

Case study of uncontrolled diabetes mellitus with neurodermatitis, peripheral neuropathy, and obesity type i with central obesity

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ABSTRACT

Diabetes Mellitus (DM) is a metabolic disease caused by abnormalities in the secretion of insulin, and the action of insulin, or both of them. In 2019, The International Diabetes Federation organization estimates 463 million people in the world who suffer from DM and Southeast Asia ranked third at 11.3%. While Indonesia is ranked 7th in Southeast Asia with 10.7 million patients. The prevalence of DM increased from 6% in 2013 to 8.5% in 2018. Based on *Riskesmas* 2018, DM disease in Banten province is amount of 1.62% (23,262). In 2021, there were 146 cases at Legok Public Health Center continuing to increase. Controlled blood sugar and risk factors for Diabetes Mellitus were conducted in Mr. F so that the complications could be prevented. Family medicine approaches with the Mandala of Health paradigm in a 49-year-old man was used for the complaints of wounds in both legs, itching since 2 years ago, headaches, fatigue, and tingling in the legs suffering from DM since November 2021. Based on the anamnesis of physical and supporting examination, the patient was diagnosed with uncontrolled DM accompanied by peripheral neuropathy, central obesity, and neurodermatitis potential diabetic ulcer. The results of the intervention showed a decrease in blood sugar, weight loss of 2 kg, complaints of itching, tingling, and wounds on both legs improved in Mr. F. Risk factors for uncontrolled blood sugar in Mr. F involved lack of knowledge, unhealthy lifestyle, lack of physical activity, non-compliance with medication and, doing control to the Health Center, financial limitations, as well as lack of support from Mr. F's family.

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INTRODUCTION

Family medicine is a part of primary health which provides comprehensive and focuses services on the family as a unit (American Academy of Family Physician (AAFP), 2019; Grierson & Vanstone, 2021; Intan Fitriyani et al., 2022; Klemenc-Ketis et al., 2019; Sukmawati, 2017). Doctors are not limited in terms of age, gender, abnormalities of organs or certain diseases, but as a whole with the

principles of biomedical, behavioral and social sciences in individuals and families. The nature of services includes increasing the degree of health (Promotive), prevention (Preventive), treatment (Curative), and rehabilitative (Silvia et al., 2022; Supriyanto et al., 2019). Family doctor services involve family doctors as screeners at the primary level, specialist doctors at the secondary level, referral hospitals, and funding parties who all work together under the auspices of laws and regulations (Grierson & Vanstone, 2021; Supriyanto et al., 2019).

Primary service is a family doctor who provides continuous and comprehensive first service to a single unit of individuals, families, and communities by taking into account environmental, economic, and socio-cultural factors (Klemenc-Ketis *et al.*, 2019). According to the Indonesian Medical Council in 2006, there are nine characteristics of primary care, namely comprehensive and holistic, continuous, prioritizing prevention, coordinating and collaborative, patients as an integral part of the family, considering the environment both where they live and where they work, upholding ethics and law, being aware of costs and quality, and can be audited, and accounted for.

Diabetes Mellitus (DM) is a group of metabolic diseases that occur due to abnormalities in insulin secretion, insulin action, or both of them (KEMENKES RI, 2021; Kemenkes RI Dirjen P2P, 2020; Sukmawati, 2018). Diabetes is also classified as a non-communicable disease, namely a disease that is not transmitted from person to person, whose development progresses slowly over a long period of time or is commonly called as chronic (Anyanwu et al., 2020; Noctor et al., 2016). In addition, involvement of other organs, such as adipose tissue (Increased lipolysis), gastrointestinal (Incretin deficiency), pancreatic alpha cells (Hyperglucagonemia), kidney (Increased glucose absorption), and brain (Insulin resistance) can cause glucose intolerance (Kemenkes RI, 2018).

The International Diabetes Federation (IDF) organization estimates that there are at least 463 million people aged 20-79 years in the world who suffered from diabetes in 2019. This amount is equivalent to 9.3% of the total population at the same age. Southeast Asia ranked in the third position of 11.3% in 2019 (Williams & Colagiuri, 2019). While Indonesia is the only Southeast Asian country which ranks 7th among 10 countries with the highest number of sufferers, that are 10.7 million. In 2013, the prevalence of diabetes mellitus increased from 6% to 8.5% in 2018 which indicated that only 25% of diabetics realize their diabetes condition. Based on data from the 2018 *Riskesdas* doctor's diagnosis at all ages, diabetes mellitus in Banten province was 1.62% (23,262) (Banten *Riskesdas*, 2018). There are 146 DM patients at the Legok Public Health Center in 2021. This situation continues to increase by 31.5%, with a total of 192 cases in 2021 (Saeedi et al., 2019; Williams et al., 2020).

Complications in DM can occur acutely and chronically, where these complications need comprehensive and well-integrated management. Complications of DM mainly occur in blood vessels, both macrovascular and microvascular (Saeedi et al., 2020; Sukmawati E et al., 2018). Macrovascular complications generally affect the heart, brain, and blood vessels. Meanwhile, microvascular complications can occur in the eyes and kidneys. There are frequent complications of the nervous system in the form of motor, sensory, or autonomic neuropathy. These complications can lead to increased morbidity and mortality associated with the impact of high financing on DM and decreased patient productivity (Jamaluddin, 2019; Lee et al., 2020)

The patient's initials of Mr. F, 49 years old, is a patient at the Legok Public Health Center who suffers from diabetes mellitus which was diagnosed since November 2021 with uncontrolled blood sugar. The patient has a complaint of a wound that does not heal due to scratching and numbness in both legs. The complaints of uncontrolled blood sugar, tingling in both feet, and wounds that don't heal, type I obesity with central obesity are the reasons for being selected as cases in family medicine. Medical visits were carried out to avoid disease progression and the occurrence of further complications. This was done with the aim of avoiding a decrease in the patient's quality of life.

RESEARCH METHOD

This type of research is a case study (Sugiyono, 2017, 2018, 2019). This study aims to control blood sugar and neurodermatitis lesions, risk factors for diabetes mellitus, and neurodermatitis in Mr. F so that complications can be prevented. Techniques for analyzing and handling cases used a family medicine approach.

RESULTS AND DISCUSSIONS

The patient's initials Mr. F, is 49 years old who came to the general polyclinic at the Legok Public Health Center with complaints of wounds on both upper ankles of about 6 cm in a round shape. Besides, there were several small wet wounds accompanied by itching and pain about 7 days ago. The patient stated that he often felt itching in the lower extremities since 2 years ago, the patient always scratched the itchy skin until small wounds appeared on the backs of his legs a week ago. Besides, the patient has provided of drugs, such as betadine and coconut oil to the wound, but it did not improve. Two days ago, the wound got bigger and didn't dry up. Tingling in the patient's feet was felt sometimes, especially during activities and did not improve after rest. Tingling was only felt in the lower leg and did not spread to the other side. Patients also felt that complaints of headaches and fatigue were increasingly felt when compared to several years ago. The patient denied any complaints of nausea or vomiting. Moreover, defecation and urination the patient had no complaints. The patient also denied any other complaints, such as visual disturbances, chest pain, and limb weakness.

The patient stated that he had been diagnosed with diabetes mellitus eight months ago (November) and in several times, he felt frequent urination, thirst, fatigue and itching, especially in the lower extremities which began to interfere with his daily life. So, the patient decided to go to the Legok Public Health Center again just to check the sores on both upper ankles that were not healing. He was suggested to do blood sugar checks. After the examination, it was found that the patient's blood sugar level was high enough so he started taking the diabetes mellitus drug that was given since then. Besides, he also admitted that he rarely had blood sugar and control checked every month at the Legok Public Health Center and did not regularly take medication due to limited funds, knowledge, and lack of self-awareness about his disease. Patients only take the drug according to the amount given by the Public Health Center, which was for ten days per visit but not regularly.

The diagnosis of diabetes mellitus was diagnosed by examining blood plasma glucose levels and HbA1c. Monitoring the results of treatment used a glucometer. Suspicion of diabetes mellitus could be considered if there were complaints, such as classic diabetes mellitus complaints (polyuria, polydipsia, polyphagia, and unexplained weight loss) and or other complaints (weakness, tingling, itching, blurred eyes, and erectile dysfunction in men, as well as pruritus of the vulvae in women) (Fadini et al., 2020; Lee et al., 2020).

Visits to Mr. F has been done seven times. The first visit was carried out on April 28, 2022 at 11.00 WIB at the general polyclinic of the Legok Public Health Center. The action taken aimed to do autoanamnesis for the patient. During the anamnesis in Mr. F, it was found classic symptoms of diabetes mellitus, type I obesity with central obesity, signs of complications such as peripheral neuropathy and neurodermatitis with diabetic ulcers. From the anthropometric examination, Mr. F was categorized in the obesity type I group (26.29 kg/m²). After the laboratory results released, it was found that Mr. F had > 126 mg/dL (215 mg/dL).

From these results, the action taken was to educate Mr. F that he suffers diabetes mellitus with type I obesity (central obesity), and explains about DM disease which includes definition, causes, risk factors, signs and symptoms, management, complications, prognosis, and prevention. Mr. F was asked to reduce his weight in order to achieve the ideal body weight. The next action was to give drugs in the form of vitamin B complex 2 x 1, cetirizine 4 mg 2 x 1, metformin 3 x 500

mg, mefenamic acid 500 mg 2 x 1, gentamicin 0.1% ointment applied, and medicine for wound care with NaCL solution 0.9%, and betadine to Mr. F as well as explaining how to take B complex vitamins, cetirizine, metformin, using gentamicin ointment, moisturizer, 0.9% NaCL solution and betadine and their functions, side effects of these drugs, and how to deal with side effects and follow-up plans for carrying out medical visits family at Mr. F.

Mr. F did autoanamnesis again to evaluate the complaints experienced. It was obtained that complaints of Mr. F decreased and the wound has improved. Dry skin of Mr. F has started to improve. Besides, communicating with Mr. F and his family regarding the solution to the economic problems experienced had been done so that they could be resolved immediately and treated with *BPJS*. The management actions taken were evaluating the regularity of the drugs that had been taken as well as educating and motivating patients to regularly take their diabetes mellitus medication for a lifetime and routine control the day before the drug runs out, as well as routine fasting or temporary blood sugar control and HbA1c every three months. The lifestyle, habits, and therapies that have been implemented now are still being continued because he had started to experience changes. Provision of motivation for enthusiasm in living life and accepting work is now also given.

The fifth visit was carried out on May 23 2022 at 14.00 WIB at the patient's house. The action taken was to communicate to the first child of Mr. F regarding the *BPJS* problems experienced by his family and motivated patient to return to the Public Health Center for control. The sixth visit was carried out on May 27 2022 at 15.00 WIB via WhatsApp. During this visit, the doctor communicated with Mr. F and his family regarding the way out of the *BPJS* economic problems he experienced. Evaluation of the regularity of the drugs that have been taken by Mr. F was also done. In addition, doing patient education and motivation to regularly take diabetes mellitus medication for a lifetime and routine control the day before the drug runs out, as well as routine fasting or temporary blood sugar control and HbA1c every three months. The last visit or the seventh visit, was carried out on May 31, 2022 at 16.00 WIB via Whatsapp as well. All actions that have been carried out on in previous visits were re-evaluated at this visit.

Mr. F has two categories of risk factors for diabetes mellitus with neurodermatitis that has the potential to become ulcers and neuropathy. Non-modifiable risk factors such as age, because with increasing age, especially >40 years, the prevalence of DM also increased. Modifiable risk factors, such as lifestyle (the habit of consuming sweet drinks, such as syrup and sweet tea and never exercising), being overweight or obese with a BMI of 26.29 kg/m² (grade 1 obesity) accompanied by central obesity with an abdominal circumference of 109 cm, and a history of smoking 3 packs a day about 15 years ago for about 12 years and has now stopped. The patient consumed about 1 bottle of alcohol per day about 8 years ago and had stopped. Moreover, he has been taking herbal medicine for aches and pains for a long time. External and internal factors holistically with the mandala of health approach which led to uncontrolled blood sugar in Mr. F accompanied by type I obesity with central obesity, potential diabetic ulcer neurodermatitis, and peripheral neuropathy. The internal factor obtained was the minimum knowledge of Mr. F regarding type 2 diabetes mellitus, peripheral neuropathy, neurodermatitis with the potential to become diabetic ulcers, and obesity. Mr. F did not regularly take diabetes mellitus medication and has minimal knowledge of wound care, often consumes sweet foods and drinks, never exercises, likes to wear socks when leaving the house and has a history of smoking and alcohol when he was young.

On the external factors, it is known that the family of Mr. F has lacks knowledge about type 2 diabetes mellitus, neurodermatitis, and obesity type I with central obesity, routine and lifetime drug consumption and wound care. Mr. F's family did not know about the foods that should be avoided by Mr. F. They also experienced economic problems regarding having to pay *BPJS* fines, house repayments, and his wife's medical expenses. So, he was rare to go to the Public Health

Center. Mr. F must accept and adapt to his current job which was not his passion. As well as there were no regular visits from health workers and Legok Public Health Center cadres.

The results of the management has been carried out to overcome the uncontrolled blood sugar in Mr. F, accompanied by neurodermatitis, peripheral neuropathy, and obesity. Mr. F has understood and implemented how to take medication correctly and regularly of metformin 500 mg 3x1, Vitamin B complex 2x1, mefenamic acid 500 mg 2x1, NaCl 0.9%, and knows the complications that can occur if he does not take the drug regularly for blood sugar control and complications, such as neuropathy. Mr. F regularly uses gentamicin 0.1% ointment 3x1, cetirizine 4 mg 2x1, and a moisturizer containing HA for all over the body to treat neurodermatitis which has the potential to become an ulcer of DM. After the medicine ran out, Mr. F did not directly control the Public Health Center due to cost constraints. The young doctor then re-educated the importance of taking medication regularly and should not be interrupted.

Diabetes is divided into four groups, namely type 1 diabetes mellitus, type 2 diabetes mellitus, gestational diabetes mellitus, and specific types related to other causes. The increase in blood sugar levels in type 1 diabetes mellitus is caused by damage to the beta cells of the pancreas, so that there is no insulin production at all. So, type 1 diabetes mellitus requires insulin from outside. Insulin itself plays a role in digesting sugar in the blood produced by the pancreas. In type 2 diabetes mellitus, the increase in blood sugar levels is due to a decrease in insulin secretion by the pancreas. Gestational DM is characterized by an increase in blood sugar levels during pregnancy, which usually occurs in the 24th week of pregnancy and blood sugar levels will return to normal after delivery (Kemenkes RI, 2020; Kementerian Kesehatan RI., 2020). Increased blood sugar levels in specific types associated with other causes are due to monogenic diabetes syndrome, diseases of the exocrine pancreas, drugs or chemicals, such as glucocorticoids in HIV/AIDS therapy or after organ transplantation (Dinisari, 2020).

CONCLUSION

Controlled blood sugar and risk factors for Diabetes Mellitus in Mr. F was carried out so that complications could be prevented. Family medicine approaches was used with the Mandala of Health paradigm in a 49-year-old man namely Mr. F with complaints of wounds in both legs, itching since 2 years ago, headaches, fatigue and tingling in the legs. The patient had suffered from DM since November 2021. Based on anamnesis, physical examination and supporting examination, the patient was diagnosed with uncontrolled DM accompanied by peripheral neuropathy, central obesity, and neurodermatitis potential diabetic ulcer. The results of the intervention showed a decrease in blood sugar, weight loss of 2 kg, complaints of itching, tingling, and wounds on both legs improved in Mr. F. Risk factors for uncontrolled blood sugar were lack of knowledge, unhealthy lifestyle, lack of physical activity, non-compliance with medication and control to the Public Health Center, financial limitations, and lack of support from Mr. F's family.

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