Nursing Interventions of Nurse-led Health Education for Diabetes Patients: To Promote Self-care

A Literature Review

Kaixi Huang

Bachelor's thesis
April 2024
Bachelor's Degree Programme in Nursing

Jyväskylän ammattikorkeakoulu
University of Applied Sciences

jamk

Description

Kaixi Huang

Nursing Interventions of Nurse-led Health Education for Diabetes Patients: To Promote Self-care

Jyväskylä: Jamk University of Applied Sciences, April 2024, 35 pages

School of Health and Social Studies. Degree Programme in Nursing. Bachelor's thesis.

Permission for open access publication: Yes

Language of publication: English

Abstract

Diabetes is a chronic metabolic disease that is a burden to many patients' families. Health education can improve patients' self-care compliance, and good self-care can improve the quality of life and health status of patients with diabetes. Nurses have the longest contact with patients, which leads to their dominance in health education.

The aim of the literature review was to explore nursing health education interventions for diabetes self-care. The purpose of the study was to enhance nurses' health education competences of diabetes self-care; to improve diabetes patients self-care awareness to reduce complication risk and extent their life expectancy.

The study was completed in the form of a literature review, and literature was screened from the Cinahl and Medline databases to find literature that met the inclusion review criteria. A total of 14 articles were included in this literature review. The articles were analyzed using inductive content analysis. Articles included in the review were organized and subthemes and themes identified.

This literature review found that electronic equipment - data visualization, traditional education, contact management, which can promote the quality of self-care as an assistant. Applications and website, video, diabetes handbook and social media can be seem as data visualization; group meeting education and personal meeting education as a traditional education; contact management can be promoted by messages and call.

Virtual education and traditional education have good effects on enhancing the life quality of diabetes patients. However, patient follow-up periods were short, and further research is needed to investigate the long-term outcomes of virtual care interventions.

Keywords/tags (subjects)

Nursing intervention, health education, diabetes, self-care

Miscellaneous (Confidential information)

None

Contents

Tables

1 Introduction

Diabetes is a common healthy problem. Globally, 460 million people are affected by the disease (Tang et al., 2021). World Health Organization (WHO, 2016) indicated that diabetes has vital effects on human health, especially in the developing countries, condition management can improve a patient's chances of living a long and healthy life. Good management includes the patient's healthy lifestyle and self-care. Diabetes has brought a great burden to the patient's family and the medical system. Some diabetic patients, especially newly diagnosed patients, lack self-management skills and knowledge (Yu et al., 2022). A good control of blood glucose is the key to prevent the progression of dis-ease and the complications associated diabetes (Nogueira et al., 2022). So, patients empower of self-care is important.

Chao et al. (2013) shown that diabetes is a chronic and disabling disease that affects health. It is estimated that in the next 20 years, the prevalence may grow up by nearly 70% in developing countries and 20% in developed countries. But in one trial, 35.4% of people had insufficient follow-up records to assess their remission (Sheils et al., 2023). Another study has shown that simply increasing patients' knowledge is not enough to improve their risk perception and health behavior. However, risk perception is related to health behaviors, and interventions of diet and exercise improve the quality of life of patients in the early stage (Nguyen, 2020). Therefore, timely follow-up of patients' assessment records and improvement of risk awareness are critical.

The recognition rate of diabetes was 73.2% and the treatment rate was 61.0%, but the management rate was 28.5% (Jihye et al., 2014). Thus, the management rate of diabetes is very low. Diabetes self-care has a significant impact on health status (Lee et al., 2022). Herre et al. (2016) have pointed to the importance of diabetes self-management courses. Medical staff play an important role in this process. Meanwhile, diabetes patients can enhance their heath by changing their behaviors and habits (Deleon et al., 2022). So, effective interventions can go a long way in helping people with diabetes. At the same time, self-care can improve cardiovascular disease in diabetes patients and have a positive impact on patients (Abbott et al., 2020). A good self-care can promote the healthy condition and the quality of life. The aim of the literature review is to explore nursing health education interventions for diabetes self-care. The purpose of the literature review is to enhance nurses’ health education competences of diabetes self-care; to improve diabetes patients self-care awareness to reduce complication risk and extent their life expectancy.

2 Background

2.1 Diabetes

“Diabetes mellitus is a general term for metabolic diseases characterized by chronic hyperglycemia. It causes by impaired insulin secretion, impaired insulin efficacy, or most commonly both.” (Petersmann et al., 2018, p.74) It is divided into 2 type diabetes.

Type 1 diabetes cause by β cell destruction and lack of insulin (Petersmann et al., 2018). National Health Service (NHS, 2021) shown that if body cannot product enough insulin, blood sugar will become high. It causes insulin insufficiency, which is usually caused by autoimmune destruction of the pancreatic islets. Other patients with a history of autoimmunity are more likely to develop type 1 diabetes. Heredity and antibody count are risk factors for type 1 diabetes (Holt & Kumar, 2015). The symptoms are “thirst, polydipsia, polyuria” - increased frequency of urination and particularly at night, “weight loss, pruritus vulvae, balanitis, blurred vision” (Scobie & Samaras, 2009, p. 23).

The American Diabetes Association (ADA,2021) shown the incidence and prevalence of type 1 diabetes are increasing. Acute diabetes symptoms and marked elevations in blood sugar levels often occur in people with type 1 diabetes. In type 1 diabetes, the body does not produce insulin - the hormone that transports glucose from the blood to the body's cells, it is secreted by the pancreas, and with the help of insulin therapy and other treatments, patients can manage their condition by, for example, exercise and diet to live a healthy life. (ADA, 2021)

For the treatment, type 1 diabetes patients mean using insulin, they cannot use the diabetic medications. If the patient has just started using insulin, it may take some time to get used to it. After teaching and practicing, patients can inject insulin at home by themselves. Different insulins have different production processes, strengths and prices, and doctors will help patients find the right type of insulin (ADA, 2021).

Type 2 diabetes cause by insulin resistance - insulin resistance in muscle and liver and reduced ability of circulating insulin (Petersmann et al., 2018 &). Type 2 diabetes is associated with obesity, and as obesity rates increase, more and more children are developing diabetes (Holt & Kumar, 2015). Type 2 diabetes is more heritable than type 1 diabetes. Type 2 diabetes usually present for 5 years before it is diagnosed. Insulin resistance is thought to be the basis of type 2 diabetes, but

not all patients develop insulin resistance and may not be present in leaner individuals (Scobie & Samaras, 2009).

The symptoms are “thirsty, itching, fatigue, polyuria, polydipsia, weight gain or weight loss, blurred vision” - vision changes, “recurrent skin infections – fungal infections in skin creases; vulval or vaginal fungal infections; balanitis” (NHS, 2022; Scobie & Samaras, 2009, p. 24). The risk factors are over 40 years old, have a close relative who has diabetes, overweight or obese (NHS, 2020).

It is most common in patients with type 2 diabetes (WHO, 2016). ADA (2021) stated that the body of a person with this condition cannot use insulin properly. Treatment varies from person to person. Some people can control blood sugar with healthy eating and exercise, while others need the help of medicines and insulin to control blood sugar. There are two key points in the management of type 2 diabetes, one is to maintain a healthy diet, and the other is to exercise.

The first line of treatment for blood sugar control in type 2 diabetes is diet planning, weight loss, and exercise. If these measures fail to bring blood sugar down to near normal values, hypoglycemic drugs are used. Medication works best when used in combine with a diet and exercise program, but diabetes medications are not suitable for everyone, so it is important to consider what is best for the patient when choosing a treatment plan. Generally, diabetes medications are safe and effective, however, they should be taken with care. (ADA, 2021)

Diabetes will lead a lot of complications. The complications are foot and circulation problems, heart attack, stroke, vision problems and blindness, pain, and loss of sensation - numbness, pain or tingling, sexual problems, constipation, or diarrhea, kidney problems, gum disease (NHS, 2021).

For avoiding the complications, NHS (2021) shown that take heart exam regularly and stop smoking. Checking and taking care of the foot to keep the foot clean and wearing comfortable shoes. The wounds take a long time to be healing, so avoiding infection is the key method for diabetic patients. To prevent keratopathy - vision loss and blindness, annual eye exams should be performed. The examination of diabetic eyes is different from the examination of ordinary vision screening. This examination can detect eye diseases before vision loss. Therefore, regular fundus examination is an effective measure to prevent eye diseases. Excess glucose in the blood increases the chances of gum disease and infection. So diabetic people need to keep their mouth clean and visit the dentist regularly. (NHS, 2021)

2.2 Patient education

Diabetes education is an important part of diabetes management. The aim is to empower patients through improved diet, exercise, recognition and management of hypoglycemia, prevent complications, blood glucose monitoring and prescribed medications (Türe et al., 2023).

Sticking to a healthy diet can improve HbA1c - markers of glycemic control levels. Restricting carbohydrates not only lowers blood sugar, but also reduces the consumption of medications. Eating fiber-rich foods can reduce the risk of cardiovascular disease and cancer (Vasconcelos et al., 2021; Kovatchev, 2017). A varied diet can prevent malnutrition or excess. Diet therapy is one of the three cornerstones of diabetes treatment. Nutritional education can increase dietary diversity for patients (Mutagwanya et al., 2023). Diabetes patients need to be informed the diet education. To change the health condition, they should intake all kinds of nutrition. There are all kinds of dietary approaches for them (Jing et al., 2023).

Physical activity in patients with type 2 diabetes is an important factor in improving blood glucose, dyslipidemia (Robert et al., 2022). Regular exercise and avoiding prolonged sitting are among the self-care behaviors of diabetes education (Patton & Riddell, 2023). Thus, activity education should be performed for the patients.

Multiple studies have documented the effects of adherence to medication. For instant, better diabetes control reduces the risk of cardiovascular disease, retinopathy, and kidney disease, by 9%, 13%, and 20% individually. The effectiveness of health programs is related to healthy behaviors (Karpes et al., 2022). Poor medication adherence is associated with increased mortality and poor treatment efficacy. Adherence not only reduces disability and improves lives, but also reduces hospitalization rates (Tan et al., 2019). It is important to provide patients with medication adherence through health education.

Blood glucose self-monitoring is the accepted standard of care for blood sugar control (Cowart & Zgibor, 2022). Thus, blood glucose monitoring can show the effective results of control. It is a key point to teach patients how to test the blood glucose at home.

2.3 Self-care

Diabetes is a chronic and self-care disease (Wu et al., 2014). Self-care for patients with diabetes includes diet, monitoring blood sugar level, foot care, drug, adherence, and regular exercise. Patients with good self-care may be able to better manage their condition (Jiang et al., 2022).

Patient attitudes can be changed to improve patient self-care skills, thereby improving clinical change (Nogueira et al., 2022). Change the lifestyle is important for diabetes patients. They need to keep enough sleep and get the high quality of sleep. Also, they need to avoid smoking and tobacco products ("Non-Pharmacological Management of Diabetes," 2022).

Increased patient activity levels are beneficial for weight control, and activities that the patient enjoys and is appropriate for them are allowed. The effect of multiple short periods of exercise is the same as one long period of exercise (Merja & Hannele, 2021). Activities include walking, yoga, running, swimming, cycling, and more. It can not only control blood sugar and reduce the risk of cardiovascular disease, but also improve the happiness index ("Non-Pharmacological Management of Diabetes," 2022).

For healthy diet, ADA (2020) shown the Diabetic Plate Method is the easiest way to create healthy meals that help control blood sugar. Dinner plate size is 9 inches. Fill half a plate with non-starchy vegetables such as broccoli, radishes, eggplant, cabbage. They contain few carbohydrates and lots of vitamins and fiber. Fill a quarter of your plate with lean protein. Such as lean pork, chicken, tofu. Fill the remaining quarter with carbohydrate foods such as grains, dairy, fruit. (ADA, 2020)

The fasting blood glucose value can determine the dose of long-acting basal insulin, the blood glucose value before a meal and 1.5-2 hours after a meal can determine the dose of rapid-acting insulin, and the blood glucose value before bedtime can determine the dose of long-acting insulin in the morning (Minna, 2021). So, patient need tests the blood glucose level 6 times a day-fasting, before lunch and dinner, after lunch and dinner, before sleeping.

Hypoglycemia – low blood glucose always presents with patients who use the insulin or some other diabetes medicine. It means that the blood glucose level is less than 4mmol/L. Patients will feel hungry, dizziness, anxious, sweating, heart palpitations, tired and blurred vision. When hypoglycemia occurs, eat or drink something that will quickly raise blood sugar, such as a small glass of juice. Monitor blood glucose again after 10-15 minutes. (NHS, 2023)

3 Aim, purpose, and research question

Aim: To explore nursing health education interventions for diabetes self-care.

Purpose: To enhance nurses health education competences of diabetes self-care; to improve diabetes patients self-care awareness to reduce complication risk and extent their life expectancy.

Research question: What are the nursing health education interventions for diabetes self-care?

4 Methodology

4.1 Literature review

A literature review is an overview of the literature on a specific topic within a specified time period. (Bowden & Purper, 2022) This includes screening of literature relevant to the specific research question, critical review of this literature and review of the research findings. Literature reviews can improve the quality of research and provide the most up-to-date evidence (Pollock & Berge, 2017).

Snyder (2019) stated that literature reviews can be effective in providing evidence for a research question or checking the accuracy of a theory. The literature review is divided into 4 steps: design - contribution, potential audience, purpose, research question method and search; conduct - sample, actual plan, search process and selection, evaluation; analysis - information type, record reporting process; writing - review motivation and necessity, level of information and clarity of presentation (Snyder, 2019).

Literature reviews come in many forms. The most common are scoping reviews - having literature on a specific topic, or answering questions about a specific topic, systematic reviews - identifies, evaluates and synthesizes literature relevant to pre-specified research questions; meta-synthesis Analysis - collect data and summarize and report to facilitate systematic review. (Chetwynd, 2022)

4.2 Literature search

The literature search was conducted in the CINAHL and MEDLINE databases of the JAMK library. Article inclusion and exclusion criteria were determined before conducting the search. Table 1 shows the article inclusion and exclusion criteria. The criteria for inclusion of articles included

peer-reviewed, published in English, research articles, published between 2013 and 2023, and providing full-text articles that answered the research questions. Excluded articles include those published in languages other than English, published outside the selected period, review articles, without answering the research questions, without peer review, and without full text.

Table 1: Inclusion and exclusion criteria

Inclusion criteria	**Exclusion criteria**
English language	Not English language
Published between 2013 and 2023	Published outside 2013-2023
Peer review	Not peer review
Reserch articles	Review articles
Full text	Not full text
Articles with answering the research questions	Articles without answering the research questions

4.3 Article selection

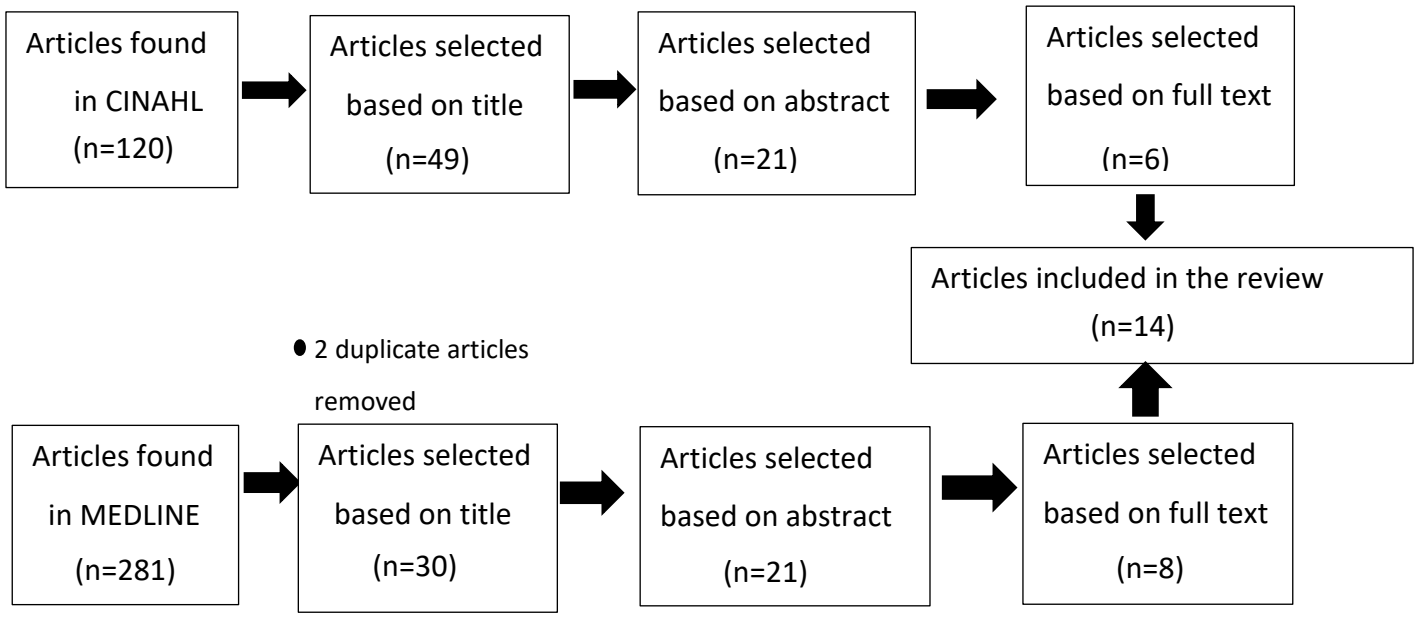
During the literature search, the Boolean operators "and" and "or" were used. The key words are "diabetic patients", "intervention", "health education or health teaching" and "self-care or self-management". PICOs model was uesd to explain professional terms in below table 2.

Table 2: PICOs model

P (population)	Diabetes patients
I (phenomena of interest)	intervention
CO (context)	health education OR health teaching AND self-care OR self-management
S (types of studies)	published in English language, peer reviewed, research articles, published from 2013 to 2023, full text available

First, 31 articles were found in the CINAHL database. 18 articles were selected by title, of which 10 articles were selected based on abstract. After reviewing full text, 4 articles were selected for review. The remaining 7 articles did not answer the research question, or the intervention was ineffective. Entered the search terms "video" and "diabetes", 88 articles were found, and selected 30 articles based on the title, 10 of which were selected based on the abstract. After reading the full text, 1 article was included in the review; entered the search term "handbook" and "diabetes", 1 article was found and included in the review based on the title, abstract and full text. Thus, a total of 6 articles were included in the review. The MEDLINE database was searched using the above search terms, and a total of 23 articles were found. From these articles, 14 articles were selected for further review based on title. Among these 14 articles, 2 articles are the same as those in the CINAL database. So, these 2 articles have been deleted. Therefore, 12 articles remained. 9 articles were selected for further review based on title. After reading the full text, 6 articles were selected for review. Entered the search terms "message" and "diabetes", 94 articles were found. And selected 11 articles based on the title, 7 of which were selected based on the abstract. After reading the full text, 1 article was included in the review. Entered the search terms "call" and "diabetes", 164 articles were found. 7 articles were selected for further review based on title. 5 articles were selected for further review based on title. After reading the full text, 1 article were selected for review. Full-text articles were excluded based on their relevance to the research question, 13 articles were included in review. The screening process is shown in Table 3.

Table 3: Screening process for articles



The quality of articles selected for review was analyzed using the assessment method of Hawker et al., (2002). Each article is evaluated in 9 categories, with each category being scored on a scale of 1 to 4, with the maximum score for all categories being 4. Therefore, the maximum score for each article was 36. The total score for each evaluated article was higher than 30. Appendix 1 shows this evaluation.

4.4 Data analysis

Content analysis is a term for different strategies for analyzing text and methods of examining written correspondence. The aim is to examine in descriptive form, who said what and with what effect (Cole, 1988; Vaismoradi et al., 2013). Content analysis is a method that can use qualitative or quantitative data and be used in an inductive or deductive manner. The advantage is that many research articles from different sources are used to confirm the evidence. It is a flexible method with no specific analytical guidelines (Elo & Kyngäs, 2008).

This article adopts an inductive approach. Induction is the bringing together of prior knowledge or fragmented knowledge about the phenomenon (Lauri & Kyngäs, 2005). Cavanagh (1997) shown that content analysis involves choosing the unit of analysis - what to analyze; creating categories - describing phenomena and placing data into actionable categories; pre-testing category rules - trying to code text; assessing reliability and validity - using accurate coding Rules determine the

reliability of the data, and coding determines the relationship between the concepts being studied and the categories that appear in the data; modify the coding rules - if the reliability of the content is not ideal, the coding rules need to be revised; predict the revised categories - reducing ambiguity about distribution data strategies; code data, reassess validity and reliability - evaluate all data and conduct content analysis. (Cavanagh, 1997)

In this study, the author read each article completely and highlighted findings relevant to the research questions. The outstanding findings were organized into a document and different sub-themes were formed according to their meaning, and the sub-themes were coded. Codes for sub-themes with the same or similar categories were combined into the same theme. All coding and coding procedures were modified. The generated themes were used to answer the research questions. A detailed analysis process is shown in Table 4.

Table 4: Sample of data analysis process

Original quotation	Sub-theme	Theme	Nursing interventions of nurse-led health education for diabetes patients
The two message-framed videos included the same information that was delivered by a nurse while the patient was performing the actual self-care. The information was given using animation, narration, and text. The only main difference was the framing of the outcomes of maintaining or not maintaining normal blood glucose, which was presented in the last scenes of the videos. (Paragas & Barcelo, 2019)	Video	Visual education	

5 Results

The studies included in this literature review were published in China (4), Philippines and the USA (1), Australia (1), Brazil (1), Ireland and the United Kingdom (1), South Korea (1), Ethiopia and Australia (1), South Korea and Germany (1), Turkey (1), India (1) and Iran (1). The research methods of the reviewed articles were qualitative research using interview and longitudinal mixed research methods; quantitative research using random grouping and control variables research methods; mixed research including interview and random grouping. An abstract of the review article can be found in Appendix 2.

The main findings of review articles that answer the research questions are divided into three themes - Data visualization, Traditional education and Contact management. Subthemes are explained further. The themes and subthemes are shown in Table 5.

Table 5: Themes and sub-themes

Themes	**Sub-themes**
Data visualization	Applications and website Video Diabetes handbook Social media
Traditional education	Group meeting education Personal meeting education
Contact management	Messages Call

5.1 Data visualization

5.1.1 Applications and website

To avoid publishing false theoretical understanding, nurses are best placed to manage social media accounts, and nurses can use the media to provide health education from the vantage point of the clinical setting (Kim et al., 2022; Paragas & Barcelo, 2019). To protect patient privacy, social media access is by invitation only (Kim et al., 2022).

Nurses upload self-care information about diabetes, such as diet, exercise, medication, blood sugar monitoring, and foot care, in the form of text and pictures in the application (Ogrin et al., 2018) and website (Kim et al., 2022). At the same time, patients can select areas of interest and set reminders for daily medical checkups or foot care in their calendar (Ogrin et al., 2018). To ease the workload of diabetes educators, diabetes self-management information will be uploaded during specific times (Kim et al., 2022). Medical staff can add patients to WhatsApp groups, and patients can receive materials from online courses and/or discuss self-care practices with each other (Esferjani et al., 2022).

5.1.2 Video

Traditional educational methods often fail to provide adequate outcomes and treatment needs due to insufficient teaching time, but informational videos can improve information retention (Paragas & Barcelo, 2019; Li et al., 2022).

Patients can learn diabetes self-care information by watching videos, narrations and short texts. For example, nurses can combine videos with detailed instructions on injecting insulin or upload videos on social media about patient self-care. (Paragas & Barcelo, 2019; Kim & Utz, 2019; Li et al., 2022; Jing et al., 2022). Through video learning, patients' self-care skills improve, and this is particularly effective for older adults (Paragas & Barcelo, 2019; Li et al., 2022). Nurses can use larger screens - use tablets or laptops for health education (Ogrin et al., 2018). The videos are divided into common content videos and personalized content videos - different insulin treatments. All medical terms are replaced by easy and daily expressions (Jing et al., 2022).

5.1.3 Diabetes handbook

Nurses can distribute diabetic handbook to patients and explain them in combination with the guideline (Kim & Utz, 2019; Esferjani et al., 2022; Kundury et al., 2023). Handbook can be presented in three formats - one that presents nursing practices and complications by using written text and illustrations (Esferjani et al., 2022); the second one that uses short sentences of less than 50 words and pictures to highlight key points (Kim & Utz, 2019). For better understanding, educational materials can be printed in bilingual formats - local language and English (Kundury et al., 2023).

The third one that an outline of insulin injection methods, injection angles, injection sites, and injection-related complications and their prevention is made into a handbook, which is read by the patient after the doctor determines the patient's injection plan. Patients read the material themselves until they understand it. The content of the handbook is the same as the information in the video. (Jing et al., 2022)

Santos et al., (2022) shown that handbook contributed to expand patients' cognition of diabetes care. The handbook also contains personal data, references, diagnosis and previous interventions, lifestyle, medical appointment scheduling and food, and physical activity guidelines. Patients can record the dosage and frequency of use of medications in the handbook, which can improve the

accuracy of taking medications. It is recommended that keep the medication together with the handbook so that the patient can avoid forgetting when to take the medication. (Santos et al., 2022)

5.1.4 Social media

Participating in social media interventions is considered by patients to take care of themselves, and patients can learn ways to maintain healthy behaviors and adverse experiences from other patients' posts or opinions. (Kim et al., 2022)

Kim and Utz (2019) shown that following the diabetes self-management course, nurses will provide self-management support for 8 weeks. Interventionists teach patients how to access and use social media services through mobile phones only and provide instructions for accessing social media. Patients can access, share, and view posts. Navigation menus for action planning in social media services are developed in the form of passive use functions, which can reduce the burden of typing for patients with low literacy. (Kim & Utz, 2019)

5.2 Traditional education

5.2.1 Group meeting education

Social cognitive theory is an effective tool to guide interventions, and nurses can incorporate this theory into health education for patients (Kim et al., 2022; Kim & Utz, 2019).

Patients are grouped according to their education and cultural level (Liu et al., 2019) and the appropriate application for the patients - Zoom or WeChat - was selected for unified online meetings (Zhu et al., 2022). Educational content includes patient setting goals, diet, medications, exercise and complications (Liu et al., 2019; Zhu et al., 2022). During the meeting, nurses can use pictures and text to explain diabetes information to patients (Liu et al., 2019).

Nurses can also organize offline group meetings (Li et al., 2022; Eshete et al., 2023). There are two different content and projects for education. Li et al., (2022) shown that lectures are held in a spacious room. The nurse explained the injection and operation steps of insulin, and the patient followed the explanation and performs the operation. After the patient learning the method, he or she can complete the self-injection under the supervision of medical staff. In addition, patients are

given psychological intervention, such as regular psychological counseling and playing soothing music. (Li et al., 2022)

The other is to hold a half-year physical activity promotion program. In the first and second sessions, the risk factors, diagnosis, symptoms, course, complications and treatment of diabetes are introduced; in the 3rd and 4th sessions, explained the diverse diet, how to reduce bad eating habits, recommended alternative eating and cooking methods; in the fifth and sixth sessions, developing a healthy eating plan and monitoring blood sugar. During the session, patients were asked to engage in group discussions. (Eshete et al., 2023)

Meanwhile, patients can share experiences or ask questions in chat rooms, discussion boards, online meetings, and lectures, which can be answered by nurses and patients (Kim et al., 2022; Kim & Utz, 2019; Esferjani et al., 2022; Li et al., 2022). They can communicate at any time without restrictions (Kim et al., 2022). Additionally, a patient's relatives need to be introduced to the mentor to accept the program and assist the patient (Esferjani et al., 2022).

5.2.2 Personal meeting education

Nurses can find out the patient’s uploaded health plan through the app and give appropriate advice. Patients can also contact a nurse on the app for one-on-one coaching (Kim & Utz, 2019; Ogrin et al., 2018). Nurses can organize offline personalized education with the goal of helping patients develop personalized plans and build a good relationship (Zhu et al., 2022) and have a personal consultation with a nurse after the course (Eshete et al., 2023).

After the patient is discharged from the hospital, the nurse conducts a follow-up visit for three months to get the patient's blood sugar level and answer the patient's questions (Zhu et al., 2022; Esferjani et al., 2022). During follow-up visits, nurses can give patients written educational materials to assist patients with practical management (Eshete et al., 2023).

5.3 Contact management

5.3.1 Messages

Nurses can provide health education to patients by sending messages (Esferjani et al., 2022; Ogrin et al., 2018; Celik et al., 2015). Nurse obtains the patient's two cell phone numbers, one of which is

used to receive self-care text messages from the nurse (Esferjani et al., 2022). Patients can also message nurses through the app (Ogrin et al., 2018).

Researchers first rated patients' skills and knowledge base. Patients received a total of 12 different text messages from healthcare professionals over the six-month study period to remind them to use their insulin correctly. Each patient receives two messages each week and each message are sent four times. The content of the text message includes injection method, injection site and its complications and storage of insulin. To ensure the accuracy of text, all text messages were obtained by researchers searching for literature. (Celik et al., 2015)

5.3.2 Call

Nurses can contact patients by phone to assist patients in formulating health plans and make suggestions for patients' already formulated plans. Nurses provide telephone counseling to patients to guide them in setting goals and exploring healthy behaviors (Esferjani et al., 2022; Mcgloin et al., 2022; Kim & Utz, 2019). Moreover, patients can save healthcare contacts by clicking on the contact icon and call the nurse through the application to consult with their doubts (Ogrin et al., 2018).

Diabetes experts conducted an orientation session with participants prior to telephone education. Nurses make weekly phone calls to patients in Kannada and English. Telephone call records are kept in a separate form to ensure complete delivery of educational information. Telephone education included self-management education on dietary restrictions and medication compliance. (Kundury et al., 2023)

6. Discussion

6.1 Discussion of result

The aim of this literature review was to explore nursing health education interventions for diabetes self-care. This literature review found that electronic equipment - data visualization, traditional education, contact management, which can promote the quality of self-care as an assistant. Applications and website, video, diabetes handbook and social media can be seem as data visualization; group meeting education and personal meeting education as a traditional education; contact management can be promoted by messages and call.

Similar as the findings of this literature review, the usage of mobile phones and social media increases (Kim et al., 2022; Kim & Utz, 2019; Ogrin et al., 2018), and more and more applications are used for health education (Ogrin et al., 2018). Healthcare interventions based on communication technology improve patients' lives (Celik et al., 2015). Participants in the review article reported that participating in social media interventions was a way to take care of themselves (Kim et al., 2022), not only increasing confidence in disease management, improving self-health behaviors (Liu et al., 2019), but also increasing a sense of accomplishment (Kim et al., 2022). Participants thought it would be worthwhile to develop application targeting people with disabilities who are newly diagnosed with diabetes or who have less knowledge about the disease (Mcgloin et al., 2022).

According to the findings of this literature review, video and telephone call have been shown to be effective self-care interventions for people with diabetes 2, while telemedicine services that replace face-to-face clinic care with telephone or video consultations (Ilali et al., 2023). Telemedicine care can serve as an avenue for healthcare delivery, especially for chronic conditions such as type 1 diabetes (Troncone et al., 2022). Virtual care via video and phone calls can expand access to primary care as an option for patients. However, higher phone use is associated with lower rates of treatment implementation and higher rates of follow-up medical care (Jie et al., 2023). Also, adults with type 2 diabetes who require complex care will have worse glycemic outcomes if they receive only telecare (Melville, 2023).

An educational intervention involving individual face-to-face consultations in patients with type 2 diabetes improved medication compliance, but the intervention had no effect in patients with hypertension – they do not have obvious symptoms and signs (Tan et al., 2019). Additionally, one study showed that the benefits of virtual care and in-person training for pregnant women with gestational diabetes. They can improve the self-care activities of pregnant women (Hosseinzadeh et al., 2022).

Meanwhile, Mirzaei et al. (2023) explained that team-based learning is a teaching method that combines active learning and cooperative learning, while lecture is a simple teaching method that asks questions to the group, which will cause participants to not take the initiative to learn or forget the questions quickly. The effect of team-based learning is better than lecture method. Team-based learning can promote and enhance elderly people to study (Mirzaei et al., 2023).

6.2 Ethical considerations, validity, reliability, generalizability

This article used the assessment tool of (Hawker et al., 2002) can be found in Appendix 1. This assessment content is evaluated from 9 viewpoints: abstract and title, introduction and aim, method and data, sampling, data analysis, ethics and bias, results, transferability, implication and/or usefulness. Each viewpoint was given score 1 to 4. The maximum value of score was 36 for each article. All of articles were more than 30 points.

All the articles included approvals of institutional review boards or ethical committees; however, one article was approved by the chief medical administrator of each hospital (Celik et al., 2015). Some studies mentioned voluntary participation (Kim et al., 2022; Zhu et al., 2022; Kim & Utz, 2019) and informed consent (Kim et al., 2022; Zhu et al., 2022; Mcgloin et al., 2022; Ogrin et al., 2018; Esferjani et al., 2022; Kim & Utz, 2019; Paragas & Barcelo, 2019; Liu et al., 2019; Eshete et al., 2023; Jing et al., 2022; Santos et al., 2022; Celik et al., 2015; Li et al., 2022; Kundury et al., 2023). All articles mentioned ethical considerations, limitations and implication of the study. All participants' information was kept confidential.

Credibility and validity can be seen from the literature review. This literature review has been carefully screened and analyzed in detail to avoid bias. Avoid plagiarism through citations to the American Psychological Association, Seventh Edition, to ensure the integrity of this literature review and respect for the original authors. The limitation of this literature review is the lack of practical research and only obtaining data from the JAMK database, which results in a lack of data.

Data sources for this literature review include South Korea, Germany, the Philippines, the United States, Australia, Ireland and the United Kingdom, Iran, China, Brazil and Turkey. The study sample was mainly adolescents, adults and the elderly, and interventions for children with diabetes were ignored.

6.3 Conclusions and recommendations

As the findings of this literature review show, virtual education and traditional education can be tools for healthy education. Both have good effects on enhancing the life quality of diabetes patients. However, patient follow-up periods were short, and further research is needed to investigate the long-term outcomes of virtual care interventions. The content and methods of virtual care need to be adapted to patient needs.

References

Abbott, L. S., Slate, E. H., & Graven, L. J. (2020). Cardiovascular disease risk among rural residents living with diabetes and prediabetes: A cluster randomized trial. Public Health Nursing, 37(1), 16–24. https://doi-org.ezproxy.jamk.fi:2443/10.1111/phn.12659

American Diabetes Association. (2021). The path to understanding diabetes starts here. https://diabetes.org/diabetes

American Diabetes Association. (1 January 2021). Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes-2021. Diabetes Care, 44(1), S15-S33. https://doi.org/10.2337/dc21-S002

American Diabetes Association. (2021). Get a handle on diabetes medication. https://diabetes.org/healthy-living/medication-treatments

American Diabetes Association. (2/2020). What is the Diabetes Plate Method? https://www.diabetesfoodhub.org/articles/what-is-the-diabetes-plate-method.html

Bowden, V. R., & Purper, C. (2022). Types of Reviews – Part 3: Literature Review, Integrative Review, Scoping Review. Pediatric Nursing, 48(2), 97–100.

Chao, S. Y., Zarzabal, L. A., Walker, S. M., Herzog, C. M., Eilerman, P. A., Luce, B. K., & Carnahan, D. H. (2013). Estimating diabetes prevalence in the Military Health System population from 2006 to 2010. Military Medicine, 178(9), 986–993. https://doi-org.ezproxy.jamk.fi:2443/10.7205/MILMED-D-13-00147

Cavanagh S. (1997) Content analysis: concepts, methods and applications. Nurse Researcher 4, 5–16.

Cowart, K., & Zgibor, J. (2022). Flash Continuous Glucose Monitoring: A Practical Guide and Call to Action for Pharmacists. Journal of Pharmacy Practice, 35(4), 638–646. https://doi-org.ezproxy.jamk.fi:2443/10.1177/08971900211000273

Chetwynd, E. (2022). Critical Analysis of Reliability and Validity in Literature Reviews. Journal of Human Lactation, 38(3), 392–396. https://doi-org.ezproxy.jamk.fi:2443/10.1177/08903344221100201

Celik, S., Cosansu, G., Erdogan, S., Kahraman, A., Isik, S., Bayrak, G., Bektas, B., & Olgun, N. (2015). Using mobile phone text messages to improve insulin injection technique and glycaemic control in patients with diabetes mellitus: a multi-centre study in Turkey. Journal of Clinical Nursing, 24(11–12), 1525–1533. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jocn.12731

Cole, F. L. (1988). Content Analysis: Process and Application. Clinical Nurse Specialist, 2(1), 53–57.

Deleon, D. M. L., Arreguy-Sena, C., Vidal, D. O. T., Krempser, P., Ferreira, K. F., & Ferreira, P. P. (2022). Social Representations of Self-Care in the Perception of Men with Diabetes. Ciencia, Cuidado e Saude, 21, 1–9. https://doiorg.ezproxy.jamk.fi:2443/10.4025/cienccuid-saude.v21i0.58842

Esferjani, S. V., Naghizadeh, E., Albokordi, M., Zakerkish, M., & Araban, M. (2022). Effective ness of a mobile-based educational intervention on self-care activities and glycemic control among the elderly with type 2 diabetes in southwest of Iran in 2020. Archives of Public Health = Archives Belges de Sante Publique, 80(1), 201. https://doi-org.ezproxy.jamk.fi:2443/10.1186/s13690-022-00957-5

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. Journal of advanced nursing, 62(1), 107–115. https://doi-org.ezproxy.jamk.fi:2443/10.1111/j.1365-2648.2007.04569.x

Eshete, A., Lambebo, A., Mohammed, S., Shewasinad, S., & Assefa, Y. (2023). Effect of nutritional promotion intervention on dietary adherence among type II diabetes patients in North Shoa Zone Amhara Region: quasi-experimental study. Journal of Health, Population, and Nutrition, 42(1), 49. https://doi-org.ezproxy.jamk.fi:2443/10.1186/s41043-023-00393-3

Holt, T., & Kumar, S. (2015). Abc of diabetes. John Wiley & Sons, Incorporated. https://ebookcentral-proquest-com.ezproxy.jamk.fi:2443/lib/jypoly-ebooks/detail.action?docID=4039246#

Hosseinzadeh, M., Sharifzadeh, G., Hosseinzadeh, M., & Torshizi, M. (2022). Comparison of the Effect of Face-to-face and Social Media-based Training on the Self-care of Women with Gestational Diabetes Mellitus (GDM) in Birjand. Modern Care Journal: Scientific Quarterly of Birjand Nursing & Midwifery Faculty, 19(2), 1–7. https://doi-org.ezproxy.jamk.fi:2443/10.5812/modernc-119456

Herre, A. J., Graue, M., Kolltveit, B. H., & Gjengedal, E. (2016). Experience of knowledge and skills that are essential in self-managing a chronic condition - a focus group study among people with type 2 diabetes. Scandinavian Journal of Caring Sciences, 30(2), 382–390. https://doi-org.ezproxy.jamk.fi:2443/10.1111/scs.12260

Ilali, M., Le Berre, M., Vedel, I., & Khanassov, V. (2023). Telemedicine in the primary care of older adults: a systematic mixed studies review. BMC Primary Care, 24(1), 1–21. https://doi-org.ezproxy.jamk.fi:2443/10.1186/s12875-023-02085-7

Jing, T., Zhang, S., Bai, M., Chen, Z., Gao, S., Li, S., & Zhang, J. (2023). Effect of Dietary Aproaches on Glycemic Control in Patients with Type 2 Diabetes: A Systematic Review with Network Meta-Analysis of Randomized Trials. Nutrients, 15(14), 3156. https://doi-org.ezproxy.jamk.fi:2443/10.3390/nu15143156

Jihye, J., Namhee, P., & So, Y. S. (2014). The Influence of Health Literacy and Diabetes Knowledge on Diabetes Self-care Activities in Korean Low-income Elders with Diabetes. Journal of Korean Academy of Community Health Nursing / Jiyeog Sahoe Ganho Hakoeji, 25(3), 217–224. https://doi-org.ezproxy.jamk.fi:2443/10.12799/jkachn.2014.25.3.217

Jiang, Y., Ramachandran, H. J., Teo, J. Y. C., Leong, F. L., Lim, Suan, T., Nguyen, H. D., & Wang, W. (Apr 2022). Effectiveness of a nurse‐led smartphone‐based self‐management programme for people with poorly controlled type 2 diabetes: A randomized controlled trial. dol:10.1111/jan.15178

Jing, Z., Le, W. S., Jing, Y. Y., Liang, Z., Can, H. C., & Xin-Mei, H. (2022). Impact of Video Technology on the Comprehension of Patients With First Insulin Injection and the Efficiency of Nurse Education. Clinical Nursing Research, 31(3), 435–444. https://doi-org.ezproxy.jamk.fi:2443/10.1177/10547738211036600

Jie, H., Gopalan, A., Muelly, E., Hsueh, L., Millman, A., Graetz, I., & Reed, M. (2023). Primary Care Video and Telephone Telemedicine During the COVID-19 Pandemic: Treatment and Follow-up Health Care Utilization. American Journal of Managed Care, 29(1), e13–e17. https://doi-org.ezproxy.jamk.fi:2443/10.37765/ajmc.2023.89307

Kim, S. H., Kim, Y., Choi, S., & Jeon, B. (2022). Evaluation of nurse‐led social media interven tion for diabetes self‐management: A mixed‐method study. Journal of Nursing Scholarship, 54(5), 569‒577. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jnu.12770

Kim, S. H., & Utz, S. (2019). Effectiveness of a Social Media-Based, Health Literacy-Sensitive Di abetes Self-Management Intervention: A Randomized Controlled Trial. Journal of Nursing Scholarship : An Official Publication of Sigma Theta Tau International Honor Society of Nurs-ing, 51(6), 661–669. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jnu.12521

Karpes, M. A. R., Xavier, C., & Rasu, R. S. (2022). Long-term Medication Adherence and Preven tive vs Reactive Care Utilization Among Older Adults With Diabetes. American Journal of Managed Care, 28(10), e378–e387. https://doi-org.ezproxy.jamk.fi:2443/10.37765/ajmc.2022.89255

Kovatchev, B. P., (2017). Metrics for glycaemic control -- from HbA1c to continuous glucose monitoring. Medical Sciences--Gastroenterology, 13(7), 425-436

Kundury, K. K., Bovilla, V. R., Kumar, K. S. P., Chandrashekarappa, S. M., Madhunapantula, S. V., & Hathur, B. (2023). Providing Diabetes Education through Phone Calls Assisted in the Better Control of Hyperglycemia and Improved the Knowledge of Patients on Diabetes Management. Healthcare (Basel, Switzerland), 11(4). https://doi-org.ezproxy.jamk.fi:2443/10.3390/healthcare11040528

Lauri, S. & Kyngäs, H. (2005). Developing Nursing Theories (Finnish: Hoitotieteen Teorian Kehittäminen.) Werner Söderström, Dark Oy, Vantaa.

Li, X., Ge, J., & He, L. (2022). Influence of Self-Practice Oriented Teaching plus Psychological In tervention on Blood Glucose Level and Psychological State in Patients with Type 2 Diabetes Mellitus on Insulin Therapy. Evidence-Based Complementary and Alternative Medicine : ECAM, 2022, 5606697. https://doi-org.ezproxy.jamk.fi:2443/10.1155/2022/5606697

Liu, Y., Jiang, X., Jiang, H., Lin, K., Li, M., & Ji, L. (2019). A culturally sensitive nurse-led struc tured education programme in patients with type 2 diabetes. International Journal of Nursing Practice, 25(5), e12757. https://doi-org.ezproxy.jamk.fi:2443/10.1111/ijn.12757

Lee, K. S., Kim, H. Y., & Jin, H. Y. (2022). Factors affecting the health status of patients with type 2 diabetes mellitus receiving insulin treatments: A multi‐mediation path analysis: Influences on insulin‐treated diabetes. Journal of Clinical Nursing (John Wiley & Sons, Inc.), 31(9/10), 1285–1297. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jocn.15985

Mutagwanya, R., Nyago, C. M., & Nakwagala, F. N. (2023). Effect of Diabetes Nutrition Education on Dietary Diversity Score of Type 2 Diabetic Patients. Canadian Journal of Clinical Nutrition, 11(1), 28–40.

Merja, K. L., & Hannele, Y. (2021). Lifestyle education in type 2 diabetes. https://www-terveysportti-fi.ezproxy.jamk.fi:2443/dtk/ebmg/koti

Minna, K., (2021). Follow-up of type 1 diabetes. https://www-terveysportti-fi.ezproxy.jamk.fi:2443/dtk/ebmg/koti

Melville, N. A. (2023). Telemedicine in diabetes care associated with worse outcomes. Clinical Endocrinology News, 26.

McGloin, H., Timmins, F., Coates, V., & Boore, J. (2015). A case study approach to the examina tion of a telephone-based health coaching intervention in facilitating behaviour change for adults with Type 2 diabetes. Journal of Clinical Nursing (John Wiley & Sons, Inc.), 24(9–10), 1246–1257. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jocn.12692

Mirzaei, T., Ravari, A., Hosseini, F., & Hassanshahi, E. (2023). Comparison of the Effect of Education Using Team-based Learning Method and Lecture Method on Controlling Diabetes in the Elderly: A Quasi-Experimental Study. International Journal of Community Based Nursing & Midwifery, 11(3), 201–209. https://doi-org.ezproxy.jamk.fi:2443/10.30476/IJCBNM.2023.97837.2210

Nguyen, A. P. (2020). Risk perception of developing diabetes: A concept analysis. Nursing Forum, 55(4), 559–568. https://doi-org.ezproxy.jamk.fi:2443/10.1111/nuf.12462

Nogueira, C. D., Silva, S. D. A., Oliveira-Cortez, A., Afonso, R. I., & De, C. T. H. (2022). Effect of attitudes and empowerment for self-care in diabetes mellitus. Saude Coletiva, 12(80), 11310–11317. https://doi-org.ezproxy.jamk.fi:2443/10.36489/saudecoletiva.2022v12i78p11302-11317

National Health Service, (2023). Low blood sugar (hypoglycaemia). https://www.nhs.uk/conditions/low-blood-sugar-hypoglycaemia/

National Health Service. (9 August 2021). Avoiding complications. https://www.nhs.uk/conditions/type-1-diabetes/living-with-type-1-diabetes/avoiding-complications/

National Health Service. (18 August 2020). Type 2 diabetes. https://www.nhs.uk/conditions/type-2-diabetes/symptoms/

National Health Service. (14 July 2021). Type 1 diabetes. https://www.nhs.uk/conditions/type-1-diabetes/about-type-1-diabetes/

Ogrin, R., Viswanathan, R., Aylen, T., Wallace, F., Scott, J., & Kumar, D. (2018). Co‐design of an evidence‐based health education diabetes foot app to prevent serious foot complications: a feasibility study. Practical Diabetes, 35(6), 203. https://doi-org.ezproxy.jamk.fi:2443/10.1002/pdi.2197

Patton, S. R., & Riddell, M. C. (2023). Current Trends and Strategies for Exercise in Diabetes. Di abetes Spectrum, 36(2), 100–103. https://doi-org.ezproxy.jamk.fi:2443/10.2337/dsi22-0019

Petersmann, A., Nauck, M., Müller-Wieland, D., Kerner, W., Müller, U. A., Landgraf, R., Freckmann, G., & Heinemann, L. (2018). Definition, classification and diagnostics of diabetes mellitus. Journal of Laboratory Medicine, 42(3), 73–79. https://doi-org.ezproxy.jamk.fi:2443/10.1515/labmed-2018-0016

Pollock, A., & Berge, E., (2017) How to do a systematic review. International Journal of Stroke, 13(2), 138-156.

Paragas, E. D., & Barcelo, T. I. (2019). Effects of message‐framed informational videos on dia betes management knowledge and self‐efficacy. International Journal of Nursing Practice (John Wiley & Sons, Inc.), 25(4), N.PAG. https://doi-org.ezproxy.jamk.fi:2443/10.1111/ijn.12737

Robert, M., Nyago, C. M., & Nakwagala, F. N. (2022). Effect of Change in Dietary Feeding Practices and Lifestyle on Treatment Outcomes of Type-2 Diabetic Patients. Canadian Journal of Clinical Nutrition, 10(2), 6–23. https://doi-org.ezproxy.jamk.fi:2443/10.14206/canad.j.clin.nutr.2022.02.02

Sheils, N. E., Jarvis, M. S., Bangerter, L. R., Asch, D. A., & Clark, C. N. (2023). Real-World Prevalence of Type 2 Diabetes Remission in a U.S. Insured Population Using a Large Administrative Claims Database. Diabetes Spectrum, 36(3), 211–218. https://doi-org.ezproxy.jamk.fi:2443/10.2337/ds22-0042

Scobie, I. N., & Samaras, K. (2009). Fast Facts: Diabetes Mellitus - Type 1 diabetes mellitus. Fast Facts: Diabe tes Mellitus, 3rd ed, 16-23. https://www.proquest.com/docview/1170777210/41A4AF7BD77747E8PQ/5?accountid=11773

Scobie, I. N., & Samaras, K. (2009). Fast Facts: Diabetes Mellitus - Type 2 diabetes mellitus. Fast Facts: Diabe tes Mellitus, 3rd ed, 24-29. https://www.proquest.com/docview/1170777340/citation/41A4AF7BD77747E8PQ/6?accountid=11773

Santos, G. F., Longhi de Oliveira, B., de Cássia Helú Mendonça Ribeiro, R., Del'Arco Paschoal, V., Alcalá Pompeo, D., & Lins Werneck, A. (2022). Diabetic and Hypertensive Patient's Handbook: adaptation of the Caderneta de Saúde da Pessoa Idosa for nursing assistance in Secondary Care. Revista Família, Ciclos de Vida e Saúde No Contexto Social (REFACS), 10(1), 145–155. https://doi-org.ezproxy.jamk.fi:2443/10.18554/refacs.v10i0.5541

Tang, J., Wu, T., Hu, X., & Gao, L. (2021). Self‐care activities among patients with type 2 diabetes mellitus: A cross‐sectional study. International Journal of Nursing Practice (John Wiley & Sons, Inc.), 27(6), 1‐11. https://doi-org.ezproxy.jamk.fi:2443/10.1111/ijn.12987

Tan, J. P., Cheng, K. K. F., & Siah, R. C. (2019). A systematic review and meta‐analysis on the effectiveness of education on medication adherence for patients with hypertension, hyperlipidaemia and diabetes. Journal of Advanced Nursing (John Wiley & Sons, Inc.), 75(11), 2478–2494. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jan.14025

Türe, A., Demirsoy, N., & Gökalp, D. (2023). Management of type 2 diabetes: Self-management education and clinical findings. Journal of Diabetology, 14(3), 135-142. 10.4103/jod.jod_20_23

Tan, J. P., Cheng, K. K. F., & Siah, R. C. (2019). A systematic review and meta‐analysis on the effectiveness of education on medication adherence for patients with hypertension, hyperlipidaemia and diabetes. Journal of Advanced Nursing (John Wiley & Sons, Inc.), 75(11), 2478–2494. https://doi-org.ezproxy.jamk.fi:2443/10.1111/jan.14025

Troncone, A., Cascella, C., Chianese, A., Zanfardino, A., Casaburo, F., Piscopo, A., Rosanio, F. M., di Candia, F., Franzese, A., Iafusco, D., & Mozzillo, E. (2022). Doctor-Patient Relationship in Synchronous/Real-time Video-Consultations and In-Person Visits: An Investigation of the Perceptions of Young People with Type 1 Diabetes and Their Parents During the COVID-19 Pandemic. International Journal of Behavioral Medicine, 29(5), 638–647. https://doi-org.ezproxy.jamk.fi:2443/10.1007/s12529-021-10047-5

Vasconcelos, C., Cabral, M., Ramos, E., & Mendes, R. (2021). The impact of a community‐based food education programme on dietary pattern in patients with type 2 diabetes: Results of a pilot randomised controlled trial in Portugal. Health & Social Care in the Community, 29(6), e318–e327. https://doi-org.ezproxy.jamk.fi:2443/10.1111/hsc.13356

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & Health Sciences, 15(3), 398–405. https://doi-org.ezproxy.jamk.fi:2443/10.1111/nhs.12048

Yu, X. F., Chau, J. P. C., Huo, L. T., Li, X., Wang, D., Wu, H. J., & Zhang, Y. L. (2022). The effects of a nurse-led integrative medicine-based structured education program on self-management behaviors among individuals with newly diagnosed type 2 diabetes: a randomized controlled trial. BMC Nursing, 21(1), 1–17. https://doi-org.ezproxy.jamk.fi:2443/10.1186/s12912-022-00970-7

Wu, S. F., Tung, H. H., Liang, S. Y., Lee, M. C., & Yu, N. C. (2014). Differences in the perceptions of self-care, health education barriers and educational needs between diabetes patients and nurses. Contemporary Nurse: A Journal for the Australian Nursing Profession, 46(2), 187–196. https://doi-org.ezproxy.jamk.fi:2443/10.5172/conu.2014.46.2.187

World Health Organization. (6 April 2016). World Health Day 2016: WHO calls for global action to halt rise in and improve care for people with diabetes. https://www.who.int/news/item/06-04-2016-world-health-day-2016-who-calls-for-global-action-to-halt-rise-in-and-improve-care-for-people-with-diabetes

Zhu, L., Shi, Q., Zeng, Y., Ma, T., Li, H., Kuerban, D., Hamal, S., & Li, M. (2022). Use of health locus of control on self-management and HbA1c in patients with type 2 diabetes. Nursing Open, 9(2), 1028–1039. https://doi-org.ezproxy.jamk.fi:2443/10.1002/nop2.1140

Appendices

Appendix 1. Critical appraisal of chosen articles (Hawker et al., 2002)

Author	Abstract and title	Introduc-tion and aim	Meth-od and data	Samp-ling	Data analy-sis	Ethics and bias	Results	Trans fera-bility	Implication and/or usefulness	Total
Kim et al., (2022)	4	3	4	4	4	3	4	4	4	34
Kim & Utz, (2019)	4	4	3	4	3	3	4	4	4	33
Paragas& Barcelo, (2019)	3	4	4	3	3	4	4	3	4	32
Li et al., (2022)	4	4	3	4	4	3	3	4	3	32
Ogrin et al., (2018)	4	4	4	3	3	4	4	3	3	32
McGloin et al., (2015)	3	4	4	3	4	4	4	3	4	33
Esferjani et al.,(2022)	4	3	4	3	4	4	3	4	4	33

Zhu et al., (2021)	4	4	3	4	3	3	3	4	4	32
Eshete et al., (2023)	4	4	4	3	4	3	3	4	4	33
Liu et al., (2019)	3	4	4	3	3	4	4	3	4	32
Jing et al., (2022)	4	4	4	3	4	3	3	4	4	33
Santos et al., (2022)	4	3	4	3	4	4	3	4	4	33
Celik et al., (2015)	4	4	3	4	3	4	4	4	4	34
Kundury et al., (2023)	3	4	4	3	4	4	4	3	3	32

Appendix 2. Summary of reviewed articles

Authors, (Year), Country	Title	Purpose and Aims of the Study	Research Methods	Sample (n)	Main results	Critical appraisal (Hawker et. al 2002)
Kim, S. H., Kim, Y., Choi, S., & Jeon, B. (2022), South Korea	Effectiveness of a nurse-led social media intervention on diabetes self-management health behaviors and glycemic control in patients with type 2 diabetes.	Effectiveness of a nurse-led social media intervention on diabetes self-management health behaviors and glycemic control in patients with type 2 diabetes.	Explanatory sequential mixed methods design: randomized controlled trial and qualitative interviews	89 patients with type 2 diabetes	Nurse-led social media platforms have positive effects on the implementation of diabetes self-management.	34
Kim, S. H., & Utz, S. (2019), South Korea & Germany	Effectiveness of a Social Media-Based, Health Literacy-Sensitive Diabetes Self-Management Intervention: A Randomized Controlled Trial.	To compare the patient impact of a social media-based, health literacy-sensitive diabetes management intervention compared with a phone-based, health literacy-sensitive diabetes management intervention.	Quantitative Study: random group	151 patients diagnosed with type 2 diabetes	Social media and phone-based interventions can reduce health literacy gaps among patients. Social media can help people with lower health literacy self-manage.	33
Paragas, E. D., &	Effects of message-framed	Effects of information-framed	Quantitative Research: Control	165 patients diagnosed	Message-framed videos can	32

Barcelo, T. (2019), Philippines & the USA	informational videos on diabetes management knowledge and self-efficacy.	information videos on self-management in patients with type 2 diabetes.	and Intervention Groups	with type 2 diabetes	improve self-management in people with type 2 diabetes.	
Li, X., Ge, J., & He, L. (2022), China	Influence of Self-Practice Oriented Teaching plus Psychological Intervention on Blood Glucose Level and Psychological State in Patients with Type 2 Diabetes Mellitus on Insulin Therapy.	Effect of self-practice-oriented teaching combined with psychological intervention on patients with type 2 diabetes.	Qualitative research: control group and observation group.	80 patients diagnosed with type 2 diabetes.	Self-practice-oriented teaching combined with psychological intervention can effectively relieve the mood and stabilize blood sugar of patients with type 2 diabetes.	32
Ogrin, R., Viswanathan, R., Aylen, T., Wallace, F., Scott, J., & Kumar, D. (2018), Australia	Co-design of an evidence-based health education diabetes foot app to prevent serious foot complications: a feasibility study.	Evaluating whether a foot health education application is feasible.	Qualitative Research: Interviews.	31 diabetic patients at risk of amputation, and they all use mobile phones.	Application is feasible and acceptable, patients' attitudes toward self-care improve.	32
McGloin, H., Timmins, F., Coates, V., & Boore, J. (2015), Ireland & UK	A case study approach to the examination of a telephone-based health coaching intervention in facilitating behaviour change for	Exploring the effectiveness of telephone health counseling for adults with type 2 diabetes.	Longitudinal mixed methods case study design.	10 patients diagnosed with diabetes.	Telephone counseling can change health behaviors in people with diabetes.	33

	adults with Type 2 diabetes.					
Esferjani, S. V., Naghizadeh, E., Albokordi M., Zakerkish M., & Araban M. (2022), Iran	Effectiveness of a mobile-based educational intervention on self-care activities and glycemic control among the elderly with type 2 diabetes in southwest of Iran in 2020.	Evaluating the impact of a mobile device-based educational intervention on self-care behaviors and glycemic control in older adults with type 2 diabetes.	Quantitative Research: Control and Intervention Groups.	118 older patients with type 2 diabetes.	Educational intervention using mobile devices improves self-care behaviors in older patients with type 2 diabetes.	33
Zhu, L., Shi, Q., Zeng, Y., Ma, T., Li, H., Kuerban, D., Hamal, S., & Li, M. (2021), China	Use of health locus of control on self-management and HbA1c in patients with type 2 diabetes.	Evaluating the impact of the Health Control Point Education Program (HLCEP) in patients with type 2 diabetes.	Quantitative Research.	120 patients diagnosed with type 2 diabetes.	The HLCEP program improves self-management and reduces HbA1c in patients with T2DM.	32
Liu, Y., Jiang, X., Jiang, H., Lin, K., Li, M., & Ji, L. (2019), China	A culturally sensitive nurse-led structured education programme in patients with type 2 diabetes.	To assess the feasibility, acceptability and impact of a structured education program in patients with diabetes.	Mixed-method study: qualitative research and quantitative design.	44 patients with type 2 diabetes.	Structured educational programs are available that nurses can use to provide health education to patients.	32

Jing, Z., Le, W. S., Jing, Y. Y., Liang, Z., Can, H. C., & Xin-Mei, H. (2022), China	Compared impact of Video Technology on the Comprehension of Patients With First Insulin Injection and the Efficiency of Nurse Education.	the effectiveness of video and paper materials used for teach-back education on the first insulin injection for patients with diabetes.	Quantitative Research: Control and Intervention Groups	110 patients with diabetes.	It can reduce the educational time of medical staff and improve patients' psychological insulin resistance.	33
Eshete, A., Lambebo, A., Mohammed, S., Shewasinad, S., & Assefa, Y. (2023), Ethiopia and Australia	Effect of nutritional promotion intervention on dietary adherence among type II diabetes patients in North Shoa Zone Amhara Region: quasi-experimental study.	Evaluate nutritional promotion interventions for dietary compliance and lessons learned to improve self-management	Quantitative Research: Control and Intervention Groups.	216 patients with type II diabetes	Nutritional intervention programs can significantly increase the overall average number of days patients adhere to a healthy diet and improve glycemic control.	33

Santos, G. F., Longhi de Oliveira, B., de Cássia Helú Mendonça Ribeiro, R., Del'Arco Paschoal, V., Alcalá Pompeo, D., & Lins Werneck, A. (2022), Brazil	Diabetic and Hypertensive Patient's Handbook: adaptation of the Caderneta de Saúde da Pessoa Idosa for nursing assistance in Secondary Care.	Presenting an adapted version of the Elderly Health Handbook to users with diabetes and arterial hypertension in secondary care.	Quantitative Research: Control and Intervention Groups.	50 patients	The handbook is effective in treating patients.	33
Celik, S., Cosansu, G., Erdogan, S., Kahraman, A., Isik, S., Bayrak, G., Bektas, B., & Olgun, N. (2015), Turkey	Using mobile phone text messages to improve insulin injection technique and glycaemic control in patients with diabetes mellitus: a multicentre study in Turkey.	Utilizing mobile text messaging services to improve the knowledge and skills of insulin injections in patients with diabetes and to assess the relationship between this intervention and metabolic outcomes.	Qualitative Research: Interviews.	221 patients with type I and type II diabetes	Nurses provide insulin injection management information and reminder systems based on SMS service to patients with insulin-dependent diabetes, which can improve insulin self-management and metabolic control.	34

Kundury, K. K., Bovilla, V. R., Kumar, K. S. P., Chandrashekarappa, S. M., Madhunapantula, S. V., & Hathur, B. (2023), India	Providing Diabetes Education through Phone Calls Assisted in the Better Control of Hyperglycemia and Improved the Knowledge of Patients on Diabetes Management.	To determine the impact of a telephone-based educational intervention on hyperglycemic control.	Quantitative Research: Control and Intervention Groups.	130 patients with type II diabetes	Phone-based education could help patients better manage type 2 diabetes.	32