



HOLISTIC MANAGEMENT OF THE ELDERLY WITH TYPE 2 DIABETES MELLITUS AND GLAUCOMA THROUGH A FAMILY MEDICINE APPROACH

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ABSTRACT

Degenerative diseases can affect quality of life. DM is a disease that can be controlled with a healthy lifestyle, and can have macrovascular and microvascular complications. This study to implement family doctor services based on Evidence Based Medicine that is patient-centred, family-approach, and community oriented. The study conducted was a case report. Primary data were obtained through history taking, physical examination and home visits. Assessment was done based on holistic diagnosis from the beginning, process, and end of the study quantitatively and qualitatively. Patient Mrs. R, 78 years old, has internal risks in the form of curative treatment patterns, lack of physical activity, lack of knowledge about the disease suffered, inappropriate dietary patterns and external risks in the form of lack of knowledge and family supervision regarding the disease, risk factors, and complications of the patient's disease. Management of patients is holistic and comprehensive, patient-centered, family approach, and community-based in literature based on EBM. From the results of the evaluation of the interventions that have been carried out, it can be seen that Mrs. R's compliance in following therapeutic recommendations, both pharmacological and non-pharmacological therapies, is good.

Keyword: diabetes mellitus; family medicine; glaucoma; holistic management

PENDAHULUAN

Degenerative diseases are diseases caused by the process of decline in body functions that occur in old age. Degenerative diseases include asthma, cancer, stroke, chronic kidney, joints, diabetes mellitus (DM), heart disease, hypertension, and obesity where the prevalence of these diseases has increased over time. According to the International Diabetes Federation (IDF), diabetes cases in Indonesia reached 10.3 million and ranked 7th after China, India, USA, Pakistan, Brazil and Mexico. Riskesdas in 2019 stated that the prevalence of DM reached 10.9%. The International Diabetes Federation predicts that there will be an increase in the number of DM patients from 10.7 million to 13.7 million in 2030. According to the Indonesian health profile in 2019, people with diabetes mellitus amounted to in 3,941,698 (IDF, 2021).

The prevalence of DM patients \geq 15 years old in Lampung is 1.4% where this value increases every year. In addition to its increasing prevalence, DM disease will be more difficult if macrovascular and microvascular complications have occurred. Macrovascular complications include heart disease, hypertension, stroke or kidney dysfunction. While microvascular complications can be in the form of neuropathy, as well as in the eyes such as diabetic retinopathy, macular edema, glaucoma (DINKES Lampung, 2021). It is known that these microvascular complications will affect the autoregulation of the retina and nerves of the eye, it will cause damage to the vascularization of the eye resulting in blood flow to the eye reduced and ocular oxygen dysfunction is impaired resulting in real hypoxia of the eye. Realignment hypoxia will result in damage to the nerve ganglion and optic nerve fibers due to the loss of the eye's autoregulatory mechanism against fluctuations in IOP (Intra-Ocular Pressure) and blood flow to the eye. These ocular vascular abnormalities in DM will increase

the susceptibility of the retina to additional stress related to open-angle glaucoma or elevated IOP (Tamara and Azelia, 2020).

Diseases such as Diabetes Mellitus and Glaucoma need to be managed comprehensively, especially in this patient, because of the patient's advanced age so that the body's metabolism has decreased, the patient is also more prone to forgetting to take his medicine regularly, has not been able to manage his diet properly if not accompanied by his family, and the lack of physical activity carried out by patient. Comprehensive management is carried out in order to identify internal and external risk factors found in patients, so that they can carry out evidence-based medicine based management that is family approach, patient-centered and community oriented. This disease is chronic so that patients must know about their disease and have awareness and be able to make lifestyle modifications so that treatment goals can be achieved and the patient's quality of life can improve and prevent complications that can occur. The role of health workers, especially doctor is identify and treat treatable problems and facilitate environmental changes to maximize functioning in the face of persistent problems.

The aim of this study is to implement and evaluate holistic management of an elderly patient with type 2 diabetes mellitus and glaucoma through a family medicine approach. This approach focuses not only on the patient's physical health but also considers psychological, social, and environmental factors that influence disease control and quality of life. By involving the family in the care process, the study aims to improve the patient's understanding, adherence to treatment, lifestyle habits, and family support system. Ultimately, the goal is to promote comprehensive and sustainable disease management that enhances both clinical outcomes and overall well-being.

METODE

This study is a case report. Primary data were obtained through anamnesis (autoanamnesis and alloanamnesis from family members), physical examination and home visits, to complete family, psychosocial and environmental data. Secondary data was obtained from the patient's medical record. Assessment was based on holistic diagnosis from the beginning, process, and end of the study qualitatively and quantitatively.

HASIL

Anamnesis

Patient Mrs.R, a 78-year-old housewife came to the General Polyclinic of the Kedaton Inpatient Health Center on December 27, 2023, with complaints of weakness and unwillingness to eat since 1 week ago, complaints accompanied by easy fatigue, trembling in the legs and The complaint is not aggravated by activity, and does not decrease with rest. Currently the patient also complains of blurred vision since 3 months, and is diagnosed with glaucoma, the doctor suggested an ophthalmologist, but the patient refused and there has not been any treatment attempt. The patient said that in mid-2012 he was diagnosed with Diabetes Militus when the patient sought treatment at the health center with the initial complaints experienced by the patient, namely drastic weight loss, the patient often felt weak, hungry, thirsty, and often woke up at night to urinate, then the patient went to the health center for treatment and blood sugar levels were checked, the results were 389 mg/dL. Since then the patient has been diagnosed with Diabetes Mellitus. However, the patient did not routinely control at the health center and did not take routine medication for Diabetes Mellitus. The patient only goes to the health center if she has complaints such as weakness and trembling.

History of DM and glaucoma in the patient's mother. Currently, the patient said that she does not do daily activities. The patient's daily activity is as a housewife. The patient denied smoking, consuming alcohol and drugs. Patients want their complaints to decrease and their illness not to worsen, so that they can do their usual activities. The patient was worried that the disease would get worse and hamper their daily activities. Patients lack understanding that the disease must be controlled with a healthy lifestyle and regular medication.

Physical Examination

General condition: appeared mildly ill; consciousness: compos mentis; blood pressure 110/76 mmHg; respiratory frequency: 18x/min; pulse respiratory frequency: 18x/min; temperature: 36.5°C body weight: 35 kg, height: 152 cm. BMI: 15.14 kg/m

Generalist Status

Head: Black hair is evenly distributed with no baldness.

Eyes: Conjunctiva anemic (-/-), sclera icteric (-/-)

ENT: Ears, nose, impression within normal limits, pharynx not hyperemic, tonsils T1/T1.

Thorax:

Heart

I : Ictus cordis not visible

P: Ictus cordis palpable at SIC 5

P : Right heart border SIC 4 sternalis dextra, left heart border SIC 2 fingers medial linea midclavicular sinistra

A : regular

Lung

I : Symmetrical appearance, retraction (-), lagging breathing (-)

P : Right and left symmetrical tactile fremitus, tenderness (-), mass (-)

P : Sonor +/-

A : Rhonci (-), wheezing (-)

Abdomen

I: Flat

A : Metallic sound (-)

P : Pressive pain (-)

P : Timpani

Extremities: Acral warm, edema (-/-)

Neurological examination:

Meningeal Stimulation Examination Stiffness : (-)

Laseque Sign : (-)

Kernig : (-)

Brudzinky I : (-)

Brudzinky II : (-)

Physiological biceps reflex examination : (+2/+2)

Trisep : (+2/+2)

Patella : (+2/+2)

Achiles : (+2/+2)

Pathological Reflex: (-/-)

Babinsky : (-/-)
Chaddock : (-/-)
Gordon : (-/-)
Gonda : (-/-)
Scaheffer : (-/-)
Oppenheim: (-/-)

Localized Status Check

Right eye (OD):

In the right eye, visual acuity is 4/60, and no visual correction has been performed. The eye position is orthophoric with intraocular pressure within normal limits ($N\pm 2$). Eye movements are free in all directions, and the visual field is within normal limits. No exophthalmos, enophthalmos, or eye deviation is present. The upper and lower eyelids show no edema, appear hyperemic (+), with no discharge (-). The eyelashes are within normal limits. The conjunctiva of the eyelids, fornices, and bulbi appear hyperemic (+) without injection. The sclera shows no ciliary injection, is not icteric, and has no edema, infiltrates, or scars. The cornea is clear with no infiltrates or ulcers, and no hlema (-). The anterior chamber is within normal limits. The pupil is round, regular, with a diameter of ± 3 mm, and direct and indirect light reflexes are present (+). The iris is brown, with clear crypts and no synechiae. The lens is clear. Funduscopy was not performed.

Left eye (OS):

In the left eye, visual acuity is 3/60, and no visual correction was performed. The eye position is orthophoric with intraocular pressure within normal limits ($N\pm 2$). Eye movements are free in all directions, and the visual field is within normal limits. No exophthalmos, enophthalmos, or eye deviation is present. The upper and lower eyelids show no edema, appear hyperemic (+), with no discharge (-). The superciliary region is within normal limits. The conjunctiva of the eyelids, fornices, and bulbi appear hyperemic (+) without injection. The sclera shows no ciliary injection, no icterus, no edema, infiltrates, or scars. The cornea appears clear without infiltrates or ulcers, with no hlema (-). The anterior chamber of the eye appears shallow with a positive hleposion. The pupil is round, regular, with a diameter of approximately 3 mm, and exhibits positive direct and indirect light reflexes. The iris is brown in color, with clear crypts and no synechiae. The lens is clear. Funduscopy was not performed.

Family Relatinship

The patient had a husband Mr. Mr. A, who had died in 1994 at the age of 48. The patient has two children. The patient's first child is 35 years old with mental illness (Mr. S 35 years old). The patient currently lives with his second child (Mrs. I 32 years old), his son-in-law (Mr. A 32 years old) and his two granddaughters. Problem solving in the family is done through family discussions and family decisions are determined by the patient's son and son-in-law as the head of the family. The patient's family monthly income is around Rp 3,500,000, which is obtained from the work of his son-in-law. The income is used to fulfill daily needs. The patient does unexpected costs. Relationships between families are good. Family time together is sufficient. Communication is good every day within the family. All family members have health insurance (BPJS). The family's treatment behavior is to check the family who is sick to services health when complaints interfere with daily activities. If sick, the patient was delivered to the puskesmas by the patient's second child. The distance from the house to the puskesmas is ± 3 kilometers and uses private transportation in the form of a two wheeled vehicle.

GENOGRAM

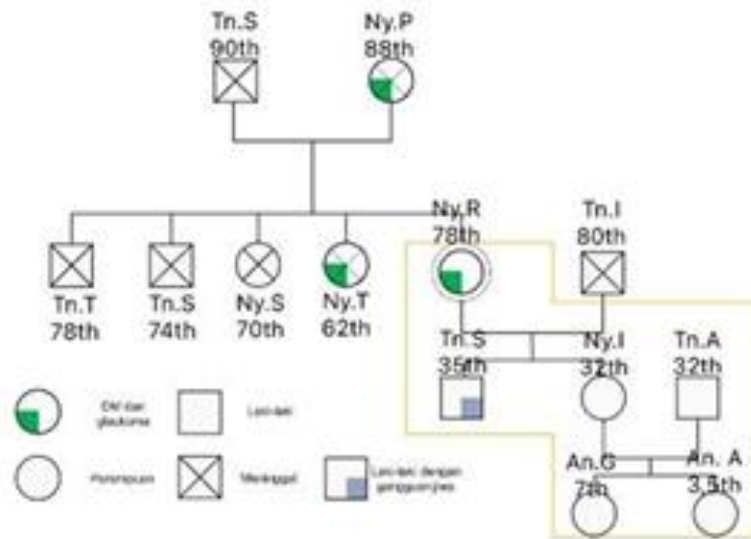


Figure 1. Genogram

INTER-FAMILY RELATIONSHIPS

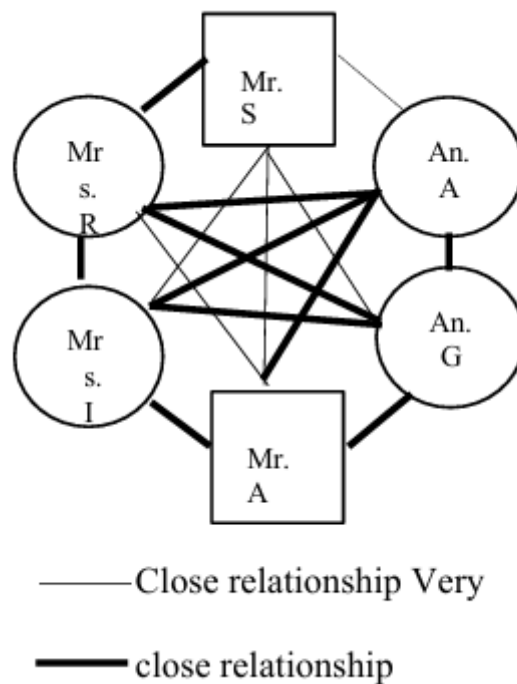


Figure 2. The relationship between Mrs. R's family

FAMILY APGAR SCORE

Total Family APGAR Score 9 (no family dysfunction).

Family APGAR Interpretation:

7 - 10 : Functional family

4 - 6 : Less functional family

0 - 4 : Highly dysfunctional family

Family SCREEM ANALYSIS

Pathological functioning in the family can be assessed using the SCREEM Score. From the results of the SCREEM family assessment obtained a score of 21, Mrs. S's family resource function is sufficient adequate.

HOME ENVIRONMENT DATA

The patient lives in a densely populated neighborhood with a house size of 20x15 m² and the number of family members living in the same house is 3 people. The house consists of three bedrooms, two bathrooms with squat WC, 1 kitchen, 1 living room and 1 family room. The roof is made of tiles, the floor is tiled throughout the house and the walls are brick. The kitchen is inside the house. There are windows in the front of the house and the rooms. Sunlight can enter the front of the house and rooms, the house is electrified, the water source is from a well, the kitchen facilities use a gas stove, drinking water needs come from cooked water. Garbage is found in the kitchen inside the house 1 and outside the house 1. At the time of the visit, it was found that the cleanliness of the house was quite good. The overall condition of the house looks neat. The distance between the front of the house and the road is ±2 m.

INITIAL HOLISTIC DIAGNOSTICS

1. Personal Aspects

- Reason for coming

The patient complained of weakness, fatigue, trembling, vision.

- Concerns

Concerns are worried that their illness will worsen and hamper their daily activities.

- Perception

The patient knew that he had diabetes mellitus and glaucoma. Patients have the perception that their disease is hereditary.

- Hope

Complaints were reduced and the disease did not worsen, so the patient was able to resume normal activities.

2. Clinical Aspects

- Diabetes mellitus type 2 (ICD 10: E.11; ICPC-2: T90).

- Glaucoma (ICD-10: H.40)

3. Internal Risk Aspects

- Unsuitable diet and eating habits (ICD-X Z72.4)

- Rarely exercise (ICD-X Z72.3)

- Insufficient knowledge of foods that should be restricted for the patient's illness (ICD-X Z55.9)

4. External Risk Aspects

- Lack of family knowledge about treatment efforts, lifestyle changes with physical activity, and appropriate dietary patterns that reduce foods high in sugar and calories. (ICD-X Z55.9)

- Family medicine patterns that are curative in nature (ICD-X Z76.8).

5. Functional Degree

Degree: 2 > able to do daily work but reduce activities outside the home.

INTERVENTION PLAN

The interventions are patient centered, family focused, and community oriented. Interventions aimed to maintain stable blood sugar levels and improve the patient's diet and lifestyle. Three visits were planned. The first visit to complete patient data was carried out when the patient visited the health center and continued to the patient's home and filled out the activity daily living questionnaire using the Barthel index, assessing the patient's diet and lifestyle. The patient's risk of falling, mental status and depression scale were assessed. After completing the questionnaire, a food recall was also conducted to determine the patient's diet in the last 24 hours. The second visit conducted a face-to-face intervention. At this second meeting, the patient was explained the results of the food recall and the nutritional adequacy rate needed by the patient, as well as the diabetes mellitus disease and the patient's diet and physical activity management plan. The third meeting was to evaluate the results of the intervention.

Patient centered

1) Nonmedicamentous

- Educate and inform patients about DM disease includes medication efforts, lifestyle changes with physical activity, and a diet that is in accordance with the normal standards of fasting and intermittent blood sugar and symptoms of hypoglycemia and hyperglycemia.
- Explain to the patient about dietary management and routine physical exercise that must be done.
- Educate patients about the complications that can be caused DM and recommends patients to have a complete blood test (kidney function), HbA1C test at regular intervals of 3-6 months, ECG and Echocardiography to see heart function, and eye nerve examination to prevent further complications

2) Medicamentosa

Pharmacologic therapy is given along with dietary management and exercise (healthy lifestyle). Pharmacologic therapy consists of oral medications:

- Metformin 3x500mg daily.
- Glimepiride 1x2mg daily.
- B comp 1x1 daily.

Family Focused

1. Family education about DM includes treatment efforts, lifestyle changes with physical activity, and an appropriate diet.
2. Explain to family members, especially those living with the patient, to supervise the patient's diet and physical activity.
3. Explain to family members about their risks and the importance of early detection, including regular blood sugar checks.

Community Oriented

- Provide education to patients and family about Dietary adjustments and regular physical exercise should be done.
- Motivating patient to want to do blood sugar control 1 once a month at least follow the prolanis program.

FINAL HOLISTIC DIAGNOSTIC

1. Personal Aspects

- Reason for coming

Complaints of weakness, fatigue, leg trembling have decreased and vision is still felt.

- Concerns

The patient is less worried about his/her illness.

- Perception

The patient knew that he had diabetes mellitus glaucoma. The and patient's perception of his disease is correct that type 2 DM can be controlled well and glaucoma can be cured if controlled by an ophthalmologist.

- Hope

Complaints were reduced and the disease did not worsen, so the patient was able to resume normal activities.

2. Clinical Aspects

- Diabetes mellitus type 2 (ICD 10: E.11; ICPC-2: T90).

- Glaucoma (ICD-10: H.40)

3. Internal Risk Aspects

- Diet and eating habits are appropriate

- The patient has routinely done physical activities such as walking three times a week in the morning.

- Knowledge about foods that should be restricted for the patient's illness has improved.

4. External Risk Aspects

- Family knowledge has improved about treatment efforts, lifestyle changes with physical activity, and appropriate dietary patterns reducing foods high in sugar and calories.

- Patients and their families have routinely visited the health center at least once a month.

5. Functional Degree

Degree: 2 > able to do daily work but reduce activities outside the home.

DISCUSSION

Case study conducted on Mrs. R aged 78 years old with Type 2 DM and Glaucoma which was studied by looking at the patient as a whole including biological, psychological and social. The importance of a family medicine approach in this patient is because the patient's disease is classified as a chronic disease and is influenced by various factors and complications that can be caused if this disease is not treated. At the first meeting on December 27, 2023 at the health center, the patient complained of weakness and did not want to eat since the first meeting. 1 week ago accompanied by easy fatigue, trembling in the legs and hands. In addition, the patient also complained of blurred vision since 3 months ago. The patient said that in mid-2012 he was diagnosed with Diabetes Mellitus with Initial complaints experienced by the patient were drastic weight loss, the patient often felt weak, hungry, thirsty, and often woke up at night to urinate, then the patient went to the health center for treatment and checked blood sugar levels, the results were 389 mg/dL.

From the results of the physical examination, the general condition: appeared mildly ill; consciousness: *compos mentis*; GCS (Glasgow coma scale) 15; the patient appeared cooperative; blood pressure: 110/76 mmhg; pulse: 83x/min; temperature: 36.5 oC; respiration: 18x/min. Body weight: 35 kg; height: 152 cm; patient's BMI: 15.14 kg/m² where the patient's nutritional status falls into the thin category. From the results of the supporting examination, the patient's blood sugar level was 243 mg/dL so that the results of this examination support the diagnosis of DM in this patient. The ophthalmologic status of both eyes showed decreased vision, increased intraocular pressure, visual field defects, shallow COA, and corneal edema, so these examination results supported the occurrence of glaucoma in the patient. The diagnosis of DM in this patient was made based on the classic symptoms found in the patient

and the examination of blood glucose levels above normal (243 mg/dL). The recommended blood glucose test is an enzymatic glucose test with venous blood plasma material. Criteria for the diagnosis of DM based on glucose examination are:

1. Fasting plasma glucose test ≥ 126 mg/dl. Fasting is a condition of no calorie intake for at least 8 hours.
2. Plasma glucose ≥ 200 mg/dl 2-hours after Test of Oral Glucose Tolerance (TTGO) with 75 g glucose load.
3. Intermittent plasma glucose test ≥ 200 mg/dl with classic complaints.
4. HbA1c test $\geq 6.5\%$ using the method method that is standardized by National Glycohaemoglobin Standardization Program (NGSP) (PERKENI, 2021).

Various complaints can be found in people with DM. Suspicion of DM should be considered if there are complaints such as:

1. Classic complaints of DM: polyuria, polydipsia, polyphagia, and unexplained weight loss.
2. Additional complaints: weakness, tingling, itching, blurred vision, and erectile dysfunction in men, and vulvar pruritus in women (Hannyta, 2020).

The diagnosis of glaucoma in patients is based on clinical manifestations that occur in patients with glaucoma. Glaucoma is a disease or disorder of the eye due to damage to the eye nerve that can narrow the visual field and loss of vision. The main cause or risk factor for glaucoma is increased eyeball pressure. The increase in the eyeball generally takes place slowly so that it does not cause symptoms at first until the patient realizes after the narrowing of the visual field.

Risk factors that can occur in people with glaucoma:

- a. High intra ocular pressure (IOP) > 20 mmHg
- b. Asian and African races and people with shallow frontal eye chambers
- c. Age above 40 years
- d. High myopian (nearsightedness) or hyperphobia (farsightedness)
- e. History of degenerative diseases such as: diabetes diabetes mellitus, hypertension, narrowing of blood vessels, and coronary heart disease
- f. Family (hereditary) history of glaucoma
- g. History of trauma or injury to the eye
- h. Long-term steroid use (Kang and Tanna, 2021).

In this patient, the risk factors found for glaucoma were elderly age, a history of degenerative disease namely DM, and a family history of glaucoma.

Clinical symptoms of glaucoma are divided into acute and chronic. Acute:

- 1) Eyeball pressure or intra ocular pressure (IOP) > 40 mmHg
- 2) Blurred vision and red eyes
- 3) Headaches and eye pain
- 4) Nausea and vomiting during headaches
- 5) Seeing rainbows in lamplight (Kang and Tanna, 2021).

Chronic:

- 1) Quiet or asymptomatic eyes until the eye nerve is severely damaged
- 2) Slow onset
- 3) There is tunnel vision or narrowed vision as if looking in a hallway.
- 4) No head or eye pain and no nausea and vomiting.
- 5) Eyeball pressure settles between 20-30 mmHg (Kang and Tanna, 2021).

Then the activity continued with the first visit to the patient's home on January 4, 2024. When the patient visited the health center, anamnesis of complaints, physical examination and supporting examinations were carried out and informed consent was obtained to ask the patient for verbal consent for coaching. Communication was carried out more deeply through the patient's home visit. During the visit, a holistic history was taken including identifying the family map, biological function, psychosocial, economic, behavior, health facilities health and infrastructure, 1x24 hour food recall, the environment around the patient's home, filling out an activity daily living questionnaire using the Barthel index, assessing the patient's risk of falling, assessing the patient's mental status and depression scale. After taking anamnesis, a list of problems that occur in patients and families (personal aspects, clinical aspects, internal and external risks and functional levels) is obtained so that the next step will be planned for the type of intervention that will be carried out given. Patients also have behavioral factors or irregular eating habits, do not exercise, and lack physical activity. Insufficient knowledge about the disease suffered, namely related to risk factors, normal blood sugar levels, complications, balanced food intake, prohibited foods and recommendations for people with DM, the importance of taking regular medication, appropriate physical activity for people with DM. Patients also have the perception that eating for people with diabetes will worsen their disease, so patients rarely eat. Patient risk factors related to lifestyle are patients rarely exercise and do physical activity. Irregular dietary patterns and eating habits.

After obtaining the problem and factors that influence the problem in the patient, the next activity was carried out on January 11, 2024. Interventions were given in two forms, namely non pharmacologically and pharmacologically. Before the intervention was carried out, a history was taken again and the patient's blood sugar was checked. After the examination, patients were asked to do pretest questions related to DM. Non-pharmacological interventions are carried out using media in the form of posters containing information related to risk factors, normal blood sugar levels, complications, balanced food intake, prohibited foods and recommendations for people with DM, the importance of taking regular medication, appropriate physical activity for people with DM. Patients are also taught how to do Diabetes foot exercises to help smooth circulation blood parts (Sari et al., 2019). Pharmacological interventions continue to follow the treatment obtained by the patient. In this case, the patient was treated with Metformin 3x500mg, Glimepiride 1x2mg, and Vitamin Bcomp 1x1. Metformin is a Biguanid class Insulin Sensitizer class drug that can be used as a first line in DM patients and is a drug that is often used in health services. This is because metformin has a way of working by reducing liver glucose production and increasing insulin sensitivity as well as minimal side effects of hypoglycemia, good drug availability and low prices. Metformin can be given 2-3 x/day (Kemenkes RI, 2020).

DM treatment requires HbA1c testing to evaluate treatment response within 3 months and determine the addition of drugs. The goal of DM patient management in general aims to improve the patient's quality of life. DM management begins with implementing healthy lifestyle modifications (appropriate diet and physical activity) along with pharmacological interventions with oral and/or injectable anti-hyperglycemia drugs. Knowledge about self-monitoring of medication side effects, such as signs and symptoms of hypoglycemia and how to deal with them should be given to patients. Healthy living behaviors for people with DM include fulfilling the recommendations of appropriate dietary patterns, increasing regular physical activity and medications exercise, regularly, using DM conducting regular blood glucose monitoring to assess the effectiveness of treatment (PERKENI, 2021).

Diet in DM patients is a diet that adjusts the calories needed by the patient. The recommended daily diet in patients is: carbohydrates are 45-65% of total energy intake, especially carbohydrates that are high in fiber. Recommended fat is about 20-25% of calorie needs and not allowed more than 30%. The required protein is 10% of energy needs. Sodium intake for DM patients is the same as healthy people, namely as much as 70), moderate (55-70) and low (the menu avoids the use of excess oil. For DM patients, foods with saturated fat content need to be avoided because DM patients tend to be more sensitive to increased LDL cholesterol and reduce the risk of cardiovascular disease. The type of vegetable side dish chosen is the type that has low fat content. The selection of animal protein sources in serving food for patients with DM needs to pay attention to the fat, cholesterol content of the source to be processed (Sari et al., 2019). In DM patients, regular physical exercise can be done 3-5 days a week with an intensity of about 30-45 minutes with a total of 150 minutes in 1 week. Physical exercise has the benefit of maintaining fitness, losing weight, and improving insulin sensitivity so as to control blood glucose levels in the body. Physical exercise has the benefit of maintaining fitness, losing weight, and improving insulin sensitivity so as to control blood glucose levels in the body. Physical exercise is recommended in the form of aerobic exercise with moderate intensity (50-70% of maximum heart rate) such as brisk walking, leisurely cycling, jogging and swimming. One of the physical exercises that can be done by people with diabetes (Sari et al., 2019).

Diabetes is a diabetic foot exercise. Foot exercises are exercises performed by people with diabetes to prevent wounds and improve circulation in the feet. The movements in foot exercises are expected to help build the strength of small muscles and thigh muscles to prevent foot deformities and overcome joint motion limitations. Diabetic foot exercises positively affect other pathological factors associated with peripheral neuropathy. Improving microvascular function and fat oxidation can reduce oxidative stress and increase neurotrophic factors. In addition, foot exercises can improve peripheral perfusion, which can prevent worsening of diabetic neuropathy. According to researchers, foot exercises can reduce the risk and progressivity of peripheral neuropathy disorders because they can improve blood flow to the periphery, increase muscle strength, and improve sensory, motor and autonomic functions. Patients are also asked to take Vitamin B Complex related to their Diabetic Neuropathy symptoms. Neuropathy symptom reduction with pharmacotherapy that can be used includes anticonvulsants, antidepressants and neurotrophics which include vitamins B1, B6, and B12. Neurotrophic vitamins function to normalize nerve function by repairing disorders of nerve metabolism through the provision of the required intake (Karedath et al., 2022).

The third home visit was to evaluate the results of the intervention on January 18, 2024. The evaluation was conducted after one week of intervention. Evaluation activities aim to assess whether the expected targets of the activities. The intervention was achieved. From the evaluation results, it can be said that there was a change in the patient's clinical, characterized by complaints of weakness and trembling in both legs reduced. The patient's family knowledge about DM has also increased, seen from the increase in pre-test to post-test scores. This shows that the patient's family already knows about risk factors, normal blood sugar levels, complications, balanced food intake, prohibited foods and recommendations for people with DM, the importance of taking regular medication, appropriate physical activity for people with DM. There is a change in patient behavior characterized by regular consumption of drugs, doing physical activity, regulating diet and reducing foods that are not recommended for DM patients.

In this evaluation, a physical examination was also carried out and the results obtained were BP 122/77 mmHg, Pulse 88x/m, Respiratory Frequency 20x/m, and Temperature 36.50C. The results of the examination obtained a GDS level of 103 mg/dL. Examination of ophthalmologic status is still obtained a decrease in vision so that the patient is still recommended to see an ophthalmologist in order to get appropriate therapy. Type 2 Diabetes Mellitus has decreased GDS levels and has begun to be controlled. The disease suffered by this patient is a chronic disease. Chronic diseases such as DM have a long disease course and generally the cure is only to reduce the severity or complications. Patients are required to regularly visit health facilities for regular blood sugar checks. Because the patient already has Health insurance will not make it difficult for patients to obtain health services every time they seek treatment (Tamara and Azelia, 2020).

Evaluation of changes in the patient's diet assessed based on 1x24 hour food recall is also appropriate. The patient began to make healthy lifestyle modifications by adjusting food patterns according to nutritional needs and the recommended diet for patients, by eating regularly and avoiding foods that contain high sugar, especially simple sugars. Based on food recall, the patient's nutritional adequacy criteria are sufficient. The patient has started trying to do regular physical exercises such as walking in the morning 30 minutes a day, 3 times a week. The patient expressed that her worries had decreased with the patient's increased knowledge about her disease. The patient's perception has changed about his illness that eating does not worsen the condition of his illness as long as it is consumed according to the patient's needs. The patient's family already knows how to manage the diet so that the patient eats more regularly. The patient hopes that the disease can be controlled and complaints reduced. The patient's family treatment pattern is no longer only curative, but regular control to prevent further complications. Support and motivation from family members for the improvement of the patient's disease more good, family mutual remind patients to take their medication, exercise regularly, and keep an eye on what they eat.

CONCLUSION

Mrs. R, a 78-year-old patient, has several internal risk factors, including infrequent physical activity, irregular medication adherence, underweight nutritional status, and limited knowledge regarding diabetes mellitus—such as its risk factors, normal blood sugar levels, possible complications, appropriate diet, and the importance of regular medication and exercise. External risk factors include a family pattern that focuses on curative rather than preventive care and limited family support in encouraging the patient to maintain a healthy lifestyle. An intervention was carried out using educational posters covering essential topics about diabetes management, including diet, physical activity, and medication adherence. Following holistic and comprehensive care using a family medicine approach, the patient's family showed a 50-point increase in knowledge, the patient's blood sugar level decreased by 103 mg/dL, and there was a positive behavioral change in the patient's dietary habits.

REFERENCES

- Badan Pusat Statistik Provinsi Lampung. (2022). Luas wilayah Provinsi Lampung. Badan Pusat Statistik.
- Bourne, RRA., Jonas, JB., Bron, AM., et al. (2018). Prevalence and causes of vision loss in high income countries and in Eastern and Central Europe in 2015: magnitude, temporal trends and projections. *Br J Ophthalmol*.102:575–585
- Dietze, J., Blair, K HS. (2021). Glaucoma Updated 2020 Dec 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. 2020 [Internet]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK538217>

- Dinas Kesehatan Kabupaten Lampung Selatan. (2023). Profil Kesehatan Kabupaten Lampung Selatan Tahun 2022. Lampung: Dinas Kesehatan Lampung Selatan.
- Dinas Kesehatan Provinsi Lampung. (2021). Profil Kesehatan Provinsi Lampung Tahun 2021. Lampung: Dinas Kesehatan Provinsi Lampung.
- Graciella, V., & Prabawati, D. (2020). The effectiveness of diabetic foot exercise to peripheral neuropathy symptoms and fasting blood glucose in type 2 diabetes patients. *ICHHD*, 30(1), 45–49.
- Hannyta, R. B. (2020). Pentingnya senam kaki diabetes bagi penderita DM.
- International Diabetes Federation. (2019). *IDF Diabetes Atlas* (9th ed.).
- International Diabetes Federation. (2021). *IDF Diabetes Atlas* (10th ed.).
- Kang, J. M., & Tanna, A. P. (2021). Glaukoma. *Medical Clinics of North America*, 105(3), 493–510. <https://doi.org/10.1016/j.mcna.2020.12.010>
- Kapetanakis, VV., Chan, MP., Foster, PJ., et al. (2016). Global variations and time trends in the prevalence of primary open angle glaucoma (POAG): a systematic review and meta-analysis. *Br J Ophthalmol*. 100:86–93
- Karedath, J., Batool, S., Arshad, A., et al. (2022). The impact of vitamin B12 supplementation on clinical outcomes in patients with diabetic neuropathy: A meta-analysis of randomized controlled trials. *Cureus*, 14(1), e31783. <https://doi.org/10.7759/cureus.31783>
- Kementerian Kesehatan Republik Indonesia. (2018). Hasil Riset Kesehatan Dasar (Riskesdas) 2018. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementerian RI.
- Kementerian Kesehatan Republik Indonesia. (2020). Infodatin: Tetap produktif, cegah, dan atasi Diabetes Mellitus 2020. Pusat Data dan Informasi Kementerian Kesehatan RI.
- Kementerian Kesehatan Republik Indonesia. (2020). Pedoman nasional pelayanan kedokteran tata laksana diabetes melitus tipe 2 dewasa. Menteri Kesehatan Republik Indonesia.
- Made, K., Murtiningsih, Karel, P., Bisuk, P., & Sedli. (2021). Gaya hidup sebagai faktor risiko diabetes melitus tipe 2. *e-CliniC*, 9(2), 328.
- Ostler, E., Rhee, D., Burney, E., Sozeri, Y. (2021). Advances in medical therapy for glaucoma. *Curr Opin Ophthalmol*. 32(2):129–133.
- Perkumpulan Endokrinologi Indonesia. (2021). Pedoman pengelolaan dan pencegahan diabetes mellitus tipe 2 di Indonesia 2021. Jakarta: PB PERKENI.
- Putz, Z., et al. (2022). Vitamin D in the prevention and treatment of diabetic neuropathy: A review. *Clinical Therapeutics*, 44(1), 813–823.
- Sari, N., Nawangsari, H., & Yosdimiyati, L. (2019). Pengaruh senam kaki terhadap neuropati perifer pada penderita DM tipe 2 di Desa Kaliwungu, Kecamatan Jombang, Kabupaten Jombang.
- Schuster, AK., Erb, C., Hoffmann, EM., Dietlein, T., Pfeiffer, N. (2020). The diagnosis and treatment of glaucoma. *Dtsch Arztebl Int*. 117(13):225–34.
- Stein, J.D., Khawaja, A.P., Weizer, J.S. (2021). Glaucoma in adults—screening, diagnosis, and management: a review. *JAMA*. 325(2):164–174
- Tamara, Y., & Azelia, N. (2020). Penatalaksanaan pasien DM tipe 2 dengan neuropati dan retinopati diabetikum melalui pendekatan kedokteran keluarga. *Medula*, 9(4), 631–638.

World Health Organization. (2018). Diabetes.
<https://www.who.int/newsroom/factsheets/detail/diabetes>

Zsuzsana Putz et al. 2022. Review Vitamin D in the Prevention and Treatment of Diabetic Neuropathy. *Clinical Therapeutic*. 44(1): 813-23.