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Self-care education for type 2 diabetes patients

A systematic literature review

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Abstract

Objective: This study aimed to review evidence systematically and critically on the role of nurses, challenges faced by nurses, and challenges faced by patients in self-care for type 2 diabetes, which would be used to inform and guide nursing practice.

Methods: The study was carried out using a qualitative systematic literature review approach. A robust literature search of 4 electronic bibliographic databases from 2012 to 2022 was carried out. The theoretical framework was based on Orem's self-care theory.

Results: The 7 papers that were considered fully relevant for this review evaluated different aspects of self-care for type 2 diabetes. Most studies revealed knowledge, beliefs and values, time constraints, financial constraints, lack of support from caregivers, and bad weather conditions to be major challenges faced by patients. Whereas some studies provided pointers that lack of experience and skills from caregivers, a high number of patients, poor government policies and guidelines, poor health care facilities, and cultural influences as barriers to nurses. However, some of the studies highlighted that nurses play huge role as educators, motivators, counsellors, and follow-up of care and supporters for these patients.

Conclusion: This study concludes that learning and leadership are interwoven. The knowledge the patient acquired through the self-care education program can help in making the necessary lifestyle changes. Also, it is important to incorporate person-centred self-care education for type 2 diabetes with the patients' cultural components engraved into it.

Language: English
Key Words: Self-care education, Self-management education, Type 2 diabetes, Adult-onset diabetes, non-insulin-dependent diabetes

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1 Introduction

Type 2 diabetes has become one of the leading health challenges in the world. A metabolic disorder that takes several years to manifest and is mostly diagnosed in adulthood, but increasingly being identified in children, teens, and young adults (Centers for Disease Control and Prevention, 2021). The Centers for Disease Control and Prevention (CDC) (2021) further revealed that this disorder affects about 90 to 95 percent of diabetic patients, making it the most common type of diabetes around the world. Also, according to World Health Organization (WHO) (2022), insulin misuse leads to type 2 diabetes, sometimes referred to as non-insulin dependent diabetes or mature-onset diabetes. Overweight or obesity, eating unhealthy foods, stress, and a lack of physical activity are all common culprits of this disorder. These risk factors predispose an individual in developing impaired glucose tolerance and impaired fasting glycaemia, which increases the risk of developing type 2 diabetes, although there is still chance of managing it (World Health Organization, 2022).

However, until recently, management of type 2 diabetes was carried-out through frequent visit to the health centers, and often managed within the hospital setting through medications and regular blood sugar monitoring (Umpierrez et al., 2012). Nowadays, health care providers and policy makers in both developed and developing nations have realized that self-care of type 2 diabetes via education is needed to boost the effectiveness of blood sugar control and quality of life among individuals suffering from this metabolic disorder. There have been wide claims that self-care education in type 2 diabetes care is expected to effectively improve self-care behavior and other important behavioral changes, creating incentive for efficiency, help lower hemoglobin A1C (HbA1c), and reduce burden on already over stretched health care resources (Funnell et al., 2012; Minet, Møller, Vach, Wagner, and Henriksen, 2010). Unfortunately, there are many obstacles that could limit the success of self-care of this disorder even when all the necessary information has been acquired.

Indeed, many factors may pose obstacle in the self-care for type 2 diabetes. Lack of financial resources to access medications, healthy foods, or those medical supplies for type 2 diabetes self-care (such as glucometer, test strips for glucose, and lancets); additionally, cultural beliefs that surround the cause of the illness is another serious consideration (Ngo-Metzger, Sorkin, Billimek, Greenfield, & Kaplan, 2012; Abdulrehman, Woith, Jenkins, Kossman, & Hunter, 2016). Thus, self-care for type 2 diabetes is facilitated if proper attention is paid to these limiting factors.

Consequently, incorporating education in the self-care of type 2 diabetes is seen as an avenue of integrating and navigating care decisions into the daily lives of the patients, also, it helps to improve health outcomes, therefore, most health care settings have employed this strategy to achieve these objectives. Thus, due to perceived importance of type 2 diabetes care, self-care education should be studied, and extensive research should be carried-out to gain vivid understanding on how this approach helps type 2 diabetes patients.

2 Background of this study

The aim of this chapter is to discuss in depth about the topic of type 2 diabetes self-care. Also, different types of diabetes, risk factors for type 2 diabetes, complications of type 2 diabetes, diagnosis, prevention, social determinants of self-care, and various strategies to manage type 2 diabetes will be discussed. However, there are 4 types of diabetes, with two main types, namely: type 1 diabetes (which requires frequent insulin administration to the patient); and type 2 diabetes (its management does not depend on frequent insulin therapy). Also, the other two types are gestational diabetes (diabetes at pregnancy); and pre-diabetes (having high blood sugar level, but not high enough to be termed type 2 diabetes). This study will have a little discussion on the other types of diabetes, followed by in depth discussion on type 2 diabetes because it is the central focus of this research.

2.1 Other types of diabetes

Diabetes is a common name for metabolic disorders that show up as high blood sugar or hyperglycaemia. Overall, diabetes has been seen as a chronic metabolic disorder that alters the ability of the body to metabolise glucose, protein, and fats, because of either insulin resistance or inability of the beta cells in the pancreas to produce enough insulin or inability of the pancreas to produce insulin at all (as seen in type 1 diabetes) (World Health Organization, 2022). More so, according to World Health Organization (2022), type 1 diabetes previously known as insulin dependent, or childhood-onset diabetes is characterized by low insulin production and necessitates daily insulin injection. It is interesting to know that type 1 diabetes affects 9 million people worldwide, the majority of whom live in high-income nations, and its source, as well as the measures to prevent it, are unknown (World Health Organization, 2022). Although, there are early warning signs and symptoms of this disorder, which prompt for quick response to avert its later consequences.

Gestational diabetes on its part is hyperglycaemia with blood glucose level occurring above the normal range, and commonly seen during antenatal period (World Health Organization, 2022). Women who had gestational diabetes during pregnancy have higher likelihood of developing diabetes related complications during pregnancy or after delivery (World Health Organization, 2022). Also, those women and their children have the possibility of developing type 2 diabetes in the future (World Health Organization, 2022). Therefore, it is important to start preventive actions to avoid occurrence of type 2 diabetes in the future.

Similarly, pre-diabetes is another type of diabetes that is worth discussing. Centres for Disease Control and Prevention (2021) revealed pre-diabetes as higher-than-normal blood sugar levels, but that are not yet high enough to be classified as type 2 diabetes. For example, in the United States alone, prediabetes affects 96 million adults, or nearly one-third of the population of this country (CDC, 2021). Furthermore, more than 80% of them are unaware that they have it (CDC, 2021). Type 2 diabetes, heart disease, and stroke are some of the spill-over effects of having pre-diabetes (CDC, 2021). However, lifestyle changes can help in preventing and reverting this condition (CDC, 2021).

However, despite other types of diabetes, this study is motivated to study about type 2 diabetes instead of other categories of diabetes because this type of diabetes affects diverse age groups across the world, also, type 2 diabetes is known to cause multi-systemic disorders, and is seen as a catalyst for other diseases such as hypertension, vision loss or blindness, nerve problem, heart diseases and stroke, foot problems (sores and infections), amongst others (CDC, 2022).

2.2 Type 2 diabetes

According to Nair and Peate (2009), insulin encourages the movement of glucose through the cell membrane and into the cell body in these cells. Therefore, Adenosine triphosphate (ATP), the primary source of energy for body cells, is created when glucose is metabolized by the cell's enzyme systems under the influence of insulin (Nair, & Peate, 2009); but type 2 diabetes (known as non-insulin dependent or adult-onset diabetes) results when the body cells ineffectively utilize the insulin produced (insulin resistance) or when the amount of insulin produced by the beta cells located in the pancreas is not sufficient to meet the demand of the body cells that require it, in this case, this is termed beta cell failure (CDC, 2021). Interestingly, there are early warning signs and symptoms designed to prompt the affected person to swing into action to avert more serious consequences.

According to WHO (2022), the symptoms are comparable to those of type 1 diabetes, but they are usually milder; as a result, the condition may not be detected until years after it has begun to cause difficulties. For example, there are instances where the affected person sees the signs and symptoms as those from other sickness such as malaria, typhoid fever, and without proper diagnoses the person will remain confused about the illness until it starts to manifest with more serious complications (CDC, 2022).

2.3 Signs and symptoms of type 2 Diabetes

Emerging evidence suggests that type 2 diabetes patients can experience a spectrum of long-lasting symptoms, including chronic fatigue, peripheral neuropathy, vision loss, consistent itching in the vaginal region (Gardner, Shoback, & Greenspan, 2011); also, weight loss, increased appetite, increased thirst, frequent urination (Vijan, 2010). It is also worthy to note that this disease has strong influence on the daily activities of the affected individuals, resulting from declining health and loss of function (Manderson, and Kokanovic, 2009; Rygg, Rise, Lomundal, Solberg, & Steinsbekk, 2010). Overall, this affects the patient's ability to meaningfully contribute to family and societal functions. Also, it is interesting to mention that a small number of people with type 2 diabetes are likely to develop a hyperosmolar hyperglycemic condition, which is a condition where the level of sugar in the blood is very high complemented with a reduced level of awareness and lowered blood pressure (Gardner et al., 2011).

2.4 Risk factors for type 2 diabetes

There are variety of factors that increase the chance of developing type 2 diabetes, which usually occurs as a combination of genetics and lifestyle factors. Generally, the risk factors for type 2 diabetes are modifiable lifestyle factors such as obesity or overweight, eating unhealthy diets, physical inactivity, stress, and smoking habits, whereas the non-modifiable factors are genetic or family predisposition, and age (Roglic, 2016). However, lifestyle factors are easier to be modified in the quest to manage type 2 diabetes, whereas genetic factor and age being inborn are not modifiable.

2.4.1 Genetics

Melmed, Polonsky, Larsen, Kronenberg, eds (2011) pointed out that most cases of diabetes involve many genes, each of which plays a little role in the risk of developing type 2 diabetes. Willemsen et al. (2015) further revealed that it is estimated that 72 percent of diabetes cases are hereditary. There are more than 36 genes and 80 single nucleotide polymorphisms (SNPs) linked to the risk of type 2 diabetes (Herder, & Roden, 2011; Fuchsberger et al. 2016). Herder, and Roden (2011) added that a total of 10% inheritable component of this disease is accountable by these genes. Interestingly, majority of the genes associated to type 2 diabetes are involved in the activity of pancreatic beta cells (Gardner et al., 2011).

2.4.2 Obesity or Overweight

Obesity or overweight remains an important risk factor for type 2 diabetes. This body mass increment causes the level of fatty acids and inflammation to rise, resulting to insulin resistance and over time this can lead to type 2 diabetes (Guh et al., 2009; Rudra, Sorensen, Leisenring, Dashow, & Williams, 2007). Insulin resistance is a term used to describe metabolic abnormality, whereby the body cells become insensitive to the insulin released by the beta cells of the pancreas. According to Guilherme, Virbasius, Puri, and Czech (2008), acquired insulin resistance is highly associated to obesity, resulting from circulating free fats that disrupt insulin signal pathway and the ability to channel glucose to the body cells that required it. When this occurs, the body cells will not be able to utilize the glucose released from foods, hence leading high level of blood glucose (Guilherme et al., 2008).

Interestingly, there are many things to do to mitigate the negative effects of obesity on type 2 diabetes patients. It is possible to manage this kind of condition by being responsible to your health, for example, eating healthy foods, being physically active (exercising) regularly, and reducing stress (CDC, 2022). According to Knowler et al. (2002), as a type 2 diabetes preventive management strategy, weight loss over 3 years is quite good enough to help people with pre-diabetes and obesity to avert type 2 diabetes by 58 percent.

2.4.3 Diet and Nutrition

As pointed out earlier, diet and nutrition have strong effects in disposing an individual to type 2 diabetes. A diet packed with fats, calories, and low-density cholesterol (LDC), increases the chance of developing type 2 diabetes; for example, a more recent study revealed that Indians postulated the significance of nutrition in the etiology of type 2 diabetes, observing that the condition was almost exclusively confined to rich people who consumed large amounts of oil, wheat, and sugar (Seidell, 1998). Obesity can result from consuming poor diet, which at the end cause insulin resistance in the body cells due to increased body mass index.

Therefore, a diet that is formulated with carbohydrate from fruits, whole grains, legumes, vegetables, and low-fat milk is encouraged in preventing and managing type 2 diabetes (CDC, 2022). In the contrast, avoidance of sugar-sweetened beverages is also a necessity for people with this metabolic disorder (Ardisson Korat, 2014). Thus, it is important that people gain knowledge of their predisposition to this disorder, in addition, knowing the appropriate diets and nutrition to consume to stay at optimum health is also very important.

2.4.4 Physical activity

Physical activity serves a crucial role in the prevention and management of type 2 diabetes complications. Staying physically active is necessary for burning some of the calories obtained from foods, and at the same time, it helps to prevent weight gain and reducing weight during the management of type 2 diabetes. Studies have proven that regular exercise aids in improving insulin action, reduction in blood pressure, enhancing lipid profile, thereby reducing the risk of heart disease and stroke (Kirwan, Sacks, & Nieuwoudt, 2017).

Additionally, CDC (2021) pointed out that being physically active makes the body more responsive to insulin (the hormone that permits your body's cells to utilize blood sugar for energy), which aids in diabetes management. Also, physical activity decreases the risk of heart disease and nerve damage by helping to regulate blood sugar levels (CDC, 2021). Thus, being physical active is an important component for preventing and managing type 2 diabetes, although, there are other factors that complement it.

2.4.5 Smoking habits

According to CDC (2022), smokers have 30 to 40 percent likelihood to develop type 2 diabetes than non-smokers. The rationale for this is that smoking hampers the management of this disease, particularly it makes the regulation of insulin level more difficult because rising level of nicotine interferes with the effectiveness of insulin, therefore, subjecting the individual to need more and more insulin administered to get the required therapeutic effect (CDC, 2022).

2.4.6 Stress

In addition to smoking habit, stress has long been suspected to be a contributing factor in developing type 2 diabetes. The concept of “stress” has implications to health in various disciplines such as psychology, biology, medical sciences, and many more. The endocrinologist Hans Selye established the notion of stress in the 1930s, expanding on prior work by Cannon (fight-or-flight and the concept of homeostasis) and Bernard (homeostasis). Stress symptoms can be classified as cognitive, emotional, behavioral, or physical. According to Pouwer, Kupper, & Adriaanse (2010), poor judgment, low self-esteem, poor focus, and negative cognitions are examples of cognitive symptoms, whereas moodiness or even sadness, anxiety, excessive worrying, anger, agitation, and feelings of loneliness or isolation are all emotional stress indicators.

Also, Pouwer et al. (2010) further revealed that aches and pains, diarrhoea or constipation, nausea, dizziness, chest pain, and a fast heartbeat are examples of physical symptoms. For example, eating too much or too little, sleeping too much or too little, social withdrawal, procrastination or disregard of obligations, increased alcohol, nicotine, or drug intake, and anxious habits such as pacing or nail-biting are all behavioural signs of stress.

Several prospective studies have investigated the possibility that "general emotional stress" is linked to an increased risk of type 2 diabetes. First, data from a longitudinal study aimed at determining the long-term impact of general emotional stress on changes in health behavior and cardiac risk profile in men and women was recently published by a group of Danish researchers (Rod, Grønbaek, Schnohr, Prescott, & Kristensen, 2009). This study analyzed data from Copenhagen City Heart Study, which involved 7,066 women and men, the result of this study provided a pointer that stressed men not women have higher likelihood of developing type 2 diabetes. In other instances, some studies have compared the health impact of depression on type 2 diabetes. When compared to healthy control group, people with type 2 diabetes have a two-fold increased incidence of co-morbid depression, lowering their quality of life (Pouwer et al., 2003; Schram, Baan, & Pouwer, 2009).

2.5 Diagnosis

As earlier mentioned, type 2 diabetes is a chronic condition that could affect other important organs such as heart, kidney, blood vessels, eyes, nerves, and teeth, therefore, it is important to undergo proper diagnoses for initiation of prompt management strategies. Blood sugar testing is a reasonably inexpensive way to make an early diagnosis (WHO, 2022). CDC (2021) added that there are various strategies to detect this disorder. One of the recommended methods is through A1C (hemoglobin A1C or HbA1c test) that measures the blood sugar level over the past 3 months. CDC (2021) further revealed that an A1C of less than 5.7 percent is considered normal, between 5.7 and 6.4 percent indicates prediabetes, and 6.5 percent or over implies diabetes.

Similarly, another important type 2 diabetes uncovering strategy is fasting blood sugar test (CDC, 2021). CDC (2021) pinpointed that after an overnight fast, this test measures your blood sugar (before your first meal in the morning). A fasting blood sugar level of 99 mmol/L or less is considered normal, while 100 to 125 mmol/L implies prediabetes, and 126 mmol/L indicates diabetes (CDC, 2021).

Glucose tolerance test is another testing method suggested. According to CDC (2021), this test measures the blood sugar levels before and after ingestion of a glucose-containing beverage. It is recommended that an overnight fasting should be carried out before the test, then drink a glucose containing beverage and have the test done (CDC, 2021). A blood sugar level of 140 mmol/L or less at 2 hours is considered normal, whereas 140 mmol/L to 199 mmol/L indicates prediabetes, and 200 mmol/L or above implies diabetes (CDC, 2021).

Finally, random blood sugar test which measures blood sugar level at the time it was tested is recommended (CDC, 2021). This blood sugar taking strategy can be taken at any time and without subjecting the patient to fasting (CDC, 2021). Diabetes is diagnosed when the blood sugar level is 200 mmol/L or above (CDC, 2021). These strategies serve as first step approaches in averting long time consequences of this metabolic disorder.

2.6 Complications of type 2 diabetes

Type 2 diabetes when neglected can create complications that could be devastating, both in the short run and in the long run. In the short-run, patients with this disorder could start having difficulties in keeping their blood sugar in the normal range. For instance, within short interval, blood sugar level could decrease, leading to hypoglycemia, and at the event of shooting it up by consuming energy rich food drinks such as Cola drink or orange juice, the blood sugar can suddenly rise above the normal range, hence making the patient to be nervous about these outcomes, depriving the patient to concentrate on other important daily activities. For example, it is likely that a person suffering from type 2 diabetes will not enjoy leisure activities at the fullness because the person will be more concerned about what kind of foods and drinks to avoid, instead of concentrating on the main mission of the vacation. All these efforts are geared toward avoiding long run complications that could be more damaging to the body.

On the other hand, long run complications such as retinopathy (eye disorder), kidney disease (nephropathy), diabetic neuropathy (damage to the nerves located outside the brain and spinal cord), and vascular problems (vasculopathy), are huge life-threatening conditions, that could reduce the overall quality of life of the affected person (Silva, Ferreira, & Pinho, 2017). This implies that type 2 diabetes is a multi-systemic disorder that affects several parts of the body. For instance, reduced blood flow to the peripheral part of the body can cause foot ulcers, which could lead to leg amputation if not taken care of adequately (Silva et al., 2017). Similarly, the diabetic retinopathy is a common cause of vision loss or blindness due to

damage of small blood vessels surrounding the retina (Silva et al., 2017). When these tiny blood vessels get damaged, the affected person will start experiencing some symptoms such as consistent eye itching, trouble reading either far or nearby objects, fluid filling the eyes, redness of the eyes, amongst others. Negligence of these early signs and symptoms of retinopathy, could result to diabetic macular edema and neovascular glaucoma, and eventual vision loss (Silva et al., 2017).

Consequently, with the occurrence of vision loss, the affected person will develop the feeling of being unwell and will be unable to participate in daily activities or living life to its fullest. For example, activities of daily living such as cooking foods, dressing up, sweeping the rooms, eating food, personal hygiene, toileting, and many more are usually affected. This person will rely solely on the help and support of others such as family members, friends, neighbors, and caregivers for activities of daily living. Also, it is likely that a person that lost his or her vison will avoid socializing, resulting to loneliness and depression (Devenney, & O'Neill, 2011).

Also, according to Pasquier (2010) there is increasing likelihood of spill-over effects from complications such as Alzheimer's disease and vascular dementia to cognitive dysfunction and dementia. Additionally, Viljan (2010) indicated that hyperpigmentation of the skin, sexual dysfunction and reoccurring infections are other possible complications; also, not forgotten is the possibility of modest hearing loss (Akinpelu, Mujica-Mota, & Daniel, 2014). This explains how type 2 diabetes could be devastating, because it affects almost every important part of the body in one way or the other, which calls for early avoidance of its occurrence.

2.7 Prevention

Eating healthy diets and regular exercise can help to delay or prevent the onset of type 2 diabetes (Raina Elley & Kenealy, 2008; Hemmingsen et al., 2017). Ripsin, Kang, and Urban (2009); Schellenberg, Dryden, Vandermeer, Ha, and Korownyk (2013) further revealed that intensive lifestyle changes could cut the risk in half. O'Gorman, and Krook (2011) pointed out that exercise is beneficial activity regardless of a person's starting weight or subsequent weight loss. Kyu et al., (2016) on its part added that physical activity lowers the risk of diabetes by roughly 28%.

On the other hand, Nield, Summerbell, Hooper, Whittaker, and Moore (2008) indicated that evidence supporting the benefits of dietary changes alone is inadequate; however, Carter,

Gray,Troughton, Khunti, and Davies (2010) pointed out that consuming a diet rich in green leafy vegetables is beneficial. Additionally, Schwingshackl et al. (2017) added that limiting intake of sugary drinks will aid in preventing this disorder. Xi et al. (2014) found association between type 2 diabetes and the drinking of sugar-sweetened fruit juices, although there is no proof that 100% fruit juice causes this disorder. A diet high in fibre to prevent this disorder was suggested by (Reynolds et al, 2019). Overall, what we eat, and drink play important role in the prevention and management of type 2 diabetes and caution should be taken whenever it comes to food consumption.

Indeed, type 2 diabetes risk may be decreased by diet and exercise, either alone or in conjunction with metformin in those with impaired glucose tolerance (Ripsin et al., 2009; Santaguida et al., 2005). However, Ripsin et al. (2009) has shown that Metformin is less effective than lifestyle modifications. Haw et al. (2017) have confirmed this by stating that long-term, lifestyle interventions reduced risk by 28%, but medication has no effect on risk after withdrawal. Also, Seida et al. (2014) gave a further confirmation that while inadequate vitamin D levels have been linked to an increased risk of diabetes, supplementing with vitamin D3 does not reduce that risk. Although, exercise, medications, and eating healthy diets have been indicated to be beneficial for type 2 diabetes prevention and management, however, there are many limiting factors that could decrease the likelihood for successful type 2 diabetes self-care.

2.8 The social determinants of self-care

The conditions in the surroundings where people are born, live, learn, work, play, worship, and age are known as social determinants of health (SDOH), and they influence a wide range of health, functionality, quality-of-life, health outcomes, and risks (WHO, 2022). WHO (2022) further added that social norms, social policies, political policies, economic policies and systems, and development goals are examples of these factors. These factors will be taken in turn for discussion in the following sub-sections below because they provide clues why some people will experience type 2 diabetes self-care deficit.

2.8.1 Income

Financial constraints affect a person health care coverage, particularly ability to purchase simple medical devices, medications, nutritional foods, access to transportation for medical appointments and many more. Hill, Nielsen, and Fox (2013) revealed that for a variety of

reasons, type 2 diabetes can be particularly difficult for individuals who are less fortunate. First, the personal financial burden of rising health-care expenditures can exacerbate the effects of poverty, especially because it consumes a larger portion of one's income (when compared with those who have huge financial resources) (Raphael et al., 2012). Second, an impoverished person may lack the resources needed to manage the illness, such as suitable housing, healthy food, and health-care services (Pilkington et al., 2010; Drewnowski, 2009). Finally, if left untreated, type 2 diabetes can reduce an individual's productivity at work and impede educational attainment, leading to further employment-related issues and poverty (Currie, Madrian, Ashenfelter, & Card, 1999).

2.8.2 Education

This later socio-economic factor can make it harder for certain patients to read and understand medical information because patients with low level of education often have low health literacy. Brown et al. (2004) pointed out that even when exposed to typical diabetes education, those with lower levels of literacy are less likely to notice the signs and symptoms of hyperglycaemia, and they have been proven to have higher haemoglobin A1c levels and greater rates of retinopathy. There is a further pointer that even when people with low literacy follow a prescribed diabetes regimen, many say they do not understand why they are doing the self-care measures or the benefits of doing so (Osborn, Bains, & Egede, 2010).

2.8.3 Age

Older people with type 2 diabetes may have other comorbidities with symptoms that could impact negatively on their ability to adhere to exercise and nutritional recommendations or care for themselves independently. Dunning (2009) provided a clear support for this by revealing that multiple physical and mental functioning problems that impact self-care ability, independence, and psychological well-being can affect an elderly person with type 2 diabetes, including glucose metabolism, chewing, and swallowing problems, cerebral and peripheral vascular and cardiac problems, nervous system problems, visual problems, renal problems, stress and depression, cognitive impairment, and musculoskeletal disorders. Thus, Dunning (2009) added that one major highlight of making and maintaining self-care decision among older adults is their decreasing functionality as they grow older, as such, a periodic assessment of self-care ability should be carried out.

2.8.4 Food security

It is tough to find healthy meals with important nutrients like vitamins and minerals if one is having infrequent access to a grocery shop. People's ability to manage health issues, particularly those requiring special dietary regimens such as type 2 diabetes, is influenced by their access to nutritional food (Quan et al., 2006; Vozoris, & Tarasuk, 2003; Fitzgerald, Hromi-Fiedler, Segura-Pérez, & Pérez-Escamilla, 2011). Thus, it is considerably more difficult to match people's food choices to diabetes regimens (type 2 diabetes) when there is difficulty getting enough calorie for them (Vozoris, & Tarasuk, 2003).

Additionally, it is interesting to point out that individuals who rely on free food from food banks, shelters, or drop-in meals find it challenging to manage their diabetes because the food is frequently unfit for a diabetic diet (Beatriz, Sherry, & Alexandra, 2011; Chan, DeMelo, Gingras, & Gucciardi, 2015; Pilkington et al., 2010). Also, these food sources are frequently canned and contain a lot of salt, flour, and sugar not suitable for type 2 diabetes patients (Beatriz et al., 2011; Pilkington et al., 2010).

2.8.5 Culture

Culture is that aspect of life that is acquired through continuous interaction and socialization with other individuals. Religious and spiritual beliefs, language competency, traditional values and beliefs and health care practices are different forms of culture that could be acquired. It is also worthy to point out that this aspect of lifestyle can be transferred from generation to generation, learnt right from birth, and are more affected by environmental factors such as availability of resources. However, culture is dynamic in nature, which implies that it is continuously changing (Timby, 2009).

Similarly, Wikberg and Eriksson (2008) viewed culture as a set of changing beliefs and values that reshape the way people within an ethnic group think and act. Therefore, culturally competent care is seen as an avenue of giving care that is sound and acceptable to the patient. More so, it is a lifelong learning process that is surrounded by continuous search for new knowledge (Campinha-Bacote, 2011). Therefore, in type 2 diabetes self-care, culture remains an important component that should be considered because it can have huge influence in the acceptability of the type 2 diabetes self-care teachings.

2.9 Strategies to manage type 2 diabetes

This section introduces the various methods to manage type 2 diabetes. There are two methods that could be utilize in the focus to prevent and manage type 2 diabetes, they are, hospital-based type 2 diabetes care, and type 2 diabetes self-care. Thus, these two methods will be described in detail in the subsequent sub-sections.

2.9.1 Hospital-based type 2 diabetes care

Initially, even at this time, conventional approach for monitoring and controlling blood sugar level is still in practice, which is basically through constant visit to the designated health care facility to get blood sugar level checked. Many of these patients live in remote areas without specialized hospitals that can carry out blood sugar testing and medications. Therefore, they are forced to travel long distance to meet up with their already scheduled medical appointment. This always comes with costs such as transport cost and other costs such as cost of getting medical attention from a doctor or specialized nurse, particularly in low-income countries with no health insurance coverage. Although, according to CDC (2020), people with diabetes can benefit from team-based health care because it can help them avoid or manage problems while also improving their quality of life. Primary care clinicians and other members of a patient's health care team can encourage patients to take their medications and receive routine eye, ear, foot, and tooth care at every appointment (CDC, 2020).

Despite the usefulness of the above strategy in helping to manage blood sugar level among type 2 diabetes patients, there is still needed to assess its effectiveness. This old strategy has been perceived to be ineffective in keeping in check the blood sugar level at the required interval, leading to newer strategy that is centered on empowering the patient to take control of their destiny. The use of this new approach has gained support from (Minet, Møller, Vach, Wagner, & Henriksen, 2010), who recommended self-care education as an effective strategy for teaching and motivating type 2 diabetes patient to be responsible of their health.

2.9.2 Type 2 diabetes self-care

Self-care or self-management has been termed as the process of being responsible, accompanied by behavior that assist in promoting health and active management of health alteration (Funnell et al., 2012). Prediabetes can be slowed or stopped, type 2 diabetes can be prevented, and complications from diabetes can be avoided or delayed with the correct

management (CDC, 2020). Although, individuals have been actively involved in food choices, sleep, exercise, and dental care, but in the context of chronic diseases, such as heart failure, diabetes, high blood pressure, this requires a consistent behavioral change that control the illness, alleviating symptoms, and preventing complications (Funnell et al., 2012).

People with type 2 diabetes spend most of their time away from their health care team and outside of clinical settings, therefore, living well with type 2 diabetes requires patients to learn how to manage their illness in the locations where they live, work, and play. Referring them to or offering DSMEs services is one method to assist them (CDC, 2020). Improved A1C readings, fewer diabetic complications, and reduced out-of-pocket expenditures are some of the valuable benefits of these services (CDC, 2020).

Specifically, the purpose of diabetes self-management education (DSME) is to boost an individual's self-efficacy in managing food intake, physical activity, blood glucose monitoring, stress management, and other diabetes-related skills and behaviors (Powers et al., 2016). For instance, adhering to the acquired knowledge during the self-management education program could help in reducing excess body fat through regular exercise, controlling intake of unhealthy foods, and maintaining regular blood sugar monitoring before and after food, hence leading to reduced type 2 diabetes associated complications, also, leading to better quality of life. The impact of DSME on glycemic control and quality of life (QOL) has been demonstrated through meta-analyses; among these participants, hemoglobin A1c (HbA1c) levels in DSME participants decreased by 0.76 percent at the first follow-up, at follow-up periods 4 or more months following intervention, reductions waned to 0.24 percent (Cunningham et al., 2018). Even though diabetes education has been found to have an impact on clinical outcomes and lifestyle modifications, the impact may fade over time. As a result, there is still a lot that can be done to enhance DSME for type 2 diabetes. Increased knowledge sustained through post intervention diabetes self-management education (DSME) follow-up could help in ensuring that the patient maintains excellent control of glycaemia and quality of life over a long period of time.

2.10 Benefits of type 2 diabetes self-care

Several studies have been carried-out to provide empirical findings to support the idea that type 2 diabetes self-management education (DSME) or self-care improves glycemic control and quality of life. Funnel et al. (2012) is one of the basic studies on this topic, this study

argues that type 2 diabetes self-care education enhances the knowledge; skills, and ability that are necessary to achieve effective behavioral changes. According to this study, this approach creates new behavior that helps in modifying lifestyle.

Similarly, more recent research has proven that there are benefits from DSME program for the patients with type 2 diabetes. For instance, a systematic review and meta-analysis by Cunningham et al. (2018) that include studies on cluster-randomized experiments, randomized controlled trials, and quasi-experimental research; measuring the effect of DSME on African American HbA1c and QOL in comparison to hospital-based care, indicated that there is considerable improvement in HbA1c and quality of life in the intervention participants compared to the controlled group.

Ernawati, Wihastuti, and Utami (2021) on their part, provided empirical research aimed to study the effectiveness of diabetes self-management education on patients with type 2 diabetes mellitus. The result of this study has shown positive outcome, indicating that DSME provided significant effectiveness to lifestyle changes and self-care among patients with type 2 diabetes. However, this study warned that various elements could influence the implementation process, which includes: **i)** limited resources, **ii)** culture, **iii)** diabetes relationship, and **iv)** clinic relationship.

More recent studies have focused on studying the impact of educational interventions on people with type 2 diabetes in primary care setting. The conclusions follow the same basic forms: incorporating DSME into the care for individuals with type 2 diabetes should theoretically drive efficiency in blood sugar control as compared to the hospital-based care (Alluhaymid et al., 2021). Celik, Forde, and Sturt (2020) researched on the impact of online self-management intervention on type 2 diabetes in middle-aged people; this study concluded that online self-management intervention has positive impact on HbA1c control.

When it comes to the issue of role of nurses in enhancing self-care, and what challenges nurses and people with type 2 diabetes face in utilizing self-care education for type 2 diabetes, the studies are more limited. Thus, this study found it worthy to explore these issues to find useful answers that will guide and inform type 2 diabetes self-care.

3 Research Aim and research questions

This chapter introduces the aim and research questions for this study. The aim of this study provides a summary of what this study hopes to achieve at the end of the research project; whereas the research questions are some of the research problems this study will answer, through analysis and interpretation of data, and wrapped-up and leave readers with the outcome of the study in the concluding chapter.

3.1 Aim

The aim of this study is to assess evidence on self-care education for type 2 diabetes and gain new knowledge that can be passed to nursing students and practicing nurses in helping type 2 diabetes patients manage this health challenge effectively.

3.2 Research questions

1) What are the roles of nurses in enhancing self-care among type 2 diabetes patients?

2) What challenges do nurses and patients face in the utilization of self-care for type 2 diabetes?

4 Theoretical framework

This chapter introduces the theoretical basis of this study. This study was conducted using Dorothea Orem's theory of self-care. Her philosophy has advocated for the maintenance of optimal health and wellness through self-care, defined as a person's ability to care for oneself and those who need it.

Orem's theory of self-care has given nurses the roles as advocates, support person, the patient's educator, and giver of a safe and therapeutic environment. Thus, this theory helps nurses to determine which level of care a patient will require at a given point in time, also, it gives patients some level of independence during the self-care process. This discussion will continue with brief highlights on the three core constituents of this theory, specifically, the theories of self-care, self-care deficiency, and nursing systems.

4.1 Theory of self-care

Orem (1989) posited self-care as human regulatory function that individuals must engage in or have performed with the intended aim to preserve their life, health, development, and well-being. The nurse's actions are always geared toward assisting the affected individual to assume full responsibility for self-care, however, the action requirements and limitations of the individual should be considered during self-care teaching.

Furthermore, Orem (1989) further added that self-care must be learned, and it must be practiced consciously and consistently through time and in accordance with specific regulatory needs. These requirements are linked to their developmental phases, health, unique health or developmental traits, energy expenditure, and environmental factors (Orem, 1989).

4.2 Theory of self-care deficit

According to Orem (1989), the central idea of the self-care deficit theory is that peoples' need for nursing are linked to their sensitivity to health-related or health-care-related activity limitations as they grow older; as such, the interventions should be tailored to the identification and management of the individual needs of the affected person. Thus, nurse's function is characterized as that of a caretaker who addresses the patients' current and anticipated requirements (Snowden, Donnell, & Duffy, 2010).

4.3 Theory of nursing systems

Orem highlighted that the nursing systems theory comprises both the theory of self-care deficit and theory of self-care; and the primary aim of the person is to receive self-care from the nursing agency. The theory of nursing systems discusses how the nurse, the patient, or both will meet the patient's self-care needs. To address the patient's self-care requirements, Orem divides nursing systems into three categories: totally compensatory, partly compensatory, and supportive-educative. The totally compensatory is when the patient receives total care assistance from the nursing agency; partly compensation is when the interventions were undertaken by both the nurse and the patient; whereas supportive-educative is when the nurse takes the role as an educator and provide supplementary information to the patient to aid independent self-care (Snowden et al., 2010).

Also, according to Orem (1989), individuals, dependent-care units, groups whose members have therapeutic self-care requests with similar components or who have similar constraints for engaging in self-care or dependent-care, and families or other multi-person units may all benefit from nursing systems.

Therefore, as earlier pointed out, Orem (1989) theory of nursing systems encompasses the theory of self-care deficit, and theory of self-care. There is a chain reaction from these Orem’s theoretical constituents because nurses as agents of care interventions in the health care systems, act in accordance with the self-care deficits of individuals to empower them to take full responsibility in their daily self-care activities.

5 Methodology

This chapter describes the method used in the extraction of relevant data for this study. This study has chosen the systematic literature review methodology. This method is defined as a systematic process of identifying, critically analyzing, and compiling relevant, high-quality individual studies that investigate into one or more research issues to arrive at a result or finding using systematic and repeatable techniques (Baumeister, 2013). This literature search serves two important purposes; first, as a process of updating current knowledge on the aim of the study, secondly, gives a strong foundation for future research.

A systematic review could be carried out using either quantitative or qualitative research approach or a combination of the two approaches. However, this study has chosen the qualitative systematic literature review approach to synthesis the results of other studies; this follows a certain procedure that accesses electronic databases, and the abstracts of all prospective relevant studies will be read in full to ascertain the usefulness of the studies for inclusion in this study. Additionally, the qualitative content analysis approach will be introduced to indicate the approach that will be used to analyze the results from these studies.

5.1 Qualitative systematic literature review

As earlier mentioned, this study has chosen to undertake this systematic review through qualitative systematic literature review approach. According to Aveyard (2010), literature review is viewed as a comprehensive study and interpretation of the articles in accordance with the pre-determined study research questions. Literature review is usually carried out by carefully searching through electronic databases for articles, analyzing the contents of each article to understand its relevance for the proposed study, next, the selected articles are sorted to find out their similarities and differences, which results to the formation of new viewpoint. This approach helps in the formulation of conclusion that is robust and relevant to inform health care decision making.

5.2 Data source and search strategy

The literature search was conducted by searching through the following electronic databases, namely Medline (EBSCO) (2012-2022), EBSCO Academic search Elite (2012-2022), CINAHL (2012-2022), and Web of Science (2012-2022). In carrying out this search, this study attempted to retrieve every relevant study that was carried-out on self-care education for type 2 diabetes. This search within the selected journals was restricted to articles

published in English language, as well as being a peer-reviewed article; and was conducted by searching through these databases utilizing the following search terms:

- Type 2 diabetes **or** type 2 diabetes mellitus **or** non-insulin dependent diabetes **or** adult-onset diabetes **or** maturity onset diabetes **or** NIDDM **or** T2DM
- Self-management education **or** Self-care education **or** Personal management education **or** Personal care education.
- At a later stage of this search, the above search terms were combined with the word **'and'** to ensure that all relevant articles were retrieved.

In addition, manual search of the references of the retrieved articles were carried-out to determine whether there was any relevant study that could be retrieved. Therefore, **appendix A** shows the data sources and search strategy.

5.3 Selection criteria

This sub-section provides a summary of the studies selection criteria for the included studies for this study (**See table 1 below**).

TABLE 1: A SUMMARY OF THE INCLUSION AND EXCLUSION CRITERIA FOR THE SELECTED STUDIES

Studies Inclusion Criteria	Studies Exclusion Criteria
1. Included study designs were any form of qualitative study undertaken for self-care or self-management education for type 2 diabetes.	1. Any study had participants with type 1 diabetes, except the type 1 and type 2 diabetes were reported separately.
2. This study included studies with study population of at least 18 years old.	2. Non-English language studies
3. Additionally, the studies selected for this systematic literature review could come from any geographical area.	3. Dissertations, commentaries, seminars, and conference papers.
4. Also, studies published in peer reviewed journals in the English language between 2012 and 2022.	4. Studies for which the full article could not be retrieved.
	5. Studies carried out using other forms of study designs such as quantitative, experimental, systematic review, etc.

5.4 Quality assessment criteria

This study carried out quality assessment of the reported evidence for type 2 diabetes self-care in the studies that met the inclusion criteria as outlined in **sub-section 5.3**. The quality assessment criteria used for assessing these papers were based on **PRISMA 2020 checklists** (Prisma, 2020). Also, the quality assessment was concluded by the author of this study.

Some of the criteria for assessing the quality of included studies are whether the research aim, and questions were clearly stated, whether the inclusion and exclusion criteria for the study were clearly stated, whether search strategies were clearly stated, whether the findings of the review were clearly synthesized and stated in the result chapter. Also, whether the findings from the result chapter were interpreted clearly with statements about the limitations of the study, implications of the results for practice, and policy recommendations. **Appendix (B)** provides a full explanation of the quality assessment, also, it provides a useful idea for the interpretation of the criteria used to include the relevant studies for this review.

5.5 Data extraction and analysis

A further step was taken to extract data from those studies that were considered relevant and met the inclusion criteria as detailed in the **sub-section 5.3** above. This study searched for relevant information in the form of author, and publication year, and aim of the study, sample informants, and context (setting). This study also extracted the methods each study used in estimating the impact of self-care education on glycaemic control and quality of life; additionally, results of these included studies, the limitations, finally, the key findings of the studies and their respective policy recommendations were also extracted. This information is recorded in **Microsoft word**, so that the accuracy of the extracted information could be checked once again. Full information of the extracted studies is put in **appendix (C).**

Additionally, in the data analysis chapter of this study, a '**self-designed flow chart**' will be used to describe the process of selection of the relevant studies. This flow chart provides a visual summarise of the articles found, also, it will report on selection decisions made at various stages of the selection process, which makes the whole process transparent and robust, and a further step will be carried out using the qualitative content analysis method to analysis the data collected.

The online literature search produced 322 scientific papers (**see figure 1**). This approach resulted in the overlapping of published papers; therefore, five papers were eventually excluded because they were found to be duplicates of other scientific studies, resulting to 317 papers. Out of the remaining 317 papers, 21 were selected as being potentially relevant for this review after reading the titles and abstracts. These 21 studies were further read in full afterward, consequently, 13 studies were excluded for not fulling the inclusion criteria as set in the methodology. One study was subsequently excluded for failing the quality

assessment as well as being a mixed study of quantitative and qualitative methodologies. The remaining seven (7) studies address different aspects of self-care for type 2 diabetes.

5.5.1 Data analysis

As earlier pointed out, this study will utilize the qualitative content analysis approach, which is a process that breaks down the contents of the gathered data into themes, aimed at observing for patterns among them for easier analysis of the results (Polit & Beck, 2010). Polit and Beck (2010) further described ´**theme**´ as a unit that unifies the basis of the data collected and give meaningful interpretation about them.

Furthermore, Elo, and Kyngäs (2008) revealed that the process involves the collection of data that are further broken down into **sub-themes**, named according to the content they presented. This approach helps in depth analysis of the results of the different articles selected to find out similarities and differences between them.

6 Ethical considerations

According to Resnik (2015), ethics stands simply as a code of conduct commonly used as a measure of behaviour that could be acceptable or unacceptable. As such, showing acceptable moral behaviour is needed in everyday activities, especially in research in which human subjects are involved. It is essential to maintain a standard ethical behaviour that foster the focus of the study, by maintenance of truth, and avoidance of errors and bias. For instance, fabrication of data for analysis is a serious misconduct in research, because it will misrepresent research data, causing erroneous interpretation of research result, leading to untrustworthy policy recommendation (Goodyear, MKrleza-Jeric, & Lemmens, 2007).

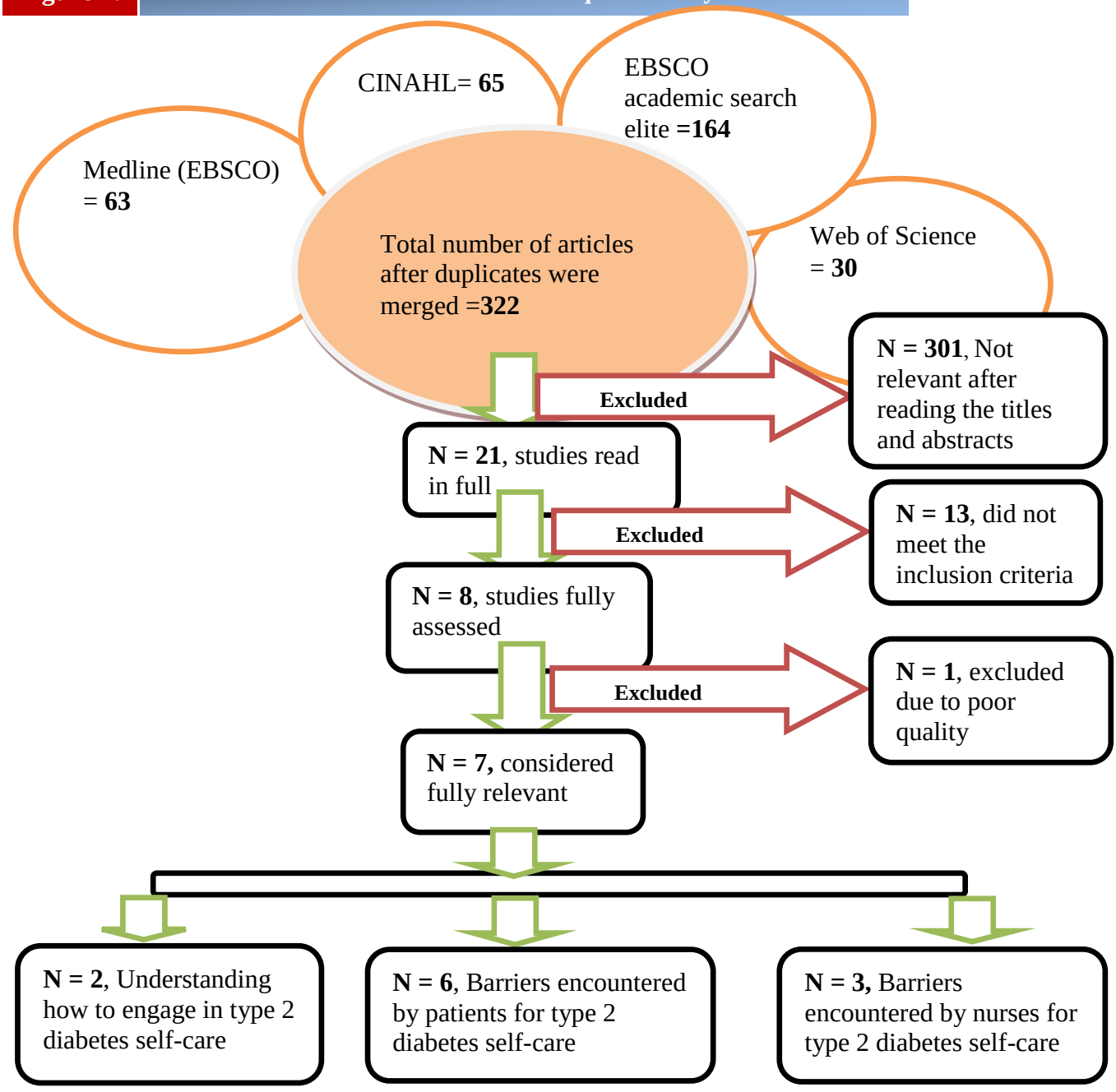
Correspondingly, Polit and Beck (2010, p. 553) revealed ethics as "a system of moral value that is concerned with the degree to which research procedures adhere to a professional, legal and social obligation of the student participant". Plagiarism is considered a serious crime in the academic world, which in real sense, is using someone academic work without acknowledging the source of such information (Finnish National Board on Research Integrity, 2021).

However, it is worthy to mention that this study is using a qualitative systematic literature review approach to study self-care education for individuals with type 2 diabetes, thus, this study is based on previous studies. Therefore, there is no direct human subject in this study. This study is conducted by collecting data from previous studies. Thus, the autonomy of human subject is not affected in this study, rather, prevention of harm to human subject is applied in this study by making such that the data collection process was credible and reliable.

7 Results

The 7 studies considered fully relevant for this qualitative systematic review are classified into three categories in accordance with the research questions as outlined in **chapter 3** of this study, the classification is as follows: **1)** Understanding how to engage in type 2 diabetes self-care; **2)** Barriers encountered by patients during self-care of type 2 diabetes, and **3)** Barriers faced by nurses during self-care for type 2 diabetes.

Figure 1: Flow chart of selection of studies for this qualitative systematic review



7.1 Understanding how to engage in type 2 diabetes self-care

Two studies have their primary aim of indicating that knowledge and motivation are keys to understanding type 2 diabetes self-care lifestyle changes (Whitehead et al., 2017; Rise, Pellerud, Rygg, & Steinsbekk, 2013), **see table 2 below.**

TABLE 2: UNDERSTANDING HOW TO ENGAGE IN TYPE 2 DIABETES SELF-CARE (THEMES AND SUB-THEMES)

THEMES	SUB-THEMES
Knowledge	Lifestyle changes on physical exercise Lifestyle changes on eating habits Lifestyle changes on medication (insulin therapy) Lifestyle changes on blood sugar monitoring Lifestyle changes on wearing appropriate footwears Lifestyle changes on weight management
Motivation	Lifestyle changes through motivation and support from others.

Knowledge and motivation serve as important tools in obtaining and maintaining information that are necessary for making lifestyle changes during type 2 diabetes self-care. Whitehead et al (2017); Rise et al (2013)

The two themes that emerged from these two studies are knowledge and motivation, and the seven sub-themes that emerged from these two central themes are: **1)** lifestyle changes on physical exercise; **2)** lifestyle changes on eating habits; **3)** lifestyle changes on medication (insulin therapy); **4)** lifestyle changes on blood sugar monitoring; **5)** lifestyle changes on wearing appropriate footwears; **6)** lifestyle change on weight management; **7)** lifestyle changes through motivation and support from others.

These two studies found that nurses are well equipped with wealth of knowledge that could be passed on to type 2 diabetes patients (Whitehead et al., 2017; Rise et al., 2013). They argued that knowledge is an important tool for making the needed type 2 diabetes lifestyle changes. It was found that through nurses, the patients got the necessary information about the pathophysiology, symptoms, risk factors, diagnoses, management options for this disease (Whitehead et al., 2017; Rise et al., 2013). Nurses utilize various strategies at their disposal to pass this information to these patients. They often organize type 2 diabetes self-care education program, using either lecturer who has been diagnosed of type 2 diabetes or past participants who are also a suffer of the illness. The intention is to gain trust from the participants; thus, patients have more tendency to start eating recommended healthy diets, engage in more physical exercises, checking the blood glucose levels at regular basis, reducing weight, wearing appropriate footwears for diabetic patients, and other important

lifestyle changes (Whitehead et al., 2017; Rise et al., 2013). Therefore, knowledge acquired through trusted education channel remains essential for type 2 diabetes patients to make the needed lifestyle changes (Whitehead et al., 2017; Rise et al., 2013). For example, a participant reported that *"when I'm out grocery shopping, I read the food labels. I have learned that. That makes it easier for me to choose food that is healthier in relation to the illness" (Rise et al., 2013, pp. 4).*

Another participant added that *"If I'm invited to a party in the evening, then I measure my blood sugar before I leave home. And if the blood sugar is high, just over 7, then I go jogging" (Rise et al., 2013, pp. 4).*

Also, it was revealed by a participant that *"I understand a lot more about why I was testing because I didn't understand it before exactly why I was testing, you know what affects me, what food affects me" (Whitehead et al., 2017, pp. 4).*

On the other hand, nurses were seen to have important role in both pre-and-post intervention periods for self-care of type 2 diabetes. They play useful role in motivating patients to stay physical active and do exercises as required. It is important to note that lack of encouragement is a huge barrier to engage in type 2 diabetes self-care. Nurses are expected to be there for the patients and have empathy about patients' condition, at the same time, develop strategies to raise their confidence to live healthier, resulting to avoidance of diabetes related complications. This supportive intervention from nurses is crucial in sustaining already acquired type 2 diabetes self-care lifestyle changes, because it helps the patient not to back out intermittently. The patient needs to be encouraged and supported to ensure that the intended aim of the acquired type 2 diabetes self-care knowledge is transited to more fruitful end results, such as weight reduction, absolute control of blood glucose level, and avoidance of type 2 diabetes long run complications (vision loss, frequent infection, dental issues, nerve damage, and many more).

Indeed, support acts as an important catalyst for maintaining lifestyle changes. It helps the patients to increase physical activities that is necessary for type 2 diabetes self-care, and support could come from children, family members, friends, neighbors, and caregivers (Rise et al., 2013). For example, a participant revealed that *"My daughter is dancing, so she's eager to be active during the summer holiday. She has taken me with her"(Rise et al., 2013, pp. 4).*

7.2 Barriers encountered by patients for type 2 diabetes self-care

Six (6) studies have their primary focus on assessing the barriers encountered by patients for type 2 diabetes self-care. The themes that were evaluated are **1)** sociodemographic challenges; **2)** culture and society challenges; **3)** health system challenges; **4)** disease uncertainty challenges (Bamuya et al., 2021; Adhikari et al., 2021; Swarna Nantha et al., 2021; Al Slamah et al., 2020; Husdal et al., 2021; Whitehead et al., 2017), **see table 3** below.

TABLE 3: BARRIERS ENCOUNTERED BY PATIENTS (THEMES AND SUB-THEMES)

Themes	Sub-Themes
Socio-Economic Challenges	Impact of age, level of education, income, time constraint, patient's sex on self-care.
Culture and Society Challenges	Impact of beliefs and values on self-care
Health System Challenges	Shortage of qualified and experienced staff team Health centre locations Poor communication channels Poor caregiver-patient relationship
The Disease Related Challenges	Uncertainty and frustration about the illness

There are self-care pitfalls faced by type 2 diabetes patients in their interaction with their immediate social space and healthcare system.
Bamuya et al (2021); Adhikari et al (2021); Swarna Nantha et al (2021); Al Slamah et al (2020); Husdal et al (2021); Whitehead et al (2017).

7.2.1 Sociodemographic challenges

The sociodemographic factors that were identified to be barriers to self-care among type 2 diabetes patients include individual beliefs and values, lack of family support, exemplar and influential characters from others, age, level of education, time constraint, and lack of funds.

Amongst the sociodemographic factors outlined above, Swarna Nantha et al. (2021) revealed that age is a serious concern when engaging a patient in type 2 diabetes self-care. The rational is that ageing comes with declining health; the patient is likely to start experiencing other health challenges such as arthritis, hypertension, vision loss, and many more. However, surprisingly, most participants in that study suggested that old age is not a huge barrier when considering type 2 diabetes self-care, their standpoint is that the main issue is the willingness to follow doctor's recommendation. They further ague that at younger age, most people will ignore the consequences of their health condition but becomes more alert of its effects when they grew old.

Also, in the same way, most participants argue that people with less education are more likely to follow strictly doctor's advice as compared to those with higher education (Swarna Nathan et al., 2021). Their thought is that people with high education will rely heavily on their own judgement of what is good for them than following sheepishly to doctor's advice, whereas people with less educational attainment are more inclined to rely on doctor's advice and support to have a successful type 2 diabetes self-care (Swarna Nathan et al., 2021).

The time factor is not left out in this discussion, particularly for women to stay active and engage in regular blood sugar monitoring (Adhikari et al., 2021; Swarna Nantha et al., 2021). These two studies further added that the most common causes of lack of time among these patients are family obligations like preparing foods for children and other family members as demanded by their culture (Adhikari et al., 2021; Swarna Nantha et al., 2021). Apart from this group of patients (married women), working-class patients are also reported to have less time to fully engage in type 2 diabetes self-care recommended activities due to tight schedule at work (Adhikari et al., 2021). A report from a participant provided support for this, *"I am a police officer. In a day, there are just far too many activities I am involved in. At one point, I am at the office, and before you know it, I am out doing field work. So sometimes I miss taking my medications because of that" (Swarna Nantha et al., 2021, pp 8).* Whitehead et al. (2017) on their part brought an evidence that most patients have issue regarding time in managing this disorder, particularly cooking for other. This decreases the available time to engage in type 2 diabetes self-care.

Furthermore, Adhikari et al. (2021) pointed out that lack of fund poses huge obstacle to keeping to health care appointments, buying medications, and conducting regular blood sugar test. This study further added that people suffering from this disorder who also have low financial resources are also constrained from buying the needed foods such as vegetables and other foods, and appropriate footwear despite having the motivation to do so. Additionally, this study revealed that the lack of insurance schemes in many countries further aggravates this burden.

The report from a participant stated that *"I have a comment on the doctor's talk about the support matter. There are many patients who suffer from the cost; the ministry did not provide everything till now, so when I ask the patient to undergo an analysis he says: it costs too much and I can't afford it. Moreover, most of them do not have a Diabetes Analysis Device, they can't afford buying it, hence, it will affect them as well" (Al Slamah et al., 2020, pp. 11).*

Another clear instance was pointed out by Al Slamah et al. (2020) that although health care services in Saudi Arabia are provided free of charge there are some hidden charges incurred by patients that prevent them to engage in physical exercise or self-monitor their condition. For instance, a participant reported that *"But some patients are unable to go to the health club, for examples they do not have subscription [reduced fee membership] or the financial ability to go there, to be honest, most patients". (patient) (Al Slamah et al., 2020, pp. 11).* In addition, another paticipant pointed out that "*We would like to, but everything here costs money, do you understand? We would like to walk and to go to the club, but everything is in return for money, we have not enough money*." *(Al Slamah et al., 2020, pp. 18).*

Lack of family support during self-care is a concern for persons with type 2 diabetes, according to type 2 diabetes patients and those who care for them. Other important support groups are neighbours and peers (friends) who continuously remind the patients to take medicine on time, maintain foot care, monitor blood glucose levels, and continue with physical exercises (Adhikari et al., 2021). Information sharing between type 2 diabetes patients and their families and previously acquired knowledge of type 2 diabetes management improve this supportive environment (Adhikari et al., 2021).

For instance, a male participant in the type 2 diabetes self-care education reported that *"I get a lot of support from my family (..) apart from emotional support, my son always gives me money to buy medicines and sometimes he bought medicine from pharmacy. The support I get from my family motivates me to manage diabetes. (...) In our family, we eat same food, so I don't feel I am eating diabetic diet. I feel lucky to have a caring family." (Adhikari et al., 2021, pp. 8).*

Similarly, exemplar and influential character from others such as peers and neighbours were discovered to play a huge leading role among people with type 2 diabetes; these patients were found to derive clues through peers' interaction or life experiences from people who have type 2 diabetes and who happened to be their neighbours, which forms external reality as described by (Swarna Nantha et al., 2021). More so, it was noted that this direct observation triggers a kind of openness in learning from people who have managed their diabetes effectively (Swarna Nantha et al., 2021).

As reported by a participant that *"I have a friend who called me up saying, 'I am doing fine without medications. A month later, I received a call from that same friend saying, in a distressed voice, that he recently suffered from an episode of stroke. So, medication is something that I must stick to dili gently [to prevent complications]" (Swarna Nantha et al., 2021, pp. 11).*

According to Bamuya et al. (2021), cultural beliefs appear to be a great determinant of an individual's understanding of type 2 diabetes self-care, particularly, they usually attribute the symptoms to witchcraft rather than the effects of its complications. It was also pointed out that religious and societal beliefs stand as obstacles to understanding and adhering to recommended treatments such as insulin therapy (Bamuya et al., 2021). For example, one participant reported that *"When someone dies suddenly, they don't know that the cause is diabetes, but they think he/she has been bewitched" (Bamuya et al., 2021, pp. 4).* Swarna Nantha et al. (2021) added to this by revealing that Muslim patients are more likely not to adhere to medication therapy such as insulin therapy during their fasting periods. Bamuya et al. (2021) further pointed out that traditional beliefs, particularly the use of traditional medicine (alternative medicine) are other issues to consider in self-care of type 2 diabetes. For instance, a participant also reported "*Someone went for prayers and was told to stop medication, but she later died" (Bamuya et al., 2021 pp. 4).*

In the same vein, Swarna Nantha et al. (2021) revealed that health belief is another barrier, for example, some patients have already developed the mindset that insulin therapy has many side effects, and they usually equate it as a time when their condition has reached a critical stage. Additionally, some of the patients find it difficult to follow strictly health advice given to them rather they prefer to follow their personal judgment such as sweeping, cleaning, and washing as equivalent to the suggested physical exercise (Swarna Nantha et al., 2021). A participant reported that *"I sweep, cook, and do the laundry everyday. I mean when I walk upstairs and down, I feel that is a form of exercise. I sweep the floor and clean the house. And I sweat it out too you know. I don't know it's true or not, but I think that's enough for me." (Swarna Nantha et al., 2021, pp 13).* Whitehead et al. (2017) also noted that most participants have tendency to fail during the self-care of this disorder due to social gathering effects. In most culture, social gathering is frequent and requires attendance, with this, most patients could be tempted to eat what they are not supposed to eat, therefore, worsening their health condition the more.

Also, according to Al Slamah et al. (2020), dietary habits and traditional foods play huge role in adherence to self-care information among type 2 diabetes patients. This study served as a pointer that patients are more inclined to continue to consume the foods they are used to eating even when diagnosed with this disease. A further concern is that these patients have already formed the habit to travel by car everywhere they go, even at short distances, which limits their ability to commit to routine daily physical exercise that can help them burn-out the calories from foods consumed (Al Slamah et al., 2020). For instance, a participant

pointed out that *"We need more support. I can tell you that the Saudi people have many events and occasions which contain eating food. The life became hard. i.e. referring to the pressure of social "eating", and the negative view for not joining in" (Al Slamah et al., 2020, pp. 18).*

7.2.2 Health system challenges

Health system challenges were found to be instrumental in affecting self-care behaviour among type 2 diabetes patients. Sub-themes that emerged from this theme are caregivers-people with type 2 diabetes relationships, shortage of qualified and experienced staff teams, poor communication channels, and health centre locations (Al Slamah et al., 2020; Swarna Nathan et al., 2021). These factors listed above are some of the challenges type 2 diabetes patients face during self-care activities because they shadow the possibility of acquiring self-care knowledge and motivation necessary for staying at optimal health. For instance, Adhikari et al. (2021) revealed that the relationship between the caregiver and the diabetes type 2 patient is crucial in ensuring adherence and commitment to the recommended self-care procedures. For example, it is believed that a cordial relationship promotes motivation, empathy, and hope to have successful self-care. Two reports from caregivers provided support for this, for instance, a female caregiver reported that *"Doctors provide counselling to their patients and that is how patients understands the importance of medicine." (Adhikari et al., 2021, pp. 9).* Another report from a male medical doctor is that *"Diabetes education is helpful. If we, doctors, can provide detailed information to diabetes patients on when to take medicine, what is the duration of medicine intake, information on continuity of medicine, it helps. It is helpful for diabetes patients to continue taking medicine." (Adhikari et al., 2021, pp. 9).*

Also, according to Adhikari et al. (2021), it was noted that inadequate information from low-level health care professionals such as health assistants and auxiliary workers regarding diabetes type 2 self-care is detrimental to the success of such initiatives. Additionally, Al Slamah et al. (2020) pointed out that coherence and collective experience as key components for efficient education of the patients; they aid in overcoming barriers such as time limitations and overcrowded appointments. Therefore, the value of having skilled and experienced care team cannot be underestimated, because it ensures that type 2 diabetes patients remain well informed and encouraged in the quest to manage their conditions.

Not forgotten, good communication channels such as text messages, phone calls, and WhatsApp messenger were found to be health professionals' communication channels to

patients, because it enables avoidance of follow-up gaps, and enhances readiness for therapeutic advice (Al Slamah et al., 2020). These communication channels not only enable communication with these patients, but also aid scalability of services provided because they enable the carers to initiate quick follow-up of care and communications with the patients outside work hours (Al Slamah et al., 2020). Also, creating type 2 diabetes awareness-raising programs in certain locations was found to be a good campaign in sensitizing the public about the danger, pathophysiology, risk factors, symptoms, diagnosis, and management of this disorder (Al Slamah et al., 2020). This sort of program is not usually targeted at those who have the disorder rather it is a type of general awareness program which also provide information on how to prevent the occurrence of this disease.

It was also revealed that across different health facilities, there is a great shortage of health care professionals to give the needed educational recommendations to patients (Al Slamah et al., 2020). This study noted that it is partly caused by low staff strength as compared to the number of patients that visit health facilities per day, and suggested improvement in the staff ratios to address the problem. Al Slamah et al. (2020) also added that this leads to the caregivers not having enough time to educate the patients properly and it influences the quality of type 2 diabetes self-care in the end.

Evidence that emerged from a nurse revealed that *"Sometimes the clinics are overcrowded, with 20 / 25 patients, so we can go over with them the basics only. The nutrition clinic also helps us, so if I want to talk about a treatment, I transfer the patient to the nutrition clinic, as well as the diabetes education clinic. For example, if I wrote injection and new meals, I send the patient to the education specialists who help the patients to understand the part which I did not have the time to explain to them at the clinic." (Al slamah et al., 2020, pp. 7).*

Another important issue is health center locations. Most of the type 2 diabetes patients live far away from the diabetes specialized hospital located in the heart of the city (Al Slamah et al., 2020). This requires them to travel long distance for their scheduled medical appointments. It is worthy to note that this comes with costs such as transport cost, time constraint cost, and many more (Al Slamah et al., 2020). This adds to the burden they face at home to pay for their daily financial needs such as foods, shelter, clothing, and provision of needs of their loved ones.

A complementary evidence emerged from a participant who pointed out that "*This is the only diabetes centre in Qassim, so the people come from every village such as: Al Dawadmi Village, so when the diabetes centres increase in this area, the pressure would be less upon us. There are diabetes centres in Onaiza and Buriydah, but if there is more than one centre, it may also decrease*

the pressure we face. As for this centre, we may increase the capacity within the centre by increasing the number of staff at the clinics, and we may increase the number of diabetes centres in the area, in general." *(Al Slamah et al., 2020, pp. 10).*

7.2.3 Beliefs and values challenges

According to Adhikari et al. (2021) most patients attributed cultural influence on their dietary misconceptions and medication compliance. These cultural beliefs have made them eat more vegetables, fruits, and cereals (Adhikari et al., 2021). Food preferences, such as a preference for a diet high in carbs, and bulky meals in the evening were also highlighted by numerous individuals as obstacles to maintaining a regular healthy diet (Adhikari et al., 2021). In addition, Adhikari et al. (2021) further revealed that holidays, celebrations, and gatherings with friends and family were seen as an opportunity to consume unhealthy food, and family members or peers at times encouraged or pressured these patients to eat unhealthy food during social gatherings. Considering this issue, the unavailability of healthy food recommended for those having type 2 diabetes could pose a barrier to socializing.

A female participant revealed that *"We have different festivals and other social events such as weddings. Some of the diabetes patients have a feeling of eating food that they are not supposed to eat. They take these events as an opportunity to eat food they've been eating before they had diabetes." (Adhikari et al., 2021, pp. 10).*

Apart from misconceptions about food, it was found that patients in Saudi Arabia raised the concern that their communities have misconceptions about practicing sports, particularly around who should practice sports (Al Slamah et al., 2020). It was revealed that women are mostly not allowed to practice sporting activities as it was considered taboo due to their cultural beliefs (Al Slamah et al., 2020). Al Slamah et al. (2020) pointed out that religious leaders preach against it because women participation in sports is against their faith, their claim is that there is tendency that their body will be exposed to the public during any sporting activity.

Adhikari et al. (2021) pointed out additional barrier to self-care for type 2 diabetes. A cited example by Adhikari et al. (2021) is that diabetes self-care hurdles included the lack of appropriate food at the market, at home, and in restaurants; the lack of space in a community for physical activity; and the lack of year-round drugs in health facilities. Also, under the availability of and accessibility of resources, most patients pointed out that new residential areas have been designed with walkways and fitness club centres, and other recreational

facilities such as golf courses and swimming pools which will aid in keeping the exercise regimens as recommended by their caregivers (Al Slamah et al., 2020).

7.2.4 The disease related challenges

It is very common that type 2 diabetes patients display feelings of uncertainty and frustration about the ill-health. They have developed the notion of questioning what their health condition will be in the future. According to Swarna Nathan et al. (2020), they have developed feelings of I am sound in health today, but who knows what will happen to me tomorrow, despite all measures taken to manage the disease. A report from a participant highlights this issue *"Right now, it's under control [diabetes]. But I just feel it can go up [blood glucose level] at any time" (Swarna Nathan et al., 2020, pp.10).* Another participant further added that *"I know it is important to control my disease. I just feel afraid of the disease sometimes. I am just troubled by the fact that anything (complications) can occur at any time (beyond control)" (Swarna Nathan et al., 2020, pp. 10).* This fear of uncertainty and frustration by these patients is an important consideration during type 2 diabetes self-care beacuse it can lead to discouragement in the management of this disorder. Therefore, nurses should be ready to formulate strategies to educate and motivate these patients to continue with the recommended self-care measures despite the uncertainty created by this disorder.

Also, according to Husdal et al. (2021) there are always new research results and technologies arising on a continuous basis, therefore it is important to provide information and learning in a continuous manner to match it with the latest messages. According to this study, the patient often believes that to stick to recommended procedures for self-care, there is a need that caregivers provide the needed support through motivation. For example, a participant made a clear statement that *"I go for a walk twice a day and I try to keep my weight down and not gain weight, but still, I don't seem to lower my long-term sugar and that can make me desperate, because eventually I don't know what to do other than just take more pills." (Husdal et al., 2021, pp. 1005).*

7.3 Barriers encountered by nurses for type 2 diabetes self-care

Three studies investigated the barriers encountered by nurses for type 2 diabetes self-care (Husdal et al., 2021; Swarna Nantha et al., 2021; Al Slamah et al., 2020). The themes that

emerged from these studies are: **1)** health system challenges; **2)** culture and society challenges; **3)** patient related challenges, see table 4 below.

TABLE 4: BARRIERS ENCOUNTERED BY NURSES (THEMES AND SUB-THEMES)

THEMES	SUB-THEMES
Health system challenges	Unclear diabetic knowledge and messages Lack of use of communication channels.
Cultural and society challenges	Beliefs and values
Patient related challenges	High number of type 2 diabetes patients; Unwilling attitude of type 2 diabetes patients.

There are some short comings encountered by nurses when trying to engage type 2 diabetes patients to self-care. These drawbacks could originate from the patient's immediate environment or from the health care system.
Husdal et al (2021); Swarna Nantha et al (2021); Al Slamah et al (2020)

Husdal et al. (2021) revealed that unclear national diabetic care procedure and message bring setbacks in engaging patients in type 2 diabetes self-care. This study argues that relational continuity, management continuity, and informational continuity are the useful tools to understand the individual patient and strengthen the self-care resources at the disposal of the patient. In addition to this, there is a further argument that a further step of assisting patients to understand the activities on their own is needed, preferably based on national diabetes standard (Husdal et al., 2021). Therefore, when this standard diabetes structure and procedure is lacking, there is tendency that the intended outcomes of type 2 self-care will not be achieved. Husdal et al. (2021) further highlighted that safe type 2 diabetes self-care is achieved if the staff had acquired adequate competence regarding this disease. Furthermore, this study added that a lack of competence could hinder the continuity of care or even create a sense of uncertainty. A sense of uncertainty could arise and be heightened when staff members give conflicting messages. Thus, this was regarded as paramount issue because it has a link to adherence to the care guidelines. An instance was pointed out by a caregiver *"There's a mix of highly competent people and absolute greenhorns and so … I really don't know who's who … and that gives a sense of insecurity … Should I trust myself or should I trust someone else or …" (Husdal et al., 2021, pp. 1003).*

Another serious concern voiced out by caregivers is the lack of use of communication channels to convey messages to type 2 diabetes patients. According to Al Slamah et al (2020), commuication remains an essential tool to dessiminate type 2 diabetes messages to those concerned. There are many communication channels that could be utilized by caregivers, particularly nurses, some of the usable channels of communication are phone

calls, text messaging, social media platforms (Facebook, Twitter, Instagram, just to mention a few). For instance, the use of social media channels could help patients gain prompt and usefull knowledge, also, it can act as an interative platform for caregivers to share about insulin adjustment to the patients. According to a caregiver *" Communicate via text so that I can know about his condition, especially if he is a fresh diabetic or is taking medicine, if there is injection or anything new for him." (Al Slamah et al., 2020, pp. 12).*

Also, patients' perception about type 2 diabetes is a serious consideration. According to Swarna Nantha et al. (2021) most patients have already developed the mind-set that everybody has diabetes, particularly type 2 diabetes, which could make them avoid taking adequate care of their health through proper medications, physical exercises, and food intake.

For example, a participant reported that *"I don't know whether the medication really helps me or not. I wouldn't know. Because every time I come to the clinic, the doctor looks at me and says 'you have to take this medicine'. So, when you have to take medicine, you just take it. I don't do much research about these things" (Swarna Nantha et al., 2021, pp. 13).* Additionally, a caregiver reported that "*The main problem we have in the Kingdom of Saudi Arabia is the food style or, in general, the lifestyle, which is not to practice exercises enough, and also to rely on the qualities of high-calorie foods, high amounts of fat and also high amounts of sugar. I think that anything needs a government programme to change it, needs to have a huge programme to try to change the lifestyle of the community." (Al Slamah et al., 2020, pp. 14).*

Apart from this stated barrier above, Al Slamah et al. (2020) revealed that there is overwhelming pressure on health care professionals, particularly nurses due to the high number of type 2 diabetes patients that needed to be attended to in the health centers. Also, this study added that this pressure limits the time allocated to attend to each patient, therefore, depriving patients from receiving adequate type 2 diabetes educational advice on how to engage in self-care; those most affected are newly diagnosed patients. This is a serious limitation to type 2 diabetes self-care because caregivers are trained to listen carefully to their patients concerns and needs, so that adequate knowledge and ways to manage it could be given to the patient.

One caregiver pointed out that "*Instead of checking 20 patients, we'd be better to see 15 or 13 patients only so that we have enough time to sit with the patient and hear about his needs and concerns if he needed to enquire about anything. . . this way, he would take the right time if the booking was not too much." (Al Slamah et a.l, 2020, pp. 10).*

To add to this, type 2 diabetes patients contribute to their misfortune in managing this condition. Their unwilling attitude to take responsibility is discouraging to their caregivers.

Al Slamah et al., 2020 pointed out that most patients intentionally avoid engaging in exercise or physically activities not just because there are no physical training centers around where they live, rather their lazy attitude is preventing them to do what will be useful in the management of their illness. They typically have reasonable explanations for why they were unable to perform the exercises that were advised. Occasionally, they blame their busy schedules, claiming that their obligations at work or to their families prevented them from doing so. A participant reported that *"When I suffered from diabetes, the doctors advised me to walk. I didn't used to walk at all and I didn't try. So, my mistake is that I didn't try to walk." (Al Slamah et al., 2020, pp. 17).*

8 Discussion

The thematic synthesis of studies that address views and experiences of persons with type 2 diabetes has shielded light on issues that resound on the conclusion reached in previous reviews. The key findings of this review will be discussed in three folds in relation to the research questions, namely: **1)** The role of nurses in enhancing self-care among type 2 diabetes patients; **2)** The challenges faced by patients in adhering to self-care education for type 2 diabetes; and **3)** The challenges encountered by nurses in ensuring that patients are engaged in self-care of type 2 diabetes.

8.1 Role of nurses in enhancing self-care among type 2 diabetes patients

According to the results of the studies included in this review, nurses are crucial in improving type 2 diabetes patients' ability to take care of themselves. These roles range from being educators, motivators, counsellors, and a follow-up of care and supporters (**see flow chart in appendix D**).

Type 2 diabetes must be prevented and managed with the help of nurses. One of these responsibilities is spreading information to encourage people to adopt new lifestyles. Learning about type 2 diabetes is important since it encourages patients to engage in healthy eating, especially when it comes to understanding various foods and their constituents. It is obvious that having this knowledge would help patients better grasp how different foods affect blood sugar levels. Additionally, it shapes understanding of the value of physical activity in making up for intentional and unintentional eating failures. Therefore, type 2 diabetes self-care through nurse education will provide patients a fresh perspective on this condition. By completely understanding that they are responsible for their own disorder management, patients are better able to take full ownership of their health (Rise et al., 2013; Whitehead et al., 2017).

Motivating the patients is an important part of the nurses' involvement in type 2 diabetes self-care. It is crucial that nurses intervene and provide some support to help patients stick to the acquired lifestyle because many patients may feel disappointed after changing their lifestyle and occasionally may not experience beneficial outcomes from already reformed lifestyle. Maintaining a healthy lifestyle is still an essential part of the fight against type 2 diabetes. Patients could focus on the broader picture through nursing education by defining attainable and reasonable objectives, being able to organize their activities around those goals, and realizing that the anticipated results do not always occur as planned.

Additionally, nurses can support adherence to the type 2 diabetes self-care skills already obtained by employing a variety of techniques. Motivational interviewing, providing appropriate educational resources, developing a good rapport with the patient, responding to any concerns that may come up, and reiterating the need of leading a healthy lifestyle are a few of the apparent techniques. As a result, nurses' motivation is a beneficial tool for increasing adherence to and sustainability of previously achieved lifestyle improvements (Rise et al., 2013; Whitehead et al., 2017).

Nurses are essential as counsellors because they take the lead in recognizing and discussing the emotional struggles that type 2 diabetes patients experience. The nurse achieves this by setting up a comfortable environment that will allow the patients to openly express their worries. These patients' worries include a worry of not losing weight after making lifestyle changes, an inability to control food choices, a lack of access to suggested foods, cultural views, and values, among many others. To make sure that all frustrating issues are addressed, and the patient is given the proper counsel, the nurse makes use of all the experiences and abilities she or he has gained via training (Rise et al., 2013; Whitehead et al., 2017).

Finally, nurses serve as advocates and follow-up caregivers for people with type 2 diabetes. Type 2 diabetes self-care is a lifelong effort that requires constancy from both the patient and the healthcare practitioner. Through ongoing follow-up care and support, the nurse must make sure the patient adheres to the lifestyle modifications they have already adopted. It is also important to note that patients find self-care for this disease to be unpleasant and disheartening, and the nurse is expected to create a care plan that is in line with the patient's current state of health. This was well supported by Orem's self-care theory (1989), which suggested that self-care should be done continually and persistently throughout time to maintain the change in lifestyle. Orem (1989) went on to reveal that there are always difficulties and problems, such as cultural obstacles, energy consumption, and developmental qualities to deal with as a person learns new information about managing type 2 diabetes. For example, when a person ages, there is a chance that they will develop conditions like dementia, arthritis, and other illnesses that cause self-care deficiencies and prevent them from successfully engaging in self-care, although having a strong desire to do so.

To guarantee that patients receive the essential follow-up treatment and assistance, a variety of measures could be used. It has been discovered that community and peer support programs are helpful for type 2 diabetic self-care. For instance, in Nepal, type 2 diabetes patients have been screened and counselled using female community health volunteers. Utilizing

technological processes is another potential technique to guarantee continuity of self-care. Recently, it has been common practice to use mobile phone technology, including WhatsApp, text messaging, phone conversations, and social networking sites like Twitter, Facebook, Instagram, and many others, to provide patients with timely information and assistance. The scalability of these technology tools is noteworthy since it enables the caregivers to distribute care information quickly and easily to many patients at a click of a button.

8.2 The challenges faced by patients

The lack of understanding of type 2 diabetes among patients is the main barrier to self-care. Most study participants stated that they understood the importance of their participation in the management of this illness, but they also admitted that since self-care must be ongoing, it is more challenging to maintain a change in lifestyle. However, they acknowledged that they had learned information regarding the pathophysiology, symptoms, risk factors, complications, diagnosis, therapy, and management options of the disease from the self-care education they had received (Rise et al., 2013; Whitehead et al., 2017). These patients discovered that one step in taking control of their type 2 diabetes is learning all there is to know about the condition and how to manage it. They also discovered that preserving the knowledge they have already obtained is crucial to enjoying a long-term blood sugar level control.

Most participants, however, admitted that they are still unsure of their medication schedule, particularly when it comes to remembering when to take their pills. Additionally, they now understand that foods may greatly increase their likelihood of developing high blood sugar levels, and that hunger may result in low blood sugar levels (hypoglycaemia), which raises significant concerns about how to treat the condition. Because the patients have come to believe that they are unsure of what tomorrow will hold for them, these abrupt changes in blood sugar levels outside of what is considered normal range induce worry and frustration, which may lead to sporadic backing out.

In addition, participants cited the following food-related problems as their biggest difficulties to following the suggested dietary guidelines: self-control with certain foods, accessibility to diabetic foods, cooking for others, and social gathering effects (Whitehead et al., 2017). In addition, a lack of funds has made it harder for these patients to obtain the

necessary meals even though they are eager to adhere to the advised diets, which has compounded the problem.

In the selected studies, most of the participants also emphasized how difficult it is to engage in physical activity because of the restricted area due to rising urbanization. For instance, most nations have seen the encroachment of structures into open areas intended for recreational activities without any formal government action. Bad weather conditions including severe snowfalls, landslides, and heavy rainfalls, to name a few, have been added to this and further worsened the situation. Imagine, for instance, that the governments of underdeveloped nations in Africa and Asia are not constructing the facilities required for leisure activities. Even though they are fervently interested in engaging in physical activity, most type 2 diabetes patients in those developing nations will have a harder time finding space for leisure activities.

Today's lack of family support is a growing trend for a variety of reasons. The most striking factor is how busy many family members' daily schedules are. The patient may also have additional comorbid conditions that require aid from the patient's family in the form of reminders for blood sugar monitoring, mini-exercise, timely medication taking, maintenance of foot care, and preparation of diabetic foods. Even when they have family members who should have taken care of them, most patients in both developed and developing nations are in dire need of support. The truth is that some family members have taken jobs distant from home to make ends meet, which has forced them to only sometimes visit their loved ones who are affected by this disorder. This leaves a major gap in providing the type 2 diabetes patient with the necessary support.

8.3 The challenges encountered by nurses

The results from the research that were chosen for this review gave helpful insights into the difficulties nurses have while attempting to improve self-care among type 2 diabetes patients. The large number of type 2 diabetes patients that use the medical facilities on a regular basis is one of the difficulties encountered by health care professionals. This problem is made more difficult by the fact that most healthcare facilities lack the necessary manpower in the form of trained and experienced care staff, making things even worse (Swarna Nantha et al., 2021; Adhikari et al., 2021).

Moreover, beliefs are yet another crucial factor. Findings from this analysis revealed that another barrier to maintaining a pharmaceutical regimen is cultural belief in alternative

medicine (Bamuya et al., 2021). Many participants in those chosen studies disclosed that they are more likely to take their conventional medications than the advised diabetes therapy (Al Slamah et al., 2020; Bamuya et al., 2021).

Religion is a significant indicator of the difficulty faced by nurses. Religious conviction trumps medical counsel since these patients were careless with their health because they trusted the information they received from their religious authorities (Al Slamah et al., 2020). For instance, the stated therapeutic goal of insulin therapy for type 2 diabetes self-care is impeded since it is viewed as inappropriate, taboo, and unholy (Al Slamah et al., 2020).

Finally, this review's findings revealed that care meetings can lack clarity and follow-up tactics (Husdal et al., 2021). This paper envisaged that care meetings should have a clear agenda so that both patients and caregivers may understand what is expected of them. Additionally, it is necessary to consider a person's needs, knowledge, and experiences while making care decisions to provide person-centred care. The upshot of the care meetings should be a clear statement of each person's situation and preferences. For instance, it's crucial to know if the patient has a self-care deficit that prevents them from taking care of themselves. Age and other illnesses should be considered, among other things. Cultural values (beliefs and values) are yet another crucial topic for discussion and consideration. Understanding that culture affects people's perspectives, values, sense of humour, hopes, worries, and fears is crucial. As a result, a nurse working with type 2 diabetes patients from various cultural backgrounds must be prepared to use sound judgment.

8.4 Strengths and limitations

The key advantage of this study is that it is the first of its kind to use qualitative research, rather than quantitative or experimental ones, to investigate the role of nurses, nurses' challenges, and patients' obstacles in type 2 diabetes self-care.

The implementation of a thorough literature search procedure is another advantage of this review. The inclusion and exclusion criteria were specified in detail in the methodology chapter, and studies that did not satisfy the inclusion criteria were automatically excluded. The effectiveness of the included studies that satisfied the inclusion criteria was evaluated using the PRISMA checklist. However, studies that were judged to be of poor quality were immediately disqualified.

The review's main flaw is the small number of studies that satisfied the criteria for inclusion, which made it challenging to come to a definitive conclusion. The review's brief duration is also a shortcoming. Therefore, spending more time on this review would have been more fascinating and would have allowed several topics to be examined more closely.

Financial limitations, which made it nearly impossible to access several publications due to a lack of finances, are another weakness of this evaluation in addition to the ones already mentioned. By excluding these studies, additional information may have been included in the results, discussion, and conclusion chapters. However, the seven (7) studies that satisfied the criteria for inclusion were effective in highlighting certain crucial issues that must be examined before making a recommendation for a policy. The concentration on type 2 diabetes alone may have led to the exclusion of several studies that contain crucial data on diabetic self-care in general, as this review may understand.

8.5 Comparing this review to similar reviews

It is important to note that there was no review precisely with the same objectives as this review. However, there is a review that came close with the same focus, it was focused on "factors that affect type 2 diabetes self-management in Africa" (Suglo, & Evans, 2020). According to this study, people with type 2 diabetes face significant obstacles because of unhelpful cultural ideas and practices as well as unfavourable contexts for health care practice, regardless of their financial situation (Suglo, & Evans, 2020). This review also made the case for the necessity to take cultural considerations into account when implementing diabetes self-management or self-care education, particularly when looking into the use of herbal medicine in the treatment of the condition.

This study also highlighted how Africa suffers greatly from the decline of its health care infrastructure (Suglo, & Evans, 2020). In addition, the governments of these nations do not have enough policies in place to assist the healthcare system in properly educating and managing people with diabetes, especially those with type 2 diabetes (Suglo, & Evans, 2020). These research results are consistent with the topics covered in this review. However, neither the involvement of nurses nor the significance of examining the difficulties experienced by nurses in ensuring that these patients follow self-care practices were mentioned in this paper.

9 Conclusion

The purpose of this review was to identify and assess evidence on self-care education for type 2 diabetes and gain new knowledge that can be passed to nursing students and practicing nurses in helping type 2 diabetes patients to engage in self-care successful. As a result, the results of this study showed that a variety of elements, including those related to the individual, interpersonal relationships, communities, organizations, and policies, are crucial to the effectiveness of type 2 diabetes self-care knowledge acquisition and adherence.

Patients with type 2 diabetes were found to face obstacles like a lack of funds, beliefs and values, competency and continuity of care issues, time constraints, location-related issues with healthcare, a lack of family support, and unfavorable weather; whereas nurses faced obstacles like the lack of type 2 diabetes trainings, a lack of qualified and experienced staff, an overwhelming number of type 2 diabetes patients, a lack of type 2 diabetic knowledge, and messages. Importantly, it was discovered that nurses played a key role in motivating and disseminating knowledge to these patients to achieve the anticipated therapeutic outcomes.

However, despite the importance of education in the self-care of type 2 diabetes, also, it is necessary to have understanding and being sensitive to cultural differences, which makes it ultimately necessary for all levels of nursing care because it helps nurses to understand and be sensitive to the ideas, attitudes, and practices of other people. Therefore, focusing on an individual's needs, traits, and treatment responses when giving care is a proven method to increase compliance and achieve desired therapeutic results.

It will be fascinating to do a systematic review on type 2 diabetes self-care in future research and examine how cultural unique elements affect dietary preferences for type 2 diabetes self-care adherence.

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Appendix

Appendix A: Data sources and search strategy

Journal and Time period	First search terms	Second search term	Combined Result
Medline (EBSCO) (2012 to 2022)	Diabetes type 2 **or** diabetes mellitus type 2 **or** non-insulin dependent diabetes **or** adult-onset diabetes **or** maturity onset diabetes **or** NIDDM **or** T2DM **Total hits= 8,686**	Self-management education **or** Self-care education **or** Personal management education **or** Personal care education. **Total hits = 4,993**	First search terms **and** second search terms. **Total hits = 63**
EBSCO academic search elite (2010 to 2022)	Diabetes type 2 **or** diabetes mellitus type 2 **or** non-insulin dependent diabetes **or** adult-onset diabetes **or** maturity onset diabetes **or** NIDDM **or** T2DM **Total hits = 9,494**	Self-management education **or** Self-care education **or** Personal management education **or** Personal care education. **Total hits = 8,807**	First search terms **and** second search terms. **Total hits = 169**
CiNAHL (2012-2022)	Diabetes type 2 **or** diabetes mellitus type 2 **or** non-insulin dependent diabetes **or** adult-onset diabetes **or** maturity onset diabetes **or** NIDDM **or** T2DM **Total hits = 4,959**	Self-management education **or** Self-care education **or** Personal management education **or** Personal care education. **Total hits = 498**	First search terms **and** second search terms. **Total hits = 65**
Web of Science (2010 to 2022)	Diabetes type 2 **or** diabetes mellitus type 2 **or** non-insulin dependent diabetes **or** adult-onset diabetes **or** maturity onset diabetes **or** NIDDM **or** T2DM **Total hits = 2,361**	Self-management education **or** Self-care education **or** Personal management education **or** Personal care education. **Total hits = 383**	First search terms **and** second search terms. **Total hits = 30**

Appendix B: PRISMA checklist

		Whitehead et al, 2017 (Journal of Evaluation in Clinical Practice)	Rise et al, 2017 (Plos ONE)	Bamuya et al, 2021 (BMC)	Adhikari et al, 2021 (BMC)
	TITLE & ABSTRACT				
1	Were the title and abstract of the research clearly stated?	Y	Y	Y	Y
	INTRODUCTION & METHOD				
2	Did the study make a clear introduction of the problem?	Y	Y	Y	Y
3	Were the aim and research questions clearly stated?	Y	Y	Y	Y
4	Were the inclusion and exclusion criteria for the selected studies clearly specified?	Y	Y	Y	Y
5	Were the search strategies clearly stated?	Y	Y	Y	Y
6	Were the data collection and selection process transparent?	Y	Y	Y	Y
7	Was the study outcome clearly stated?	Y	Y	Y	Y
	RESULTS				

8	Used a flow-chart to describe the outcome of the selection process?	Y	Y	Y	Y
9	Presented the findings in a thematic approach?	Y	Y	Y	Y
10	Reported biases in the study?	Y	Y	Y	Y
11	Certainty of evidence was clearly stated?	Y	Y	Y	Y

	DISCUSSION				
12	Give a broad interpretation of the result in the context of available evidence?	Y	Y	Y	Y
	Other Information				
13	The limitations of evidence used in the study were discussed?	Y	Y	Y	Y
14	Limitations of the study process were discussed?	Y	Y	Y	Y
15	The importance of the results for practice, policy, and future research were discussed?	Y	Y	Y	Y
16	Described the sources for financial and non-financial resources?	Y	Y	Y	Y

17	Described any competing interests during the study?	Y	Y	Y	Y
18	Indicated where the study protocol could be found?	Y	Y	Y	Y
19	Indicated where the template, data extraction from included studies, data used for analysis, data codes, and any other material could be found.	Y	Y	Y	Y

Appendix B: PRISMA Checklist Continuation

		Swarna et al, 2021 (Plos ONE)	Al Slamah Nicholl, 2020 (Plos ONE)	Husdal et al, 2021 (International Journal of Public Participation in Health Care and Health Policy)
	TITLE & ABSTRACT			
1	Were the title and abstract of the research clearly stated?	Y	Y	Y
	INTRODUCTION & METHOD			
2	Did the study make a clear introduction of the problem?	Y	Y	Y

3	Were the aim and research questions clearly stated?	Y	Y	Y
4	Were the inclusion and exclusion criteria for the selected studies clearly specified?	Y	Y	Y
5	Were the search strategies clearly stated?	Y	Y	Y
6	Were the data collection and selection process transparent?	Y	Y	Y
7	Was the study outcome clearly stated?	Y	Y	Y
	RESULTS			
8	Used a flow-chart to describe the outcome of the selection process?	Y	Y	Y
9	Presented the findings in a thematic approach?	Y	Y	Y
10	Reported biases in the study?	Y	Y	Y
11	Certainty of evidence was clearly stated?	Y	Y	Y

	DISCUSSION			
12	Give a broad interpretation of the result in the context of available evidence?	Y	Y	Y
13	The limitations of evidence used in the study were discussed?	Y	Y	Y
14	Limitations of the study process were discussed?	Y	Y	Y
15	The importance of the results for practice, policy, and future research were discussed?	Y	Y	Y
	Other Information			
16	Described the sources for financial and non-financial resources?	Y	Y	Y
17	Described any competing interests during the study?	Y	Y	Y
18	Indicated where the study protocol could be found?	Y	Y	Y
19	Indicated where the template, data extraction from included studies, data used for analysis, data codes, and any other material could be found.	Y	Y	Y

Note: Y = Yes, N = No, UC = Unclear, and NA = Not applicable

Appendix C: Data extraction from selected studies

First author, Reference, year and Journal	Whitehead et al, 2017 (Journal of Evaluation in Clinical Practice)	Rise et al, 2017 (Plos ONE)	Bamuya et al, 2021 (BMC)	Adhikari et al, 2021 (BMC)
Research Topic	A nurse-led approach to promote type 2 diabetes self-management	Making and maintaining lifestyle changes after group-based type 2 diabetes self-management education	Use of Socio-econological model to explore factors that influence the implementation of a diabetes structured educational program.	Barriers to and facilitators of self-management practices.
Research Aim	To explore the acceptability of the intervention and gain insights on what people feel in implementation of the intervention 6-months post intervention.	To investigate how participants, make and maintain lifestyle changes after the intervention	To explore factors that influences the implementation of DSME in these settings.	To explore the barriers to and facilitators of type 2 diabetes self-management practices in Nepal.
Target population/ Country	A group of volunteers who were diagnosed with type 2 diabetes	23 patients who attended educational-group program in central Norway	Sixty-six people with confirmed cases of type 2 diabetes in Malawi, Maputo, and Mozambique	20 people with type 2 diabetes in Nepal selected health facilities.
Methods	A qualitative design with participants randomized into an intervention	Semi-structure interviews	Telephone and focal-group interview in the faculty of medicine in these countries.	Four focus-group discussions and 16 semi-structured interviews.

Type of Study	Patients perspective study	Patient perspective study	Patient and provider of care perspectives	Patient and providers perspectives.
Results	Increase in knowledge around self-management of type 2 diabetes and increase in sense of personal responsibility are important to maintaining lifestyle changes.	Obtaining new knowledge, taking responsibility, and receiving confirmation of an already healthy lifestyle help in sustaining lifestyle changes.	There is need to develop an integral and dedicated diabetes services with tailored training to all professionals, also involving the traditional leaders is a good strategy.	Several factors such as government policies, beliefs and values, insufficient counselling, financial problem, knowledge, and many more play huge role in determining type 2 diabetes self-management.
Conclusion	There is need for ongoing support post intervention, which could aid in maintaining glycaemic control.	Knowledge remains the key factor to acquiring and adhering to lifestyle changes for type 2 diabetes self-care.	There is multi-faceted factors that play a significant role in the implementation of diabetes self-management education.	These findings will help develop programs that impact knowledge in type 2 diabetes self-management.

Appendix C: Data extraction from selected studies continuation

First author, Reference, year and Journal	Swarna et al, 2021 (Plos ONE)	Al Slamah Nicholl, 2020 (Plos ONE)	Husdal et al, 2021 (International Journal of Public Participation in Health Care and Health Policy)
Research Topic	The external realities of people with type 2 diabetes.	Cultural adaptation of self-management of type 2 diabetes	Diabetes care provided by national standards can improve patients' self-management skills.
Research Aim	To uncover factors that govern the external realities of people with type 2 diabetes in relation to disease management	Exploring the barriers and facilitators for implementing national programme for type 2 diabetes management education within the community and health care system in Saudi Arabia.	To understand how type 2 diabetes patients perceive Swedish primary diabetes care and self-management support.
Target population/ Country	Participants from the non-communicable disease (NCD) department at the Seremban primary care center in Malaysia.	Adult patients with confirmed cases of type 2 diabetes in Saudi Arabia.	Patients with confirmed T2D in Swedish primary care settings.
Methods	A qualitative study using a ground theory approach through interviews and focus group discussions.	Focus group discussion with health care professionals, and interview with patients.	Qualitative study with focus groups interviews
Type of Study	Provider and patients' perspective study	Patient and provider of care perspectives	Patients' perspective study
Results	Lifestyle, habits of people with type 2	Resources availability, patient lifestyle, a lack of	Clarification of structures and procedures in primary diabetes care and health care staff being there and providing support

	diabetes and low-quality food environment are main concerns.	cultural or social support and many more created obstacles to type 2 diabetes self-care.	are useful tools to enable trust and co-operation to enhance self-management.
Conclusion	Concentrating on the modifiable factors, the type 2 diabetes patients could comfortably manage their conditions.	Providing for supportive environment via knowledge dissemination can help patients to self-manage their diabetes.	Providing relational continuity, management continuity, and informational continuity improve individual patients' self-management resources.

Appendix D: Flow chart for the role of nurses in self-care for type 2 diabetes

FLOW CHART 3: Role of Nurses in ensuring type 2 diabetes self-care adherence