

Management of type 2 diabetes mellitus cases with diabetic neuropathy complication and hypertension grade II through the approach of family medicine

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ABSTRACT

Family medicine is an academic and clinical discipline focused on providing sustainable, comprehensive, coordinated and contextual primary health care for individuals, families, and communities. Based on the IDF, it is estimated that there are 537 million people in the world suffering from DM in 2021 with 19.5 million people coming from Indonesia. In 2018, there were 23,262 cases found in Banten province. DM is the 3rd most common disease in the world. Mrs. E is one of the patients suffering from diabetes mellitus with hypertension and diabetic neuropathy. Controlled blood sugar levels and blood pressure in Mrs. E aimed to there are no worsening complications of diabetic neuropathy and prevent other complications. A female patient, 49 years old, came to the Kresek Health Center to take part in Prolanis activities, the patient claimed to have a history of DM for the last 3 years. The problem analysis was carried out with a family medicine approach using the Mandala of Health so that a holistic diagnosis was obtained for comprehensive management. After the intervention, there was clinical improvement, GDS decreased from 325 mg/dL to 260 mg/dL and blood pressure decreased from 150/80 mmHg to 130/80 mmHg. The risk factors, internal and external factors cause the disease in Mrs. E and the findings of comprehensive management and the results of its management.

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INTRODUCTION

Family Medicine is an academic and clinical discipline focused on providing continuous, comprehensive, coordinated, and contextual primary health care to individuals, families, and communities (Febri Endra Budi Setyawan, 2019). Family Medicine considers biological, psychological, socio-economic, cultural and spiritual parameters and is not limited by age, sex, organs, systems or diseases (Anggraini et al., 2015).

A family doctor is a doctor who can provide community-oriented health services focused on the family. This not only views the patient as a sick individual but as part of the family unit and not only waits passively, but actively visits the patient or his family if necessary. A family doctor is a

personal doctor for people of all ages and health conditions. They are a reliable first contact for health issues and directly handle most healthcare needs (Abarca, 2021; Kurniawan, 2015).

One of the services in family medicine is Diabetes Mellitus (DM). DM is high levels of sugar in the blood caused by chronic metabolic disorders accompanied by metabolic disorders of carbohydrates, fats, and proteins due to the reduced function of the hormone insulin (Sukmawati E et al., 2018; Susanti, 2019). Diabetes is a major health problem reached alarming levels. According to The International Diabetes Federation (IDF) in 2021, it is estimated that 537 million adults aged 20-79 years worldwide (10.5% of all adults in this age group) suffered diabetes (Prawitasari, 2019; Saeedi et al., 2019; Williams et al., 2020).

In Southeast Asia, it is estimated that in 2021, there are 90 million adults have diabetes and Indonesia is in 5th place in the world with an estimated 19,5 million adults who have diabetes. In 2021, The International Diabetes Federation (IDF), with more than 3 out of 4 adults with diabetes, lived in low-and middle-income countries. Diabetes is responsible for 6,7 million deaths in 2021, 1 mortality case every 5 seconds (Williams et al., 2020). It is estimated that around 537 million adults aged 20-79 years worldwide (10,5% of all adults in this age group) have diabetes (Kemenkes RI, 2020; Mufarida, 2020; Yuli Sya'baniah Khomsah, 2022).

The prevalence of DM based on the doctor diagnosis in the population of all ages in Banten province as many as 23.262 cases. Based on gender, more men suffer from DM than women, which are 11,839 people for men and 11,423 people for women. Age <1 year as many as 444 people, age 1-4 years as many as 1,804 people, age 5-14 years as many as 4,275 people, age 15-24 years as many as 3.905 people, age 25-34 years as many as 4.092 people, age 35-44 as many as 3.738 people, age 45-54 years as many as 2.700 people, age 55-64 years as many as 1.504 people, age 65-74 as many as 586 people and age 75 and over as many as 215 people. Thus, it can be concluded that the age group 5-14 is the group that most suffer DM while the age groups of 75 and over are the group least suffering from DM. According to the residence, people who live in urban areas more suffer from DM than people who live in rural areas as many as 16.543 for those who live in urban areas while 6.719 for those who live in rural areas (Kemenkes RI, 2020). Meanwhile, in 2021, there were 782 old and new cases of DM at the Kresek Health Center.

Based on what has been explained, there are patients suffering from Type II diabetes mellitus with complications of diabetic neuropathy and hypertension *grade II* at the Kresek Health Center. Research subjects named Mrs. E. 40 years old. This case study with Family Medicine Approach in the Working Area of Kresek Public Health Center, District of Kresek, Tangerang regency, Banten province. Routine patient control at Puskesmas Kresek for approximately 3 years but the patient's blood sugar and blood pressure levels are still not controlled. If Mrs. E did not get any visit, it might be worsen the complications of diabetic neuropathy and will be more other complications in patients due to blood sugar levels and blood pressure of patients who have not been controlled. So, this case is interesting to be a case of Family Medicine.

RESEARCH METHOD

This type of research is a case study (Awwabiin, 2021; Hidayat, 2019). Research subjects named Mrs. E. 40 years old. This case study with Family Medicine Approach in the Working Area of Kresek Public Health Center, District of Kresek, Tangerang regency, Banten province. The research was carried out on June 02, 2022-July 01, 2022. Inspection visits were conducted at the Mrs. E's house on June 2, 2022, June 13, 2022, June 20, 2022, and June 24, 2022

RESULTS AND DISCUSSIONS

It was examined by a 49-year-old woman who came to the Kresek Health Center to participate in routine Prolanis activities every month. She E claimed that she has a history of diabetes mellitus since the last 3 years. Currently, Mrs. E felt tingling and numbness in both legs since about 2 weeks

ago. Complaints of tingling and numbness arise and disappear in the last 3 days, then tingling and numbness more often arise. When examined by a doctor in the health center on June 2, 2022, obtained the GDS of Mrs. E is currently 325 g/dL as well as the patient's blood pressure 150/80 mmHg. She of blood pressure before. Currently, Mrs. E is diagnosed hypertension, and given antihypertensive drugs in the form of amlodipine 1x10mg. The diagnosis of DM is made on the basis of blood glucose examination and HbA1c levels.

About 3 years ago, Mrs. E complained of frequent urination at night, often hungry so much to eat, and often thirsty. When checking into the Kresek Public Health Center, it was obtained that the high GDS of Ny. E and then diagnosed having diabetes mellitus by the doctor. She E was given medicines of Glibenclamide 1x5mg and Metformin 2x500mg. She E has routine medication, when the medicine runs out, she buys at the nearest pharmacy. She E claimed that there are descendants of diabetes mellitus, because her mother had passed away about 1 year ago due to diabetes mellitus. All this time, Mrs. E has never been overweight.

At the physical examination carried out on June 2, 2022 at the Kresek Health Center at the Prolanis activity, the general condition of Mrs. E seems to have mild pain, *compos mentis*, and nutritional status of *normoweight*. On examination of vital signs obtained blood pressure of 160/80 mmHg, pulse frequency of 98 times per minute, respiratory rate of 20 times per minute, and temperature of 36.8°C. During the examination process, the system obtained from the head to the lower extremities was within the normal limits. In the supporting examination, it was obtained that the GDS of Mrs. E showed 290 g/dL. The activities carried out were introducing, anamnesis, anthropometric examination, examination of vital signs and physical examination, blood sugar examination, and explaining the plans and objectives for a visit to carry out management on Mrs. E. Having informed consent to Mrs. E that has been approved by Mrs. E to intervene.

On a physical examination carried out on June 13, 2022 at 14.00 WIB which was located at Mrs. E's house, the general state of the patient was good, consciousness *compos mentis*, and normoweight nutritional status. On examination of vital signs obtained blood pressure of 160/80 mmHg, pulse frequency 95 times per minute, respiratory rate of 20 times per minute, and a temperature of 36.7°C. During the examination process, the system obtained from the head to the lower extremities was within the normal limits. In the supporting examination, it was obtained that the GDS of Mrs. E showed 290 g/dL. The activities carried out were taking anamnesis and further physical examination, checking blood sugar, seeing the situation and the environment of Mrs. E, asking her daily activity, to the diet of the patient and her family.

On the second visit to the Mrs. E's house on June 20, 2022, a physical examination of the general state of good, *compos mentis* consciousness was examined. On examination of vital signs obtained blood pressure of 160/80 mmHg, pulse frequency 90 times per minute, respiratory rate 20 times per minute, and temperature 36.7°C. During the examination process, the system obtained from the head to the lower extremities was within the normal limits. In the supporting examination, it was obtained that the GDS of Mrs. E showed 433 g/dL. The activities carried out aims to provide education on medication adherence, information on recommended eating patterns and physical activities that can be done, and also education on hand and foot gymnastics.

On the third visit to the Mrs. E's house on June 24, 2022, a physical examination of the general condition of Mrs. E E was good, and *compos mentis* consciousness. On examination of vital signs obtained blood pressure of 130/90 mmHg, pulse frequency as many as 97 times per minute, respiratory rate of 20 times per minute, and a temperature of 36.9°C. During the examination process, the system obtained from the head to the lower extremities was within the normal limits. In the supporting examination, it was obtained that the GDS of Mrs. E showed 260 g / dL. The activities carried out are anamnesis of complaints that are currently felt, examination of vital signs and physical examination, examination of blood sugar when evaluating compliance with taking medication, and evaluating diet and physical activity carried out by Mrs. E. Then, she was given treatment in the form of Metformin 2 x 500 mg, Glibenclamide 1 x 5 mg, Amlodipin 1 x 10 mg, and

Vitamin B complex 1 x 1 tab and education about the disease she suffered, recommended drug consumption, lifestyle modifications, and diet.

Based on a review of the theory, the management of DM begins by implementing a healthy lifestyle (medical nutritional therapy and physical activity) along with pharmacological intervention with anti-hyperglycemia drugs orally and/or injections. The principle of eating regulation in DM patients need to be given emphasis on the importance of the regularity of the meal schedule, the types, and amount of calorie content (Garnita, 2016; Kementerian Kesehatan RI., 2020).

Based on the data of the examination, it is known that the results of the blood sugar examination are obtained in Table 1 below.

Table 1. Result of blood sugar examination

Examination Date	Result of Blood Sugar Examination
June 2, 2022	GDS: 325 mg / dL
June 13, 2022	GDS: 290 mg / dL
June 20, 2022	GDS: 433 mg / dL
June 24, 2022	GDS: 260 mg / dL

Blood sugar of Mrs. E decreased to GDS 260 mg/dL after consuming drugs that are given regularly and changing her life pattern. She E understand diabetes mellitus which consists of causes, risk factors, signs and symptoms, course of the disease, prevention, management, and complications that can occur. Besides, she understands that diabetic neuropathy is one of the complications of uncontrolled diabetes mellitus. She E has started to take the medication regularly and understands that treatment will be carried out for life and understands the importance of blood sugar control at least once a month even though there are no complaints that arise and are routine for control. She has begun to pay attention to the type, schedule, and amount of food she consumes and has begun to exercise almost every day by walking around the house for 30 minutes. She understands the importance of always using footwear every day even though she is in the house. Besides, she has started doing diabetic foot exercises and tells that tingling and numbness felt have been reduced.

Physical exercise is one of the pillars in the management of DM. A regular physical exercise program is performed 3-5 days a week for about 30-45 minutes, for a total of 150 minutes per week, with a break time between exercises of no more than 2 days in a row. Daily activities are not included in physical exercise. In addition to maintaining fitness, physical exercise can also lose weight and improve insulin sensitivity, so it will improve blood glucose control. Physical exercise is recommended in the form of aerobic physical exercise with moderate intensity (50-70 % maximum heart rate), such as brisk walking, cycling, jogging, and swimming (D & Nusadewiarti, 2020; Prawitasari, 2019).

Diabetes risk factors consist of two factors, namely modifiable risk factors and non-modifiable risk factors. Non-modifiable risk factors include race, ethnicity, age, sex, family history of DM, family history of having a baby >4,000 grams, and history of birth with low birth weight (LBW) or <2,500 grams. Meanwhile, modifiable risk factors are overweight, central obesity, *sedentary lifestyle*, hypertension (HT), dyslipidemia, an unhealthy and unbalanced diet (high in calories), a prediabetic condition characterized by impaired glucose tolerance (TGT 140-199 mg/dl), or impaired fasting blood sugar (GDPT <140 mg/dl), and smoking.

Management of the above cases in line with the program running by PROLANIS. It is a health care system and proactive approach that is implemented in an integrated manner involving participants, health facilities, and the BPJS Kesehatan in order to maintain health for BPJS Kesehatan participants who suffer from chronic diseases and achieve optimal quality of life with effective and efficient health care costs (Alkaff et al., 2021; Ariana et al., 2020).

The goal is to encourage participants with chronic diseases to achieve optimal quality of life with an indicator of 75% of registered participants who visit first-level health facilities to have good

results on specific examinations of Type 2 diabetes and hypertension according to relevant clinical guidelines, so it is able to prevent complications of the disease. The PROLANIS target is all BPJS kesehatan participants who have chronic diseases (Alkaff et al., 2021; Imade Rosdiana et al., 2017).

Table 2. Result of blood pressure examination

Examination Date	Result of Blood Pressure Examination
June 2, 2022	150/80
June 13, 2022	160/80
June 20, 2022	160/80
June 24, 2022	130/90

Based on Table 2 above, it is known that the blood pressure of Mrs. E decreased to 130/80 mmHg after consuming drugs that are given regularly and changing her life pattern. Hypertension is a condition when systolic blood pressure is found to be more than equal to 140 mmHg, and or diastolic blood pressure is more than equal to 90 mmHg. This condition is also often called "*The Silent Killer*" because there are usually no complaints found (Yonata & Pratama, 2016).

According to the WHO, hypertension is a condition where there is an increase of systolic blood pressure more than 140 mmHG and diastolic of more than 90 mmHg. Normal blood pressure is at a value of 120 mmHg for systolic blood pressure when the heart is beating and 90 mmHg for diastolic blood pressure when the heart is relaxed. According to the family medicine approach that has been done on Mrs. E, evaluation obtained that Mrs.E already understands the causes, risk factors, signs, and symptoms of the disease course, prevention, management, and complications of hypertension that can occur. Therefore, she understands the importance of regular blood pressure control at least once every two weeks which has been routine for control at least once every two weeks and has been routine for control. She can already do the DASH diet (Dietary Approach to Stop Hypertension) by limiting the intake of table salt to its daily consumption and exercising almost every day by walking around the house for 30 minutes.

In this case, the management of hypertension is in accordance with the management for hypertension which is divided into pharmacological and non-pharmacological management. Non-pharmacological and lifestyle management is recommended for all individuals with elevated blood pressure regardless of age, sex, comorbidities, or cardiovascular risk status (Perhimpunan Dokter Hipertensi Indonesia, 2021; Pramana, 2020). Patient education is important for effective management and should always include detailed instruction on weight management, salt restriction, smoking management, adequate management of obstructive sleep apnoea, and exercise (PDH, 2019). Patients need to be informed and revised at each appointment that these changes must be continued for life for effective treatment of the disease. Weight loss is recommended if there is obesity although the Body Mass Index (BMI) is optimal and the optimal weight range is still unknown. Weight loss can lead to a decrease in systolic blood pressure of up to 5 to 20 mmHg (PERHI, 2019).

Pharmacological therapy consists of angiotensin converting enzyme (ACEi) inhibitors, angiotensin receptor blockers (ARBs), diuretics (usually thiazides), calcium channel blockers (CCBS), and *beta-blockers* treatment, which are instituted concerning to account age, race, and comorbidities, such as the presence of renal dysfunction, liver dysfunction, heart failure, and cerebrovascular disease. JNC-8, ACC, and ESC / ESH have their own recommendations for pharmacological management (Jerez Tirado & Porras Ramirez, 2021; Navarrete-Mejía et al., 2021; World Health Organization, 2020).

CONCLUSION

Risk factors of the diabetes mellitus and hypertension in Mrs. E is her lifestyle. She never exercise, like sweet and salty foods and sweet drinks since young, and excessive eating portions, become passive smokers, and the presence of genetic elements from her mother so that it is known the

internal and external factors holistically that can lead to uncontrolled blood sugar and blood pressure levels in Mrs. E. Therefore, health workers need to increase health promotion activities and routine screening for non-communicable diseases, such as diabetes mellitus and hypertension.

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