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CORRELATION OF UNCERTAINTY IN ILLNESS AND SELF-CARE IN TYPE 2 DIABETES MELLITUS PATIENTS

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ABSTRACT

Background: Diabetes is a non-communicable disease (NCD) and requires adherence to self-care to maintain health and prevent the disease from worsening. Several factors affect self-care in diabetic patients, including uncertainty in illness. Uncertainty is a major source of stress in patients with chronic diseases and also reduces patient compliance with self-care behavior. This study aims to determine the correlation between uncertainty in illness and self-care in type 2 diabetes mellitus patients at the Internal Medicine Polyclinic, Bandung City Hospital.
Methods: This study aims to determine the correlation between uncertainty in illness and self-care in type 2 diabetes mellitus patients at the Internal Medicine Polyclinic, Bandung City Hospital.
Result: This research results show a high level of uncertainty of 56.63%, a self-care level is good and a poor of 50%, p-value = 0.033 (α<0.05).
Conclusion: There is a relationship between uncertainty in illness and self-care in type 2 diabetes mellitus patients at the Internal Medicine Polyclinic at the Bandung City Hospital. This study recommends health workers improve self-care for patients with management uncertainty for type 2 diabetes mellitus patients.

Keywords: Self-care; Type 2 Diabetes Mellitus; Uncertainty in illness

BACKGROUND

Diabetes mellitus abbreviated as diabetes is a non-communicable disease (NCD) that is experiencing the fastest prevalence increase in globally and has become a health emergency in the 21st century.[1] In 2021, the prevalence of diabetes in the world is 10.5%, or 536,6 million adults (aged 20-79 years) who suffer from diabetes, this number is expected to increase to 643 million in 2030 and 783 million in 2045. In Indonesia, the prevalence of diabetes is 19.5%, or as many as 28.6 million people adults living with diabetes. This makes Indonesia ranked 5th as the country with the highest number of people with diabetes in the world. [1]

West Java is the province with the largest contributor to diabetes cases with the first rank in Indonesia. The prevalence of diabetes in West Java according to Riskesdas data in 2018 based on a doctor's diagnosis in a population ≥15 years was 131,846 people.[2] Meanwhile, in Bandung the prevalence of diabetes in 2018 based on a doctor's diagnosis in a population ≥15 years was 52,511 people.[3] Diabetes mellitus is included in the top 10 outpatient diseases with the highest number of new cases in Bandung City Hospital.

Diabetes is a group of metabolic diseases in the form of impaired insulin secretion, insulin action, or both, characterized by an increase in blood sugar.[4] Type 2 diabetes is the most common type of diabetes. More than 90% of all cases of diabetes are type 2 diabetes.[1] The cause of type 2 diabetes is mostly the result of being overweight and lack of physical activity.[5]

Diabetes-related mortality and morbidity can result from complications that accompany the disease.[6] Diabetic patients are at risk for foot ulcers that require amputation.[4] The risk of heart attack and stroke also increases two to three times compared to non-diabetic. Blindness caused by retinopathy results in nearly one

million people being blind due to diabetes.

Diabetes is also one of the main causes of kidney failure.5 According to WHO 5 diabetes management includes diet, physical activity, tobacco removal, blood sugar control, and foot care. These behaviors are included in diabetic self-care behaviors (Toobert et al., 2000 in Sugiharto [7]). Self-care is the main focus of many

interventions.8 Self-care is defined as the ability of individuals, families, and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without support from health care providers.[9]

Diabetes is a chronic disease that requires adherence to self-care to maintain health. Not practicing self-care is a major factor causing death in diabetics.6 In type 2 diabetes, several studies have shown that patients are less obedient in practicing self-care. Research conducted by Awad M. Al-Qahtani 10 in Saudi Arabia showed that the majority of respondents of type 2 diabetes patients (90.1%) had poor self-care behavior. Another study conducted in Ghana on patients with type 2 diabetes showed that patients had low adherence to each component of self-care diabetes, only 8.6% of respondents practiced a proper diet, 21.4% practiced physical exercise every day, 0.5% monitored blood sugar values and only 9.6% who do foot care.11 In Indonesia, research conducted by Pamungkas et al., [12] shows that most respondents do not practice a proper diet, do not monitor blood sugar independently, and do not adhere to medication.

The previous study reported that self-care in chronic illness is influenced by uncertainty in illness. Uncertainty in illness reduces patient compliance with self-care ($r=-0.25$, $p=0.002$).[14] Based on the research of Kim & Kim 14 and H. Zhang et al., [13] illness uncertainty can play a role as the main source of stress in patients with chronic diseases. Uncertainty of illness can lead to psychological problems such as depression, anxiety, and fear experienced by patients during the disease. Uncertainty of illness usually appears in chronic disease, if the emergence of uncertainty is assessed as a danger, the patient can experience distress, anxiety, a pessimistic outlook on life, and even depression.[16]

An et al., [18] stated that uncertainty cannot disappear spontaneously. However, no literature discusses related uncertainty in diabetes in Indonesia. Based on the magnitude of the problems mentioned above, new research is needed to assess uncertainty and its contribution to the self-care of diabetic patients. It is important to conduct this research as the development of knowledge in the field self-care of diabetes self-care. Thus, research on the "Correlation Uncertainty in Illness and Self-care in Type 2 Diabetes Mellitus Patients" was carried out.

RESEARCH METHODE

Study Design

This research is a correlational quantitative descriptive study with a cross-sectional approach.

Participants

The population was patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic at the Bandung City Hospital in March 2022 with a total of 255 people. The sampling technique used non-probability sampling by consecutive sampling. The sampling time that has been determined by the researcher is 6 days, namely on July 18-25, 2022. The sample size obtained in this study is 32 samples.

The inclusion criteria were type 2 diabetes patients with a minimum length of diabetes of 1 week, aged ≥ 18 years, and who did not experience communication disorders. The exclusion criteria in this study were patients who experienced health problems that could interfere with the interpretation of the results such as fatigue, weakness, dizziness, impaired consciousness, and other problems that made it impossible for the patient to become a respondent.

Instruments

Mishel Uncertainty in Illness-Community Form (MUIS-C)

The MUIS-C questionnaire measures uncertainty that has 4 dimensions: ambiguity, complexity, inconsistency, and unpredictability. The scoring system in this questionnaire uses closed statements using a Likert scale of 1-5, namely strongly disagree, disagree, undecided, agree, and strongly agree. This questionnaire has been translated into Indonesian by a translator from the National English Center (NEC) English course institution. The back-translation questionnaire was done by native speakers from American Translators Association (ATA). The back-translated questionnaire was then checked for similarity in meaning with the original questionnaire by the translator agency Quantum Jakarta which has been certified by HPI.

The content validity was tested on 2 psychiatric nursing lecturers, namely Ns. Cucu Rokayah, M.Kep. Sp.Kep.J and Ns. Emi Wuri Wuryaningsih, M.Kep. Sp.Kep,J and 1 lecturer in medical-surgical nursing, namely Ns. Vivop Marti Lengga, S.Kep., M.Kep. Questionnaire uncertainty consists of 23 statements. After the construct validity test, it was found that 14 statements had a value of r count > r table (0.576). The calculated r value for the 14 questions ranged from 0.587 to 0.802. The reliability test showed Cronbach's alpha value of 0.916.

Revised-Summary of Diabetes Self-care Activities (SDSCA)

This questionnaire measures the patient's self-care activities in adjusting diet, physical activity, monitoring blood sugar, taking the medication regularly, and taking care of the feet. This questionnaire was taken from the research of Zuela [19] and was tested for validity again by the researcher. The questionnaire consists of 17 questions. After the construct validity test, it was found that 9 questions had a value of r count > r table (0.576). The calculated r value for the 9 questions ranged from 0.597 to 0.766. The value of Cronbach's alpha is 0.840.

The skewness value of -0.896 can be said that the data is normally distributed. Then, the categories of uncertainty and self-care are calculated using a cut-off point from the mean value.

The mean value of the uncertainty is 40.63 so the uncertainty is high if the score is ≥ 40.63 and the uncertainty is low if the score is <40.63. The mean value of self-care is 32.44, so the self-care category is good if the score is ≥ 32.44 and the self-care category is poor if the score is < 32.44.

Data Collection

Researchers and enumerators looked at the medical record status to obtain patient data that matched the inclusion and exclusion criteria. After getting the data, we came to the respondent and explained the purpose of the research. Respondents who agreed and were willing to then sign the informed consent form to participate in the study. After the respondent finished filling out the questionnaire, the we conducted interviews related to the questionnaire.

Data Analysis

Univariate analysis using frequency and percentage and bivariate analysis using contingency coefficient correlation analysis.

Ethical Considerations

This research has passed the ethical test of the Health Research Ethics Committee of STIKes Aisyiyah Bandung with letter number 184/KEP. 01/UNISA-BANDUNG/VII/2022.

RESULT

Descriptive of Uncertainty in Illness

Table 1 *Uncertainty* in Type 2 Diabetes Mellitus Patient at the Internal Medicine Polyclinic Bandung City Hospital

Uncertainty	F	%
High	18	56.63
Low	14	43.8

Table 1 shows that 56.63%, namely 18 respondents have a high level of uncertainty.

Descriptive of Self-care

Table 2 *Self-care* in Type 2 Diabetes Mellitus Patient at the Internal Medicine Polyclinic Bandung City Hospital

Self-care	F	%
Good	16	50
Poor	16	50

Table 2 shows that 50% of the respondents, namely 16 respondents, showed self- care good and poor.

Relationship Between Uncertainty in Illness and Self-Care

Table 3 Relationship Between Uncertainty in Illness and Self-Care in Type 2 Diabetes Mellitus Patients at the Internal Medice Polyclinic Bandung City Hospital

		Self-care Category		Total	*p-value*
		Good	Poor		
Uncertainty Category	High	6 (18.8 %)	12 (37.5 %)	18 (56.3 %)	0,033
	Low	10 (31.3 %)	4 (12.5 %)	14 (43.8 %)	
	Total	16 (50%)	16 (50%)	32 (100%)	

DISCUSSION

Descriptive of Uncertainty in Illness

The results showed that most of the respondents (56.63%) had a high level of *uncertainty*. The results of this study are different from the study on heart failure patients conducted by An et al., [18] in China showing that the majority of respondents have uncertainty that is at a moderate level (96.79±12.48). Meanwhile, research on patients undergoing hemodialysis conducted by Kim & Kim [14] in Korea showed that the majority of respondents had uncertainty at a moderate level (90.00±11.63).

The high uncertainty in this study was caused by the emergence of 3 dimensions of uncertainty sources, namely ambiguity, complexity, and unpredictability in diabetic patients. Mishel (2009) in Smith & Liehr [17] states that ambiguity results from the disease being unclear or constantly changing. This ambiguity causes the patient to feel confused about his illness which can increase the uncertainty felt by the patient. This is in line with the research findings where statement item number 5, namely *"My diabetes symptoms continue to change unexpectedly"* becomes the statement with the highest total score with 18 respondents answering agree or strongly agree on this statement. Based on the interviews with respondents, the respondent said that she was confused by the changing symptoms of diabetes, sometimes often urinating up to 6 times in one night, and sometimes the frequency of BAK was normal/not too frequent. Also, sometimes respondent suddenly feels weak and sometimes feel healthy as if they do not have any disease.

Symptoms experienced are a process of individual perception, evaluation, and response to symptoms.[20] Lin et al [21] stated that diabetes symptoms can be a sign of poor glycemic control so recognizing symptoms can encourage patients to modify self-care behavior. In this study, it was found that the symptoms of diabetes are not always consistent with blood sugar values. This confusion is exacerbated by

blood sugar values that are often not in line with the symptoms felt by patients. A respondent said that he often experienced the severity of diabetes symptoms such as more frequent urination, but when his blood sugar check was close to normal (±160 mg/dl), he also had no symptoms of diabetes and felt his body was healthy but when he checked his blood sugar was high (>200 mg/dl). Another respondent said that when checked his blood sugar every time at the hospital the result is always high but there were no symptoms of diabetes felt by the respondent. This is in line with Lin et al., [21] who reported that each type 2 diabetes patient had different symptoms, even though some patients did not feel any symptoms.

The absence of symptoms in some diabetic patients can make patients not aware that they have diabetes, in this case, it requires a relationship with compatible and safe health workers who can make patients correctly recognize the uncertainty of life due to diabetes.[22] The uncertainty in illness theory states that uncertainty can decrease when the authority is very credible. Credible authority refers to a person's degree of trust and confidence in health care providers. Credible authorities provide information about the disease that can increase the familiarity of the event, thereby reducing uncertainty (Mishel, 1988 in Smith & Liehr [17]). Lack of credible information from health professionals regarding disease can exacerbate disease ambiguity and increase uncertainty.[14] Health care providers can provide sufficient time for consultations to help diabetic patients understand the uncertainties in their illness.

Complexity dimension results from the difficulty of understanding the treatment and care of diseases and the health care system (Mishel, 2009) in Smith & Liehr,[7]). The complexity of the treatment is shown in the respondent's statement that she does not yet understand how to eat the right food for diabetic patients, he has reduced his eating sugar but when he checks his blood sugar is high. Interviews with other respondents said that he felt confused due to erratic blood sugar, he had implemented a diet according to the advice of a nutritionist but when he checked his blood sugar was still high. This shows that the treatment of diabetes (diet and how to maintain stable blood sugar) experienced by respondents is too complex to understand and it contributes to a higher level of uncertainty.

The difficulty in understanding treatment was shown in the respondent's statement during the interview, the respondent said that he had complied with taking diabetes medication regularly but his blood sugar was still high. Another respondent said that his blood sugar fluctuated even though he had taken diabetes medication according to the doctor's instructions. Difficulty understanding treatment can contribute to increased uncertainty (Mishel, 1988 in Y. Zhang [16]).

The dimension of unpredictability results from a discrepancy between current and previous disease experiences (Mishel, (2009) in Smith & Liehr, [17]). Complications and severity of diabetes symptoms can occur during the disease.[5] A respondent said that he could no longer stand for a long time due to weakness and numbness in his legs due to the symptoms and complications of diabetes. Another respondent said that his vision had changed, during the day it looked more glared and the night looked more blurry. Difficulty predicting the course of the disease can increase uncertainty in patients (Mishel, 2009 in Smith & Liehr [17]).

The total score of the lowest statement items from all respondents' answers is in the unpredictability dimension in item number 14, namely *"The severity of my diabetes mellitus (sugar) is known"* with 21 respondents answering agree or strongly agree on this statement. The respondent said that he had known the severity of diabetes because the doctor had said that diabetes could not be cured, another respondent said that his family members and neighbors had died of diabetes. Then, some respondents say that the severity of diabetes is caused by its complications. Some respondents also know that diabetes is a serious disease because it is the cause of various diseases such as heart disease, stroke, and neurological disease. Mishel (1988 in Smith & Liehr, [17]) states that adequate information about the seriousness of the disease can reduce the uncertainty of illness perceived by the patient.

Descriptive of Self-care

The results showed that half of the respondents (50%) showed good and poor self- care. This can happen because in this study some respondents already understood the benefits of self-care for diabetes and some did not understand the benefits of self-care for diabetes. According to Riegel [8] ideal self-care is where the patient has reflection or

contemplation that has a relationship with knowledge gained so that he performs self-care purposefully. Self-care aims to relate to patients' knowledge about how self-care is needed for their illness and its benefits for their body condition. In diabetic patients, self-care aims are obtained from the patient's understanding of the benefits of self-care and the ability to adjust self- care with the value of their blood sugar level.[23]

The results of this study are different from previous studies conducted by Sudyasih et al., [24] which state that the majority of respondents have self-care in the good category (38.1%). Another study conducted by Sabil et al., [26] showed that the majority of respondents had self-care in a good category (66%). Meanwhile, research conducted by Indriani et al., [25] shows that the majority of respondents have self-care with a poor category (52.2%).

Self-care in this study consisted of five components, namely dietary regulation, physical activity, blood sugar monitoring, drug use, and foot care (Toobert et al., (2000) in Sugiharto et al., (7)). Dietary regulation is important to do in diabetic patients because the food eaten can affect the patient's blood sugar levels.[27] The dietary component of the SDSCA questionnaire used in this study measures adherence to the recommended dietary plan, consumption of fruits and vegetables, restriction of fatty foods, and carbohydrates.

The recommended diet in diabetic patients includes the arrangement of the contents of the plate, namely half a plate containing vegetables, a quarter plate containing carbohydrates, and the remaining quarter plates containing protein.[27] Carbohydrate intake needs to be limited because carbohydrates can increase blood sugar higher and faster than other foods.[27] Diabetic patients also important to eat foods that contain fiber in vegetables and fruit and reduce the intake of high in fat foods.[4] Also, diabetic patients need to limit their saturated fat intake and avoid trans fats. Apart from being dangerous to health, diabetic patients have a risk of developing heart disease due to complications of diabetes. This can be exacerbated by the consumption of saturated fat.[27]

Physical activity can maintain blood glucose by increasing insulin sensitivity so that it helps insulin work better.[27] The SDSCA questionnaire in this study measured light physical activity carried out daily and special physical activity (exercise). In this study, the majority of respondents had done light physical activity every day such as cleaning the house, washing clothes, washing vehicles, walking, and going up and down stairs. However, the majority of respondents did not do specific physical activity sessions (exercise) such as swimming, brisk walking/jogging, gymnastics, and weight training. During the interview, some patients knew the importance of having an active lifestyle and exercise to maintain blood sugar levels, while some other patients did not know the benefits of an active lifestyle and exercise for diabetes. In addition, some patients also experience obstacles in doing exercise such as weakness (a symptom of diabetes) and numbness in the feet and hands (nerve complications).

Diabetic patients are recommended to check their blood sugar regularly. If using insulin, the patient may be instructed to check blood sugar just before injecting insulin so that the patient can adjust the dose if needed. It is recommended to check blood sugar before going to bed every night and in the morning before doing activities. Other times to check blood sugar may include before eating and/or two hours after.[27] In this study, it was found that the total blood sugar monitoring score shown in the question *"In the past week, how many days have you checked blood sugar in health services or independently at home?"* ranked the lowest of all questions with 22 respondents answering 0 (days a week) on this question. The majority of respondents said that they only checked their blood sugar once a month during diabetes control at the hospital. The majority of respondents also do not have their own blood sugar checker at home.

Taking blood sugar-lowering medications as prescribed can help maintain the patient's blood sugar even though these blood sugar-lowering drugs cannot cure diabetes.[27] In this study, the majority of respondents were given oral diabetes medication, they also routinely take diabetes medication. The results of this study found that the total score for drug use shown in the question *"In the last one week, how many days did you use the medication according to the dose/doctor's instructions?"* ranks the highest of all questions with 25 respondents answering 7 (days of the week) on this question. When interviewed about the reasons for taking diabetes medication, respondents said that taking diabetes medication is beneficial to keep their blood sugar from being high, to recover, and to

prevent complications.

Over time, diabetes can cause loss of sensation in the feet. When the patient loses sensation in the feet, the patient may not feel the pebbles in the footwear or blisters on the skin of the feet which can cause sores. In addition, diabetes can also reduce the amount of blood flow in the legs. Numbness and less blood flow in the legs can cause foot problems in diabetic patients. Foot care can reduce the chance of foot amputation in diabetic patients.[28] In this study, the majority of respondents did not perform a foot examination independently. Lack of foot care in diabetic patients can be caused because patients do not understand how and the importance of foot care. This is evidenced by the results of interviews which show that the majority of respondents said they did not understand the benefits, methods, and importance of foot care.

The Relationship Between Uncertainty in Illness and Self-Care

In this study, it was found that there is a relationship between uncertainty in illness and self-care in patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic Bandung City Hospital. According to Mishel, (1988 in Y. Zhang, [16]) uncertainty is a neutral condition until assessed. Assessment is a cognitive process used to determine whether a stressor is a hazard (threat) or an opportunity (challenge). This assessment then uses coping strategies to respond to stressors resulting from uncertainty. If the stressor of uncertainty is assessed as dangerous and has the potential to produce negative outcomes, individuals will try to use coping strategies to reduce uncertainty. However, if uncertainty is assessed as an opportunity that has the potential to produce positive results, individuals will try to use coping strategies that maintain uncertainty.

Coping is a mental and physical effort that is used to manage stressors of uncertainty.[16] Patient coping developed from the existence of uncertainty could affect self-care. Individual behavior can be influenced by the coping strategies used in dealing with existing stressors. Coping strategies affect the individual's ability to decide on various options for action. One of them is the choice to take action in self-care.[29]

If the emergence of stressors from uncertainty is not overcome with appropriate coping strategies, it can cause the patient to feel stressed. This is stated in the study [13] which shows that uncertainty is positively related to the perception of stress. This can happen because uncertainty can lead to the belief that an uncertain future is unfair and sad which results in increased stress that is felt due to uncertainty. The perceived stress partially mediates between uncertainty and self-care, accounting for 40.8% of the total effect.

The results of this study are in line with the research conducted by Kim & Kim [14] in Korea on patients undergoing hemodialysis, showing that there is a significant relationship between uncertainty and self-care compliance. This study is also in line with the research conducted by Jang et al., [30] in Korea which showed that uncertainty was significantly related to the self-care of patients undergoing hemodialysis.

In this study, it was found that almost half of respondents (37.5%) had poor self-care with high uncertainty and almost respondents (31.3%) had good self-care with low uncertainty. This could be due to the level of uncertainty that could affect self- care. The higher uncertainty, the lower the self- care that is carried out.[13]

Research in China shows that coping strategies to deal with the disease are negatively correlated with uncertainty ($r = -0.231$, $P = 0.001$) and the method of coping strategies to surrender to disease is positively correlated with uncertainty ($r = 0.249$, $P < 0.001$). In practice, it shows that uncertainty can decrease and patients can be more focused on self-care if patients actively face reality, communicate with medical staff, and gain knowledge related to disease in various ways. On the other hand, if the patient succumbs to his illness and loses confidence in the health care provider, his self-care will be reduced. Then, the patient will stop seeking relevant information about the disease and become laissez-faire (let things happen) on the disease process and prognosis. Thus, increasing uncertainty can accelerate disease progression.[31] Therefore, uncertainty is very important to prevent the worsening of the disease.

Based on Mishel's theory, uncertainty is managed through four components. This uncertainty management can be carried out by healthcare providers. The first component is the provision of information. In this case, health care providers can provide information about symptoms, treatments, and sources of support to increase patient knowledge. The second component is a communication strategy. In this case, healthcare providers can improve communication strategies between patients and healthcare providers. The third component is that

health care providers can help patients assess uncertainty in a positive perspective. The fourth component is that health care providers can conduct cognitive behavioral coping strategies, such as relaxation, guided imagination, and distraction. Overall, previous studies have shown improvements in patient's knowledge of the illness, positive thinking skills, problem-solving, patient- health care provider communication, access to information resources, use of coping strategies, and social support. This can reduce uncertainty.[16]

Nevertheless, type 2 diabetic patients were seldom provided the educational program on uncertainty management. This is the first study to identify a relationship between uncertainty in illness and self-care in the diabetic patient. Therefore, the role of healthcare providers is very important to educate patients with type 2 diabetes about uncertainty in diabetes to help them understand the relationship between uncertainty and self-care behaviors for better improving the outcomes of diabetes control.

LIMITATIONS OF THE STUDY

There is no adaptation of MUIS-C instrument in Indonesian which has been tested for validity and reliability. In addition, there are no recent studies that examine uncertainty in diabetic patients and the relationship between uncertainty in illness and self-care in diabetic patients so the available reference sources are limited.

Mishel Uncertainty in Illness Scale (MUIS) only measures the level of uncertainty in the disease without measuring how the patient assesses uncertainty and what coping strategies the patient uses in dealing with uncertainty.

CONCLUSION

There is a relationship between uncertainty in illness and self-care in type 2 diabetes mellitus patients at the Internal Medicine Polyclinic at the Bandung City Hospital. This study recommends healthcare workers improve self-care for patients with management uncertainty for type 2 diabetes mellitus patients. Knowing the relationship between uncertainty and self-care is beneficial for health workers to improve diabetes care.

RECOMMENDATION

This study also suggests health care providers provide health education by focusing on improving self-care by managing uncertainty including increasing knowledge about diabetes and developing appropriate coping strategies for patients with type 2 diabetes mellitus to improve self-care. Future studies are expected to examine the effect of management uncertainty on self-care in type 2 diabetes patients.

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