function, manifestation, signs, and advancement in the disease do not always appear in a comparable manner. Regarding this, emphasis is placed on understanding each patient's unique situation and precisely what kind of care is appropriate for them, demonstrating that different nursing treatments are necessary for various patient types (Becker et al., 2012; Wayne, 2014).

Older patients who have good normal body function can be helped by using long term diabetes management interventions for which other younger patients would normally use. Those that are to an extent affected by some disorders due to the disease can do with the use of relaxing the requirement of controlling blood sugar in an appropriate way as they do not aid to reduce microvascular complications (Fonseca, 2010).

Those with poor blood sugar can have acute complications like poor wound healing, Hyperglycaemia and coma should at least be spared of the goal of blood sugar control to avoid the effects (WHO, 2018). Therefore, nurses need to properly assess and decide the best care management for the patient's survival and well-being or what goal should be achieved first or set as priority.

3   Methods

3.1   Aim, purpose, and research questions

This literature review was aimed at establishing nursing interventions in the care of older people with diabetes from existing literatures. The purpose was to show what interventions nurses can adopt towards caring for older persons suffering from diabetes. The research question guiding this literature review was:

What are the nursing interventions in the care of older persons with diabetes?

3.2   Literature review

In nursing, literature reviews have gained popularity over the past two decades as a method to compile data and information that is specific to the nursing profession. Even though various approaches towards undertaking a literature review exist, the various approaches have been found to have similar characteristics (Aveyard & Bradbury-Jones, 2019).

To answer the research questions, a literature review approach permits an incredibly extensive and clear evaluation of existent previous research. To systematically search, select, appraise, and synthesize pertinent published and gray literature appropriate to address the research question of this study, this method uses a credible and reproducible methodology.

This literature review followed the four steps as elaborated by Aveyard & Bradbury-Jones, (2019). The first step which involves searching, literature that answered to the topic was searched from two scientific databases, CINAHL and Medline. In the second phase, article selection was done using a prescribed inclusion criteria and by both writers of the literature review. In the third phase, selected articles were appraised for quality by using JBI/HAWKER appraisal tool. In the fourth and last stage the results from the selected and appraised articles that answered to the research question were analyzed and formed the final outcome of this literature review.

3.3 Data search

Data were searched from three scientific databases using a preformulated inclusion and exclusion criteria against PICOs. Studies were included if they were published in English, peer reviewed, published between 2013 -2023, full text were available and free for JAMK students and answered to our research question. All studies that did not meet these criteria were eliminated. Table 2 below shows the inclusion and exclusion criteria.

Study inclusion criteria	Study exclusion criteria
- Published in English - Peer reviewed. - Published between 2013 -2023 - Fulltext were available and free for JAMK students. - Answered to our research question.	All other studies that never met the inclusion criteria were excluded

Table 2. Inclusion and exclusion criteria.

Population, Interest, Context, and studies (PIC0s), criteria were used towards refining the search criteria. This is elaborated in table 3 below.

P	**Population:** Diabetic older people
I	**Interest:** Nursing interventions
Co	**Context:** Diabetes care
S	**Studies:** Published in English, Peer reviewed, published between 2013 -2023, Full text were available and free for JAMK students, Answered to our research question.

Table 3. PICOs

The following key search words in table 4 below were established to help the writers search for literatures that answered to the topic and addressed the research question of this study.

Older people OR older adults OR seniors OR geriatrics
AND diabetes
AND nursing interventions OR nursing care OR nursing support OR best practice OR nursing treatment

Table 4. Key search words

3.4 Data selection and critical appraisal

In this data selection phase, articles were selected by both writers using the inclusion criteria. Also, both writers agreed to separately select the data and come together to carry out the screening and final selection. This helped the writers not only to effectively select the required articles but also minimize time waste. Two scientific data bases CINAHL and MEDLINE were used for data retrieval. A total of N=262 articles were retrieved. In the identification phase, a total of N=90 duplicates were identified and eliminated. Both writers performed the first screening of N=172 articles by carefully reading their titles and abstracts. A total of N=100 articles were excluded because of wrong population and a sum of N=32 articles were removed due to failure to answer research question. Hence, N=40 articles remaining at this stage which both writers further screened by reading the full text. A total of N=30 articles were removed because of wrong outcomes. A total of N=10 articles were selected by both writers and analyzed for results. PRISMA flowchart in figure 2 was established by the writers to show different phases used during data selection.
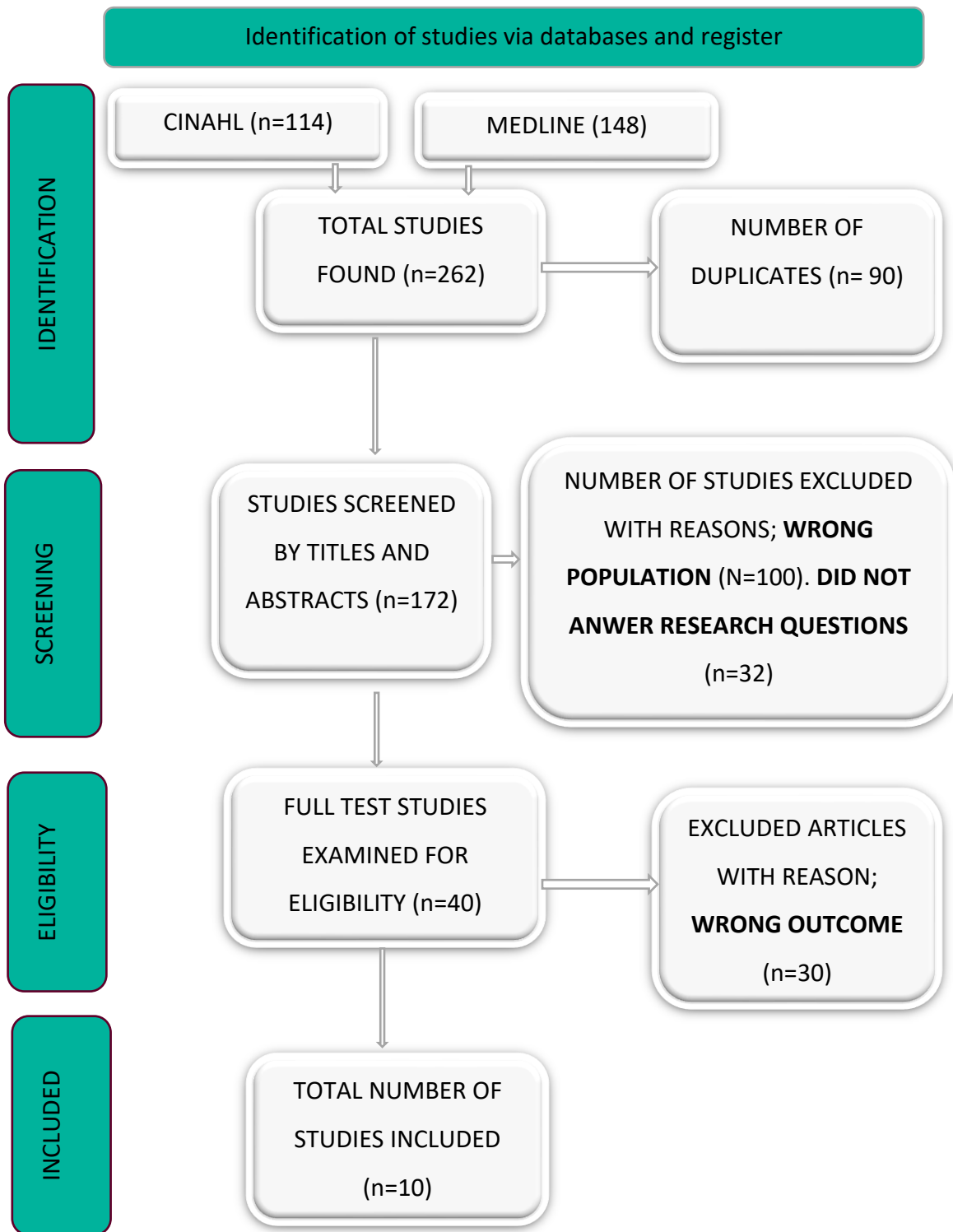
Figure 2. PRISMA chart

The writers carried out critical appraisal for the N=10 selected articles to ascertain their qualities using Hawker et al. (2012) appraisal tool. The essential components of critical appraisal (Hawker et

al., 2012) includes abstract and title, introduction and aims, method and data, sampling, data analysis, ethics and bias, results, transferability, usefulness, and implication. The grade for these components ranges from 1, 2, 3, and 4, which correspond to very poor, poor, fair, and good, respectively. An article with a maximum score of 36 points indicates high quality while an article with minimum points of 9 shows low quality. Among the N=10 selected articles, a minimum of 25 points and maximum of 35 points were obtained. These scores show that all the chosen articles were of good quality and will be analyzed for result. (Appendix 1 summarizes in detail the critical appraisal of the selected articles)

3.5   Data analysis

Inductive content data analysis aims towards establishing themes, categories and concepts that represent different similar and dissimilar categories (Kyngäs et al., 2020; Elo & Kyngäs, 2008). Inductive content analysis and analysis process which involves reduction of data from key findings, meaning units, open codes, subcategories, categories, to main categories were used to analyze the selected data (Elo et al., 2014; Kyngäs et al., 2020).

The writers adopted Kyngäs et al. (2020) content analysis which follows three stages (preparation, organization, and reporting). The first stage contains key findings, meaning units and open codes. At this stage, data were read and important information that answered to the research questions were recorded. In the second stage, data were classified into subcategories and categories, hence, corresponds to permitting categories and similar content analysis from a selected article to generate a concept. The main categories were formed in the third stage. These main categories represent different concepts that answered to the research questions (Kyngäs et al., 2021).

This inductive analysis tries to produce fresh insights and avoided copying the established fundamental understanding of the analyzed articles (Kyngäs et al., 2020, Elo et al., 2014; Graneheim et al., 2018). The first stage involved the establishment of 48 key findings, 47 meaning units were extracted and grouped into 45 open codes, 20 subcategories of comparable and dissimilar contents were created and arranged into 14 categories. Finally, 3 main categories summarized the outcome of this data analysis.

Main Categories	Categories
Patient teaching	Education, Information, Selfcare, Goal setting.
Nursing care	Assessment, Care planning, Nutrition, Electronic care, Support, and encouragement.
Follow up and medication	Insulin therapy, Monitoring and evaluation, reviewing, diabetes medication.

Table 5. Outcome of data analysis

4 Results

The N=10 study papers analyzed in this research were published each in the year (2016), (2018), (2022), (2020), (2015), (2021), (2021), (2018), (2017), and (2016). The following countries are where these studies were carried out, Norway, United Kingdom, Italy, Taiwan, London, Canada, Slovenia, Brazil, Korea, and Brazil.

Three main categories represented the outcome of the analyzed data. Patient teaching was the first main category, and it elaborated the type of professional instructions given to the diabetic older people by nurses which may not involve the collaboration of other healthcare professionals. The second main category was nursing teaching which demonstrated guided nursing care that requires the services of other healthcare professionals. The third main category was Follow up and medication which presented nursing care targeted at avoided further complications caused by diabetes. The findings of this analysis provided a more detailed perspective on the nursing intervention in the care of diabetic older people. The findings are detailed below.

4.1 Patient teaching

Education

Diabetic patients' education was established to be significant in the care of older people with diabetes (Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Northwood et al., 2021; Lorber et al., 2021; Linhares et al., 2018, Kim & Kim, 2017; Fernandes et al., 2016). Education about diabetes should be targeted to promote self-management (Luciani et al., 2022). However, McClinchy (2018) maintained that diabetes education should follow individualized approach, considering the educational level, cognitive ability, and general functionality of the patient. Significant factors such as glycemic control, blood glucose check, symptoms of hyperglycemia and hypoglycemic, diabetes induced health complications, environment related safety should be properly identified in diabetes education (Claydon & Spencer, 2015; Haugtsvedt et al., 2016; Lee et., 2022). In addition, educational materials should be reliable, easy to access and affordable (Northwood et al., 2021; Lorber et al., 2021; Linhares et al., 2018, Kim & Kim, 2017; Fernandes et al., 2016).

Information

It was found that nurses provided diabetic patients especially the less privileged ones with the proper information on how to obtain social, financial, and material support (Northwood et al., 2021). Patients were informed about several government supported and non-governmental programs that promote diabetes care (Northwood et al., 2021; Lorber et al., 2021). Diabetic patients are provided with well guided information on how to access the healthcare (Northwood et al., 2021; Lorber et al., 2021; Haugtsvedt et al., 2016) where and how to dispose used materials such as insulin pen, lancet and test strip (Haugtsvedt et al., 2016).

Selfcare

Selfcare was identified as a tool that promoted patient's understanding of own wellbeing and allowed the patient to participate and take charge of own sickness (Luciani et al., 2022; Lee et al., 2020; Kim & Kim, 2017). Selfcare is a crucial part of diabetes management and should not be neglected (Luciani et al., 2022). Older people with memory and physical function challenges need nursing support in their selfcare (Kim & Kim, 2017). Study conducted by Luciani et al. (2022), revealed that selfcare is significant in the care of diabetic older people especially when access to healthcare is restricted or poor. For instance, the experience of covid 19 pandemic promoted the use of selfcare and directed diabetes education towards selfcare management (Lee et al., 2020; Luciani at al., 2022). Older people with physical and mental function challenges were encouraged to participate in their own care according to the level of their capacity with guided nursing support as revealed in the study by Lee et al., (2020).

Goal setting

Goal setting was outlined as an objective which is achievable and serves as a strong motivational tool in diabetic care management (Lorber et al., 2021). Setting a goal helped the patient to understand the target and aim towards achieving them (Lorber et al., 2021; Northwood et al., 2021). Several goal settings that were associated with diabetes management included lifestyle goal, glycemic level, weight loss and patient safety goals as outlined by Lorber et al., (2021). Every properly outlined

diabetes care goals as according to (Lorber et al., 2021; Northwood et al., 2021) had a guided process of achieving them.

4.2   Nursing care

Assessment

Analyzed research papers showed that Every patient exhibited different symptoms depending on factors such as age, type of the diabetes condition they have, severity and risk factors that encouraged progression of the disease (Lee et al., 2020; Luciani et al., 2022; Haugtsvedt et al., 2016; McClinchy, 2018). It was therefore suggested that nurses should first get properly equipped with proper nursing assessment skills through education and research that involved, practical training, visual aids, and theory lessons to be able to carry out individualized care thereby managing the stay at hospital and enhancing general diabetic care (Haugtsvedt et al., 2016: Linhares et al., 2018; Kim & Kim, 2017; Fernandes et al., 2016). Assessment was determined from the physical assessment through observation, identifying signs and symptoms and the medical assessment that involved tests and screening (Haugtsvedt et al., 2016; McClinchy, 2018).

Care planning

After identifying the relevant information that a diabetic patient individually exhibited, nurses were required to set targets that are personal for them to meet the patients' requirements (Claydon & Spencer, 2015; Northwood et al., 2021; Kim & Kim, 2017; Fernandes et al., 2016; Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al., 2022; Lee et al., 2020). Care plans were identified to be relevant even at the end-of-life care with consideration of the kind of modification that was regarded as imperative as they supported patients through this challenging period of the condition (Claydon & spencer, 2015).

Support and encouragement

It was deduced that having a good relationship established between the nurses and the diabetic patients provided the foundation of successful type of care for the condition (Kim & Kim, 2017;

Fernandes et al., 2016; Linhares et al., 2018). Involving patients and families of the ones that are affected helped create a multi-professional approach thus making the care smooth and fulfilling (Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Northwood et al., 2021; Lorber et al., 2021; Linhares et al., 2018; Kim & Kim, 2017; Fernandes et al., 2016). Information about where to obtain financial assistance was discovered to be very helpful as a lot of funds are required to make this type of care possible (Kim & Kim, 2017; Fernandes et al., 2016; Linhares et al., 2018). Study by Claydon & Spencer (2015) revealed that nurses support and encouragement promote patients' feelings of not being alone in the care process.

Electronic care

Electronic care is a type of diabetes care provided by nurses to the patients through audio, audio-visual, live chat, written messages, and other electronic means that are devoid of physical contact (Luciani et al., 2022). It was established to be an effective, fast, and accessible means of care giving hence, reduces time waste during care (Luciani et al., 2022; Lee et al., 2020). For instance, as established by Luciani et al. (2022), at the peak of COVID19 pandemic, electronic means were sought and found to be a crucial means to handle diabetes care as there was less physical contact between patients and nurses. Through audio visual means, a patient can call for care guidance while the nurse watches and guides the patient through the required care procedures (Luciani et al., 2022; Lee et al., 2020). This type of care proved to be an effective means of caring for diabetic patients and should be properly promoted (Luciani et al., 2022).

Nutrition

Older people were discovered to have various reasons that would suggest why their nutrition is not balanced or why they mostly face malnutrition (Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Northwood et al., 2021; Lorber et al., 2021). These factors included factors like having similar diets for a long period of time, declining ability to taste and smell, aging in particular, increased muscle mass that reduces demand for energy and the inability to move due to inactiveness (Haugtsvedt et al., 2016; McClinchy, 2018). As a result, there were actions to be considered to ensure that nutrition is improved ,these actions include, assessing for malnutrition risks, planning meals that are balanced and rich in proteins and

energy ,encouraging mobility and living in conducive environment that enhanced nutrition intake (Haugtsvedt et al., 2016).

4.3 Follow up and medication.

Insulin therapy

Insulin therapy was established to be vital in the process of glycemic control, especially in type 1 diabetes (Haugtsvedt et al., 2016; McClinchy, 2018; Northwood et al., 2021; Lorber et al., 2021; Linhares de Carvalho et al., 2018, Kim & Kim, 2017; Fernandes et al., 2016). Diabetic older people with psychological and physical capacity could administer insulin independently (Haugtsvedt et al., 2016). However, they required quality follow up from the nurses to ascertain how effectively they use the insulin (Northwood et al., 2021; Lorber et al., 2021; Haugtsvedt et al., 2016). Important factors such as insulin administration routes, fasting and non-fasting glucose level, carbohydrate count, short and long-acting insulin, what to do when insulin dose is missed should be part of insulin therapy follow up (Haugtsvedt et al., 2016). The use of insulin pump has helped both dependent and independent older diabetic patient to administer insulin independently (Lorber et al., 2021; Haugtsvedt et al., 2016). More knowledge and use of insulin pump should be promoted (Haugtsvedt et al., 2016).

Monitoring and evaluation

Blood and sugar monitoring are key components that showed the pattern of glucose in response to all presiding forms of treatment that a patient has undergone, and this helped to identify what should be eradicated and improved as far as care is concerned for an individual suffering from this condition and could also be used to support diagnostic reports (Haugtsvedt et al., 2016; Northwood et al., 2021; Kim & Kim, 2017). Monitoring also meant regular assessment, key tests that are needed by a patient and general observation of how one responded to treatment (Haugtsvedt et al., 2016). Monitoring laid the foundation for the next step which was identified as evaluation. This was where nurses give a report of values that were obtained from monitoring and begin planning for treatment based on individual patient results from monitoring depending on how unique the condition pre-sented itself (Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al. ,2022; Lee et al., 2020; Claydon

& Spencer, 2015; Northwood et al., 2021; Lorber et al., 2021; Linhares et al., 2018; Kim & Kim, 2017; Fernandes et al., 2016).

Reviewing

Diabetes care has been established to be very individual for anyone experiencing it (Haugtsvedt et al., 2016; McClinchy, 2018; Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Northwood et al., 2021; Lorber et al., 2021; Linhares et al., 2018, Kim & Kim, 2017; Fernandes et al., 2016). Therefore, nurses need to identify what type of care is given to who for instance, people who are at the end-of-life care do not have the same care plan as those that have diabetes 1 condition and are mobile. Due to this, there should be constant reviewing of care to confirm for any changes expected as far as evidence-based information and the pattern of responding to treatment is concerned such that nothing is missed or termed as irrelevant when giving care and to limit side effects that are possible because of the present outline of care (Claydon & Spencer, 2015).

Diabetic medication

Apart from the non-pharmacological approach of handling diabetes conditions, it was established that various forms of pharmacological care used in diabetes treatment predominantly through the use of medication (Claydon & spencer, 2015; Lorber et al., 2021; Linhares et al., 2018; Fernandes et al., 2016). Medication prescribed depends on the type of diabetes one has, and according to the individual patient's current condition (Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Lorber et al., 2021; Linhares et al., 2018; Fernandes et al., 2016). The key factor to ensuring that medicine serves the right purpose was adherence (Luciani et al., 2022). Nurses have a role to administer the prescribed medication (Luciani et al., 2022; Lee et al., 2020), and guide patients on how to take the medications independently (Luciani et al., 2022; Lee et al., 2020; Claydon & Spencer, 2015; Lorber et al., 2021; Linhares et al., 2018; Fernandes et al., 2016).

5 Discussion

This literature review was conducted towards establishing the nursing interventions in the care of diabetic older people. The result from this study shows that nurses render electronic care to the diabetic patients especially when there is need for urgent care and difficult access to healthcare. We found that diabetic older people with good cognitive and physical functioning benefit from this type of care.

Evidence showed that diabetic older people were associated with diabetic retinopathy (Leley et al., 2021) aging and diabetes are significant factors for hearing loss (Oh et al., 2014). Hence, these militating factors make it difficult for most diabetic older people to participate in the electronic means of diabetes care (Leley et al., 2021; Oh et al., 2014). Our findings established that quality assessment of patients' awareness to reality, cognitive ability and physical function ability should be caried out prior to electronic care. Luciani et al. (2022), established that electronic care keeps older diabetic patients motivated and helps them participate actively in their own care.

Diabetes education improves self-care performance, medication adherence, and the proportion of patients who reach therapeutic goals (Fan et al., 2016). This is consistent with this study's results that diabetes education should be directed to the specific needs of each patient and should emphasize improving self-care. Evidence revealed that effective diabetes education is based on the patients' level of intellectual prowess (Fan et al., 2016), and the choice of language should be clear, direct, and easy to understand (Werfalli et al., 2020; Fan et al., 2016). There is a need for educational resources to be offered in the form of straightforward messages, delivered in ways that interest older persons with diabetes and focusing on their individual requirements to improve the success of diabetic education in older people (Werffalli et al., 2020).

In this review, selfcare was established to be significant in the care of diabetic older people. Study by Touati et al. (2011) shows that physical functioning, cognitive ability, psychosocial ability and understanding of diabetes as a disease are important factors assessed prior to selfcare of diabetic older people. For it to be effective, it is vital to ensure quality individualized selfcare guidelines and a follow-up support (Pennbrant et al., 2020; Pizzol et al., 2019; Touati et al., 2011). This literature found that selfcare provided older people with diabetes the opportunity to take active part in owns wellbeing management. However, previous studies showed that attitudes and beliefs about

health and illness change negatively, and perceptions of their disease's severity frequently decrease as people get older (Pennbrant et al., 2020; Oh et al., 2014).

Nutrition as illustrated in this study is vital for the management of diabetic older people. Early in childhood, one develops food habits that are influenced by a variety of factors (Stanley, 2014). However, nutritional plan that limits dietary options or long-standing eating habits may be rejected outright by older persons with established eating habits (Donna & Carrie, 2014; Stanley, 2014). This supported the presented findings that the risk of malnutrition is associated with prolonged eating of a similar diet. The dietary needs of each patient should be taken into consideration while developing meal plans, and success depends on having a realistic plan (Stanley 2014; Donna & Carrie 2014). It is best to implement initial strategies that do not significantly modify the existing eating habit (Stanley, 2014).

This study demonstrated the efficacy of insulin therapy in maintaining glycemic control in diabetic older people, especially in type 1 diabetes. We found that the use of insulin pump is significant in the glycemic control of older people with diabetes. In line with the findings of this present review, previous studies have shown that insulin pump therapy improves and sustains glycemic control in individuals with type 1 and type 2 diabetes of all ages (Almogbel, 2020; Evans et al., 2019; Karges et al., 2017).

Support and encouragement were illustrated to have promoted the relationship between nurses and diabetic order people. We established that this helps to create a conducive care environment where older people with diabetes are motivated to adhere to care processes. Further evidence has been provided that, patients with diabetes who receives supportive care from their healthcare providers are more likely to adhere to their treatment plan, feel more in control of their own care and show improvement in their blood control and overs all care processes (Rad et al., 2013).

6   Ethical considerations

The ethics code of conduct in nursing care is a norm that is indispensable to purse. To distinguish between nursing care practice and other types of research, this literature review complied with good academic and scientific practice, and research ethics (Clerk, 2019). To ensure reliability, data was selected using critical appraisal and only articles that met the criteria and were of high quality were chosen (Goard, 2015). The thesis supervisor was constantly referred to and reviewed this study to ensure that the writers follow JAMK thesis reporting guidelines.

To prevent plagiarism, all the data and articles utilized for this review were acknowledged using in text citations and listed in the references section (Bierer & Barnes, 2014). Fair, true, and appropriate results are necessary for the research to be valid (El-Masri, 2013). To avoid bias, due to methodology, scientific data bases were used in data search and articles with different research methods were selected (Kaufmann et al., 2016). The process of research triangulation was crucial since it allowed two authors to pool their viewpoints and findings, which enhanced the research's overall quality and the literature review's overall conclusion (Noble & Heale, 2019).

Only peer-reviewed, English-language articles that were openly accessible to the public and JAMK students were used. The articles' dates were confined to 2013 to 2023 and they had to address the study issue. The fact that all of the papers included in this review were published in English limited the information acquired as well as its viability, transferability, and dependability. The research's reliability was impacted by the fact that the majority of the articles examined only had graphical information and may not have been the most recent, which could have affected the updated new results that may have happened subsequently.

7   Conclusion

Nursing interventions are essential in the field of caring for the elderly with diabetes. Nurses play a critical role in supporting well-being by managing medications and offering lifestyle advice. In order to provide a patient-centered care environment, their holistic approach considers both physical and emotional demands. By guiding the complex nature of their illness with individualized care and knowledge, interventions by nurses ultimately enable older adults with diabetes live better lives.

In order to stay up to date with the latest developments in diabetes treatment, nurses who provide care for older patients with diabetes may face difficulties such as a demanding workload, limited time, and ongoing education requirements. Significant challenges also include handling the varied requirements of older people and communication barriers across healthcare teams. To ensure that older diabetic patients receive the best care possible, overcoming these obstacles will require an integrated approach that includes more communication, regular training, and enough personnel.

Variations in health literacy, treatment plan adherence, and the existence of comorbidities are patient-related factors that impact the care of older adults with diabetes. A patient's capacity to adequately control their diabetes may also be impacted by cognitive problems. Individualized care regimens, encouraging adherence, and promoting general well-being in the management of diabetes in older adults require an understanding of and attention to these unique characteristics.

Improving the health outcomes of elderly diabetics can be greatly enhanced by utilizing electronic care. To ensure broad availability and efficacy, however, issues including affordability, cognitive limitations, and technological impediments must be addressed. An intelligent, comprehensive strategy that considers the particular requirements of this population will open the door to a more effective and integrated electronic health care system for the management of diabetes in older individuals.

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Appendices

Appendix 1. Articles selection and critical appraisal scoring

Author	Published year and country	Titles	Methods	Results	Total score (n=36)
Haugtsvedt, Aarflot, Igland,Graue, Landbakk	2016, Norway	Diabetes knowledge in nursing homes and home- based care services: a validation study of the Michigan Diabetes knowledge Test adapted for use among nursing personnel	Cross-sectional study	The need for diabetes education was found to be significant. Nurses identify individual diabetic patients' needs and set target that meet these needs. Insulin use was found to be relevant in the glycemic control. Nurses provide and guide diabetic patients on where to find evidence-based information in the overall management of diabetes.	32
McClinchy	2018, United Kingdom	Dietary management of older people with diabetes	Case study	Physical need assessment and assessment for malnutrition were found to be important in the overall	25

				management of diabetic patients. Individualized approach to diabetes care was found to be effective. A significant aspect of diabetes care in nutritional management. People suffering from diabetes require reliable diabetes education.	
Luciani, Bigoni, Canesi, Masotto, Fabrizi, Di Mauro, Ausili	2022, Italy	Self-Care of Adults with Type 2 Diabetes During the COVID-19 Pandemic: A Qualitative Interpretive Description Study.	Qualitative Interpretive Description Study.	Electronic health solution was found to be a vital means of diabetes management during Covid 19 pandemic. Balanced diet and physical activities were found to promote health and manage diabetes. Adherence to medication was found to be crucial in the care of diabetic patients. Nurses	34

				promote dia-betes selfcare. Nurses were important in the assess-ment and management of diabetic patients	
Lee, L., Tung, H., Tsay, S., Chen, Y., Lee, H., & Zeng, Y.	2020, Taiwan	Predictors for self-manage-ment in older adults with type 2 dia-betic nephropathy	cross-sec-tional correla-tion design	Physical func-tion evalua-tion was found to be crucial to the treatment plan for pa-tients with di-abetes nephropathy. Nurses guide diabetes nephropathy patients' medication selfcare. Healthy diet and exercise were found to be significant in the overall care of dia-betic pa-tients. Nurses intervene in diabetes health educa-tion and pro-mote selfcare	33
Claydon & Spencer	2015, London	Improving di-abetes care at the end of life	Qualitative descriptive	Nurses iden-tify end of life and make ef-fective diabe-	28

| | | | | tes manage-ment care plan. It was found that di-abetic pa-tients and their families needed relia-ble education on how to manage dia-betes. Re-viewing care plan was found to be significant in the care of people suffer-ing from dia-betes and lessens side effects associ-ated with treatment. Di-etary adher-ence was cru-cial for glucose con-trol. Nurses intervene in the medica-tion of diabe-tes care at the end of life. | |
| Northwood, M., Ploeg, J., Markle-Reid, M., & Sheri-fali, D. | 2021, Canada | Home-Care Nurses Expe-riences of Caring for Older Adults with Type 2 Diabetes Mellitus and Urinary In- | Interpretive Description Study | Nurses and interprofes-sional team were signifi-cant in the as-sessment and care of diabe-tes and uri- | 35 |

		continence an Interpretive De-scription Study		nary incontinence. Assessment of Social determinant of health and the general contributing factors were found to be significant in the management of type 2 diabetes and urinary incontinence. Diabetic and urinary incontinence patients require guidelines on how to monitor their blood sugar levels. Patients were instructed by nurses on how to obtain provincial financing for diabetes supplies. Regular exercise and proper diet were prioritized by nurses.	
Lorber, M., Kmetec, S., Mlinar Reljić, N., & Fekonja, Z.	2021, Slovenia	Diabetes management of older adults in nursing	A retrospective descriptive study	Nurses intervene in the glycemic and medication management of diabetic	33

		homes: retro-spective study		patients. Nurses evalu-ate the levels of depend-ency and in-dependence in diabetic pa-tients. Dietary management were found to be important in the care of people with diabetes. Dia-betic patients were found to require evi-dence-based information about their health. Nurses inter-vene in the detection and follow-up of diabetic compl-ications. Identifying each individ-ual patient's glycemic tar-get levels were found to be import in the care of di-abetic people.	
Linhares de Carvalho, S., Araripe Fer-reira, M., Pe-reira Medei-ros, J. M., Fer-reira Queiro-	2018, Brazil	Conversation map: an edu-cational strat-egy in the care of el-derly people with diabetes mellitus	Descriptive qualitative, experience report study	Nurses were important in the assess-ment and management of diabetic patients .It was found	31

ga, A. C., Rebouças Moreira, T., & da Silva Negreiros, F. D.				that diabetic older people need support and encouragement. Promotion of selfcare was found to be important in diabetic management. Nurses intervene in providing evidence-based health education for diabetic patients. Footcare was found to be significant in managing diabetic complications. Insulin therapy was found to be significant in maintaining glycemic level goals. Regular physical exercise and diet were crucial for glycemic control and overall care of diabetes and prevention of diabetic foot.	
Kim, H., & Kim, K.	2017, Korea.	Health-Related Quality-	Short Geriatric Depression	Early management of diabetes was	32

| | | of-Life and Di-abetes Self-Care Activity in Elderly Patients with Dia-be-tes in Korea | Scale (SGDS) Questionnaire | found to be important to avoid further complications caused by di-abetes. Regu-lar depression monitoring for older dia-betic patients was found to be significant in the overall care of older people with diabetes. Sup-ports from family and friend were found to pro-mote selfcare in diabetic older people. Nurses inter-vene in the assessment of the physical and psycho-logical condi-tions of dia-betic patients. Diet and exercise were found to be important in the overall management of patients suffering from diabe-tes. | |
| Fernandes Li-ma, A., Araújo Moreira, A. | 2016, Brazil | The percep-tion of the el- | Descriptive, exploratory study | Quality nurse patient rela-tionship were | 30 |

| C., da Silva, M. J., Araújo Monteiro, P. A., & Gonçalves Teixeira, P. | | derly with diabetes on their disease and the nursing care. | | found to be important in the management of diabetic older people. Physical activities and healthy diet were found to be crucial in the overall management of diabetic patients. Nurses intervene in the medications of patients suffering from diabetes. | |