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The Experiences of Patients with Diabetes and Strategies For Their Management During the COVID-19 Pandemic: A Qualitative Study

Anita Joeliantina^{ORCID}, Irfany Nurul Hamid^{ORCID}, and Endang Sulistyowati^{ORCID}

Nursing Departement, Politeknik Kesehatan Kemenkes Surabaya, Indonesia

Corresponding author: Anita Joeliantina (anita@poltekkesdepkes-sby.ac.id)

ABSTRACT Self-care is a key point for patients with Diabetes Mellitus (DM) to maintain normal blood sugar levels. During the COVID-19 Pandemic, patients with DM experienced limitations in carrying out self-care. The study explores in-depth the experiences of patients with DM in carrying out self-care during the pandemic of COVID-19. This type of research was qualitative research with a phenomenological approach. The number of participants in the phenomenological study was patients with DM at the Keputih Surabaya Health Center with ten people. The determination of participants is determined using the purposive sampling technique. The collecting data through in-depth interview techniques online and offline. Data analysis used the Van Manen method. There are five themes related to the self-care behavior of patients with DM during the COVID-19 pandemic in this study, namely: poor diabetic diet, absence of physical activity, impaired monitoring of blood glucose levels, change of medication pattern, and absence of foot care. DM patient's self-care behavior obtained is a decrease in diet, physical activity, monitoring blood glucose levels, and foot care. This decrease was caused by various conditions that occurred during the pandemic. In treatment behavior, it was found that there was the use of herbs as a companion to medical treatment. Furthermore, researchers need to carry out further research on strategies for implementing appropriate self-care in patients with DM during a pandemic, especially the use of herbs as a complement to treatment.

INDEX TERMS Covid 19, Pandemics, Blood glucose, Self-care, Diabetes Mellitus.

I. INTRODUCTION

The first COVID-19 was reported in Indonesia on March 2, 2020, with two cases [1]. Diabetes Mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to defects in insulin secretion, insulin action, or both [2]. The number of cases and prevalence of diabetes have continued to increase over the last few decades [3][4]. Based on Indonesian National data, DM is a positive comorbid condition for COVID-19 which ranks 2nd (34.4%) after hypertension (50.5%) [5]. Various mechanisms mediate DM as a risk factor for COVID-19, namely glycemic disorders and diabetes-related conditions such as immune dysfunction, obesity, and hypertension [6]. Research reports from China and Italy show that older patients with chronic diseases, including DM, are at higher risk of contracting COVID-19, experiencing severity and death [7]. During the COVID-19 pandemic, 69.8% of DM patients in Indonesia experienced difficulties managing their disease. These difficulties included attending 30.1% of diabetes

consultations, 12.4% access to diabetes medication, checking blood glucose levels 9.5%, controlling diet 23.8%, and doing regular exercise 36.5%. Difficulties in managing diabetes during the COVID-19 pandemic are prone to diabetes complications [8].

In 2010, the Indonesian Ministry of Health created a program, namely Program Chronic Disease Care Program (PROLANIS=CDCP) in First Level Health Facilities, which focused on diabetes self-management in primary care [8]. Patients with DM before the COVID-19 pandemic carried out CDCP activities face-to-face. These activities include direct health promotion through health education, joint sports, treatment, consultation, and checking blood glucose levels [9]. The Indonesian government during the COVID-19 pandemic imposed restrictions on activities outside the home which resulted in adjustments to CDCP activities at first-level health facilities. The focus of health services at first-level health facilities is handling COVID-19, so this adjustment interferes with health management for people with DM [8].

The Keputih Surabaya Health Center is the first-level health facility that carries out CDCP activities for patients with hypertension and diabetes. Information obtained from the Keputih Health Center before the COVID-19 pandemic, CDCP had carried out routine activities, but during the COVID-19 pandemic did not carry out activities because the focus of its activities was handling COVID-19 which included the patient referral process, swab implementation, and vaccination. During the pandemic, the availability of drugs for DM sufferers at the Keputih Health Center is often empty, and patients who want to check their blood glucose levels must be swabbed first. This situation causes limited utilization of health services at Community Health Centers by patients with DM and decreased self-care. The government's restrictions on activities outside the home during the pandemic have also caused a decline in self-care. Previous research has only shown how self-care behavior of DM patients is during a pandemic. This study reveals what behaviors patients with DM have implemented during a pandemic, so it is useful for health workers to be able to determine which behaviors must be maintained or corrected in order to maintain stable blood sugar levels. Based on the data above, researchers will explore more deeply any behavior related to self-care in patients with DM during the COVID-19 pandemic.

This research exploration aims to obtain accurate facts about what experiences patients with DM have had in managing their disease

II. MATERIAL AND METHODS

A. RESEARCH DESIGN

This research is qualitative research with a phenomenological approach.

B. SETTING AND PARTICIPANT

The place of research is Keputih Community Health Center in Surabaya. The number of participants is ten people with DM were the determination of participants using the purposive sampling technique following the inclusion criteria. The inclusion criteria were that the participants had a duration from DM for more than one year, the patient is in a stable condition, can communicate well, has never been exposed to covid-19, and is willing to participate in research.

C. DATA COLLECTION

The collecting data is through a semi-structured study process from August to October 2021. The researchers conducted in-depth interviews with the participants on the behaviors of self-care during the COVID-19 pandemic and used an interview guide (table 1). Self-care behaviors include eating arrangements, exercise activities, medication adherence, blood glucose level monitoring, and foot care. The initial interview process was introducing yourself, building trust (trustworthiness), and obtaining general information. Subsequent in-depth interviews were conducted with patients to explore the experiences of DM patients in performing self-care during the COVID-19 pandemic. The

time used in conducting interviews is 30-60 minutes, taking into account the condition of the participants. The researcher recorded all the interviews with the participants using a voice recorder based on the participants' consent.

D. DATA ANALYSIS

The data obtained by in-depth interviews were analyzed using the Van Manen method, which is a method that combines descriptive and interpretive phenomenological characteristics [10]. There were six stages of analysis from the Van Manen method. These stages consist of: (1) formulating questions that turn to the nature of the patient's life experience about self-care during a pandemic; (2) exploring his life experiences while living them through in-depth interviews; (3) reflecting on the essential themes; (4) describe the phenomenon by writing and rewriting the patient's experience; (5) maintain a strong relationship with the phenomena experienced by the patient; and (6) balance the research context by considering the part and the whole in the form of a narrative.

E. TRUSTWORTHINESS

Researchers build trustworthiness with participants from data collection, and field data analysis until data presentation. The principles of building trustworthiness are credibility, dependability, confirmability, and transferability [10].

F. ETHICAL CONSIDERATIONS.

This research was declared Ethically Eligible through a Certificate of Ethical Eligibility No.K/672/KEPK-Poltekkes_sby/V/2021. Before collecting data, researchers must obtain permission from the Head of the Surabaya City Health Office and the Keputih Community Health Center in Surabaya. The researcher provided information to all potential participants about the purpose of the study, the role of the researcher, the confidentiality of data, the participant's right to withdraw, and the length of the interview. Researchers must also obtain informed consent from participants before conducting interviews.

TABLE 1
Interview guide

Dimensions	Open-Ended Questions
Diabetic diet	How do you manage your food during a pandemic?
Regulation of physical activity	How do you manage physical activity at home and outside during the pandemic?
Monitoring blood glucose levels	What are you doing to bring your blood glucose levels together during a pandemic?
Compliance with taking medication	How do you relate to taking diabetes medication during a pandemic?
Foot care	How have you behaved regarding taking care of your feet during the pandemic?

III. RESULT

The number of participants is ten people, with the following characteristics: age; 30-40 years: 1 person, 41-50: 1 person, 51-60: 5 people, 61-70: 2 people, > 70: 1 person, sex; the male is six people and four female, duration of DM: 1-5 years are four people, 6-10 years are two people, and > 10 years are four people. Four people have diabetic foot complications. The number of participants who have carried

There are five themes related to the self-care behavior of patients with DM during the COVID-19 pandemic in this study, namely: poor diabetic diet, absence of physical activity, impaired monitoring of blood glucose levels, change of medication pattern, and absence of foot care (TABLE 3).

Poor diabetic diet

TABLE 2.
Characteristics of a patient with DM (n = 10)

No.	Age	Gender	Education	Duration of DM	Blood Glucose Level	Family History	Complications	Co-Morbidities	Vaccination	Smoking History
1	33	M	Senior	2	190	Father	No	HT	Ya	Ya
2	79	M	Elementary	20	120	No	DFU	HT	Ya	Ya
3	65	F	Elementary	15	389	No	No	Kidney stones	No	No
4	61	M	Elementary	2	140	No	No	No	No	No
5	52	F	Elementary	8	130	No	No	No	No	No
6	55	F	Elementary	15	200	No	DFU	No	No	No
7	58	M	Elementary	13	500	Father	DFU	TBC	No	No
8	56	M	Elementary	10	200	No	No	No	No	No
9	43	F	Junior	5	150	Mother	DFU	No	No	No
10	52	M	Junior	2	120	No	No	HT	No	No

TABLE 3
Themes of the experiences of patients with DM

No.	Age	Gender	Education	Duration of DM	Blood Glucose Level	Family History	Complications	Co-Morbidities	Vaccination	Smoking History
1	33	M	Senior	2	190	Father	No	HT	Ya	Ya
2	79	M	Elementary	20	120	No	DFU	HT	Ya	Ya
3	65	F	Elementary	15	389	No	No	Kidney stones	No	No
4	61	M	Elementary	2	140	No	No	No	No	No
5	52	F	Elementary	8	130	No	No	No	No	No
6	55	F	Elementary	15	200	No	DFU	No	No	No
7	58	M	Elementary	13	500	Father	DFU	TBC	No	No
8	56	M	Elementary	10	200	No	No	No	No	No
9	43	F	Junior	5	150	Mother	DFU	No	No	No
10	52	M	Junior	2	120	No	No	HT	No	No

out the vaccine is two, while eight people have not received the vaccine because they are afraid of their condition as patients with DM. The random blood glucose levels of 6 patients were less than 200 mg/dl, and 4 people were 200 mg/dl or more. All patients who were participants had never suffered from the COVID-19 virus. Participants who have co-morbidities are five people (hypertension, kidney stones, tuberculosis). 2 participants have a history of smoking, and 3 participants had a family history of illness (TABLE 2).

Additional information obtained from the participants was the participants had never participated in CDCP activities at the Community Health Center. During the pandemic, the participants never took advantage of online medical consultations with health workers because they did not know and did not understand the online consultation process ambiguities in denominators.

A. EXPERIENCE CARRYING OUT SELF-CARE

Most of the participants in this study had never received information about eating arrangements. During the COVID-19 pandemic, participants in this study did not show any effort to adjust the diet for DM patients. In general, patients with DM still have not managed their diet. These data are by the statements as follows:

I eat, as usual, don't diet to be healthy" (P1). "I eat corn rice every day" (P2). "I do not have a diet, just reducing glucose drinks" (P5). "I have never been on a diet because I have always eaten very little" (P6).

"I am still having difficulty starting a diet" (P7). "If I feel that my body is achy and unhealthy, I will eat less (P9)

Absence of physical activity

During the COVID-19 pandemic, participants in this study, most of them did not exercise. While for their daily activities, they tended to stay at home. They only left the house for specific purposes. Participants have never received

information about appropriate physical activity for DM patients. Statements that support these conditions are as follows: "I never walk in the morning again" (P2). "I am just at home" (P5), and "I never exercise" (P8).

Impaired monitoring of blood glucose levels

During the COVID-19 pandemic, participants in this study did not routinely monitor blood glucose levels. Before the pandemic, patients routinely visited the Community Health Center to check blood glucose levels as recommended by health workers. During the pandemic, they did not monitor their blood glucose levels at the Community Health Center for fear of contracting COVID-19 and were afraid to have a swab checked at the Community Health Center. The data can be seen in the statements of a participant as follows:

"I never had a blood test at the Community Health Center" (P1). "I just checked the blood at the community health center for the last two months because the COVID-19 has decreased and was swab first" (P3). "I don't routinely check blood glucose levels, sometimes I check my blood sugar with the midwife. (P5). I was afraid that the swab would continue to be positive" (P6).

Change of medication pattern

Participants in this study almost routinely took medicine by getting it at the Community Health Center during the COVID-19 pandemic. If a drug at the community health center runs out, participants can buy it because its price is affordable. Patient statements that support the data are:

"I buy my own medicine (P2). "... imitate the old prescription" (P3). "... show the old medicine pack" (P5). Some participants took herbs as a complement or alternative to medical treatment, such as the following statement: "I don't regularly take medicine but drink Habatusaudah to take care of my body" (P1). "I drink warm red ginger stew every day for my immune system" (P4). "I drink herbal medicine when there is a disturbance in my body" (P8).

Absence of foot care

Participants in this study had never received information about foot care for patients with DM. During the COVID-19 pandemic, participants in this study had never treated their feet. Even before the pandemic, the participants had never taken care of their feet. The feet of patients with DM were dry, 2 participants had sores on their big toes, and 2 had scars on their big toes and heels. The statements of participants that support the data are:

"I never take care of my feet" (P1). "The wound on my leg is because it hit the motorcycle engine, and I don't feel it" (P2) "I don't know how to take care of my feet" (P4). "There is a scar on my big toe. In the past, this wound did not heal because my blood glucose level was high" (P6) "I had a sore on my big toe first it didn't feel like it was painful, and swollen, and now the wound is almost dry" (P7). "I got a nail on my heel because I didn't feel it, suddenly my leg was swollen and red, it just hurt" (P9).

IV. DISCUSSION

Research data shows that the self-care behavior of DM patients during the COVID-19 pandemic is not appropriate because it is not done routinely and regularly. These data are consistent with the results of other studies showing that the COVID-19 pandemic is detrimental to the level of self-management of individuals with type 2 diabetes [11]. The new thing found in this study is the patient's habit of consuming herbal medicine to increase body immunity in addition to medical treatment which has not been revealed in previous studies. A complete review of the discussion of the results of this study can be seen in the following explanation.

A. POOR DIABETIC DIET

The data in this study shows almost all participants did not regulate their diet during the COVID-19 pandemic. Participants still eat, as usual, do not have a diet, eat less if there are complaints, and reduce glucose drinks. Another study has shown how the COVID-19 lockdown has changed dietary patterns and physical activity habits in patients with T2DM in Spain. This new habit of dietary patterns will hurt metabolic control and health in patients with T2DM. They also showed an increased intake of glucose foods and snacks, possibly due to emotions such as the boredom of staying at home all day or the stress caused by the pandemic. There is a relationship between the degree of food cravings and snack consumption in patients with DM during the lockdown period [12]. Patients with DM must maintain consistency in managing their diet regularly. They should eat healthily, with a balanced amount of fiber and protein. The limited amount of fat in the diet is significant for maintaining blood glucose levels [13]. The success of nutritional therapy in patients with DM depends on how the individual chooses the right food products. Therefore adherence to recommended dietary regimens should be part of routine nutritional assessments carried out by healthcare providers [14].

DM sufferers must pay attention to adequate nutrition during a pandemic so that metabolic changes do not occur which cause obesity or poor nutrition. Setting the number of calories must be adjusted to the patient's condition during a pandemic. The new habit during the pandemic is to stay at home, patients tend to eat more. If there is an excess of calories due to excessive eating, it can interfere with the body's metabolism which can trigger complications such as blood vessel disorders and diabetic foot ulcers.

B. ABSENCE OF PHYSICAL ACTIVITY

Participants in this study indicated that they had never exercised during the COVID-19 pandemic. They carry out activities at home and out of the house for purposes that they consider necessary. This condition may be one of the causes of increased blood glucose levels. Research on the physical activity of patients with T2DM in Spain showed a high percentage of physical inactivity before the COVID-19 lockdown and exacerbated it during the home lockdown [12]. Patients with DM in Brazil also show inadequate physical activity. Physical activity related to the use of

leisure time by patients with DM is also low [15]. Regular physical activity has many beneficial effects on health, especially during this pandemic, namely its ability to improve metabolic health and immune defenses. Physical activity guidelines suggest that to reduce sitting time. Adults with T2DM should replace prolonged sitting with light activity every 30 minutes. These activities are complementary, not a substitute for structured exercise (exercise) that includes at least 150 minutes/week of combined aerobic and resistance training [16]. Especially in the COVID-19 situation, regular exercise for patients with DM is not fundamental only for glycemic control. That is also for psychological well-being, as physical activity reduces stress and anxiety and improves mood and sleep quality [17].

Physical activity is one of the pillars of self-management of DM patients. So that physical activity must still be carried out during a pandemic by adjusting to the patient's environmental conditions. Patients can determine the right physical activity according to their condition so that blood glucose levels remain optimal. Patients can do substitute exercises that can be carried out around the home area such as light exercise in the morning or evening for 15-30 minutes.

C. IMPAIRED MONITORING OF BLOOD GLUCOSE LEVELS

The behavior of monitoring blood glucose levels by patients with DM during the COVID-19 pandemic in this study showed that patients did not monitor blood glucose levels regularly. Two-thirds of the participants stated that their blood glucose levels increased and became difficult to control after contracting COVID-19. Unstable blood glucose makes them feel frustrated and hinders their self-efficacy in carrying out diabetes management [18]. Uncontrolled hyperglycemia adversely affects patients with COVID-19 infection [19]. Self-monitoring blood glucose level (SMBG) is the most significant factor in self-management in patients with DM. SMBG is a powerful tool to prevent hypoglycemia and improve the quality of life of people with DM [20]. Several things that need to be necessary for implementing the SMBG are the type of diabetes, treatment patterns, clinical priorities, family and financial capabilities/support, and educational and behavioral factors. If patients with DM achieve the blood glucose target, they can reduce the frequency of SMBG. Patients record the results and time of SMBG in a blood glucose diary or digitally [21][22]. Individuals with DM must have an independent blood glucose checker so they can check their blood glucose at home during the COVID-19 pandemic. They must consume a proper diet and physical exercise at home too. That can improve glycemic control and reduce the risk of infection [23].

The blood glucose level of DM sufferers is one indicator of their success in carrying out self-care. Therefore, during a pandemic, DM sufferers must continue to monitor their blood glucose levels. Patient independence in monitoring

blood glucose levels needs to get support from health workers. Patients who have the initiative to independently check blood glucose levels deserve appreciation.

D. CHANGE OF MEDICATION PATTERN

Data from research on medication adherence in patients with DM show that almost all patients regularly take diabetes medication. Although health services for patients with DM at the community health center have decreased, it does not reduce their to remain obedient to taking medication. Patients buy their diabetes medication by showing the pack of drugs that they are usually consuming. Another reason is the price of drugs that are still affordable to patients. These data are consistent with other studies showing that patients with DM are taking their medication according to a prescription similar to the medication they were taking before the pandemic [24]. During the COVID pandemic period, it is significant for patients with DM to regularly take their prescribed medications or anti-diabetic drugs and insulin on time [13]. Diabetic self-care adherence by patients with DM was greater for medication use and consumption of a healthy diet but lower for glycemic monitoring, physical activity, and foot examinations, which were frequently reported findings even before the pandemic [15]. Adherence to taking medication is one of the pillars of DM disease management which is most adhered to by DM patients. DM patients feel this behavior is easy to implement and the price of drugs is not expensive.

Patients with T2DM as sufferers of chronic diseases tend to use herbs to manage their illness [25] [26]. Perceived self-efficacy is a strong predictor associated with the use of herbs as a complement to diabetes self-care in regulating blood glucose levels [25]. The use of herbs for patients with DM can be used together with anti-diabetic drugs to have better therapeutic potential, minimize the dose of oral hypoglycemic drugs, and as an effective supportive therapy in the prevention and management of long-term complications of diabetes [27][28].

Patient awareness to continue taking medication during a pandemic is a positive behavior that must be maintained. Patients not only use medical treatment but also use herbs. The reason patients choose to use herbs is because they feel the efficacy of these herbs. This behavior is a new finding from this study and has never been disclosed in previous research. The existence of patients who choose to use herbs must get the attention of health workers, where patients must get the right information in using herbs.

E. ABSENCE OF FOOT CARE

This study indicated that all patients with DM did not take care of their feet during the COVID-19 pandemic. There is no difference in foot care behavior before and during the covid-19 pandemic. All patients stated that they did not know how to take care of their feet and foot exercises. Another study data showed that 56.3% of patients with DM did not check their feet during the COVID-19 pandemic[15].

Patients should maintain foot hygiene to prevent foot-related problems during the covid-19 pandemic [13]. Foot care is part of the self-care behavior of patients with DM have aims to prevent the occurrence of diabetic foot ulcers. Predictors that were significantly related to foot care were duration of diabetes mellitus, knowledge of foot care, consequences, medication adherence, and self-confidence [29][30][31].

So the presence of covid-19 in our midst can threaten people with high risks such as DM and other non-communicable diseases, namely increasing morbidity and mortality [32][33]. Appropriate intervention is needed so that patients with DM can maintain their health status optimally. In addition to implementing strict health protocols and hygiene measures, other specific interventions for diabetes and comorbid management are proving critical to enable continuity of care services during the pandemic. These interventions include remote consultation, digital remote monitoring and education, e-prescribing, drug delivery options, mobile clinics, and self-care at home [32]. Support from all parties, both health workers and family members, is needed by patients with DM in carrying out self-care. Family support is indispensable for patients to continue implementing diabetes self-management [34]. Lack of family support can be a barrier for patients with DM in carrying out diabetes self-care. Support from family members is very significant to promote lifestyle changes and improve self-management behavior in diabetic patients [18].

All DM sufferers in this study did not perform foot care because of a lack of knowledge about foot care. Foot care behavior during a pandemic has not been reviewed in previous studies, and has only been revealed in this study. This bad foot care behavior needs attention from health workers. Nurses as part of the health workforce must provide good knowledge about care to prevent diabetic foot ulcers.

A diabetic diet, physical activity, medication adherence, monitoring glucose levels, and reducing risk factors are the pillars of self-management of DM patients. This must still be done during the pandemic by adjusting the patient's environmental conditions. Patients can determine the pillars of management appropriately according to their condition so that blood glucose levels remain optimal.

E. IMPLICATION AND LIMITATION

This study explores the experiences of patients with DM in carrying out self-care during the COVID-19 pandemic. Government policies in preventing the transmission of COVID-19 by imposing restrictions on activities outside the home affect patients with DM in carrying out self-care. The researcher expected that this research could provide information to develop simple and effective strategies for carrying out self-care for patients with DM during the COVID-19 pandemic according to the patient's condition.

This study was conducted during the COVID-19 pandemic so that interactions with patients must use strict health protocols and not have too long contact with patients. The place of research is a specific area that is felt comfortable and

affordable by the researcher. That may limit the generalizability of the research findings elsewhere. The in-depth interview process carried out led to a tendency for researchers to conduct subjectivity in data analysis. This requires further research using instruments or other more objective data collection guidelines.

VI. CONCLUSION

This research has explored the self-care experience carried out by patients with DM to manage their disease during the Covid-19 pandemic. DM patient's self-care behavior obtained is a decrease in diet, physical activity, monitoring blood glucose levels, and foot care. This decrease was caused by various conditions that occurred during the pandemic. In treatment behavior, it was found that there was the use of herbs as a companion to medical treatment. DM sufferers as a vulnerable group should receive more attention in terms of implementing self-care. Health workers are required to monitor the implementation of self-care for DM patients during the COVID-19 pandemic. Monitoring can be done online or offline with strict health protocols according to the needs and conditions of the patient to provide fast and appropriate help or treatment which can ultimately reduce the morbidity and mortality of DM sufferers. Furthermore, researchers need to carry out further research on strategies for implementing appropriate self-care in patients with DM during a pandemic, especially the use of herbs as a complement to treatment.

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