

Supportive and Palliative Care in Diabetes

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Abstract

Palliative care aims to improve the quality of life of patients with life-threatening diseases by preventing suffering and providing relief from pain and associated discomfort. However, palliative care in diabetes has not received much attention and its integration into standard diabetes management is rarely practiced. It is important to identify and manage the risks that affect mortality in diabetes as early as possible. Early initiation of palliative care in diabetes may have a positive impact on managing diabetic complications. Advanced care planning (ACP) is important for patients to make well-thought-out decisions for future healthcare. Besides, tools such as Gold Standards Framework (GSF) can be used for prognostication. During the management of diabetes, glycemic targets, management of diabetic medication, management of diabetes complications and diabetes education are important aspects. The use of diabetogenic medications, such as corticosteroids, in diabetic patients for treating other conditions requires clinicians to carefully consider the risks and benefits. Moreover, complementary and alternative medicine (CAM) in diabetes palliative care is an attractive option depending on the patients' preferences. Existing diabetes management guidelines and protocols are very helpful with the treatment plan, but they are unlikely to consider patients' needs and preferences. Therefore, palliative care should not be reserved for only severe patients, and there is a need for new guidelines to integrate palliative care into regular diabetes care.

Keywords: Diabetes; Diabetes Education; Glycemic Targets; Palliative Care; Prognosis

Introduction

Diabetes is a serious, non-communicable disease that significantly impacts quality of life due to its multiple complications. Globally, over 476 million people were affected by diabetes in 2023, and this number is estimated to increase to 643 million in 2030 and 784 million in 2045, representing a 51% increase in prevalence worldwide [1]. In Malaysia, the prevalence of diabetes is 19.0% in adults aged 20 to 79 years old, with one in every five adults affected [2]. Type 2 diabetes mellitus (T2DM) which once predominantly affected individuals over 40 years old, is now appearing in young adults [3,4]. This shift in the age of diabetes diagnosis is driven by the burden of obesity, a sedentary lifestyle, and a strong family history of type 2 DM [4,5]. As a result, diabetes can now affect individuals of all age groups, presenting a new challenge in diabetes management.

Chronic hyperglycemia, which can lead to complications such as retinopathy, nephropathy and neuropathy, significantly reduces an individual's quality of life. Maintaining normoglycemia through tight glycemic control has been shown to decrease microvascular complications of diabetes, but there is limited evidence for its impact on macrovascular complications [6-8]. Moreover, tight glycemic control requires that the targeted blood glucose level be personalised based on each individual's clinical conditions [9]. Advances in healthcare have led to longer life expectancy for diabetic patients, but many still experience complications from diabetes. This has prompted a shift in focus from traditional diabetes management to a more palliative approach.

The palliative care approach aims to improve the quality of life of patients with life-threatening diseases by preventing suffering and providing relief from the pain they experience [10]. Early initiation of palliative care may have a positive impact in managing potential remediable pain and distress. As age increases and functional changes occur, self-care becomes more complicated, adding a burden to disease management,

as lifelong self-care is vital in diabetes [11]. Self-care behaviours such as healthy eating, medication compliance, blood glucose monitoring, good problem-solving skills, healthy coping mechanisms, and risk-reduction behaviours have shown positive outcomes in preventing of complications and improving quality of life [12-14]. The exchange of information about palliative care options and end of life care should be incorporated into diabetes education for better decision-making in treatment plans. However, the establishment of palliative care services for diabetes is hindered by a lack of skilled palliative care providers and the absence of a federally run program and clear policy [15]. Furthermore, it is crucial to identify and manage risks that impact mortality in diabetes as early as possible. Polypharmacy [16] and drug-induced hypoglycemia [17,18] are crucial risk factors affecting the quality of life during diabetes management. Therefore, early initiation of palliative care is essential to reduce unnecessary physical and mental suffering in patients, increased costs, unnecessary interventions, and improved satisfaction with care [19,20]. It is ideal for clinicians to discuss palliative care and its advantages with patients early during diabetes to prevent long and unpredictable disease consequences [20]. Although existing diabetes management guidelines and protocols help with treatment plans, they are unlikely to consider patients' needs and preferences [21]. Palliative care should not be limited to extremely sick patients, and new protocols for incorporating palliative care into standard diabetic care are required. Based on evidence-based guidelines and global palliative care in diabetes, **(Figure 1)** provides a clinician-friendly flowchart to help guide the commencement of palliative care for diabetic patients.

Methods

In this review, we used keywords combinations search of “diabetes”, “diabetes education”, “glycemic targets”, “palliative care”, “prognosis”, “advance care planning”, “diabetogenic medicines”, “complementary & alternative therapies” and “spiritual care” in PubMed to get relevant articles to review palliative care in diabetes. Based on this, we also provided the future directions and conclusions.

Goals of Palliative Care

Generally, the goal of palliative care is to alleviate pain and discomfort using clinical methods rather than simply treating the symptoms. Palliative care focuses on spiritual and emotional well-being through moral support, meaningful interactions with family, counselling and therapy [22]. According to the World Health Organization (WHO), palliative care is applicable in the early course of illness, integrated with other treatments [10]. In the context of diabetes, the main focus of palliative care is to discuss the goals for symptom management, treatment costs and patient preferences regarding therapy [23].

Based on the Center of Advanced Palliative Care (CAPC), palliative care focuses on relieving symptoms and pain from serious illness regardless of the diagnosis or prognosis to improve the quality of life of patients and their families [19]. Furthermore, it emphasizes the importance of involving patients and their families in open discussions about appropriate care goals and treatment plans. It is crucial to keep them well-informed so they can make well-thought-out decisions. Primary care physicians can collaborate with physicians in hospice and palliative medicine to align patient goals with the treatment plan [24]. A research study found that patients who received palliative care consultations to establish care goals had lower rates of future acute care utilisation compared to those who did not receive such consultations [25]. Diabetic patients may experience a decline in their health status over time, as well as unexpected acute illnesses due to the long and unstable disease condition [20]. Therefore, early integration of palliative care in diabetes may have a significant positive impact on the patient's illness.

Advance Care Planning (ACP)

Advance care planning (ACP) is a continuous process of communication among health professionals, patients and families with the purpose of discussing treatment options and prognostic information while addressing patients' goals, values and preferences [20, 26]. The patient's preferences need to be monitored as they may change throughout the course of the disease. ACP enables patients to make well-thought-out decisions for future healthcare in the event of decisional incapacity. Advance care planning can be divided into two types: advance decision and advance statements. An advance decision is a legally binding written decision that allows patients with mental capacity to refuse any specific treatments in the future. Additionally, advance statements enable patients to address and record their preferences, beliefs and wishes for their future care. Furthermore, clinicians play an important role in supporting ACP by ensuring that the

patient and family have a clear understanding of the disease progression, prognosis and available treatment options. Clinicians should also ensure that the treatment plan aligns with the individual's current healthcare goals by conducting periodic reviews of the care plan. This is important because the plan may need to be adjusted based on changes in the individual's health status [27].

Gold Standards Framework (GSF) and other Diabetes-related Indicators of Reduced Life Expectancy

The Gold Standards Framework (GSF) is a practical, systemic, evidence-based approach practiced by many care homes, general practitioners (GP's) and hospitals [28]. Patients who are seriously ill and near the terminal stage of life are included in GSF and are known as 'gold' patients [29]. 'Gold' patients will receive rapid care, and better services with the implementation of GSF so that they are able to live well before they die [28]. It is crucial to identify patients who need to be included in GSF early because early planning can help the patient avoid unnecessary suffering. According to the 'Gold Standard' recommendations, diabetes specific guide has adopted a colour-coded timeframe that can simplify diabetes documentation. The first colour is blue, which indicates an individual with a life expectancy of twelve months. Next is a green colour, where individuals with advanced disease have a life expectancy of months. Diabetes patients coded with yellow colour indicate that their condition is declining, and they have a life expectancy of weeks. Individuals who are in the last few days of life will be coded with red colour [30]. All these colours represent the need for end-of-life care for patients who usually have advanced and progressive, conditions, along with co-existing conditions that increase the risk of dying from sudden acute crisis or catastrophic events [28]. Sometimes, there are no clear indications of prognosis for diabetes patients for various reasons. In this regard, GSF provides indicators of poor prognosis as identification guidance. One useful prognostic indicator is the 'surprise question': 'Would you be surprised if the patient were to die in the next year, months, weeks or days?' If the answer is no, then the GSF process will start, and plans will be made for the patient. If the answer is unsure, then it is necessary to investigate general indicators of decline in the patient. However, if the answer is yes, then regular assessments will be done on the patient [31]. The diabetes-related general indicators of reduced life expectancy are given in **(Figure 2)**.

These indicators will help identify what needs to be done in the next step. If there are indicators showing a decrease in expectancy, then the GSF process should begin immediately. However, if there are unclear results in the general indicators, specific clinical indicators will be used. If patients do not meet the requirements outlined in the diabetes-related general indicators, they will be regularly reassessed to monitor their condition.

Diabetic complications

Diabetes patients often develop complications such as cardiovascular and renal diseases, which are often the main causes of death [32]. While preventing long term diabetes complications may not be the primary concern, managing the complications of diabetes patients in palliative care does provide comfort and reduce the number of hospital admissions. The most suitable range of blood glucose and haemoglobin A1c (HbA1c) targets must be individualised according to diabetes experts [33]. However, It is recommended that blood glucose levels be maintained between 6.0 mmol/L and 15 mmol/L to reduce the risk of hypoglycemia and hyperglycemia respectively [30]. In case where patients are in the end stage of life, HbA1c levels are recommended to increase up to 8% [33]. Blood glucose monitoring (BGM) plays a crucial role in managing diabetes patients, especially those in palliative care, to minimise the risk of further complications.

Hyperglycemia can lead to life-threatening situations such as diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemia (HHS) if left untreated. Dying from DKA and HHS is uncomfortable as the patient may experience rapid breathing, nausea, vomiting, stomachache, dehydration, and psychological complications before they death [34]. However, managing hyperglycemia should include frequent blood glucose testing, insulin and fluid replacement [33]. Ketone testing should also be included in the care plan for type 1 and type 2 diabetes patients with severe complications.

Hypoglycemia can cause mental delays such as short-term memory loss and can affect decision-making and problem-solving skills. Regular BGM is important for patients at high risk of hypoglycemia [33]. Common risk factors for hypoglycemia in patients are outlined in **(Figure 3)**.

For patients with a life expectancy of only a few months, it is recommended to target fasting blood glucose levels up to 180 mg/dL. In type 1 diabetic patients with a prognosis of weeks, insulin doses should be adjusted to maintain fasting blood glucose levels above 180 mg/dL. For type 2 diabetic patients with a life expectancy of weeks, it is advised to stop hypoglycemic medications in the final weeks and monitor blood glucose levels regularly [35].

Medicine management in diabetes (Insulin and OHA)

Palliative care for patients with diabetes focuses on the quality use of medicines to control blood glucose levels within an acceptable range and reduce hypoglycemia and other medicine-related risks [36]. It is important to decide and select suitable medicines, monitor the drug’s effectiveness frequently, and stop administering medicines when appropriate [36,37]. However, medicine options are affected by availability, cost, the patient’s prognosis, route of administration, medicine risk profile, the patient’s health status, comorbidities and the type of diabetes [33].

Type 1 diabetes (T1DM)

During the stable phase, patients with T1DM usually continue their usual regimen. Patients’ conditions are monitored closely to adjust the dose accordingly if they develop renal and liver diseases, to tailor with their weight loss and food intake so that hypo and hyperglycemia can be prevented. During the terminal stage, usually medicines are stopped in those patients. Commonly, T1DM patients will use basal (long/intermediate acting) or bolus (rapid acting) insulin regimens with insulin analogs. These regimens are suitable for adjusting the dose according to patients’ food intake and eating pattern as a bolus dose is administered when they eat. In addition, the regimens can benefit patients in unstable or deteriorating stages and when they experience nausea, vomiting and anorexia to avoid hyperglycemia [38,39].

During unstable stages, patients are treated with specific management depending on the conditions whether they are returning to a stable stage or deteriorating towards the terminal stage. If patients are likely to recover, an intravenous insulin infusion may be indicated for acute medical conditions and during surgical procedures. If blood glucose levels are >15 mmol/L, blood ketone tests should be done, particularly when the patients experience nausea, vomiting and dehydration, which can cause remediable ketoacidosis [38,39].

Type 2 diabetes (T2DM)

Generally, patients can continue with the usual glucose-lowering medicines (GLM) regimen in a stable stage. However, GLM regimen or insulin doses may be reduced to ease the medicine regimen and lower the risk for hypoglycemia, especially in the unstable and deteriorating end-of-life (EoL) stages. GLM combinations need to consider patients’ health status, blood glucose pattern, self-care capacity, medicine adverse effect risk profile, hypoglycemia and life expectancy. Moreover, gastrointestinal issues can interfere with the absorption of oral GLMs and gastrointestinal prokinetic medicines, ultimately impacting their effectiveness [40].

Generally, diabetes patients are usually prescribed other medicines like antihypertensive medicines for comorbidities like hypertension. Considering the benefits and risks of continuing these medicines, doses and their intervals are required to be taken into consideration to minimise polypharmacy and their adverse outcomes [41,42]. Furthermore, nonsteroidal anti-inflammatory drugs (NSAID’s) which can cause unwanted gastrointestinal effects, should be carefully considered when prescribed to diabetic patients with anorexia or use corticosteroids as an alternative [43].

The different GLM classes and their respective issues are given in (Table 1) [33].

Table 1: The commonly prescribed glucose-lowering medicine classes and respective issues to consider during prescription and glucose-lowering medicines monitoring.

Medicine class	Description
Metformin	The most commonly used GLM particularly in overweight individuals. Patient’s renal function should be monitored and adjust doses when necessary. Medicine prescribing should be stopped when creatinine is >150 mmol/L or eGFR <30

	ml/min/1.73 m ² . Metformin should be avoided in patients with higher risk for lactic acidosis, distressing gastrointestinal symptoms and pronounced weight loss.
Sulphonylureas	Avoid sulphonylureas in patients with renal and/or liver disease as well as in those who are at risk for hypoglycemia.
Thiazolididones	Thiazolididones are contraindicated in patients with liver and/or congestive heart failure. Patients taking this medicine may experience oedema, which can be uncomfortable for them. Pioglitazone should be avoided in individuals at high risk for bladder cancer or those who already have bladder cancer.
Incretins	GLP-1 and DPP-4 analogs may be used depending on prescribing indications in the relevant country. However, a combination of GLP-1 and sulfonylurea is likely to cause hypoglycemia. Additionally, GLP-1 has a high risk for nausea and weight loss and may be contraindicated in some cases. Due to the potential link between GLP-1 and DPP-4 analogs and pancreatitis incidences, they are not recommended for patients with pancreatic disease and should be discontinued if they cause abdominal pain.
Sodium-glucose cotransporter-2 inhibitor (SGLT-2)	SGLT-2 medicines do not have sufficient clinical evidence to support their use in palliative care and their use is not approved in many countries. These medications pose a high risk for urinary tract and genital infections, as well as polyuria.
Insulin	Most patients with T2DM patients are eventually prescribed insulin and may already be using it while under palliative care. Adjusting insulin doses is easier than adjusting oral GLMs. Administering insulin can reduce the number of tablets patients need to take, simplifying their medication regimen.

Diabetogenic medicines

Patients with diabetes are often diagnosed with other comorbid conditions leading to the need for an integrated management approach [44]. Managing comorbidities in diabetes contributes to an increased number of medications which is associated with an increased risk of adverse drug events and drug-drug interactions. Some medicines have been reported to be diabetogenic causing destruction of β -cells and impaired insulin secretion or insulin sensitivity [33,45]. Moreover, this induction of hyperglycemia occurs regardless of whether the diabetes is newly diagnosed or in established patients [30]. The degree of hyperglycemia is dependent on the dosage, with higher doses resulting in a more significant impact on blood glucose levels [46]. Thiazide diuretics, antipsychotics, β -blockers, antiepileptics, and corticosteroids are commonly prescribed diabetogenic medicines [33,45]. The mechanism of drug-induced hyperglycemia varies with each diabetogenic medicine as illustrated in **(Figure 4)** [47]. Therefore, close monitoring is essential for diabetic patients on blood glucose-lowering therapy, as the treatment response may differ with the use of diabetogenic medicines.

Corticosteroids and diabetes

Corticosteroids are indicated for the treatment of inflammation and inflammatory conditions by inducing immunosuppression [27,33,45,48,49]. Individuals with a predisposed risk of diabetes should be identified for their likelihood of developing corticosteroid-induced hyperglycemia before being prescribed corticosteroids, in order to prevent their progression to diabetes. However, insulin resistance, steroid-induced diabetes and glucose intolerance are complications that can arise from long-term use of high doses of corticosteroids [48]. Hence, individuals should be informed about the risk of developing diabetes associated with the use of diabetogenic medicines.

Diabetic patients will be educated on the complications of corticosteroids used on their blood glucose levels. Furthermore, the signs and symptoms of infections are often masked by corticosteroids and may be presented atypically, causing some degree of distress to the patients [33]. Therefore, the existing blood glucose-lowering therapy may require some modification according to patient comfort and goals of care following corticosteroid-induced hyperglycemia. Diabetes care integrated with palliative care aims to

enhance patient comfort by managing distress symptoms associated with hyperglycemia and to withdraw irrelevant medicine use with regular review of patients' medications [50]. Individual susceptibility to hyperglycemia and the diabetogenic effects of medicines on diabetic patients should be assessed to aid decision making in the palliative care of diabetes [33]. Therefore, it is essential to compare the risks and benefits of using corticosteroid medicines in diabetic patients.

Complementary & alternative therapies

Complementary and alternative medicine (CAM) refers to complementary medicine alongside alternative treatments. Alternative medicines, on the other hand, are used independently of conventional medical practices [50]. Therefore, using CAMs is an attractive option in palliative care for diabetic patients because they offer a wide range of clinical therapies that cause fewer side effects compared to conventional medicine [51,52]. Diabetic patients receiving palliative care often turn to CAM to relieve pain, reduce restlessness, decrease mental stress and improve their quality of life. For example, diabetic patients may incorporate massage, music therapy, acupuncture, meditation, art therapy and reflexology in their palliative care plan [33]. Additionally, to improve overall health, diabetic patients can also engage in exercises such as yoga, tai chi, and swimming [52,53]. According to a study by Qiu et al. in 2007, regular walking exercise has been shown to effectively lower HbA1c levels, diastolic blood pressure and body mass index [54]. Furthermore, many herbal products are used in CAM for treating diabetes. For example, a creeper plant called *coccinia indica* (ivy gourd) is used in Ayurveda and has been found to produce hypoglycemia through mechanisms similar to insulin. Clinical trials have suggested that *coccinia* can decrease fasting blood glucose levels without adverse effects among type 2 diabetes patients [52]. Fenugreek leaves have also shown antidiabetic and hypocholesterolemic properties, but it is contraindicated in pregnant women [52]. Fenugreek enhances glucose uptake into cells, decreases carbohydrate absorption and increases insulin secretion [33,52,54]. Several clinical trials have demonstrated that fenugreek has hypoglycemic effects by reducing fasting blood glucose and HbA1c levels in addition to exercise, diet control and drug therapy to prevent long-term morbidity [54-56]. Moreover, the leaves of the *Gymnema sylvestre* (gymnema) plant have been found to suppress the sweet taste sensation and hypoglycemic effects. The extract from gymnema leaf, known as GS4, can be an alternative therapy for patients with type 1 and type 2 diabetes, with some studies reporting improvements in fasting blood glucose and A1C levels [52]. *Gymnema sylvestre* has positive effects on blood glucose homeostasis, promotes pancreas regeneration and controls sugar cravings [57].

Numerous dietary supplements are used to lower glucose levels and treat comorbidities of diabetes such as hypertension and hyperlipidemia. A clinical trial showed that omega-3 supplementation did not affect fasting blood glucose or HbA1c levels, but it can improve in triglyceride levels [58, 59]. Omega-3 fatty acid (O3FA) supplementation has been found to reduce albuminuria and maintain renal function in diabetic patients with hypertriglyceridemia [60]. Coenzyme Q10, a vitamin-like substance that is thought to be deficient in diabetes patients compared to healthy individuals [61,62]. Also, coenzyme Q10 has shown effectiveness in improving markers of insulin metabolism, glycemic control and blood lipid levels. Coenzyme Q10 supplementation can decrease HbA1c, fasting blood glucose and triglyceride levels while protecting the cardiovascular system from serious complications [62,63]. Since diabetic patients often take multiple antidiabetic medications, there is a potential for drug-herb and drug-dietary supplement interactions. Therefore, it is important to check for interactions between drugs, supplements, and herbs to prevent adverse events [52].

Diabetes education

Education on self-care and managing diabetes complications is essential for diabetes patients and their families. It is important to discuss the care plan and goals of care with diabetic patients and their families, including explaining what palliative care is and its benefits for the individual. Patients must know how to adjust medicines to establish self-management routines. Additionally, the families of the patients need to understand palliative care, such as annual retinal screening and cardiovascular risk screening to detect diabetic complications during a more treatable stage [33]. Monitoring the blood glucose levels of patients is crucial to prevent other diabetes complications. For example, self-monitoring of blood glucose (SMBG) is the preferred method for assessing glycemic control to prevent hypoglycemia. To improve diabetic

control, patients should be taught how to use SMBG data to adjust food intake, exercise, or pharmacological therapy [64]. The necessity and frequency of SMBG should be personalised at follow-up visits [65]. Furthermore, patients should be guided in meal planning to keep their blood glucose levels within the daily target range. Carbohydrates, fat, protein and fiber in food all affect blood glucose levels differently. Typically, people with diabetes should aim to get about 45% of their calories from carbohydrates. A carbohydrate serving is equivalent to 15 grams per serving. Women should aim for 3 to 4 carbohydrate servings (45–60 grams) per meal, while most men should target 4 to 5 carbohydrate servings (60–75 grams). Carbohydrate counting can help patients keep their blood glucose levels close to the target range, which can also prevent or delay diabetes complications such as heart disease, stroke, kidney disease, blindness, nerve damage, and lower-limb amputation [66]. Moreover, to prevent hypoglycemia, carbohydrate consumption should be regulated for patients on insulin or sulphonylureas [65].

Managing care components/ Approach

Diabetes complications such as neuropathy, foot ulcers, cardiovascular disease and depression can cause patients to experience unpleasant symptoms and reduce their quality of life. Palliative care focuses on managing these symptoms and promoting comfort through regular assessments to plan and set care goals with the individual and their families. In the management of diabetic foot ulcers (DFUs), the feet should be examined at least once annually or more frequently in the presence of risk factors. For patients who are unable to check their own feet, their families should also be trained in foot assessment. Foot care education should be provided to all diabetes patients to help prevent foot complications. The goal of managing foot ulceration is to facilitate wound healing, stabilise the wound by reducing exudate, decrease wound size, prevent infection, and enable the person to remain relatively independent at home [67,68]. This can reduce treatment burden by providing local wound care using hyaluronic acid dressings, which can improve ulcer healing compared to basic wound care dressings [69]. Palliative care for diabetic foot ulcers can also involve using non-removable or removable devices. For example, non-removable devices like total contact casts (TCC) have shorter healing times (e.g. 12 days) compared to removable cast walkers. According to NICE 2015 guidelines, foot protection services offer prevention of diabetic foot problems for low, moderate and high-risk feet as well as management of simple active diabetic foot problems in the community that do not require hospitalization [69]. The recommended referral schedule is provided in (Table 2).

Table 2: Recommended referral schedule [69]

Risk	Referral
Normal/Low risk	No need for a referral. Yearly review for diabetic foot ulcer at primary care.
Moderate risk	Refer to the foot protection service within the next three months.
High risk	Early referral to the foot protection service within two weeks.
Active diabetic foot problem	Urgent referral to multidisciplinary foot care team within 24 hours.

Moreover, diabetes patients require individualised management during times of illness to prevent hypoglycemic and hyperglycemic emergencies. Insulin or antidiabetic medications should be continued unless the patients begin vomiting or experience dehydration [68]. Additionally, palliative care offers emotional support for both patients and their families. Some patients may develop depression after being diagnosed with diabetes, and the palliative care team can assist them in coping with stress through counselling. The goals of diabetes management include maintaining blood glucose and HbA1c levels as close to the normal range as possible to prevent or manage long-term complications. Therefore, monitoring blood glucose levels is crucial as it can help adjust medicine regimens and provide information on the risk of hypo or hyperglycemia [50].

Nutrition and hydration

In people receiving palliative care, cachexia, anorexia, dysphagia, nausea and vomiting are common, and these may cause malnutrition. Additionally, there may be a decrease in the absorption of vitamin B12 if they are on metformin and have renal disease. Inadequate vitamin B12 may cause pernicious anemia. Therefore, they may need supplementary nutrition based on dietetic advice at the end of life (EoL) stages. For individuals who have difficulty taking food and fluids orally, enteral feeds may be necessary to improve their nutritional status [33]. Enteral feeds also known as artificial nutrition and hydration, come with risks such as diarrhea, bloating, vomiting, hyperglycemia and hyperphosphatemia, which may reduce the quality of life [70]. Additionally, patients who have small meals and long gaps between meals may require additional nutrition to prevent uncontrolled diabetes. Adding sugar or consuming chocolate may help patients who receive small meals [71]. Furthermore, malnutrition may result in hypoglycemia, frailty, falls and slow wound healing [50].

For patients unable to drink fluids orally, clinically assisted hydration like subcutaneous fluid can be initiated [27,72]. This can help manage the consequences of dehydration, but it may also lead to fluid overload. Therefore, hydration should be stopped if fluid overload occurs [27]. However, these interventions may not provide benefits for individuals with advanced disease, as they are unlikely to improve nutritional status and quality of life [33,72].

Palliative and End-of-Life Care Challenges

There are several challenges in delivering palliative and end-of-life care. The obstacles such as psychological issues in patients like depression, pain that causes discomfort, anxiety and impatience, hopelessness and loss of self-esteem, honor and respect for patients, hinder the achievement of the goals of palliative care [73-74]. There are also misconceptions from patients that this care means the doctor has given up hope on patient [74]. Moreover, one of the challenges faced by clinicians who deliver end-of-life care is the time spent discussing and counselling the patient. Additionally, this care requires a significant amount of time and attention from healthcare providers. Furthermore, stressful conditions and inadequate training can lead to poor decisions [73-74]. The death of the patient affects the performance and trust in their job [73]. Healthcare professionals may have difficult conversations with patients and their families, as it is not the norm to talk about death in certain societies and cultures [74].

Family care

Family carers have the responsibility of caring for the patient, which includes tasks such as feeding and scheduling rounds to attend to the patient's needs. It is essential for them to be well informed about the patient's care plan, as well as being equipped with the necessary skills and knowledge about insulin administration and blood glucose monitoring to effectively assist the patient [33]. Family members often experience emotional distress while caring for a terminally ill diabetic patient. They are at risk of reduced immunity, sleep deprivation and unresolved grief [50]. They are also prone to experiencing negative physical, social and emotional consequences. Therefore, healthcare professionals need to observe their signs of stress, monitor their health, and provide for their emotional, physical, social-cultural and spiritual needs [33].

Spiritual care

Spiritual care is crucial for patients coping with a terminal illness, as they often grapple with thoughts of loss, grief and death. It is included in the World Health Organization's definition of palliative care [10]. The main focus of spiritual care is on spirituality, empowerment, searching for purpose in life and seeking hope, gratitude, and peace [33,75,76]. Resources of spiritual strength can include the patient's connection to God, mindfulness and meditation.^[76] Some studies have shown its beneficial effects in relieving despair, reducing discomfort, and improving QoL in fatal illnesses [77-79]. However, it may be necessary when a patient is refusing care, experiencing fear of dying, or becoming more isolated. Unfortunately, spiritual support is often overlooked by healthcare teams in current clinical settings [75].

Palliative care plays a significant role in improving the quality of life for patients with diabetes. **(Figure 5)** provides a summary of the benefits of palliative care in diabetes.

Future perspective

In the future, equitable, unbiased and evidenced-based palliative care should be made available regardless of economic and social status, location, diagnosis or prognosis. Therefore, goals for the future must be

accomplished with respective palliative care. These goals encompass ensuring availability and accessibility to medications, enhancing education, research and training for healthcare professionals and establishing a strong regulatory commitment and integration. Inadequate access to addictive drugs like opioids has been a dilemma for patients suffering from pain and distressing symptoms. It is mainly due to weak national control policies, restrictions by regulatory bodies, lack of knowledge and fear of addiction [80]. Every nation should guarantee the availability of essential medications for palliative care patients, even in underdeveloped countries. Moreover, future guidelines should be collaborated with other specialty fields like cardiac and renal specialties to standardise the approach for palliative care and reduce the number of guidelines that healthcare professionals need to consider. The guidelines and strategies could be continuously evaluated based on the impact of the recommendations on patients [33]. An international platform for healthcare professionals to exchange skills and knowledge should be established so that they can learn from global connections. Furthermore, good communication and listening skills should be emphasized on the platform. These skills are vital when discussing palliative care planning with patients to ensure their needs are met and to minimise uncertainty especially when discussing emotive issues [81]. In addition, lectures and workshops on palliative medicine and care should be included in all undergraduate curricula. To ensure that all future healthcare professionals have the necessary knowledge and skills in palliative care.

To ensure continuous interest in palliative care, state, national and international palliative care societies should be established with registered physicians from both general and specialist fields [80].

Conclusion

This review discusses current practices of palliative care for diabetes patients. Palliative care for diabetes is crucial in providing quality care and management for patients approaching the end of their lives. It is a challenging process, especially for the patients, as diabetes significantly impacts their quality of life, and the side effects of the medications can be unpleasant adding to the complexity of the dying process. Moreover, palliative care for diabetes encompasses various aspects, including medications, diet, and spiritual needs. The primary goal of palliative care is to help patients with diabetes for as long as possible in a positive and comfortable manner. Therefore, the involvement of patients, healthcare professionals, and family members is essential to ensure that palliative care is administered effectively. Furthermore, early detection and risk management are key factors in allowing diabetes patients enough time to make decisions and express their end of life wishes. It is crucial to consider different measures to prevent diabetes from interfering with the desires of diabetic patients who seek a peaceful death.

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