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Management of a Patient with Type 2 Diabetes Mellitus and Uncontrolled Hypertensive Urgency Using a Family Doctor Approach in a First-Level Health Facility in Indonesia: A Case Report

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ABSTRACT: Noncommunicable diseases (NCDs) result from genetic, environmental, and behavioral factors. These diseases include cardiovascular conditions and diabetes. According to the Lampung Provincial Health Office in 2021, the prevalence of type 2 diabetes mellitus increased from 1.37% to 3.76% (equivalent to 88,518 cases), and the prevalence of hypertension rose from 15.10% to 17.35%. NCDs are chronic and affect quality of life and productivity, necessitating comprehensive management. The goal of a family medicine approach in treating patients with type 2 diabetes mellitus and hypertension is to identify clinical, psychological, and psychosocial factors. Primary data is collected through anamnesis, physical examination, and home visits to evaluate the physical environment. Patient Mrs. A, a 55-year-old farmer, reported complaints of headaches and frequent nighttime urination. She has a history of hypertension since 2022 and type 2 diabetes mellitus since 2023. Management was carried out holistically using a patient-centered, family-oriented, and community-based approach grounded in Evidence-Based Medicine. Interventions included both pharmacological and non-pharmacological via family conferences. Evaluation of the interventions showed improved knowledge among the patient and her family, a reduction in the patient's blood pressure and blood glucose levels, and behavioral changes in the patient to consume meals aligned with recommended dietary allowances.

KEYWORDS: Type 2 Diabetes Melitus, Hypertensive Urgency, Family Medicine Services.

INTRODUCTION

Non-communicable diseases (NCDs) are the result of genetic, environmental, and behavioral factors. NCDs include cardiovascular diseases, cancer, chronic lung diseases, and diabetes.[1] Non-communicable diseases are chronic in nature, affecting the quality of life and productivity of those affected.[2]

Diabetes Mellitus is a group of non-communicable diseases characterized by hyperglycemia due to abnormalities in insulin secretion, insulin action, or both.[3] Hypertension is another non-communicable disease defined by a systolic blood pressure of ≥140 mmHg and/or a diastolic blood pressure of ≥90 mmHg.[4]

According to the World Health Organization (WHO), non-communicable diseases claim 41 million lives annually, equivalent to 74% of global mortality.[1] Based on a report by the International Diabetes Federation (IDF), in 2021, approximately 537 million people, or 10.5% of the global population aged 20-79 years, were diagnosed with Diabetes Mellitus.[5] Indonesia ranks fifth globally in the number of Diabetes Mellitus cases, with 19.5 million patients.[5] Data from the Lampung Provincial Health Office in 2021 showed that the prevalence of type 2 Diabetes Mellitus rose from 1.37% to 3.76%, or 88,518 cases.[6] At Gedong Tataan Public Health Center, type 2 Diabetes Mellitus was the third most common disease, with a prevalence of 1,149 patients in 2023.[9]

WHO estimates that 1.28 billion adults aged 30-79 years worldwide suffer from hypertension.[7] The 2018 Basic Health Research (Riset Kesehatan Dasar) revealed a hypertension prevalence of 34.1% in Indonesia, which has a population of approximately 260 million.[8] Data from the Lampung Provincial Health Office in 2021 showed that hypertension prevalence increased from 15.10% to 17.35%, affecting 1,825,525 individuals.[6] At Gedong Tataan Public Health Center, hypertension was the fourth most common disease, with a prevalence of 1,235 patients in 2023.[9]

The management of hypertension and type 2 Diabetes Mellitus requires a holistic and comprehensive approach, involving collaboration among doctors, patients, patients' families, and the community. This approach aims to identify both internal and external risk factors in patients, enabling management based on evidence-based medicine that emphasizes family-approach, patient-centered,

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and community-oriented care. The role of family doctors is crucial in these efforts, as they are not only responsible for treatment but also for promoting health and preventing these degenerative diseases.

CASE REPORT

Mrs. A, a 55-year-old farmer, visited the Gedong Tataan Community Health Center on March 5, 2024, for a check-up and to collect her routine medications related to her hypertension and diabetes. The patient presented with complaints of headaches for the past 5 days. She stated that she has had hypertension since 2022 and diabetes since 2023. She was prescribed amlodipine 5 mg and metformin 2x500 mg since diagnosis. However, her adherence to the medications has been poor. Initially, the symptoms she experienced are frequent headaches accompanied by dizziness, frequent urination at night up to 3 times, as well as constant feelings of hunger and thirst. Currently, her complaints have reduced, but she occasionally still experiences headaches, dizziness, and difficulty sleeping.

One month ago, the patient visited the Gedong Tataan Community Health Center to monitor her hypertension and received antihypertensive therapy with amlodipine. She was also prescribed metformin for her diabetes. However, according to her family, the patient does not take the medications regularly because she often forgets and does not understand that the medications need to be taken daily. A blood pressure check revealed a reading of 182/102 mmHg, and a random blood glucose test at the health center showed a result of 232 mg/dL.

The patient has a lifestyle that lacks physical exercise and often consumes snacks. She spends her days working as a farmer, assisting her husband. A food recall was conducted, which showed that her nutrient intake exceeded the recommended levels for energy, carbohydrates, proteins, and fats. The patient does not know the appropriate diet and physical activities for individuals with hypertension and diabetes mellitus.

During screening for complications, the patient denied experiencing frequent tingling sensations in her toes, slow-healing wounds, chest pain, hearing loss, vision impairment, or itching of the skin. The patient reported a family history of hypertension in her father and diabetes in her mother, both of whom are now deceased. Currently, the patient lives with her husband, her first child and son-in-law, and two grandchildren.

The patient expressed concern that her condition might worsen because she previously considered hypertension and type 2 diabetes mellitus to be common illnesses that did not require routine treatment. She also does not yet understand the complications that can arise from hypertension and diabetes mellitus or how to prevent them. Additionally, the patient has not been routinely participating in the Indonesian chronic disease management program (Prolanis).

The general condition of the patient appeared mildly ill. Body temperature was 36.6°C, blood pressure was 182/102 mmHg, pulse rate was 90x/minute, respiratory rate was 20x/minute, weight was 63 kg, and height was 155 cm. The BMI was calculated at 26.22 kg/m², classifying the nutritional status as overweight, with a waist circumference of 76 cm. On general examination, the conjunctivae were non-anemic, and the sclerae were non-icteric. Visual acuity testing showed 6/7.5 in the right eye and 6/9 in the left eye. Examination of the ears, nose, and throat revealed findings within normal limits, and jugular venous pressure was not elevated. Thorax examination showed symmetrical chest expansion and tactile fremitus, no tenderness, symmetrical chest expansion, and resonant percussion sounds over both lung fields. Breath sounds were vesicular throughout all lung fields, with no adventitious breath sounds noted, suggesting findings within normal limits. The apex beat was not palpable, heart borders were within normal limits, and heart sounds I and II were regular without any additional heart sounds. Abdominal examination revealed a rounded contour, bowel sounds at 12 times per minute, no tenderness, and no organomegaly, with findings within normal limits. Both upper and lower extremities were warm to touch, with no edema and a capillary refill time (CRT) of less than 2 seconds. Musculoskeletal and neurological status were within normal limits. laboratory examinations on March 5, 2024, showed the patient's random blood glucose level at 232 mg/dL and total cholesterol level at 137 mg/dL.

FAMILY DATA

The patient is the eldest of five siblings, with both parents having passed away. Her husband, Mr. A, works as a farmer. The patient has four sons. Currently, the patient lives with her husband (Mr. A), her eldest son (Mr. AD), her daughter-in-law (Mrs. S), and her grandchildren (J and F). The family maintains good communication, and problem-solving is carried out through family discussions, with decisions made by the patient's husband as the head of the household. The patient herself also works as a farmer. The family

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income is approximately Rp. 700,000 per month, which is used to support the patient and her husband. All family members are covered by health insurance (Kartu Indonesia Sehat) through BPJS Kesehatan PBI. The family's healthcare-seeking behavior is curative in nature. The distance from their home to the local health center (puskesmas) is approximately 5 km, which they travel on foot.

The relationship among Mrs. A's family can be seen in Figure 1.

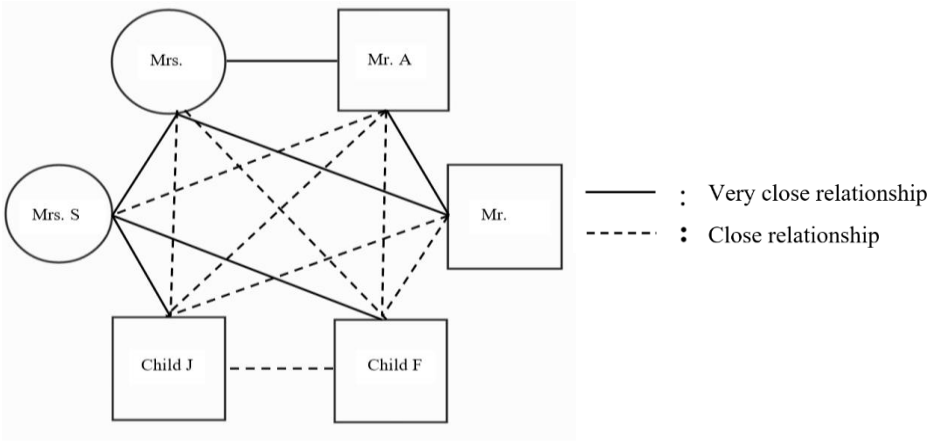

Figure 1. Mrs. A's Family Map

The Family APGAR Score for Mrs. A's family showed a total score of 8, with the following breakdown: Adaptation (2), Partnership (2), Growth (1), Affection (2), Resolve (1). The Family APGAR Score interprets there is no family dysfunction in Mrs. A's family. The Family SCREEM tool was utilized to evaluate the family's role in addressing health issues and its impact on the health behaviors of individual members. Using the SCREEM Score, the pathological functioning of Mrs. A's family was assessed, yielding a score of 26. This result suggests that Mrs. A's family possesses adequate resources to support her health management effectively. According to Duvall's Family Life Cycle stages, the patient's family is in Stage VII, which is the "Middle-aged parents" stage, as shown in Figure 2.

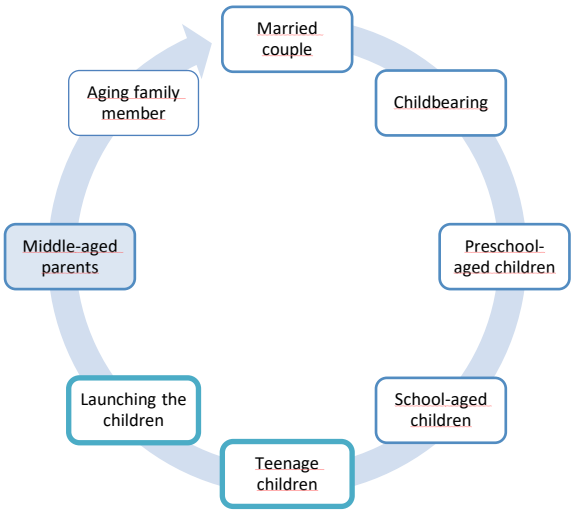

Figure 2. Mrs. A Family Lifecycle

The patient lives in a privately owned permanent house with a total of 6 occupants. Currently, the patient resides with her husband (Mr. A), her eldest son (Mr. AD), her daughter-in-law (Mrs. S), and her grandchildren (J and F). The house measures 9x12 m². The house consists of three bedrooms, one living room, one family room, one kitchen, and two bathrooms with squat toilets. The floors

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are made of cement and ceramic, the kitchen is located inside the house, and drinking water comes from boiled water. Ventilation appears to be adequate, with windows in almost every room allowing for good air circulation. The house has electricity, and the water source comes from the well inside the house. The windows are made of transparent glass and are routinely opened. During the visit, the house was found to be reasonably clean and well-organized overall. The distance between the front of the house and the road is approximately 5 meters.

Figure 3. Mrs. S's House Floor Plan

Initial Holistic Diagnosis

Personal Aspect

- **Reason for visit**: The patient wants to check her health, particularly blood pressure and blood sugar.
- **Concerns**: The patient is worried that her condition will worsen.
- **Perception**: The patient does not know that hypertension and type 2 diabetes mellitus require routine treatment.
- **Expectations**: The patient hopes that her complaints will improve.

Clinical Aspect

- Hypertensive Urgency (ICD-10: I16.0; ICPC-2: K86)
- Type 2 Diabetes Mellitus (ICD-10: E11; ICPC-2: T90)

Internal Risk Aspects

- The patient lacks knowledge about her illness, its causes, target blood glucose and blood pressure, and treatments.
- The patient does not yet understand the importance of regular check-ups and consistent medication use.
- An improper diet and eating habits.
- The patient does not yet understand suitable physical activities for diabetes mellitus and hypertension.
- The patient is unaware of the complications associated with hypertension and diabetes mellitus.

External Risk Aspects

- The family's treatment behavior is curative in nature.
- Lack of family support and motivation for medication adherence and physical activity.
- Limited family knowledge on preparing suitable dietary plans for the patient.

Functional Degree

- Based on the Dartmouth COOP Functional Health Assessment Charts, the patient's functional level is categorized as degree 2, indicating that the patient can carry out self-care and light daily tasks both indoors and outdoors but has begun to limit work-related activities.

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INTERVENTION

The interventions provided include both pharmacological and non-pharmacological approaches for the patient's hypertension and type 2 diabetes mellitus. The pharmacological interventions aim to reduce symptoms and prevent complications, thereby improving the patient's quality of life. The non-pharmacological interventions involve family conferences and education for both the patient and her family on the importance of routine check-ups, dietary management, physical activities, and potential complications. The interventions will use posters as educational media. Evaluation will include pre-tests and post-tests. The patient will be visited three times, the first visit for data collection and monitoring, the second for interventions, and the third for evaluating the interventions.

The patient-centered interventions included non-pharmacological management, which focused on educating the patient about the illness and its causes, target blood glucose and blood pressure levels, treatment plans, and the importance of regular check-ups and medication adherence. Additionally, the patient was educated on dietary guidelines tailored to their nutritional needs for managing hypertension and diabetes mellitus, appropriate physical activities or exercises, and the potential complications associated with these conditions.

Pharmacological management was adjusted to address the patient's uncontrolled blood glucose and blood pressure levels. Initially, the patient was taking Metformin 500 mg twice daily; however, due to a random blood glucose level of 232 mg/dL, an additional antidiabetic medication, Glibenclamide, was prescribed once daily. To further manage the patient's hypertension, Captopril was added twice daily alongside the initial Amlodipine regimen of once daily.

Family approach interventions included non-pharmacological therapy, educate the patient's family on the importance of prevention over curative treatment, educate the patient's family to consistently encourage and remind the patient and her husband to participate in aerobic exercises, educate the patient's family to remind the patient to take her medications, and educate the patient's family on healthy dietary patterns for individuals with diabetes mellitus and hypertension. Community-oriented interventions included educating the patient to participate in the Indonesian integrated health post for non-communicable diseases (Posbindu) and the Indonesian chronic disease management program (Prolanis) activities, and educating people in the patient's community about the importance of participating in these programs.

The Final Holistic Diagnosis

- **Personal Aspect**: The patient will undergo routine health check-ups, concerns have decreased due to improved knowledge about her illness, the patient now understands that she has a degenerative condition (hypertension and diabetes) and needs regular follow-ups, most of the patient's expectations have been met as her complaints have improved.
- **Clinical Aspect**: The patient has Hypertensive Urgency (ICD-10: I16.0; ICPC-2: K86), Type 2 Diabetes Mellitus (ICD-10: E11; ICPC-2: T90).
- **Internal Risk Aspects**: The patient now understands her illness, its causes, target blood glucose, target blood pressure, treatment plans. Patient understands the importance of routine check-ups and consistent medication use, suitable physical activities for diabetes mellitus and hypertension, and the complications associated with hypertension and diabetes mellitus.
- **External Risk Aspects**: The patient's family is committed to focusing on disease prevention, provides support and motivation for medication adherence, and capable of preparing suitable dietary plans for the patient.
- **Functional Degree**: The patient can perform daily activities as she did before becoming ill, thus her functional degree is 1.

DISCUSSION

A case study was conducted on Mrs. A, a 55-year-old patient with Hypertensive Urgency and Diabetes Mellitus. The patient was assessed holistically, encompassing biological, psychological, and social aspects. The importance of the family medicine approach for this patient lies in the fact that her conditions rely heavily on the compliance of both the patient and her family in managing the diseases. The health issue discussed in this case involved a 55-year-old woman who visited Gedong Tataan Public Health Center with complaints of headaches over the past five days. The headache, localized at the back of her head or neck, was described as throbbing, worsened with fatigue, and improved with rest. The patient also reported excessive thirst, frequent hunger, and nocturia up to three times per night. These complaints disrupted her daily activities, prompting her to seek medical attention at the health center. The patient was evaluated through three meetings using a family medicine approach. The first visit focused on diagnosis establishment, the second on face-to-face intervention, and the third on evaluation.

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At the first meeting on March 15, 2024, at the patient's home, anamnesis and a physical examination were conducted. During the anamnesis, it was found that the patient complained of throbbing headache in the back of the neck and often felt thirsty, hungry, and urinated frequently at night. A food recall examination was conducted, and it was found that the patient had excessive intake of energy, carbohydrates, protein, and fat. From the physical examination, the general condition appeared moderately ill, with consciousness compos mentis, blood pressure 182/102 mmHg, pulse rate 90x/minute, respiratory rate 20x/minute, temperature 36.6ºC, body weight 63 kg, height 155 cm, BMI 26.22 (Overweight) with a waist circumference of 76 cm. On physical examination, the eyes showed no anemia in the conjunctiva and no icterus in the sclera. Visual acuity was 6/7.5 in the right eye and 6/9 in the left eye. The ears were normotia (+/+), without discharge (-/-), hyperemia (-/-), or tenderness (-/-). The nose was normal with no discharge (-/-), hyperemia (-/-), or deviation (-/-). Jugular venous pressure was not elevated, lymph nodes were not enlarged, and the thyroid gland was not enlarged. A thoracic examination of the lungs and heart appeared within normal limits. Abdominal examination also showed normal findings. The extremities were warm to touch, with no edema, and a capillary refill time (CRT) of <2 seconds. A neurological examination was within normal limits. The diagnosis of hypertension in this patient was established based on physical examination, where the patient's blood pressure was 182/102 mmHg. A diagnosis of hypertension can be made if blood pressure measurements show a systolic pressure ≥140 mmHg and a diastolic pressure ≥90 mmHg.[9] The diagnosis of Diabetes Mellitus was also confirmed based on the anamnesis, where the patient presented with classic symptoms of Diabetes Mellitus, including frequent urination (polyuria), frequent hunger (polyphagia), and frequent thirst (polydipsia), along with a random blood glucose test (RBG) >200 mg/dL, with the result being 232 mg/dL.[3]

Based on its causes, hypertension is divided into primary (essential) and secondary hypertension. Primary hypertension is a condition with no identifiable cause. While it cannot be cured, it can be controlled. The risk factors for primary hypertension are divided into modifiable and non-modifiable factors. Modifiable factors include nutritional aspects such as excessive salt and saturated fat intake, lack of physical activity, tobacco and alcohol use, and overweight or obesity. Meanwhile, non-modifiable factors include a family history of hypertension and age. On the other hand, secondary hypertension occurs due to certain comorbid conditions. In this patient's case, there were no other underlying diseases, so the diagnosis was primary hypertension.[7] Hypertensive urgency is characterized by an elevated blood pressure with a systolic pressure >180 mmHg or diastolic pressure >110 mmHg without evidence of organ damage.[10] The patient and her family were given a pretest about DM and hypertension to assess their knowledge regarding these diseases, with the scores being 50 for the patient, 50 for her husband, and 60 for her son-in-law.

After identifying the problems and contributing factors affecting the patient, the next step was to conduct interventions on March 27, 2024. The interventions were carried out in two forms: non-pharmacological and pharmacological. Prior to the intervention, a follow-up anamnesis, physical examination, and random blood glucose (RBG) test were performed.

The pharmacological treatment given to the patient included metformin 2x500 mg, to be taken 10-15 minutes before meals; glibenclamide 1x5 mg/day; amlodipine 1x10 mg/day; and captopril 2x12.5 mg/day. Metformin is an antidiabetic drug from the insulin sensitizer class of biguanides, which is the first-line therapy for Diabetes Mellitus (DM). It works by reducing hepatic glucose production and improving insulin sensitivity. Metformin has minimal risk of hypoglycemia, good availability, and affordable cost. It can be administered 2-3 times per day.[3] Glibenclamide (or glyburide) is a second-generation sulfonylurea. It works by increasing insulin secretion from the pancreatic beta cells. Sulfonylureas bind to the SUR1 receptor in the beta-cell membrane, which is part of the ATP-dependent potassium channel. By inhibiting this channel, depolarization occurs, leading to insulin release. Sulfonylureas also reduce hepatic insulin clearance, increasing plasma insulin levels.[13] It is also recommended that the patient undergo regular HbA1c evaluations to ensure treatment aligns with the Diabetes Mellitus management algorithm, ensuring effective therapy and achieving therapeutic targets.[3] The management of hypertensive urgency, based on the 2019 Indonesian hypertension consensus, includes thiazides, ACE inhibitors (ACE-I), angiotensin receptor blockers (ARBs), or calcium channel blockers (CCBs). For high-risk patients, such as those with systolic blood pressure >150 mmHg, very old age (>80 years), or frailty, combination therapy should be considered, such as ACE-I/ARB with beta-blockers (BB)/CCB, or CCB with diuretics/BB, or BB with diuretics.[9] Amlodipine belongs to the calcium channel blocker (CCB) class. It works by inhibiting calcium channels, preventing calcium from entering the cells. This reduces intracellular calcium levels, leading to decreased endothelial contraction, increased smooth muscle relaxation, and subsequent vasodilation.[11] Captopril is an angiotensin-converting enzyme inhibitor (ACE-I) that works by inhibiting ACE, which converts angiotensin I into angiotensin II. Angiotensin II binds to AT1 receptors on smooth muscle cells, causing

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vasoconstriction of pre-capillary arterioles and post-capillary venules. It also inhibits norepinephrine reuptake and stimulates catecholamine release from the adrenal medulla, all of which contribute to increased blood pressure.[12]

The non-pharmacological intervention was carried out through a family conference, supported by a poster presentation that discussed ways to manage hypertension and diabetes. The poster emphasized the importance of medication adherence, a proper diet, physical activity or aerobic exercise, and understanding the complications of hypertension and diabetes mellitus. The patient's family also participated by accompanying the patient and listening to the explanations provided.[14] [15]

Evaluation was conducted on April 8, 2024, to assess the patient's condition as well as lifestyle changes. The results showed that the patient no longer experienced headaches and was attending regular health check-ups. The patient also reported feeling less anxious, which was attributed to an increased understanding and awareness of the disease. The patient's perception of the condition had improved, as they now understood it to be a degenerative disease that required consistent monitoring and management. During the evaluation, a physical examination was performed, and the results showed a blood pressure of 147/89 mmHg, a pulse rate of 88 beats per minute, a respiratory rate of 18 breaths per minute, and a temperature of 36.8°C. The random blood glucose test showed a result of 129 mg/dL.

Table 1. Target Therapy Based on Holistic Diagnosis

Variable	Pre	Intervention	Post
Knowledge			
- Patient	50		100
- Husband	50	Education using posters	100
- Daughter-in-law	60		90
Complaints	Headache and dizziness accompanied by difficulty sleeping	Amlodipine 1x10 mg, captopril 2x12.5 mg	Complaints no longer present
Blood Glucose Levels	232	Metformin 2x500 mg and glibenclamide 1x5 mg	129
Physical Activity	The patient's daily routine as a farmer was limited to morning hours	Counseling the patient to perform 30-minute aerobic exercises routinely 3 times a week	The patient routinely engages in aerobic exercise
Food Intake	Intake of energy, protein, and fat, based on food recall, was excessive	Education to apply balanced nutrition intake according to nutritional guidelines	Energy, protein, and fat intake are now sufficient

CONCLUSION

The case of a 55-year-old woman with diabetes mellitus and hypertension highlights the importance of a holistic and evidence-based approach in managing chronic conditions. The integration of patient-centered care, family involvement, and community-oriented strategies proved effective in addressing both clinical and psychosocial aspects of her condition. Through tailored interventions, including dietary assessments, educational family conferences, and motivational support, the patient showed significant improvement in adherence to both pharmacological and non-pharmacological therapies. This case underscores the critical role of comprehensive care in enhancing patient outcomes, particularly in individuals with limited health knowledge and inadequate family support.

DECLARATION OF PATIENT CONSENT

The authors certify that they have patient consent for clinical information to be reported in the journal.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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