The correlation of knowledge and duration of illness towards self-management with diabetes mellitus patients in the pandemic era of COVID-19

Galuh Ayu Wibowo¹, Sri Wahyuni²,*

¹ Faculty of Health, Institut Ilmu Kesehatan Bhakti Wiyata Kediri, Indonesia; galuhwibowo19@gmail.com
² Faculty of Health, Institut Ilmu Kesehatan Bhakti Wiyata Kediri, Indonesia; sri.wahyuni@iik.ac.id
* Correspondence: sri.wahyuni@iik.ac.id; Tel.: (+62) 82232029778

Abstract: Diabetes mellitus (DM) is a chronic disease that, if not treated trigger various disease, and also cause the severity of COVID-19 infection. People with DM need proper knowledge and management to improve the quality of life of patients during a pandemic and the treatment process will take a lifetime. The purpose of this study is to determine the relationship between knowledge and duration of illness on diabetes mellitus self-management. The study’s design is a correlational study with a cross-sectional approach, with a total sample of 138 respondents who were taken by convenience sampling technique. Data was collected using the diabetes knowledge questionnaire (DKQ-24), the COVID-19 knowledge questionnaire, and the diabetes self-management questionnaire (DSMQ). The Chi-Square statistical test analysis revealed that a p-value of 0.00 relationship between knowledge and self-management among Indonesian with DM in the pandemic era of COVID-19. There is a relationship between knowledge of diabetes mellitus and COVID-19 on self-management of diabetes mellitus, and there is no relationship between duration of illness and diabetes mellitus self-management during the COVID-19 pandemic.

Keywords: knowledge; duration of illness; self-management; diabetes mellitus

Introduction

Diabetes mellitus (DM) is a disease characterized by hyperglycemia due to the inability of the pancreas to produce insulin (Pemayun & Saraswati, 2020). Diabetes mellitus causes various complications of the disease and can trigger the severity of COVID-19 infection. Diabetes mellitus is the second most common comorbidity found in COVID-19 patients (Yang et al., 2020). Indonesia occupies the fifth highest level of diabetes cases in the world with a case prevalence of 2.0%. The prevalence of diabetes mellitus can increase with the increasing age of the patient and reaches its peak at the age of 55-64 years (Kemenkes RI, 2018). The number of diabetes mellitus patients who came for control at the Kediri Hospital in the last three months was 483 and during the COVID-19 pandemic, it decreased by 50% (Kediri Hospital, 2022). Based on the results of interviews with five patients with diabetes mellitus, showed that the patients already knew the management of diabetes mellitus, but the patients said they had difficulty maintaining dietary patterns and lacked physical exercise.

The COVID-19 pandemic is a new challenge for diabetes mellitus patients. The COVID-19 pandemic is causing changes that affect all aspects of life. DM patients need adaptation and learning by filtering information circulating to them, where inaccurate information can cause patients anxiety and panic due to COVID-19. The imposition of restrictions on community activities made policy changes at the hospital. The COVID-19 pandemic has reduced patient control schedules in hospitals, due to the policy of online health consultations, this has resulted in changes in patient knowledge which can affect
self-management (Gupta et al., 2017). Patient knowledge about diabetes mellitus is needed to help treat the disease, where the better the knowledge about diabetes, the better it is in handling the diabetes mellitus diet (Sundari, 2018). The length of time a person experiences illness can have an impact on one's ability to deal with problems that will affect the degree of health (Irawandi, 2020).

Patients who have been sick for a long time tend to experience boredom and despair in treating their illnesses (Roifah, 2016). Diabetes mellitus management using appropriate guidelines, standards and evidence-based protocols can prevent more severe diabetes mellitus complications (Birkinshaw et al., 2018). Diabetes mellitus management through lifestyle changes and adherence to long-term therapy is important. Diabetes mellitus management consists of 5 pillars, namely: education, diet, physical exercise, medication adherence, and also monitoring blood sugar levels (Perkeni, 2019). Controlled blood glucose levels can reduce long-term complications in patients. Self-management plays a role in balancing insulin doses with activity levels and food intake so that the patient’s blood glucose level is within a safe target range (Nugraha & Dewi, 2020). The level of patient knowledge about disease management and prevention can determine the degree of pain experienced by patients (Pemayun & Saraswati, 2020). The results of previous studies showed that there was a significant relationship between the level of patient knowledge about diabetes mellitus management and fasting blood sugar levels (Ramadhani et al., 2019). Good knowledge and followed by proper self-management is the key to controlling DM. The results of a previous study showed a significant relationship between the long-suffering factor and self-care in diabetes mellitus respondents, with the tendency that old diabetes mellitus patients tending to have more adequate self-care compared to new patients (Mustipah & Prihatiningsih, 2019). Patients with diabetes who have been sick for a long time can adapt better. Based on the results of the review from the background above, the researchers were interested in examining the relationship between knowledge and long-suffering in self-management in diabetes mellitus patients during the COVID-19 pandemic at Kediri Hospital.

Materials and Methods

Study Design and Participants

A cross-sectional survey was conducted between 28 February 2022-31 March 2022, looking at demographic characteristics, knowledge of diabetes mellitus, knowledge of COVID-19 and self-management. Data collection used a questionnaire given to respondents who came to Kediri Hospital. At the beginning of the survey, we explained the purpose of this research and explained the details of informed consent. If participants agreed to participate in this study, they were asked to fill out a consent form.

Data Collection

When and where the data were collected, who collect the data, any research assistants/enumerators/local coordinators? Respondents were type 2 diabetes mellitus patients aged 45-65 years, did not suffer from dementia or mental illness and were willing to become respondents. The respondents who did not complete the questionnaire were excluded. In this study the number of samples used was measured using the G-Power application totaling 138 respondents.

Instruments

The questionnaire consists of five sections: demographics, diabetes mellitus knowledge, COVID-19 Knowledge, and self-management. Demographics include age, gender, last education, marital status, occupation and duration of diabetes mellitus. The COVID-19 knowledge questionnaire uses Knowledge towards COVID-19 (Zhong et al., 2020). This questionnaire has 12 questions: four questions about clinical features (K1-K4), three questions about transmission routes (K5-K7), and five questions about COVID-19 prevention and control (K8-K12). The answer options are “yes”, “no” and “don't know”.
The correct answer is given 1 point and the wrong/unknown answer is given 0 points. The total knowledge score ranges from 0 to 12, with a higher score indicating better knowledge about COVID-19. The Cronbach's alpha coefficient of the knowledge questionnaire is 0.71. DM knowledge questionnaire using the Diabetes Knowledge Questionnaire (DKQ-24) consists of 24 questions developed by Starr County (Garcia et al., 2001), which is a questionnaire developed from DKQ-60 with a Cronbach alpha value of 0.78. The aspects assessed were basic information (10 items), glycemic control (7 items), and prevention of complications (7 items). The answer choices are “yes” and “no”. Assessment is based on the number of items answered correctly by the respondent, the correct answer is given a value of 1 while the wrong answer is given a value of 0. The knowledge score is said to be good if the answer is > 75% correct (18 questions are correct) and less if the answer is correct < 75% (Cántaro et al., 2016).

The self-management questionnaire using the Diabetes Self-Management Questionnaire (DSMQ) belonging to (Schmitt et al., 2013) was previously translated into Indonesian by research with the results of Cronbach’s r alpha reliability test of 0.641 (r alpha > 0.374). The questionnaire was in the form of a Likert scale and consisted of 16 questions with 7 favorable types and 9 unfavorable questions with indicators of glucose management (number 1,4,6,10,12), diet (number 2,5,9,13), physical activity (numbers 8,11,15), and utilization of health services (numbers 3,7,14) and self-management (number 16). The assessment score is very appropriate = 3, appropriate = 2, almost appropriate = 1, inappropriate = 0. This questionnaire measures the patient's self-management in the last 8 weeks. The final value is categorized as poor = 0-16, sufficient = 17-32, good = 33-48 (Fuadi, 2018).

**Statistical Analysis**

The techniques used to analyze the data, including computer software used, if appropriate) Statistical analysis was performed using SPSS (version 24; IBM). Frequency distributions are used to present demographic characteristics. Bivariate analysis is used to determine the effect of the independent variable on the dependent variable. The Chi-square test is used to analyze the relationship between knowledge, duration of illness and self-management. Statistical significance is indicated by the p-value < 0.05.

**Results**

Table 1 shows that most of the respondents are female (63.8%). Most of the respondents are middle age (63%). The respondent’s education is high school (34.8%). Marital status is married (83.3%). Most of the respondents did not work (38.4%). Random blood glucose level > 200 mg/dl is 47.8%. The type of treatment used was oral medication (44.9%).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Criteria</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>50</td>
<td>36.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>88</td>
<td>63.8</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle age (45-54)</td>
<td>87</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Elderly (55-65)</td>
<td>51</td>
<td>37</td>
</tr>
<tr>
<td>Educational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elementary school</td>
<td>45</td>
<td>32.6</td>
</tr>
<tr>
<td></td>
<td>Junior high school</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Senior high school</td>
<td>48</td>
<td>34.8</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>27</td>
<td>19.6</td>
</tr>
</tbody>
</table>
Table 2 shows that knowledge of diabetes mellitus is related to self-management (p<0.05). Table 3 shows that there is no relationship between the duration of illness and self-management (p>0.05).

**Table 2.** Analysis of the diabetes mellitus knowledge on self-management.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Self-management; n (%)</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>50 (61.7)</td>
<td>19 (32.5)</td>
<td>12 (14.8)</td>
</tr>
<tr>
<td>Low</td>
<td>24 (42.1)</td>
<td>8 (14.0)</td>
<td>25 (43.9)</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>27</td>
<td>37</td>
</tr>
</tbody>
</table>

*Chi-square test

**Table 3.** Analysis of duration of illness on diabetes mellitus self-management

<table>
<thead>
<tr>
<th>Duration of illness</th>
<th>Self-management; n (%)</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>&lt;5 (years)</td>
<td>37 (59.7)</td>
<td>12 (19.4)</td>
<td>13 (21)</td>
</tr>
<tr>
<td>5-10 (years)</td>
<td>17 (37.8)</td>
<td>11 (24.4)</td>
<td>17 (37.8)</td>
</tr>
<tr>
<td>&gt;10 (years)</td>
<td>20 (64.5)</td>
<td>4 (12.9)</td>
<td>7 (22.6)</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>27</td>
<td>37</td>
</tr>
</tbody>
</table>

*Chi-square test

**Discussion**

The results of the study show that there is a relationship between knowledge about diabetes mellitus and knowledge of COVID-19 on self-management in patients with diabetes mellitus. Research in Pakistan states that there is a strong relationship between knowledge and self-management (p <0.05) (Bukhsh et al., 2019). Research in China shows that knowledge of COVID-19 is significantly associated with lower negative attitudes and practices that trigger the transmission of COVID-19 (Zhong et al., 2020). Knowledge of a disease is a person’s understanding of the disease which basically has four dimensions, namely symptoms, causes, risk factors, complications, and treatment (Rabe et al., 2007).
Factors that can influence knowledge include education, age, work, family, and experience. Research in Ethiopia states that knowledge, self-efficacy, formal education and social support influence self-care management (Gurmu et al., 2018). Patients can control their disease conditions and improve their quality of life if they have good knowledge about disease management, besides that knowledge is the main aspect that patients must have throughout their lives. Patients who have a good level of knowledge will influence the management of the disease appropriately (Zhong et al., 2020). Education supports one's knowledge in order to understand something. The higher a person's education, the easier it is to receive and process information, so that they have a good understanding of the importance of self-management (Saqila & Muflihatin, 2021). The observation results show that the respondent's knowledge is good, supported by the respondent's education. This is evidenced by the observation that the majority of respondents have a high school education. In addition, the age of the respondents is classified as mature (> 45 years) so that their thinking is more rational and they have a lot of life experience so that they get a lot of information and skills.

This research is in line with previous studies which showed no correlation between the length of suffering and self-management (Bukhsh et al., 2019). The duration of diabetes illness affects the understanding of the importance of self-management behaviour so that it can be used as a basis for seeking information about self-care through various sources of information (Irawandi, 2020). In addition, the longer the duration of the illness can increase the risk of complications (Hariani et al., 2020). Duration of illness and severity are the main triggers for diabetes complications and can also affect the patient's quality of life (Roifah, 2016). The process of experiencing chronic pain can have a psychological impact, namely the emergence of negative attitudes in managing diabetes such as not adhering to a planned diet program, lack of physical activity and lack of adherence to medication (Ardhiyanto, 2019). On the other hand, patients with an initial duration of illness have higher optimism for recovery. Other factors that affect self-management are the level of compliance, anxiety, boredom and the lack of seriousness of respondents in carrying out diabetes therapy.

Conclusions
The results showed that there was a relationship between knowledge and self-management, but there was no relationship between illness duration and self-management in diabetes patients during the COVID-19 pandemic.

Supplementary Materials: None

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Conflicts of Interest: The authors declare no conflict of interest in this study.
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