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**BARRIERS TO PHYSICAL ACTIVITY IN RECENTLY DIAGNOSED TYPE 2 DIABETES MELLITUS PATIENTS: A QUALITATIVE STUDY**

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**Abstract**

**Background:** Physical activity as one of diabetes management plays important role in maintaining glycemic control. Not all diabetics are doing adequate physical activity. Especially for recently diagnosed type 2 Diabetes Mellitus patients with the characteristic haven't adopt diabetes management properly.

**Objectives:** The aim of this study to reveal the barriers in physical activity that faced by recently diagnosed type 2 Diabetes Mellitus patients.

**Methods:** Qualitative study with phenomenological approach was conducted in 10 recently diagnosed type 2 Diabetes Mellitus patients in Primary Health Care Kedungdoro and Asemrowo, Surabaya. The participants were selected based on inclusion criteria, namely patients aged 25-45 years old, under 6 months diagnosed, spoke in Indonesian or Javanese well. The exclusion criteria were patients with complication. Semi-structured in-depth interviews guided by interview guideline was conducted to obtain the information about barrier in physical activity. There were six questions in interview guideline. Then data from interview was analyzed by Colaizzi method.

**Results:** Two themes were emerged as barriers in physical activity namely time expenditure and health literacy. Participants' time expenditure refers to the limited time in doing physical activity, namely obligation to others and lack of spare time. Health literacy refers to the ability in searching and using health information. The barrier in health literacy aspect namely physical activity substitute and different information that got from others.

**Conclusion:** The barriers of physical activity were problem in time flexibility, activity substitute, and need for straightening various information. Using media technology and involving family to promote and remind the physical activity can be suggested.

**Keywords:** *Barriers, Diabetes Mellitus Type 2, Recently Diagnosed, Physical Activity.*

## INTRODUCTION

Physical activity is one of the diabetes management. Physical activity, as diabetes management, must be carried out by patients recently diagnosed with type 2 Diabetes Mellitus (T2DM) and guarding the progress of the disease (PERKENI, 2015). Physical activity is defined as planned, structured, and repeated energy expenditure, which may include cardiovascular exercise, strength, and flexibility (World Health Organization, 2017). Physical activity significantly reduce glycosylated hemoglobin (HbA1c) by 0.6 to 8.0% (Lanhers et al., 2015). Unfortunately as many as 58.7% of patients with T2DM had lack physical activity (Ramadhanisa, Larasati, & Mayasari, 2013). Adults who have T2DM did less physical activity than people who didn't (Egede & Zheng, 2002). Nearly a third of diabetics have a sedentary lifestyle (Nelson, Reiber, & Boyko, 2002).

Data from the International Diabetes Foundation (IDF) in 2017 stated that the number of DM patients was 425 million and around 90% were DM type 2. The results of Indonesia basic health research in 2018 showed an increase in the number of DM patients based on doctor's diagnosis of 1.5% in the year 2013 to 2.0% in 2018 (Kemenkes, 2018). East Java Province ranks fifth with the prevalence of DM patients based on doctor's diagnosis of 2.1% in 2013 and increased to 2.6% in 2018. Surabaya ranks sixth in East Java in terms of the number of DM patients diagnosed by doctors by 4.5% in 2018 (KEMENKES, 2018).

World Health Organization recommend of 150 minutes of moderate-intensive aerobic activity or 90 minutes of vigorous aerobic every week (World Health Organization, 2017). Physical activity can increase blood sugar uptake and insulin sensitivity as to maintain blood sugar homeostasis through a decrease in blood sugar levels after 2-73 hours (Colberg, 2012). The benefits of physical activity for diabetics are great, but the barriers to its implementation are also great especially for patients who have recently diagnosed with type 2 diabetes mellitus. Moreover, patients who

recently diagnosed have characteristics that still do not trust the diagnosis, lack of acceptance, and lack of ability to adopt diabetes management properly (Castro-Sánchez & Ávila-Ortíz, 2013). Previous studies regarding obstacles faced by overseas patients include lack of energy, skill, and support (Alzahrani, Albakri, Alqutub, Alghamdi, & Rio, 2019) tiredness and being distracted (Thomas, Alder, & Leese, 2004). Previous research in Indonesia regarding the barriers to implementing diabetes management only includes diet and medication (Fajrunni'mah, Lestari, & Purwanti, 2017; Rondhianto, 2013).

Based on the facts and results of previous studies, it is important to know the barriers experienced by patients recently diagnosed with T2DM so that the barriers can be overcome and the patient can perform physical activity adequately. A question-based approach can be used to determine the patient's response (Atkinson & Rubinelli, 2012). In the question-based approach, diabetics can reveal their subjective experiences or barriers when doing physical activity. This study aims to determine the barriers experienced by patients recently diagnosed with type 2 diabetes mellitus in physical activity.

## METHODS

### *Study Design*

This study is qualitative design with phenomenological approach.

### *Setting*

The research was conducted in two Primary Health Care namely Primary Health Care Kedungdoro and Asemrowo, Surabaya on 2<sup>nd</sup> March to 30<sup>th</sup> April 2020.

### *Research Subject*

The subject of this study were recently T2DM patient which diagnosed under 6 months. 10 participants who matched the data saturation criteria were included in this study. The data saturation criteria is when no new keyword found in interview.

The inclusion criteria were patients aged 25-45 years old, under 6 months diagnosed T2DM, spoke in Indonesian or Javanese well. The exclusion criteria was T2DM patients with complication.

Participant were recruited from medical record as preliminary data. The medical record was gotten from the Primary Health Care data by the permission of Primary Health Care's chief and helped by the staff for the access. Then matched the data with the inclusion and exclusion criteria, then confirmed the criteria to the participant by door to door visitation. Participant recruitment was stopped when the researcher don't get new keywords at the interview and occurred in the tenth participant.

#### *Data Collection*

The technique of collecting data used semi-structured in-depth interviews which guided by interview guides to obtain the information about barrier in conducting physical activity. The interview guides consist of six questions, 1) Do you do physical activity?; 2) What is the kind of physical activity which you do?; 3) Why you choose those kind of physical activity?; 4) If you don't, why don't you do physical activity?; 5) What are the barrier in physical activity?; 6) How can you resolve the barrier in physical activity?.

The interview process is carried out by the researcher himself without being delegated to others both the process of giving informed consent and interview. During the study there were no respondents who dropped out. Each respondent held three meeting sessions. The first session was giving informed consent and interviews. The second session was an interview to ask questions that escaped the first session. The third session was an interview to ask questions that escaped the first session, obtained result validation from participant, and termination the data collecting process. Interviews were conducted for approximately 20 minutes. During the interview process, both participant and researcher maintain the distance 1 meter and wore masker as Corona virus disease 2019 (Covid-19) health protocol.

#### *Data Analysis*

Interview data were analyzed using the Colaizzi method (Creswell & Poth, 2018), including 1) Reading the entire transcript; 2) Quoting keywords; 3) Formulating meaning; 4) Formulation of categories, sub-themes and themes; 5) Integration of categories, sub-themes and themes; 6) Formulation of a series of themes; 7) Validation of results on respondents.

#### *Trustworthiness*

The guarantee of the validity of qualitative research results is carried out through credibility, transferability, dependence, and conformability data (Creswell & Poth, 2018).

The credibility is data convinced by both participants and researcher. To improve the data credibility, researcher not only used interview data but also medical records' data. For example researcher not only used participants' recognition about diagnosis, age, and how long they have been diagnosed to determine the sample, but also used medical record's data.

The transferability data is the accuracy of research finding against the context of the participants. To ensure the transferability, the researcher validate the research finding to the participants at the end of research session.

The dependence data is when other researchers can repeat or replicate the research process. To increase the data dependency, the researcher clearly describes the research process from design to trustworthiness data.

The confirmability data is the result of this research has been agreed upon by other people. This study involved 3 researchers to improve data confirmability.

#### *Ethical Consideration*

This research was ethically legal through the issue of a decree No: 1926-KEPK on February 26, 2020 by the Health Research Ethics Commission.

## RESULTS

### *Characteristics of Respondents*

This study involved 10 patients recently diagnosed with T2DM as respondents. Respondents consisted of men and women. Most respondents were women, housewives and high school education. The following characteristics of respondents in the study are summarized in table 1.

**Table 1** Distribution Frequency of Respondents with Demographic Data in the Primary Health Care Kedunggoro and Asemrowo, Surabaya from 2<sup>nd</sup> March until 30<sup>th</sup> April 2020.

Characteristics	N	%
<b>Age (years)</b>		
26-35	5	50
36-45	5	50
<b>Gender</b>		
Man	4	40
Woman	6	60
<b>Highest Education</b>		
High School	7	70
Bachelor	3	30
<b>Marital Status</b>		
Married	10	100
<b>Employment</b>		
Housewife	5	50
Employee	5	50

Sources: Primary Data of Questionnaire, 2020.

### *Themes of the Barriers to Physical Activity*

This study emerged two themes, namely time expenditure and health literacy as barrier in physical activity of recently diagnosed T2DM patients. Time expenditure consist of two subthemes, namely obligation to other and lack of spare time. The barrier in health literacy consist of two subthemes, namely physical activity substitute and different information that got from others.

#### *Theme 1. Time Expenditure*

Time expenditure refers to participants' perception about limited time to do physical activity. Participants' obligation to others as father, mother, housewife, and head of

household took their time. They assume that doing the obligation has taken a lot of time.

*"...I have been taking care of the house all day, cooking, washing..." (P1)*

*"Shopping in the market, taking care of the house, sometimes I have to wait my son in the school until he get home..." (P2)*

*"...I've been working all day. In the morning also drop off schoolchildren, afternoon pick up them. Then go to work again..." (P4)*

Participants' also felt that they didn't have enough spare time to do physical activity. Almost all the day they were busy and trouble to do their obligation. They assumed that evening or day off as time for break.

*"...I have no time, miss. I've been bothered for taking care of the house and children..." (P3)*

*"...I'm tired of working. If there is free time, I used for rest and sleep..." (P5)*

*"...All day work, miss. I've already tired..." (P8)*

#### *Theme 2. Health Literacy*

Health literacy refers to searching and using health information especially physical activity. T2DM recently diagnosed patient's characteristic were faced the difficulties in adopt diabetes management properly, busyness, and other, so they sought information from others. By facing difficulties in adopt diabetes management, they have hope and initiative to substitute physical activity into other activity.

*"...Cooking, sweeping, mopping already made me sweaty. Can't it be replaced physical activity?..." (P6)*

*"...I'm walking when shopping, miss. Walking already sports, isn't it?... (P7)*

*"...I want to exercise but I don't have time. Are there replacement activities?..." (P10)*

From the sought of information, participants got various kind of information. They got different information from different people. Those information made them confused, believed and adopt the information from non-expert, so they chose not to do physical activity.

*"...I'm confused actually. Want to exercise but no time. I don't exercise but I feel stay healthy..." (P8)*

*"...Difference, miss. There are those who do not physical activity, only drink herbal but they are healthy..." (P9)*

*"...I do not know what benefit of physical activity. He said exercise is for increase health. I do not exercise, there is no time also..." (P10)*

## DISCUSSION

This study emerged two themes as barrier in physical activity, namely time expenditure and health literacy. Time expenditure refers to participants' time limitation to participate in physical activities. Obligation to others as father and mother for working and taking care the household be the barrier to physical activities. This result in line with the previous study stated that families responsibility likelihood be the barriers in physical activities (Al-Kaabi et al., 2009; Lidegaard, Schwennesen, Willaing, & Færch, 2016). Diabetic as father and mother have commitment to work and prioritize the family needs, so they didn't feel have time for physical activities (Kadariya & Aro, 2018). Busy in working and taking care of the household was quite time consuming. Female participants were predominantly employed as housewives. Women are expected to devote themselves to caring for children, cooking, and other homework. Caring for children such as school transfers is sometimes done by mothers or fathers. This condition was quite interesting to replace home activities into valuable physical activities that have a good impact for diabetics by adjusting the time and intensity. The daily activities that can be use and value as physical activity such as walking, brisking, and moping in specific time and intensity (World Health Organization, 2017).

Lacking of spare time also perceived as barrier in physical activity. This finding was same with previous study which stated that diabetic was complaining that they didn't have enough spare time to do physical activity (Aditama, Rahmawati, Parfati, & Pratidina,

2015; Thomas et al., 2004). Busy for a day also made them loss many time, energy, and felt the hassle. Almost all of the day has spent to do their obligation. After that they felt tired and didn't have enough energy.

Health literacy refers to ability in searching and using health information. Participant felt that physical activity was a time expenditure activity, so they search the substitute activities. As knowledge problem, participant need to know the substitute activities and hope that their daily activities can replace the prescribed daily activities. This theme is a unique finding. The obstacles or problems of knowledge regarding physical activity substitutes are found mostly in recently diagnosed diabetics and low income (Kalantzi, Kostagiolas, Kechagias, Niakas, & Makrilakis, 2015; Onwudiwe et al., 2011). Inadequate health literacy should resolved immediately. Those situation can limit participants' ability to do diabetes management especially physical activities (Sudore et al., 2006).

The other barriers in searching and using information was different information among diabetics. Participants not only search information from credible source like doctor and nurse, but from non-expert. The difference information they got not only in physical activity, but also diet and medication. Those made participants confused. This result in line with previous study (Funnell, Bootle, & Stuckey, 2015; Rankin et al., 2016). This difference can occur because of the diversity of information sources utilized by participants. Different sources of information can cause differences in understanding and perception of information. Diabetics utilize various sources of information. This is the duty of health workers to correct the information so that there is no misunderstanding and participants leave diabetes management.

This study result especially in health literacy as barrier in physical activity is different with previous study (Thomas et al., 2004) that didn't reveal health literacy as barrier. The difference in participants characteristic was the reason. Participants in



previous studies were patients who had been diagnosed for more than 5 months. Whereas in this study participants were patients who were recently diagnosed for less than 6 months. Characteristics of patients recently diagnosed with T2DM are diagnosed less than 6 months and difficult to adopt diabetes management properly. These characteristics made participants still unfamiliar with information. With these characteristics, participants need to be more stringent assistance from health workers to manage diabetes, especially physical activity.

The finding of this study lead to the improvement in assisting patient's diabetes management. Health workers can improve the education method to be more flexible and fit the patients' time and needs about physical activity. The flexibility of time and information can be achieved through using technology. The used of smartphone application as media can improve DM management significantly (Hanifah, Giena, & Sari, 2019). Not only health worker, family also have role in breaking barrier of physical activity by reminding and supporting the diabetics for doing physical activity (Wijayanti, 2019).

This study limitation was the pandemic Covid-19 conditions limit the interaction between researchers and participants. The implementation of health protocol during the interview such as a minimum distance of 1 meter and the use of a mask slightly obstruct the recording of sound to the voice recorder.

## CONCLUSION

The participants' time expenditure perception limit them to do physical activities. Health literacy also being the barrier in doing physical activity. This result was support the theory that patient recently diagnosed T2DM unable to adopt diabetes management properly due to lack of acceptance or knowledge.

## SUGGESTIONS

The health workers provide technology assisting for educate the patients recently diagnosed T2DM about kind of physical

activities and as communication media to decrease patients confusion. For further research can prove the relationship between themes that emerge in this study with the implementation of physical activity.

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## DECLARATION OF CONFLICTING INTEREST

None.

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## AUTHOR CONTRIBUTION

**Yulia Kurniawati:** Conceptualizing the study, collecting data, analyzing data, and compiling publication manuscripts.

**Ninuk Dian Kurniawati:** Conceptualizing the study and supervisor.

**Ririn Probowati:** Conceptualizing the study and supervisor.

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