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Implementation Of Self-Monitoring Of Blood Glucose Based On Insulin Injection Technique Education Towards Blood Sugar Control In Diabetes Mellitus Patients In The Yudistira Room, DR. Amino Gondohutomo RSJD, Semarang, Central Java Province

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Abstract

Diabetes Mellitus is a chronic disease that requires optimal blood glucose control to prevent complications. Low patient ability to perform Self-Monitoring Blood Glucose (SMBG) and inappropriate insulin injection techniques can hinder glycemic control. This study aims to describe the application of SMBG based on insulin injection technique education to control blood sugar in Diabetes Mellitus patients in the Yudistira Ward of Dr. Amino Gondohutomo Mental Hospital, Semarang. The study used a descriptive case study design with a nursing care approach. The study population was Diabetes Mellitus patients undergoing insulin therapy, with a sample of two patients selected using purposive sampling. The instruments used included a nursing assessment format, SMBG observation sheets and insulin injection techniques, blood glucose monitoring sheets, SOPs for actions, and a glucometer. Data were analyzed descriptively by comparing conditions before and after the intervention. The results showed an increase in the patient's ability to perform SMBG and insulin injection independently. In the first case, blood glucose levels decreased from 230 mg/dL to 196 mg/dL, while in the second case, they decreased from 340 mg/dL to 215 mg/dL. In conclusion, the implementation of SMBG based on insulin injection technique education helps improve blood sugar control, therapy compliance, and self-management skills in Diabetes Mellitus patients.

Keywords:*Blood Glucose Monitoring, Diabetes Mellitus, Glycemic Control, Insulin Injection Technique, Self-Management*

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INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disease whose prevalence continues to increase worldwide and has become a major health problem. Uncontrolled hyperglycemia can lead to various serious complications that impact patients' quality of life. Data shows that more than 537 million people were living with diabetes in 2021, and this number is expected to continue to rise, including in Indonesia, which has seen a rise in diabetes prevalence in recent years (International Diabetes Federation, 2021; American Diabetes Association, 2024).

Controlling blood glucose levels is the primary goal in managing diabetes mellitus to prevent long-term complications. Successful glycemic control depends not only on pharmacological therapy but also on the patient's active involvement in self-care, including blood sugar monitoring and appropriate insulin use (American Diabetes Association, 2024; ElSayed et al., 2024).

However, many patients with diabetes mellitus still experience difficulty achieving optimal blood sugar levels. This condition is often associated with low knowledge, poor adherence to therapy, and suboptimal implementation of self-monitoring of blood glucose (SMBG). SMBG plays a crucial role in helping patients monitor their blood glucose levels and supporting decision-making regarding daily diabetes management (American Diabetes Association, 2024; Battelino et al., 2023).

Furthermore, incorrect insulin injection technique remains a common problem among patients with diabetes mellitus. Improper injection technique can lead to suboptimal insulin absorption, increase the risk of local complications, and hinder the achievement of glycemic targets. Several studies have shown that structured education on insulin injection technique can improve patient skills and the effectiveness of insulin therapy (Frid et al., 2022; American Diabetes Association, 2024).

Observations in the Yudistira Room of Dr. Amino Gondohutomo Mental Hospital in Semarang indicate that some patients do not routinely perform SMBG and do not understand the correct insulin injection technique. Therefore, this study aims to describe the application of Self-Monitoring Blood Glucose based on insulin injection technique education to control blood sugar in Diabetes Mellitus patients. This research is important to support increased patient independence in diabetes management, with the novelty of integrating SMBG and insulin injection technique education as a structured nursing intervention (American Diabetes Association, 2024; Frid et al., 2022).

METHOD

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This research uses a descriptive case study method with a nursing care approach to illustrate the implementation of Self-Monitoring Blood Glucose (SMBG) based on insulin injection technique education in patients with Diabetes Mellitus. This approach is carried out through the stages of assessment, nursing diagnosis, intervention, implementation, and evaluation to obtain a comprehensive picture of the patient's blood sugar control (Creswell & Creswell, 2023; Sugiyono, 2022; American Diabetes Association, 2024).

The research subjects were selected using a purposive sampling technique from Diabetes Mellitus patients undergoing insulin therapy and experiencing unstable blood glucose levels in the Yudistira Ward of Dr. Amino Gondohutomo Mental Hospital, Semarang. Sample selection was based on predetermined inclusion and exclusion criteria to obtain data in accordance with the research objectives (Sudaryono, 2021; Emzir, 2023).

The research instruments included a nursing assessment form, SMBG and insulin injection technique observation sheets, blood glucose monitoring sheets, standard operating procedures (SOPs), and a glucometer. Data were collected through interviews, observations, physical examinations, and documentation. They were then analyzed descriptively by comparing patient conditions before and after the intervention, specifically regarding blood glucose levels, SMBG skills, and insulin therapy adherence (Sugiyono, 2022; Battelino et al., 2023).

The study began with subject selection and an initial assessment, followed by education on insulin injection techniques and SMBG training. Following the intervention, regular mentoring and evaluations were conducted to assess the patients' ability to perform SMBG, the accuracy of their insulin injection technique, and changes in blood glucose levels. The evaluations were conducted to assess the intervention's effectiveness in supporting blood sugar control in patients with diabetes mellitus (Frid et al., 2022; American Diabetes Association, 2024).

RESULTS AND DISCUSSION

Study Results and Case (Case 1)

Data analysis

NO	Date/Time	SYMPTOM	ETIOLOGY	PROBLEM
1.	10/27/2025 09.00 WIB	DS: The patient reported pain in the wound on his left leg after surgery. DO: There is a post-operative suture wound on the left pedis measuring 10 cm long, the skin around the	Peripheral neuropathy	Impaired Skin/Tissue Integrity (D.0129)

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		wound is slightly reddish, CRT <3 seconds, minimal edema.		
2.	10/27/2025 09.00 WIB	DS: The patient reported pain in the wound on his left leg after surgery. P: Pain occurs when moving. Q: It feels sore R : Left leg S : Scale 4 T: Appears and disappears DO: The patient appears to be in pain BP 134/58 mmHg	Physical agents (trauma, surgery, burns)	Acute Pain (D.0077)
3.	10/27/2025 09.00 WIB	DS: The patient reports feeling tired and dizzy quickly. The patient reports urinating 9-10 times a day. DO : J 06 GDS 223mg/dL HbA1C 10%	Insulin resistance	Instability of blood glucose levels (D.0027)

Nursing Diagnosis (Priority Problems)/SDKI

NO	Date/Time	DIAGNOSIS	PRIORITY
1.	10/27/2025 10.00 WIB	Impaired Skin/Tissue Integrity bdPeripheral neuropathy(D.0129)	1
2.	10/27/2025 10.00 WIB	Acute Pain bdPhysical agents (trauma, surgery, burns)(D.0077)	2
3.	10/27/2025 10.00 WIB	Instability of blood glucose levelsbdInsulin resistance (D.0027)	3

Nursing Care Plan

NO DP	Date/Time	OBJECTIVES AND RESULT CRITERIA	INTERVENTION
1.	10/27/2025 11.00 WIB	After nursing intervention for 3 x 24 hours, skin and tissue integrity increased (L.14125)	**Wound Care (I.14564)** *Observation*

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		with the following outcome criteria: - Elasticity increases - Increased hydration - Increased tissue perfusion - Pain decreases - Bleeding decreased - Redness decreases - Hematoma decreased - Abnormal pigmentation decreases - Scar tissue decreases - Decreased necrosis - Skin temperature improves	1. Observe the location, size, depth, and shape of the wound. 2. Observe the color of the wound tissue (red, yellow, black) 3. Assess the amount, color, and odor of the exudate. 4. Examine the edges of the wound: are they shrinking, soft, or are there signs of infection. 5. Check the condition of the skin around the wound (redness, irritation, maceration). 6. Record the progress of the wound at each dressing change. *Therapeutic* 1. Perform wound care using aseptic techniques. 2. Apply topical medication/antibiotic ointment as directed by your doctor. 3. Ensure the patient is in a comfortable position during the procedure. *Education* 1. Explain the purpose and procedures of wound care to the patient. 2. Teach how to keep the wound area clean. 3. Teach when to change dressings and how to clean wounds at home if possible. 4. Education on the importance of high protein, vitamin C, and zinc

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			nutritional intake for wound healing. 5. Encourage patients to control blood sugar levels (for DM patients). *Collaboration* 1. Collaboration with doctors for the administration of systemic/topical antibiotics. 2. Collaborate with a nutritionist to develop a high-protein and high-calorie diet.
2.	10/27/2025 11.00 WIB	After nursing intervention for 3 x 24 hours, the pain level decreased (L.08078) with the following outcome criteria: - Pain intensity decreased (pain scale ≤ 3/10). - Relaxed facial expression. - Not nervous, looks comfortable. - Vital signs within normal limits. - Patients can sleep/rest well. - The patient is able to perform light activities without significant pain.	**Pain Management (I.08230)** *Observation* 1. Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10). 2. Observe facial expressions, body position, and protective behavior. 3. Observation of vital signs (BP, N, RR) for changes due to pain. *Therapeutic* 1. Create a comfortable and calm environment. 2. Adjust your body position to support relaxation and reduce pressure on the painful area. 3. Teach non-pharmacological techniques: deep breathing, relaxation, distraction, warm/cold compresses as indicated. *Education*

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			1. Educate patients to report pain immediately if it increases. 2. Recommend avoiding activities that worsen the pain. *Collaboration* 1. Collaboration with doctors for the administration of analgesics
3.	10/27/2025 11.00 WIB	After nursing intervention for 3 x 24 hours, blood glucose levels were stable (**L.05022)**with the following results criteria: - Blood glucose levels improve - Complaints of weakness decreased - Complaints of dizziness decreased	**Hyperglycemia Management (I.03115)** 1. Observation a. Identify possible causes of hyperglycemia b. Identify causes of increased insulin requirements c. Monitor blood glucose levels d. Monitor for signs and symptoms of hyperglycemia e. Monitor fluid intake and output f. Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. 2. Therapeutic a. Provide oral fluid intake b. Consult a doctor if signs and symptoms of hyperglycemia persist or worsen. c. Facilitate ambulation if orthostatic hypotension is present. 3. Education a. It is recommended to avoid exercise if blood glucose levels are more than 250mg/Dl.

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			b. Recommend monitoring blood glucose levels independently c. Encourage adherence to diet and exercise d. Teach the indications and importance of urine ketone testing, if necessary. e. Teach diabetes management (e.g., use of insulin, oral medications, monitoring fluid intake, carbohydrate replacement, and assistance from a health professional) 4. Collaboration a. Collaboration with insulin administration, if necessary b. Collaboration in administering IV fluids c. Collaboration of potassium administration

Evaluation

NO DP	Date/Time	EVALUATION	Signature/Name
1	Monday 10/27/2025 12.00 WIB	S: The patient said he was willing to undergo wound care. O : Composmentis Consciousness, E4V5M6 The patient appeared to be enduring pain during wound treatment. Clean the wound with the following principles: **T (Tissue Management) :** Irrigate the wound with 0.9% NaCl solution and swab with moist gauze to remove necrotic	Khurrotun

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		tissue and any foreign objects adhering to the wound. Dry with sterile gauze. **I (Infection and Inflammation):** The skin around the wound is red, edema of at least grade 1, pain when pressed, 3cc of blood comes out when pressing the edge of the wound. Give Ceftiaxon 2g (IV) injection H5 at 12.00 Glimepiride 1x2 mg (P) at 08.00 **M (Moisture) :** Apply a thin layer of Bioplacenton + Sufratul ointment. Cover the wound with melolin, gauze, and then hepatic. Cover with an elastic bandage. **E (Edge of Wound) :** The edges of the wound experience new epithelial growth. Wound Condition: 10cm long sutured wound (score 2), erythema (score 1), wound edges fused with wound base (score 2), no cavities (score 1), no necrotic tissue (score 1), no amount of necrotic tissue (score 1) blood exudate type (score 2), small amount of exudate 3cc (score 3), reddish skin color around wound (score 2), non-pitting edema <4mm around wound (score 2), no hardening of tissue edges (score 1), 100% granulation tissue (score 2), 90% epithelialization of wound covered with epithelial tissue (score 2) **(Betes Jensen wound assessment score = 22)** Give Ceftiaxon 2g (IV) injection H5 at 12.00 Patients receive a TKTP diet + extra egg whites	

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		A : Network Integrity Damage bdMechanical factors (surgery) P: Continue intervention - Observe the location, size, depth, and shape of the wound. - Observe the color of the wound tissue (red, yellow, black) - Assess the amount, color, and odor of the exudate. - Examine the edges of the wound: are they shrinking, soft, or are there signs of infection. - Check the condition of the skin around the wound (redness, irritation, maceration).	
2	Monday 10/27/2025 12.00 WIB	S: The patient said he was willing to be given medication, but it was still painful. P: Pain when the leg is moved Q: It hurts R: Wound on the left leg S : Scale 4 T: Appears and disappears O :The patient appeared to be grimacing in pain. The patient appears to be practicing deep breathing to reduce pain. Administer Ketorolac 30mg/8h IV at 08.00 Give PCT 1000mg/orally at 12.00 BP : 134/58 mmHg, N : 78 x/min, S : 36.6 C, RR : 20 x/min, SpO2 : 96% A :Acute Pain bdPhysical agents (trauma, surgery) P: Continue intervention - Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10).	 Khurrotun

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		- Observation of vital signs (BP, N, RR) for changes due to pain. - Teach non-pharmacological techniques: deep breathing, relaxation, distraction, warm/cold compresses as indicated.	
3	Monday 10/27/2025 12.00 WIB	S :The patient reported urinating 9-10 times a day. The patient felt nauseous and dizzy. The patient said he did not yet dare to check his blood sugar and inject insulin independently. The patient said he ate food from the hospital, but only half a portion because he felt nauseous. O :Composmentis Consciousness, E4V5M6 BP : 134/58 mmHg, N : 78 x/min, S : 36.6 C, RR : 20 x/min, SpO2 : 96% Installed inf RL 20tpm (Left Hand) H3 At 12:00 PM, blood glucose level was 230 mg/dL with nurse education. HbA1C was 10%. Inj Apidra 6 iU (SC) before meal at 12:00 PM. Urine output 800cc/7 hours The patient ate half a portion of the TKTP diet + extra egg white. A :Instability of blood glucose levelsbd Hyperglycemia(D.0027) P: Continue intervention - Monitor blood glucose levels - Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. - Recommend monitoring blood glucose levels independently - Encourage adherence to diet and exercise - Teach diabetes management (Insulin use) - Collaboration in administering IV fluids	Khurrotun

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NO DP	Date/Time	EVALUATION
1	Tuesday 10/28/2025 12.00 WIB	S : - O : Composmentis Consciousness, E4V5M6 The wound appears to be covered with an elastic bandage, there is no visible exudate sticking to the bandage. A : Network Integrity Damage bdMechanical factors (surgery) P: Continue intervention - Perform wound care using aseptic techniques. - Observe the location, size, depth, and shape of the wound. - Observe the color of the wound tissue (red, yellow, black) - Assess the amount, color, and odor of the exudate. - Examine the edges of the wound: are they shrinking, soft, or are there signs of infection. - Check the condition of the skin around the wound (redness, irritation, maceration). - Teach how to keep the wound area clean. - Teach when to change dressings and how to clean wounds at home if possible. - Education on the importance of high protein, vitamin C, and zinc nutritional intake for wound healing. - Encourage patients to control blood sugar levels (for DM patients).
2	Tuesday 10/28/2025 12.00 WIB	S: The patient said he was willing to be given medication, there was still pain but it had reduced. P: Pain when the leg is moved Q: It hurts R: Wound on the left leg S : Scale 3 T: Appears and disappears O :The patient appeared to be grimacing in pain. The patient appears to be practicing deep breathing to reduce pain.

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		BP : 120/62 mmHg, N : 77 x/min, S : 37.1 C, RR : 20 x/min, SpO2 : 96% A :Acute Pain bdPhysical agents (trauma, surgery) P: Continue intervention - Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10). - Observation of vital signs (BP, N, RR) for changes due to pain. - Teach non-pharmacological techniques: deep breathing, relaxation, distraction, warm/cold compresses as indicated.
3	Tuesday 10/28/2025 12.00 WIB	S :The patient said he wanted to try checking his blood sugar and injecting insulin independently according to the nurse's education. The patient said the nausea had decreased. O :Composmentis Consciousness, E4V5M6 Installed RL 20tpm (Right Hand) H1 Infusion relocation BP: 120/62 mmHg, N: 77 x/min, S: 37.1 C, RR: 20 x/min, SpO2: 96%. J 12 GDS 212 mg/dL J 12 Inj Apidra 6ui(SC) before meals (The patient performs blood glucose checks and insulin injections independently under the direction of the nurse) The patient ate 3/4 of the TKTP diet portion + extra egg white A :Instability of blood glucose levelsbd Hyperglycemia(D.0027) P: Continue intervention - Monitor blood glucose levels - Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. - Recommend monitoring blood glucose levels independently - Encourage adherence to diet and exercise - Teach diabetes management (Insulin use) - Collaboration in administering IV fluids

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NO DP	Date/Time	EVALUATION	Signature/Name
1	Wednesday 10/29/2025 12.00 WIB	S :The patient is willing to have his wound treated The patient said that at home there was a nurse who was willing to come to the house to change the wound dressing. The patient said he had his own blood sugar monitoring device and would regularly take his blood sugar medication. O : Composmentis Consciousness, E4V5M6 The patient appeared to be enduring pain during wound care. He appeared to understand the nurse's instructions (to protect the wound area from water and to clean the surrounding skin by wiping with warm water). He also appeared to understand the nurse's instructions (to educate the patient about eating high-protein foods such as egg whites, catfish, tofu, and tempeh, and that there were no dietary restrictions). GDS/morning: 126 mg/dL Clean the wound with: **T (Tissue Management) :** Irrigate the wound with 0.9% NaCl solution and swab with moist gauze to remove necrotic tissue and any foreign objects adhering to the wound. Dry with sterile gauze. **I (Infection and Inflammation Control):** The skin around the wound is red, edema of at least grade 1, pain when pressed, blood comes out/bleeding 1cc when pressed on the edge of the wound. Administer Glimepiride 2mg (P) at 08.00 **M (Moisture) :**	Khurrotun

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		Apply a thin layer of Bioplacenton + Sufratul ointment. Cover the wound with melolin, gauze, and then hepatic. Cover with an elastic bandage. **E (Edge of Wound) :** The edges of the wound experience new epithelial growth. 10cm long sutured wound (score 2), erythema (score 1), wound edges fused with the wound base (score 2), no cavities (score 1), no necrotic tissue (score 1), no amount of necrotic tissue (score 1) blood exudate type (score 2), small amount of exudate 1cc (score 3), pink skin color around the wound (score 1), non-pitting edema around the wound (score 1), no hardening of the tissue edges (score 1), 100% granulation tissue (score 2), 90% epithelialization of the wound covered with epithelial tissue (score 2), **(Betes Jensen wound assessment score = 20)** A : Network Integrity Damage bdMechanical factors (surgery) Q:Education on dressing change times and methods cleaning the wound at home (Patient goes home)	
2	Wednesday 10/29/2025 12.00 WIB	S: The patient said P: Pain when the leg is moved Q: It hurts R: Wound on the left leg S : Scale 2 T: Appears and disappears O :The patient appeared to be grimacing in pain. BP : 138/68 mmHg, N : 68 x/min, S : 36.6 C, RR : 20 x/min, SpO2 : 97%	 Khurrotun

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		A :Acute Pain bdPhysical agents (trauma, surgery) P: Continue intervention - Education on deep breathing and relaxation when pain occurs at home (Patient goes home)	
3	Wednesday 10/29/2025 12.00 WIB	S :The patient stated that he wanted to check his blood sugar and inject insulin himself. He stated that his nausea had subsided. O :Composmentis Consciousness, E4V5M6 Installed inf RL 20tpm (Right Hand) H2 BP : 138/68 mmHg, N : 68 x/min, S : 36.6 C, RR : 20 x/min, SpO2 : 97%. At 12.00 GDS: 196mg/dL J 12 Inj Apidra 6ui(SC) before meals (The patient performs blood glucose checks and insulin injections independently correctly) The patient ate 1 portion of the TKTP diet + extra egg white A :Instability of blood glucose levelsbd Hyperglycemia(D.0027) P: Continue intervention - Education for blood sugar control and adherence to insulin injection therapy at home independently (patient goes home)	 Khurrotun

Study Results and Case (Case 2)

Data analysis

NO	Date/Time	SYMPTOM	ETIOLOGY	PROBLEM
1.	02/12/2025 09.00 WIB	**DS :** The patient reported nausea, vomiting, and cold sweats. He reported urinating 10 times a day. **DO :** CM Case, E4V5M6	Insulin resistance	Instability of blood glucose levels (D.0027)

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		Blood sugar 354 mg/dL HbA1C >14%		
2.	02/12/2025 09.00 WIB	**DS:** The patient complained of dizziness and couldn't sleep. P: Pain occurs during activity. Q: Dizzy R : Head S : Scale 5 T: Appears and disappears **DO:** CM Case, E4V5M6 BP 177/86 mmHg, Pulse 102 x/min, Temp 36.3oC, RR = 20 x/min, SpO2 = 99% room air Leuocytes 17.11*103/µL The patient appeared to be grimacing. Diaphoresis	Physiological injury agents (inflammation)	Acute Pain (D.0077)

Nursing Diagnosis (Priority Problems)/SDKI

NO	Date/Time	DIAGNOSIS	PRIORITY
1.	02/12/2025 10.00 WIB	Instability of blood glucose levelsbd Hyperglycemia(D.0027)	1
2.	02/12/2025 10.00 WIB	Acute Pain bdPhysiological injury agents(D.0077)	2

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Nursing Care Plan

NO DP	Date/Time	OBJECTIVES AND RESULT CRITERIA	INTERVENTION
1.	02/12/2025 11.00 WIB	After nursing intervention for 3 x 24 hours, blood glucose levels were stable (**L.05022)**with the following results criteria: - Blood glucose levels improve - Complaints of weakness decreased - Complaints of dizziness decreased	**Hyperglycemia Management (I.03115)** 1. Observation a. Identify possible causes of hyperglycemia b. Identify causes of increased insulin requirements c. Monitor blood glucose levels d. Monitor for signs and symptoms of hyperglycemia e. Monitor fluid intake and output f. Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. 2. Therapeutic a. Provide oral fluid intake b. Consult a doctor if signs and symptoms of hyperglycemia persist or worsen. c. Facilitate ambulation if orthostatic hypotension is present. 3. Education a. It is recommended to avoid exercise if blood glucose levels are more than 250mg/Dl. b. Recommend monitoring blood glucose levels independently c. Encourage adherence to diet and exercise

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			d. Teach the indications and importance of urine ketone testing, if necessary. e. Teach diabetes management (e.g., use of insulin, oral medications, monitoring fluid intake, carbohydrate replacement, and assistance from a health professional) 4. Collaboration a. Collaboration with insulin administration, if necessary b. Collaboration in administering IV fluids c. Collaboration of potassium administration
2.	02/12/2025 11.00 WIB	After nursing intervention for 3 x 24 hours, the pain level decreased (L.08078) with the following outcome criteria: - Pain intensity decreased (pain scale ≤ 3/10). - Relaxed facial expression. - Not nervous, looks comfortable. - Vital signs within normal limits. - Patients can sleep/rest well. - The patient is able to perform light activities without significant pain.	**Pain Management (I.08230)** *Observation* 4. Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10). 5. Observe facial expressions, body position, and protective behavior. 6. Observation of vital signs (BP, N, RR) for changes due to pain. *Therapeutic* 4. Create a comfortable and calm environment. 5. Adjust your body position to support relaxation and reduce pressure on the painful area. 6. Teach non-pharmacological techniques: deep breathing,

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			relaxation, distraction, warm/cold compresses as indicated. *Education* 3. Educate patients to report pain immediately if it increases. 4. Recommend avoiding activities that worsen the pain. *Collaboration* 2. Collaboration with doctors for the administration of analgesics

Evaluation

NO DP	Date/Time	EVALUATION	Signature/Name
1	02/12/2025 12.00 WIB	**S :** The patient reported urinating 10 times a day. The patient felt nauseous and vomited. The patient said he did not yet dare to check his blood sugar and inject insulin independently. The patient said he ate food from the hospital. **O :** Composmentis Consciousness, E4V5M6 BP 177/86 mmHg, Pulse 102 x/min, Temp 36.3oC, RR = 20 x/min, SpO2 = 99% room air Installed RL 20tpm + Ikaneuron 1A/24hm At 12:00 PM, blood glucose level: 340 mg/dL with nurse education. HbA1C >14%. Inj Apidra 6 iU (SC) before meal at 12:00 PM. Urine output 800cc/7 hours The patient ate 2 tablespoons of DM diet **A :** Instability of blood glucose levelsbd Insulin resistance(D.0027) **Q:**Continue intervention - Monitor blood glucose levels	Khurrotun

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		- Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. - Recommend monitoring blood glucose levels independently - Encourage adherence to diet and exercise - Teach diabetes management (Insulin use) - Collaboration in administering IV fluids	
2	02/12/2025 12.00 WIB	**S:**The patient said he had a spinning headache and couldn't sleep. P: Pain occurs during activity. Q: Dizzy R : Head S : Scale 5 T: Appears and disappears **O :** Composmentis Consciousness, E4V5M6 The patient appeared to be grimacing in pain. Diaphoresis BP 177/86 mmHg, Pulse 102 x/min, Temp 36.3oC, RR = 20 x/min, SpO2 = 99% room air 07 o'clock inj. Ketorolac 30mg extra (IV), Diphenhydramine 1A (IV) in the emergency room 12 o'clock PO: Betahistine 12mg, PCT 500mg **A :** Acute Pain bdPhysiological agents **Q:**Continue intervention - Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10). - Observation of vital signs (BP, N, RR) for changes due to pain. - Teach non-pharmacological techniques: deep breathing, relaxation, distraction, warm/cold compresses as indicated.	Khurrotun

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NO DP	Date/Time	EVALUATION	Signature/Name
1	12/03/2025 12.00 WIB	**S :** The patient said he wanted to try checking his blood sugar and injecting insulin independently according to the nurse's education. The patient said the nausea had decreased. **O :** Composmentis Consciousness, E4V5M6 Installed RL 20tpm + 1A/24hm fisheuron (starting at 08.00) BP 168/76 mmHg, Pulse 92 x/min, Temp 36.3oC, RR = 20 x/min, SpO2 = 99% room air 07.00 GD1 = 194 mg/dL 10:00 AM GD2 = 192 mg/dL 12 o'clock GDS = 235 mg/dL J 12 Inj Apidra 6ui(SC) before meals (The patient performs blood glucose checks and insulin injections independently under the direction of the nurse) The patient ate half of the DM diet portion **A :** Instability of blood glucose levelsbd Insulin resistance(D.0027) **Q:**Continue intervention - Monitor blood glucose levels - Monitor urine ketones, ABG levels, electrolytes, orthostatic blood pressure, and pulse rate. - Recommend monitoring blood glucose levels independently - Encourage adherence to diet and exercise - Teach diabetes management (Insulin use) - Collaboration in administering IV fluids	Khurrotun
2	12/03/2025 12.00 WIB	**S:**The patient said the dizziness had reduced. P: Pain occurs during activity. Q: Dizzy	Khurrotun

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		R : Head S : Scale 3 T: Appears and disappears **O :** Composmentis Consciousness, E4V5M6 The patient seemed more relaxed than the previous day. Diaphoresis(-) BP 168/76 mmHg, Pulse 92 x/min, Temp 36.3oC, RR = 20 x/min, SpO2 = 99% room air Hours 08 Inj Diphenhydramine 1A(IV) 12 o'clock PO: Betahistine 12mg, PCT 500mg, Candesartan 16mg **A :** Acute Pain bdPhysiological agents **Q:**Continue intervention - Assess the location, intensity, duration, frequency, and character of the pain (use a pain scale of 0–10). - Observation of vital signs (BP, N, RR) for changes due to pain. - Teach non-pharmacological techniques: deep breathing, relaxation, distraction, warm/cold compresses as indicated.	

NO DP	Date/Time	EVALUATION	Signature/Name
1	04/10/2025 12.00 WIB	**S :** The patient stated that he wanted to check his blood sugar and inject insulin himself. He reported that he no longer had nausea or vomiting. **O :** Composmentis Consciousness, E4V5M6 Installed RL 20tpm + 1A/24hm fisheuron (starting at 08.00) BP : 138/68 mmHg, N : 68 x/min, S : 36.6 C, RR : 20 x/min, SpO2 : 97%. 12.00 GDS/meal = 215mg/dL	Khurrotun

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		J 12 Inj Apidra 6ui(SC) before meals (The patient performs blood glucose checks and insulin injections independently correctly) The patient finished eating 1 portion of the DM diet **A :** Instability of blood glucose levelsbd Insulin resistance(D.0027) **Q:**Continue intervention Education for blood sugar control and adherence to insulin injection therapy at home independently (patient goes home)	
2	Wednesday 10/29/2025 12.00 WIB	**S:**The patient said P: Pain occurs during activity. Q: Dizzy R : Head S : Scale 2 T: Appears and disappears **O :** Composmentis Consciousness, E4V5M6 The patient appears relaxed. BP 148/76 mmHg, Pulse 86 x/min, Temp 36.5oC, RR = 20 x/min, SpO2 = 99% room air Hours 08 Inj Diphenhydramine 1A(IV) 12 o'clock PO: Betahistine 12mg, PCT 500mg, Candesartan 16mg **A :** Acute Pain bdPhysiological agents **Q:**Continue intervention - Education on deep breathing and relaxation when pain occurs at home (Patient goes home)	 Khurrotun

DISCUSSION

In this case study, Self-Monitoring Blood Glucose (SMBG) based on insulin injection technique education was implemented in a type II Diabetes Mellitus patient with left foot gangrene after trans-pedi amputation in the Yudistira Ward of Dr. Amino Gondohutomo

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Regional Mental Hospital, Semarang. The main focus of nursing intervention was to help the patient improve their ability to self-monitor their blood sugar and perform insulin injection techniques correctly to help control blood glucose levels.

Based on the results of the assessment, it was found that the patient experienced unstable blood glucose levels, characterized by initial GDS results of 223 mg/dL and HbA1c 10% in Mrs. L and initial GDS results of 354 mg/dL and HbA1c >14% in Mr. B. In addition, the patient also did not understand the correct insulin injection technique and had not routinely checked his blood sugar independently. This condition is in accordance with the theory that states that Diabetes Mellitus patients often experience non-compliance with therapy and lack of knowledge regarding disease management so that blood sugar levels are difficult to control.

The nursing diagnoses established in this case study are unstable blood glucose levels, knowledge deficit, ineffective health management, acute pain, risk of infection, and impaired tissue integrity. These diagnoses arise from the patient's hyperglycemia, lack of understanding of insulin injection techniques, and the presence of post-amputation wounds due to complications of diabetes mellitus. This aligns with the Indonesian Diabetes Association (IDHS) theory that patients with diabetes mellitus are at risk of impaired blood sugar control and complications due to a lack of self-management skills.

The primary intervention provided was education on insulin injection techniques and gradual self-monitoring of blood glucose. Patients were taught how to use a glucometer, how to read blood sugar test results, insulin injection locations, injection site rotation, and correct insulin injection technique. Patients were also educated on dietary adherence, physical activity, and the importance of regular check-ups. This intervention aligns with the theory of the American Diabetes Association and PERKENI, which states that diabetes education and self-monitoring of blood glucose are essential components of diabetes mellitus management to improve patient glycemic control.

The evaluation results showed an increase in the patient's ability to perform blood sugar checks independently and inject insulin correctly. On the second day, the patient began to be able to perform blood sugar checks independently with a GDS result of 212 mg/dL, then on the third day the GDS result decreased to 196 mg/dL in Mrs. L. The GDS result was 235 mg/dL, then on the third day the GDS result decreased to 215 mg/dL in Mr. B. The decrease in blood sugar levels indicates that the implementation of SMBG based on insulin injection technique education helps improve patient blood glucose control.

In addition to lowering blood sugar levels, patients also appeared more cooperative and confident in performing self-care. Patients understood the importance of adherence to insulin

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therapy, a diabetic diet, and regular blood sugar checks. These results align with previous research showing that education on insulin injection techniques and self-monitoring of blood glucose can improve therapy adherence and self-care skills in patients with diabetes mellitus.

Upon diagnosis of impaired tissue integrity, wound care was performed using aseptic techniques, combined with antibiotics and a high-protein diet. Evaluation results showed improvement in the post-amputation wound, characterized by good tissue granulation, minimal exudate, and increased epithelialization. This demonstrates that good blood sugar control also impacts wound healing in patients with diabetes mellitus.

Thus, it can be concluded that the implementation of Self-Monitoring Blood Glucose based on insulin injection technique education has a positive impact on the self-management ability of Diabetes Mellitus patients in controlling blood sugar levels, increasing therapy compliance, and supporting the wound healing process.

CONCLUSION

The implementation of Self-Monitoring Blood Glucose (SMBG) based on insulin injection technique education in patients with Diabetes Mellitus showed positive results in improving the patients' ability to monitor blood sugar and inject insulin independently. In both cases, there was an improvement in glycemic control, indicated by a decrease in blood glucose levels during the intervention period. Furthermore, patients showed an increased understanding of insulin use, adherence to therapy, and awareness of self-care. These findings indicate that the integration of SMBG and insulin injection technique education can be an effective nursing intervention to support blood sugar control and improve self-management skills in patients with Diabetes Mellitus.

This study has limitations due to its case study design with a limited number of subjects, making the results unable to be generalized to a wider population. The relatively short observation period also fails to adequately describe the long-term sustainability of glycemic control. Therefore, further research is recommended using an experimental or quasi-experimental design with a larger sample size and longer monitoring period. Practically, the results of this study can serve as a basis for nurses to develop structured SMBG education programs and insulin injection techniques to improve the quality of nursing care for patients with diabetes mellitus.

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