

Ministry of Health, Health Polytechnic of East Kalimantan

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Submission date: 19-Apr-2023 09:21AM (UTC+0700)

Submission ID: 2068915817

File name: STUDI_KASUS_PUBLISH.docx (147.22K)

Word count: 4993

Character count: 28134

Caring for Patients with Type II Diabetes Mellitus: A Nursing Case Report

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Abstract

Introduction: Diabetes Mellitus (DM) is a disease characterized by an insufficient amount of insulin that does not function normally. According to data of Basic Health Research of Indonesia Government year 2018, the global prevalence of DM among those aged 55 to 64 years reached 6.3% of 265 individuals, the highest value among all other age groups. **Purpose:** To present a case study with TTDM in Samarinda, Indonesia and to determine the nursing care plan, explaining the nursing interventions and showing the importance of nursing care of patients with DM. **Method:** we treated 2 patients who had TTDM using a standardized nursing process for 3 days and made observations and recorded the similarities and differences that emerged as a result of disease response and the effects of the treatment provided. **Findings:** Researcher has completed collecting data set which was then used to establish each of the 6 nursing diagnoses, and further each nursing plan details implemented and evaluated. There is a diversity and resemblance of data that was revealed in the discussion session of their report. Using a thematic analysis approach, patterns in the data were identified and analyzed. The data were then synthesized using Indonesian Nursing Standardized (3S) terminology. The patient's positive health outcomes supported the accuracy of the diagnoses and the appropriateness of the nursing interventions. **Discussion:** case study method contributes in understanding the overall nursing care for patients, especially those with TTDM because it opened up nursing scenarios that support nurses in utilized critical thinking skills including in making decisions in the use of the entire nursing process. By carefully implementing chosen interventions through nursing process nurse was able to compare data between cases, to determine the causes of differences and similarities from the data obtained and analyze based on appropriate theories and concepts. **Recommendation:** Through case discussions, nurses able in managing the delivery of nursing care to patients; accordingly, it is intended that the quality of nursing services would increase. In the future, case studies should be applied more often as a means of problem-solving in nursing care services.

Keywords: Type II Diabetes Mellitus (TTDM), patients, nursing care, case study

INTRODUCTIONS

Diabetes mellitus (DM) is a significant health problem in both developed and developing countries; it is estimated that 422 million adults around the world suffered from DM in 2014. People with diabetes who have trouble controlling their glucose levels are more likely to develop complications (WHO International, 2016).

The global prevalence rate of DM sufferers between the ages of 55 and 64 years is 6.3% of 265 individuals, the highest value compared to all other age groups. With East Kalimantan's prevalence rate reaching 3.2% by province, it ranked second after DKI Jakarta with a 3.4%(WHO International, 2016). In the meanwhile, districts or cities in Samarinda City in East

Kalimantan, with a population of 3.04%, has the highest prevalence of diabetes at all ages (Kementerian Kesehatan Republik Indonesia, 2021). The World Health Organization anticipates that the prevalence of type II diabetes will increase and become a global health issue. The component also appears to be caused by age, physical activity, hypertension, lifestyle, and family her tory, among others (Fatimah, 2015).

10 year 2015 Indonesian Endocrinology Association (PERKENI) diagnostic criteria for DM: blood glucose levels >200 mg/dl and/or fasting blood glucose values >126 mg/dl (Soelistijo et al., 2019). Glucose is formed in the liver from the food been consumed. The insulin hormone will be produced in the pancreas with the aim of controlling glucose levels by regulating production (Glovaci et al., 2019). The detriment happens as insulin secretion is insufficient due to injury to a little or bigger part of the β cells of the islets of Langerhans which act to make insulin, as a result insulin will suffer a drop and deficiency. High blood glucose levels then lead to a variety of health complications that impair the quality of life in those with DM (Soelistijo et al., 2019). Several signs and symptoms that can be observed in patients with DM are but not limited to: increased urine frequency (*polyuria*), excessive thirst (*polydipsia*), increased hunger (*polyphagia*), fatigue and drowsiness, and decreased body weight (Farrell et al., 2017).

Instability of blood glucose levels due to hypoglycemia and hyperglycemia is frequent a nursing concern which translates into one of nursing problem for patients with T1DM. In addition to independent intervention in the form of education regarding correction and improvement of lifestyle management, there are also collaborative interventions which include providing appropriate therapy (one of them: administering insulin) and blood sugar monitoring (Herdman, 2018). DM patients who are not treated promptly can experience neuropathy, nephropathy, retinopathy, diabetic ulcers, and other problems (Cai et al., 2021). To overcome ther , nurses must provide comprehensive nursing care, including assessment, diagnosis, nursing plans, implementation, and evaluation. Therefore, reducing problems in people with DM (DeFronzo et al., 2015).

METHOD

11 In their report, the author employs descriptive research in the form of a case study to investigate the topic of nursing care for T1DM. The research design applied was descriptive and employed a case study technique, which involves direct application of the nursing process and an intense investigation of one research unit, such as a patient, family, group, community, or institution (Varela et al., 2021).

Data collection technique

Using an interview technique in which information about the respondent is collected verbally through conversations with participants, including among others: personal data, personal data of parents/guardians, reason for hospitalization, current client's main complaint (here and now principle), her tory of current illness, pre-existing conditions. Medical her tory, genogram (line of descent), social her tory, basic needs such as diet, activity/rest, personal hygiene, elimination, physical and mental assessment were also obtained through interview activities.

The next technique is through the observation method carried out by the author to collect information that is arranged systematically using standard methods (Sugiyono, 2013). The activity uses the participatory observation method so that the writer really participates in the activities carried out, through examination of the patient's body systems, palpation, percussion, auscultation.

The third technique is that the writer performs documentation, namely writing notes containing all the information needed to determine nursing diagnoses, interventions, and nursing evaluations that are arranged systematically, validly, and responsibly (Blair & Smith, 2012). After completing nursing work on patients, the next activity is daily documentation in nursing forms to find out how the patient's disease is progressing. Documentation is carried out every day after carrying out nursing care actions on patients which are written using a nursing care format. The data collection tool used is an assessment sheet whose data directs the author to nursing care for TDDM cases.

To ensure the quality of the data obtained and have high validity, the data is collected using various types of data. In addition to primary data from interviews, observation and direct physical examination of patients, secondary data is also used which includes case study data sources obtained through indirect or indirect methods, such as data from relatives or the patient's family. Then it is equipped with tertiary data obtained from the client's care record or client's medical report, which presents the client's medical history or treatment. The information includes supporting examinations (laboratory, radiology) and a list of drugs the patient is receiving.

The research instrument uses a numerical rating scale pain assessment format.

RESULTS

Below is results of nursing assessment phase

Identity	Participant 1	Participant 2
Age	54	60
Education	Middle school	Middle school
Main complaints	Muscle cramps	Dizziness
Current disease history	<ul style="list-style-type: none"> • shortness of breath • cramps in the left leg and difficulty moving • Edema anasarca 	<ul style="list-style-type: none"> • shortness of breath • dizziness • Easily exhausted
Blood Glucose Levels	175 mg/dL	235 mg/dL
Signs And Symptoms	<ul style="list-style-type: none"> • always thirsty and wants to urinate • frequent dizziness • trembling hands • amount of urine 2000 cc/24 hrs • dry skin • HbA1C 8,8% 	<ul style="list-style-type: none"> • No problem with thirst, no urge to urinate • frequent dizziness • tired • amount of urine 2000 cc/24 hrs • HbA1C 7,2%
Vital signs	BP : 140/90 mmHg Pulse : 82 x/min	BP : 140/80 mmHg Pulse : 85 x/min

	RR : 22 x/min Body temp :36°C	RR : 20 x/min Body temp: 36,2°C
Pain	pain in the left leg caused by swelling, intensity like cramps, scale 3 and intermittent	pain in the head due to activity, feels like being grabbed, on scale: 3, intermitten
Barthel Indeks/ Functional Status	Total score of 5, level of dependency: high dependent	Total score of 20, with the level of dependency: independent
Total Fluid Balance	18/5/2022 : 1.704 – 985 = +719 ml 19/5/2022 : 1.654 – 1.035 = +619 ml 20/5/2022 : 1.704 – 735 = + 969 ml	18/5/2022 :1.118–717 = +401 ml 19/5/2022 :1.178-667 = +511 ml 20/5/2022 :1.068-567 = +501 ml

DISCUSSION

This section will discuss the results of research based on literature sources. There are six nursing diagnoses along with their etiology and intervention options to solve them

1) Acute pain associated with physiological injurious agents as evidenced by the participant complaining of pain, the participant looks grimacing (D.0077).

Acute pain was one problem in both participants as evidenced by participant 1 complaining of pain since two days ago in the left leg, pain will occur if the participant tries to lift the leg with a pain scale of 3, the participant also complains of shortness of breath. Whereas in participant 2, headache (dizziness) since three days ago, pain is felt if the participant has too many activities such as standing up and walking to go to the bathroom with a pain scale of 3, the participant also complains of shortness of breath and says that shortness occurs if the room temperature is too cold. Cramps in participant 1 are caused by nerve damage known as diabetic neuropathy.

³ Pain is a condition in the form of an unpleasant feeling, which is very subjective. Everyone's feelings of pain are different in terms of scale or level, and only that person can explain or evaluate the pain they are experiencing (Oggiam et al., 2021). Pain is anything that hurts the body that is said by the individual who experiences it (Farrell et al., 2017). While the Indonesian Nursing Diagnosis Standards (SDKI) state that acute pain is defined as a sensory or emotional experience related to actual or functional tissue damage with a sudden or slow time and mild to severe intensity that lasts less than 3 months. It is characterized by major symptoms and signs, namely complaining of pain, grimacing, being protective, restlessness, increased pulse frequency, and difficulty sleeping (Tim Pokja SDKI DPP PPNI, 2016).

To overcome the problem, the authors carried out several nursing actions: assess participant's pain complaints, the perceived pain scale, and providing non-pharmacological techniques in the form of deep breathing relaxation to reduce pain. Nonpharmacological techniques are one of the independent nursing interventions to reduce pain felt by participants. Relaxation techniques give individuals self-control when pain arises and can be used for someone regardless health-sick fluctuation (Potter & Perry, 2015). Also it has benefits that are equivalent to blood sugar-lowering drugs both oral and injectable insulin where if this technique is combined with standard care it can relieve stress in DM participants and help reduce pain in participants with high blood sugar levels (Surwit et al., 2002).

On the third day, both participants got the pain level problem resolved as evidenced by decreased pain complaints, the pain scale of the two participants decreased to 1, the participant looked comfortable after doing deep breathing relaxation.

2) Instability of blood glucose levels related to insulin resistance is evidenced by participants complaining of fatigue, high blood glucose levels (D.0027).

To overcome the hyperglycemia, participant 1 was given insulin therapy with Novorapid 3x4 units and Lantus 0-0-8 units while participant 2 was given insulin therapy Apidra 3x8 units and Levemir 0-0-14 units. The difference between Novorapid and Apidra with Lantus and Levemir also lies in how they work. Novorapid and Apidra are fast-acting insulin types, where participants usually get injection about 15 minutes prior meal. Rapid-acting insulin works very quickly in lowering blood sugar levels in a span of 30-90 minutes, while long-acting insulin is insulin that can work all day and that's why this type of insulin is mostly used at night and only used once a day. An example of long-acting insulin itself as used by the two participants namely Lantus and Levemir. Giving long-acting insulin is a treatment strategy to improve fasting blood sugar levels or pre-prandial blood sugar. Because post-prandial blood glucose is a condition that is influenced by fasting blood sugar levels, administration of insulin is also expected to reduce blood sugar levels after meal (Semlitsch et al., 2020).

After implementing nursing intervention for 3 days by monitoring blood glucose levels, providing education regarding diabetes management and administering insulin, the results of nursing problems for stability of blood glucose levels were resolved. Blood glucose level of participant 1 in 133 mg/dL and in participant 2 in 185 mg/dL. Also, as a form of ongoing care, nurses provide education to families and participants on diabetes management with the aim of maintaining normal blood glucose levels. We provide education to families and participants, they are required to be able to implement independent interventions after being outside the hospital institution, which were must continue to administer insulin and manage diabetes independently, maintain proper DM diet and frequent routine checks of blood glucose levels.

3) Hypervolemia associated with impaired regulatory mechanisms as evidenced by participants complaining of shortness of breath, there is edema in all extremities, positive fluid balance results (D.0022).

The results of the study found that there was a problem of hypervolemia in participant 1, meanwhile the problem was not found in participant 2. The existence of hypervolemia in participant 1 was proven by complaints of shortness of breath since 2 days before, there was edema in both extremities since month before and the swelling had increased with grade +2 pitting edema, the amount of intake was greater than the output, causing a balance fluid showed hypervolemia and decreased albumin levels with a value of 1.9 g/dL. Unlike participant 1, participant 2 did not have a diagnosis of hypervolemia as seen that there was no swelling or edema in the extremities, normal intake and output, and the participant's normal albumin level was 4.4 g/dL. Participant 2 only complains of shortness of breath associated with room temperature.

Hypervolemia is defined as an increase in intravascular, interstitial and/or intracellular fluid volume characterized by major symptoms and signs, namely dyspnea, anasarca and/or peripheral edema, increased body weight in a short time (Tim Pokja DPP PPNI, 2016).

To overcome the problem, the intervention was to educate on how to limit fluids and administration of diuretic drugs. The diuretic drug given was in the form of Furosemide 40 mg which was diluted as much 40 cc, administered through a syringe pump which was set to 4 l/hour, until the third day. The diuretic response to Furosemide is related to its concentration in the urine. Furosemide is delivered to the renal tubules by a non-specific organic acid pump in the proximal tubule (McMahon & Chawla, 2021). In some cases sodium intake may be sufficient to overcome the diuretic effect, and limiting sodium intake may restore the reaction ability (Sica & Gehr, 2014).

Following the completion of nursing procedures consisting of a check for signs and symptoms of hypervolemia, monitoring fluid intake and output, and the administration of diuretic drugs for three days, the problem was partially resolved, with edema still present in the extremities but in a less severe state.

4) Impaired sense of comfort related to lack of situational/environmental control, participants complain of discomfort, shortness of breath, participants appear restless (D.0074).

According to the research findings, both participants encountered discomfort. Participant 1 reported discomfort and shortness of breath after protracted sitting, so she was administered 3 lpm of oxygen via nasal cannula whenever these symptoms occurred. Participant 1 also exhibited agitation and a morose expression whenever felt uneasy. During the procedure, participant 2 reported experiencing discomfort and shortness of breath due to the excessively cold room temperature. If participant 2 is experiencing shortness of breath, a nasal cannula delivering 3 lpm will be administered, and the room temperature will be increased to assist alleviate symptoms.

A disturbance of feeling comfortable refers to a state in which one does not experience feelings of happiness, relief, or perfection in the physical, psychospiritual, environmental, or social dimensions, as stated by the Indonesian Nursing Diagnostic Guidelines (2018). The disruption of comfort may also be caused by symptoms of the condition, a lack of control over the setting or environment, or side effects of the treatment that the participant is now taking (İbrahimoglu et al., 2023).

Some of the signs or symptoms that can be seen from participants who complain of uncomfortable are appearance of restless facial expressions, sleep deprived, complaining of being too cold or too hot, nausea and fatigue. Complaining of discomfort, complaining of being chilly, and feeling weary were some of the signs and symptoms that were present in both of the participants, which can be seen as some of the many signs and symptoms that may be seen from the diagnosis.

The authors administer nursing interventions such as deep breathing relaxation techniques and monitoring of the participants' respective patterns of breathing. The technique of deep

breathing distraction, which involves breathing deeply and exhaling gently, is one form of nursing care. Author instructs the patient of technique of deep breathing distraction. It has the potential to relieve pain while also increasing lung ventilation and oxygen levels in the blood (Farrell et al., 2017).

Both participant 1 and participant 2 appeared to have experienced some degree of relief after engaging in deep breathing relaxation techniques for three days. Participant 1 reported experiencing less shortness of breath with a respiratory rate of 21 times per minute. Participant 2 also reported experiencing some degree of relief and comfort after engaging in deep breathing relaxation techniques for two to three days, it decreased and breathing rate of 21 times per minute. And neither of the two individuals needed oxygen any more.

5) Anxiety associated with potential dangers to one's sense of self, as shown by the fact that participants felt concerned about their circumstances (D.0080).

⁹ The intervention was carried out with the goal of gaining a deeper understanding of the factors that, for the two participants, bring on feelings of worry. Both of the individuals came from distinct backgrounds and had different traits, which led to two separate sets of results. The HARS scale score for participant 1 was 24, whereas the score for participant 2 was 21. The first participant expressed concern that her condition would worsen, whilst the second stated that she was concerned that no one would look after her children while she was away from the house. In spite of the fact that they are distinct, both of them produce disruptions to the individual's bodily and psychological well-being.

The Indonesian Nursing Diagnostic Standards define anxiety as "an individual's emotional condition and subjective experience of an object that is unclear and specific due to anticipation of danger in which the individual may take action to deal with the threat with symptoms and signs that participants feel worried about the consequences of conditions experienced, looked agitated, looked tense, pulse frequency, breathing and increase in blood pressure" (Tim Pokja DPP PPNI, 2016). Anxiety is characterized by symptoms and signs such as participants feeling worried about the consequences of conditions experienced, looking The initial phase of treatment was marked by fluctuating vital signs, which can be attributed to the patient's anxiousness.

The author use a strategy that supports vocal expression of sentiments, being empathic, presenting sources of social support (close family members, friends, and neighbors), and deep breathing relaxation techniques as a means of overcoming difficulties (Karagoz & Sayilan, 2023). The method can lessen the intensity of both physical pain and mental worry, hence lowering levels of both types of stress (Ray & O'Connor, 2022). Participant 1 requires a strengthening of the family's participation in caring for him while she is at home so that she can live healthily despite having a chronic illness. Because of this, the intervention is focused on the efforts to motivate the development of attitudes and emotions that support health behaviour, encourage family activity in caring for sick family members, and encourage utilization of public health facilities. This is due to the fact that support from family members might improve adherence to treatment protocols (Chang et al., 2022). This is vital in order to prevent the signs and symptoms from becoming worse as a result of non compliance to the advice and instructions from healthcare workers.

The deep breathing relaxation technique that is taught by nurses is beneficial for achieving a state of peace and comfort, lowering stress levels, relaxing muscles to lower tension, and having the impact of lowering anxiety (Lyu et al., 2022). When breathing is slow and in control—that is, when the pace, rhythm, and intensity of breathing are changed—it helps the muscles become more flexible, and the muscles are then better able to absorb events that provoke emotional outbursts without becoming rigid (Moghadam et al., 2022).

This nursing problem resolved after nursing activities carried out for three days, as demonstrated by a decrease in the HARS scale in participant 1 with a score of 10 and participant 2 with a score of 10.

6) The sixth nursing diagnosis is a knowledge deficit, which is caused by a lack of exposure to information and is demonstrated by the fact that patients are unaware of their ailment (D.0111).

It was determined that participant 2 was the only one who struggled with knowledge deficit, while participant 1 was aware of her disease and had some understanding of it. Participant 1 had known since 2012 that she had DM since routinely checked her blood sugar at the posyandu. As a result, Participant 1 had never been hospitalized because she was able to have the same diet and lifestyle that she always had. It was proven that there is a lack of knowledge by the participants who had less or did not know about the condition of the disease. During public holiday prior being taken to the hospital, participants reported consuming a large quantity of sugary foods and beverages, which led to elevated levels of blood glucose. This demonstrated that the participants did not fully understand about expected behaviour in DM management of care. Behaviour of participant 2 contributed to the statement, where she did not have health seeking behaviour despite experiencing signs and symptoms of DM.

There is a definition of the absence or lack of cognitive information related to certain subjects. This absence or lack of cognitive information can be caused by cognitive limitations, a lack of exposure to information, ignorance of sources of information, and other similar factors. There are a number of main signs and symptoms, the most important of which is that the participants exhibit conduct that is not in line with the instructions and demonstrates a faulty perspective of the issue.

In order to provide health education to accomplish goals, it is necessary to consider number of factors, such as the materials and methods used to facilitate the transfer of knowledge in order to eradicate the knowledge gap (Casciato et al., 2023). Yusyaf (2013) discovered that there was an increase in the degree of knowledge possessed by families following the distribution of health education using flipcharts

The high prevalence of DM is attributable to lifestyle factors such as low levels of knowledge and lack of early detection awareness, as well as a westernized diet that is high in protein, fat, sugar, and sodium but low in fiber (Mohan et al., 2023). Therefore, the authors provide health education about the patient's disease as well as lifestyle maintenance education. Many studies in patient education show how there is an increase in knowledge (Abu-Baker et al., 2022; Almomani et al., 2021), changes in behavior to become more empowered (Shapu et al., 2020) and have control and be able to make decisions about their health status (Idoko et al., 2019). By adhering to a particular lifestyle, a person can prevent the advent of disease and maintain his health because lifestyle intervention is an effective measure for diabetes prevention in high-

risk individuals with prediabetes (Tu et al., 2022). As the third day progressed, the participants discussed the necessity of adhering to a particular diet and lifestyle.

SUMMARY

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