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Research Article Sofyan Indrayana<sup>1\*</sup>, Mulyanti Mulyanti<sup>1</sup>, Erni Samutri<sup>1</sup>, Muhammad GA Putra<sup>1</sup>, Ngatini Ngatini<sup>1</sup>, Ummi Nurhidayatul Umami<sup>1</sup>, Geladis Titanik<sup>1</sup> Abstract  
Introduction: People with type 2 DM (T2DM) tend to experience indirect health risks due to problems in aspects of self-care behavior during the COVID-19 pandemic. However, information on self-care among people with T2DM during the pandemic is still limited across the world. This study aimed to understand the self-care behavior change among T2DM in Kasihan 2 Community Health Center before and during the COVID-19 pandemic. Methods: This was a non-experimental study with a retrospective approach.

As many as 187 people with T2DM were recruited from a Kasihan 2 Community Health Center using an accidental sampling technique. We exclude participants who have severe complications and impairment cognitive. Data were self-report administered by using The Summary of Diabetes Self-Care Activities Measure (SDSCA). The Wilcoxon Signed Rank Test was performed to examine the hypothesis. Results: Our study found that the average diabetic self-care score before the COVID-19 pandemic was 65.257(±11.22), meanwhile self-care score during the pandemic was 59.15(±11.08). Wilcoxon test for SDSCA total score resulted in z coefficient was -9.596 with the p-value equal to 0.00 (<0.05). Several aspects of diabetic self-care had a significant difference (p<0.05) between before and during the COVID-19 pandemic, such as general diet (z=-9.596); special diet (z=-4.836); physical activity (z=-9.629), and blood glucose monitoring (z=-5.760).

Conclusions: There was a significant change in diabetic self-care before and during the COVID-19 pandemic especially in the general diet, special diet, physical activity, and blood glucose monitoring among T2DM in Kasihan 2 Community Health Center. Therefore, health professionals may visit the patient periodically to make sure people

with type 2 diabetes mellitus perform the recommended self-care. Keywords: self-care, diabetes mellitus, community health center, pandemic, COVID-19

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SELF-CARE BEHAVIOR CHANGES AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS IN KASIHAN 2 COMMUNITY HEALTH CENTER DURING COVID-19 PANDEMIC Indonesian Nursing Journal of Education and Clinic (INJEC) IN PRESS Volume 7 Issue 2, December 2022 DOI: 10.24990/injec.v7i2.502 injec.aipni-ainec.org/index.php/INJEC/index Received : 2022-09-20 Accepted : 2022-12-29 The Association of Indonesian Nurse Education Center (AINEC) Indonesian Nursing Journal of Education and Clinic (INJEC) In Press | pISSN: 2527-8800 ? eISSN: 2527-8819

INTRODUCTION Diabetes mellitus (DM) is defined as metabolic impairment caused by inadequate insulin production or ineffective use of insulin (International Diabetes Federation, 2021).

DM is predicted to be increased up to 643 million in 2030 and 783 million in 2045 worldwide (International Diabetes Federation, 2021). Indonesia become the fifth ranking of diabetes numbers (19.5 million) in 2021 (International Diabetes Federation, 2021). Over 90% of all diabetes worldwide, type 2 diabetes mellitus (T2DM) is the most common type of diabetes (International Diabetes Federation, 2021). Meanwhile, uncontrolled T2DM, which it is mostly diagnosed after getting severe symptoms, will lead to complications that result in physical, mental, and economic burdens for patients and their families (Fejfarová et al.,

2014; Kerr, Rayman and Jeffcoate, 2014; International Diabetes Federation, 2021). These burdens will result in lower quality of life among people with diabetes (Fejfarová et al., 2014; Indrayana et al., 2019; Canra, Wahyuningsih and Indrayana, 2019). Therefore, preventing emerged complications is important. Diabetes mellitus self-care is defined as an evolutionary process of knowledge development or awareness by learning to survive with the complex nature of diabetes in a social context (Shrivastava, Shrivastava and Ramasamy, 2013).

In other words, people with T2DM need to control their illness through their own ability. DM self-care, including healthy eating (including general and specific diet), physical activity, blood glucose monitoring, foot care, medication, and smoking behavior is believed to prevent diabetes complications (Shrivastava, Shrivastava and Ramasamy, 2013; Indrayana et al., 2019; Prabawati and Natalia, 2020).

However, self-care practice still needs to be improved because a study conducted in Indonesia revealed that self-care behavior among T2DM was mostly (96%) in the fair

category (Manto, Permana and Primanda, 2017). On the other hand, Coronavirus Disease 2019 (COVID-19) pandemic situations changed have changed the order of life, including behavior and health services. The presence of chronic diseases, including type 2 diabetes mellitus, results in a worse prognosis for COVID-19 (Center for Disease Control, 2021; Kemenkes, 2021; World Health Organization (WHO), 2021).

People with DM tend to have indirect health risks due to disturbances in healthcare and lifestyle factors during the COVID-19 pandemic (Hartmann-Boyce et al., 2020). These health impairments will certainly affect the condition of T2DM patients, although information on the impact of COVID-19 on DM patients has not been consistently identified (Hartmann- Boyce et al., 2020). Health services and lifestyles of people with T2DM might be changed due to social restrictions (Kemenkes, 2020) that applied during the COVID-19 pandemic.

Moreover, several programs, such as a management program of chronic diseases called PROLANIS (Ahmad et al., 2017), cannot be performed during the pandemic. Meanwhile, understanding the risk of alteration of health services and lifestyle is the key to preventing health consequences among people with DM either during or post-pandemic (Hartmann-Boyce et al., 2020). Self-care for diabetes is one of the important aspects of people with DM treatment that might be affected during the pandemic.

However, information about self-care practices among people with DM during the COVID-19 pandemic is still Ilmy, Windarwati, Noorhamdani, & Wijaya <http://injec.aipni-ainec.org/index.php/INJEC/index> | In Press limited (Hartmann-Boyce et al., 2020). This study aimed to reveal the self-care behavior change among type 2 diabetes mellitus in Kasihan 2 Community Health Center during the COVID-19 pandemic.

**METHODS** Study design This non-experimental study used the retrospective approach to collect the data, hence every participant will be also measured for phenomenon in the past (Plichta and Kelvin, 2013; Machfoedz, 2019).

The variable measured in this study was Self-Care Behavior. Population, samples, and sampling As many as 187 people with T2DM were recruited from Kasihan Community Health Center in the period of June to August by using an accidental sampling technique (Plichta and Kelvin, 2013; Machfoedz, 2015). The inclusion criterion was people with T2DM who were diagnosed at least two years before the study was conducted to minimize the confounding variable, such as psychological problems that may appear related to duration of disease.

We exclude people with type 2 DM who have severe complications and cognitive

impairment. Sample size was calculated using Slovin equation from 352 population. Instruments Demographics data and certain conditions were collected from participants using demographics and certain condition questionnaires. It included a question about age, gender, education level, DM duration, presence of Diabetic Foot Ulcer (DFU), occupation, income, comorbidity, and having someone who remains to perform diabetic self-care.

Diabetic self-care was administered by self-report using The Summary of Diabetes Self-Care Activities questionnaire (SDSCA) that has been translated to an Indonesian version ( Sugiharto et al., 2019; Toobert, Hampson and Glasgow, 2000). This questionnaire consists of two items about general diet, three items about a specific diet, two items about physical activity, two items about blood glucose monitoring, five items regarding foot care, three items about taking medicine, four items about smoking habits, and four items about self-care (Toobert, Hampson and Glasgow, 2000). The score is calculated by adding up the number of days divided by the number of questions on each domain or dimension (Sugiharto et al.,

2019; Toobert, Hampson and Glasgow, 2000). Domain smoking habits and self-care were not included in the score but these are used as consideration for health education needs (Sugiharto et al., 2019; Toobert, Hampson and Glasgow, 2000). Validity and reliability for the Indonesian version of SDSCA were not performed in this study because they have already been tested with the content validity index of 0.98 and  $\alpha$  of 0.72, which are considered satisfactory (Sugiharto et al., 2019). Procedure Indonesian Nursing Journal of Education and Clinic (INJEC) In Press | pISSN: 2527-8800 ? eISSN: 2527-8819 Data were collected face-to-face using paper-based questionnaire.

After the researcher obtained permission from the head of the Community Health Center, potential respondents were identified. We explained the research purpose, procedure, and confidentiality to those who matched with the inclusion and exclusion criteria. After participants signed the informed concern, the questionnaires were distributed to be filled within a maximum 20 minutes. Demographic data must be completed before the participants answer the questionnaire about diabetic self-care before and during the COVID-19 pandemic using the Indonesian version of SDSCA.

Researchers ensured there were no missing data from returned questionnaires before they were collected. Data analysis The collected data were tabulated to be the dataset and analyzed using IBM SPSS Statistics 20 version for Windows. Descriptive analysis was performed to describe the demographics and certain conditions including age, gender, education level, DM duration, presence of Diabetic Foot Ulcer (DFU), occupation, income, comorbidity, and having someone who remains to perform diabetic self-care of

people with type 2 diabetes mellitus. Shapiro Wilk test was performed to measure the distribution of data on diabetic self-care before and during the COVID-19 pandemic.

The Wilcoxon Signed Rank Test was performed to examine the hypothesis due to the non-normally distributed data, with p-value less than 0.05 considered statistically significant. Table 1. Characteristic of respondents (n=187) Characteristic Subcategories n % Mean(±SD) Age - 51.56 (±8.02) Gender Male 42 22.5 Female 145 77.5 Education Elementary 52 27.8 Junior high 40 21.4 Senior high 67 35.8 Diploma 18 9.6 Bachelor 10 5.3 DM Duration - 3.93 (±2.54) Presence of DFU Never 171 91.4 Ever 16 8.6 Occupation Unemployed 91 48.7 Public servant 24 12.8 Employee 24 12.8 Businessman 15 8.0 Farmer 33 17.6 Income\* - 1,957,754.01 (±1,101,163.26) Comorbidity No 147 78.6

Hypertension 40 21.4 Having someone to remind to perform self-care No 132 70.6 Yes 55 29.4 \*DFU= diabetic foot ulcer \*IDR= Indonesian Rupiah \*DM= diabetes mellitus Ily, Windarwati, Noorhamdani, & Wijaya <http://injec.aipni-ainec.org/index.php/INJEC/index> | In Press Ethical clearance Ethical consideration was filled by obtaining ethics approval from the institutional review board Universitas Alma Ata with the number KE/AA/VI/10528/EC/2021. It was also fulfilled by applied of anonymity and obtaining the informed concern from participants after they obtained an explanation of the purpose of the research, research procedures, and confidentiality.

RESULTS The characteristics of respondents are summarized in Table 1. As many as 187 respondents participated in this study with a mean age was 51.56 (±8.02) years old. Participants of this study were dominated by females (77.5%); senior high education (35.8%); never had a diabetic foot ulcer (DFU) (91.4%); unemployed (48.7%); have no comorbidity (78.6%), and most of them did not have someone to remind in performing self-care (70.6%). Moreover, participants were having DM for 3.93 (±2.54) years and their monthly income was 1,957,754.01 (±1,101,163.26) on average. Table 2 shows that several aspects of self-care, namely general diet, specific diet, physical activity, and blood glucose level monitoring, were changed ( $p < 0.05$ ) compared to before the COVID-19 pandemic among people with type 2 DM in Kasihan 2 Community Health Center. On the other hand, two of these, foot care and medication, were not significantly changed with the p-value being 0.053 and 0.377 ( $p > 0.05$ ), respectively.

DISCUSSION Our study identified the different self-care behaviors among people with type 2 diabetes mellitus before and during the COVID-19 pandemic. This study found that most of the self-care behavior aspects among people with type 2 diabetes mellitus in Kasihan 2 Community Health Center have been changed during the COVID-19 Pandemic. These were general diet, specific diet, physical activity, and blood glucose level monitoring. These changes may increase their risk of poor prognosis of COVID-19

(Center for Disease Control, 2021).

General diet and specific diet are the aspects of diabetic self-care that significantly changed during the COVID-19 pandemic among people with T2DM in Kasihan 2 Public Health Center. General diet is about how obedient people with T2DM are in following a healthful eating plan during the last seven days to a month (Sugiharto et al., 2019; Toobert, Hampson and Glasgow, 2000). Meanwhile, the Table 2. Self-care behavior change among people with type 2 diabetes mellitus in kasihan 2 community health center during covid-19 pandemic (n=187) The aspect of Self- Care\* Pre-Pandemic of COVID-19 (mean±SD) During COVID-19 Pandemic (mean±SD) Z p General diet 4.09(±1.99) 3.06(±1.78) -9.596 0.000 Specific diet 3.35(±0.87) 3.11(±0.78) -4.670 0.000 Physical activity 5.01(±1.24) 3.87(±1.37) -9.629 0.000 Blood glucose level monitoring 2.06(±0.64) 1.67(±0.65) -5.760 0.000 Foot care 3.86(±1.09) 3.78(±1.13) -1.931 0.053 Medication 4.53(±0.74) 4.58(±0.72) -0.884 0.377 \*Based on The Summary of Diabetes Self-Care Activities questionnaire (SDSCA) Indonesian Nursing Journal of Education and Clinic (INJEC) In Press | pISSN: 2527-8800 ? eISSN: 2527-8819 specific diet is how they adhere to following the type and amount of healthy foods (Sugiharto et al., 2019; Toobert, Hampson and Glasgow, 2000). People with T2DM tend to have a lower general diet during the COVID-19 pandemic compared to before, which is indicated by a Z score of -9.596.

It also could be seen in decreasing the mean score of the general diet from 4.09(±1.99) to 3.06(±1.78) during the pandemic. Similarly, the mean score of specific diets among them was identified to significantly decrease from 3.35(±0.87) to 3.11(±0.78) with a z score was -4.67. It is reflected that, during the COVID-19 pandemic, people with T2DM did not follow the healthful eating plan recommended for DM. It could be the result of social restrictions and healthcare restrictions that applied in Indonesia during the outbreaks (Kementrian Kesehatan RI, 2020).

People with T2DM are more likely have difficulty to getting the foods which are appropriate to their healthy eating plan during the restriction. They also experienced work from home (WFH) or staying at home during the pandemic, which may increase their mental distress (Sutarto, Wardaningsih and Putri, 2021). Hence, those who got stressed tend to have a disturbance in eating patterns as well (Yau and Potenza, 2013).

Moreover, they may not go to the Public Health Center to attend the management program of chronic diseases called PROLANIS, which is an activity to improve health knowledge to repair the disease and prevent a resurgence (Ahmad et al., 2017). The physical activity aspect is about how someone performs a minimum of 30 minutes of exercise, not including daily activities (Toobert, Hampson and Glasgow, 2000). This

aspect of diabetic self-care was also identified to be decreased significantly from 5.01(±1.24) to 3.87(±1.37) with a Z score of -9.629 during the pandemic.

This result is supported by some studies which also indicate reducing physical activity during a pandemic (Caputo and Reichert, 2020; Pérez-Gisbert et al., 2021). They also change their physical activity by sedentary activity such as watching television, being active on social media, etc. (Zorcec et al., 2020; Prieto Rodríguez et al., 2022). It might be caused by social distension, isolation, and unable to attend to physical activity programs in PROLANIS or see a health professional, which will affect physical activity among people with chronic diseases including diabetes mellitus (Ahmad et al., 2017; Pérez-Gisbert et al., 2021; Prieto Rodríguez et al., 2022). Blood glucose level monitoring, which is pivotal in diabetic self-care (Prabawati and Natalia, 2020) was found to reduce significantly from an average score of 2.06 (±0.64) before the pandemic to 1.67(±0.65) during the pandemic. Normally, **people with type 2 diabetes mellitus in** the population will go to PROLANIS in the Public Health Center to check their glucose levels periodically (Ahmad et al., 2017).

Unfortunately, **during the COVID-19 pandemic**, the program was closed due to social distancing and isolation (Kemenkes, 2020). **CONCLUSIONS** Our findings reveal that there is **a significant change in diabetic self-care before and during the COVID-19 pandemic, especially in the general diet, special diet, physical activity, and blood glucose monitoring among T2DM in Kasihan 2** Public Health Center. These changes might be caused by the implementation of social distancing and Ilmy, Windarwati, Noorhamdani, & Wijaya [http:// injec.aipni-ainec.org/index.php/INJEC/ index](http://injec.aipni-ainec.org/index.php/INJEC/index) | In Press isolation to prevent the spread of COVID- 19.

We recommend the healthcare professional to visit patients **periodically to make sure people with type 2 diabetes mellitus perform the recommended self- care.**

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