The Impact of Telenursing on Self-Care Management and Quality of Life for Chronic Disease Management Program (PROLANIS) Members with Type 2 Diabetes Mellitus at the Garuda Health Center in Bandung City, Indonesia, in 2022

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ABSTRACT
Diabetes Mellitus (DM) type 2 is rapidly becoming one of the world’s most common non-communicable diseases (NCDs), and one of the most frightening problems in public health. Patients with type 2 diabetes mellitus must be able to manage their disease independently to control blood glucose and prevent complications. Community empowerment and social engineering can be done by nurses through remote communication with patients via telenursing. Identifying the Effect of Telenursing on Self-Care Management and Quality of Life for Members of the Chronic Disease Management Program (PROLANIS) with Type 2 Diabetes Mellitus. Using the pre-experiment design method with one group pretest-posttest design. The research sample consisted of 45 respondents, 15 male respondents and 30 female respondents, taking the sample using accidental sampling. Data collection using the Summary of Diabetes Self Care Activities (SDSCA) and Diabetes Quality of Life (DQOL) instruments the test used is the Wilcoxon Signed Ranks Test. All manuscripts must contain an abstract, which summarizes the purposes of the work, the methods, the most significant results, and the conclusions. Based on the results of the Wilcoxon test, with a 95% confidence level p-value (0.001). There is an effect of telenursing therapy on improving the quality of life of PROLANIS members with type 2 diabetes mellitus. It is hoped that respondents and elders can improve self-care management and quality of life through the stages of Diabetes Self-Management Education (DSME), which can be carried out daily under health workers’ guidance through telenursing or family.

KEYWORDS
Diabetes Mellitus, Telenursing, Self-care, Quality of Life

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Introduction
Diabetes Mellitus (DM) type 2 is rapidly becoming one of the world’s most common non-communicable diseases (NCDs) and one of the most frightening problems in public health. Non-communicable diseases (NCDs) are diseases or medical conditions that cannot be determined from one individual to another. The dominance of health problems in society is currently starting to shift from infectious diseases to non-communicable diseases. The increase in PTM cases means that it can be seen from the inclusion of PTM in the 10 biggest diseases every year. These types of diseases are not contagious but are no less deadly and result in fatal conditions that result in a person being unproductive. Non-communicable diseases are more influenced by changes in human behavior patterns, one of which is diabetes mellitus (DM) (Profil Kesehatan Kota Bandung, 2020).

The highest prevalence of diabetes among people aged 20 to 79 years is seen in Arab-North African and Western Pacific countries, with 12.2% and 11.4%, respectively. With a frequency of 11.3%, Indonesia is ranked third in Southeast Asia. IDF also estimates the prevalence of diabetes in the population between the ages of 20 and 79 in a number of nations, identifying the top 10 diabetic-affected nations. The top three countries are China, India, and the United States, with 116.4 million, 77 million, and 31 million patients, respectively. With 10.7 million victims, Indonesia is placed 7th among the 10 nations with the largest number. The only nation in Southeast Asia on the list is Indonesia. (Pusat Data dan Informasi Kementrian Kesehatan RI, 2020).

The number of DM in 2020 in the city of Bandung was 43,906 patients, of which 50,646 patients, or 115.4%, had received health services according to the standards for people with diabetes mellitus. In the previous year, the scope of examination of DM patients was carried out on 28,553 people, with 45,430 or 62.85. Although the coverage of health services for people with DM exceeds one figure, another The highest percentage of examinations for DM patients was in Bandung Wetan District, namely 410.33%, Sukasari (135.33%), and Arcamanik (134.42%). Meanwhile, the areas with the smallest DM examination coverage were the districts of Bojongloa Kaler (29.4%), Bojongloa Kidul (35.34%), and Andir (Profil Kesehatan Kota Bandung, 2020). Data on the chronic disease management program
Type 2 diabetes mellitus patients must be able to manage their condition on their own in order to maintain blood glucose control and avoid complications. Diabetes self-care management (DSCM) is the name for this independent action that diabetics can implement (American Diabetes Association, 2017). People with diabetes mellitus practice self-management techniques such as controlling healthy eating habits, exercising frequently, regularly checking blood sugar levels, using medications or insulin, and utilizing healthcare services. (Schmidt et al., 2013; Zuqni and Bahri, 2019).

Additionally, stress brought on by having diabetes affects one's quality of life (Shahab, 2006). People with diabetes mellitus should strive to maintain a high quality of life because the poor quality of life and psychological issues can aggravate metabolic abnormalities, either directly through hormonal stress or indirectly through complications. One of the significant variables that might impact someone's health is their quality of life. Poor quality of life will make a sickness worse, and vice versa, a disease can make a person's quality of life worse, particularly chronic conditions that are challenging to treat, such as diabetes mellitus.

Professionals should provide DM education. One of them is a nurse, who must actively participate in the prevention and early identification of diabetes and its consequences through the provision of health services, public education, administration of the health system, and treatment of patients to enhance their quality of life. These advancements can be used by nursing to create new strategies for providing care. Nurses can engage in community empowerment and social engineering through remote patient communication (CNA, 2005).

The American Nurses Association (ANA) has identified telenursing as one approach that focuses on the administration, supervision, coordination, and service of patient care through the use of telecommunications technology. (Glinkowski et al, 2018).

Based on the aforementioned context, the author is motivated to undertake a study named “Is there any impact of Telenursing on Self-Care Management and Quality of Life for Chronic Disease Management Program (PROLANIS) Members with Type 2 Diabetes Mellitus at the Garuda Health Center in 2022?”

Literature review

Diabetes Mellitus

The chronic, progressive condition known as diabetes mellitus (DM) is defined by the body’s inability to properly metabolize carbohydrates. Protein and fat cause hyperglycemia (high blood glucose levels). However, those who have DM can take precautions to lessen the likelihood of this happening. (Black, M. Joyce, 2014). There are significant problems linked to the diseased process and independent causes. This section reviews books, academic articles, and any other sources pertinent to a certain topic, field of study, or theory. It also offers a description, a synopsis, and a critical assessment of these works in connection to the research subject under consideration.

Type 2 diabetes mellitus is a condition in which blood sugar increases due to pancreatic beta cells producing small amounts of insulin and also impaired insulin function or insulin resistance. Type 2 diabetes mellitus consists of a series of dysfunctions characterized by the presence of hyperglycemia due to a combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucaone secretion (Haryono & Susanti, 2019).

Type 2 diabetes mellitus generally originates from metabolic disorders that are genetically and clinically heterogeneous. Type 2 diabetes mellitus is a type of diabetes that is not dependent on insulin. Type 2 diabetes mellitus generally attacks adults aged around 30 years and over, although teenagers and children can still have the opportunity to be attacked. The cause of type 2 DM is still not clearly known. However, there are certain factors that can increase a person's risk of developing this type of diabetes (Haryono & Susanti, 2019). These factors include age, family history, lack of physical activity, and obesity.

Diabetes mellitus that is not managed properly can lead to various chronic complications, such as cerebrovascular disease, complications in the eyes, kidneys, nerves, and so on. Therefore, good DM management and handling are needed. The purpose of this DM treatment is to normalize insulin activity and blood glucose levels in an effort to prevent, reduce, and delay the occurrence of complications, both acute and chronic. In the treatment of DM, it is divided into two groups, namely non-pharmacological and pharmacological treatment (Ignatavicius & Workman, 2006; Brunner dan Suddarth, 2014; Perkumpulan Endokrinologi Indonesia, 2011; Rahman, 2019 and Rosadh, et al. 2017).

Telenursing

The American Nurses Association (2001) defines telenursing as a subset of telehealth that focuses on the practice of a specific profession (nursing). Telehealth is the use of communication and information technology using electronic media that can be used remotely between health workers, patients, and professionals, as well as health administrative officers (Health Resources and Services Administration, 2007). Another definition of telenursing is the use of information technology in providing nursing services as part of services in the health sector where there is a physical distance between patients and nurses (Greenberg 2004). Meanwhile, the Kansas Telemedicine Policy Group defines telehealth as the practice of providing health services, establishing diagnoses, consulting, treating,
transferring medical data, and providing health education or education using interactive audio-visual communication media.

**Self-care**

The self-care deficit nursing theory (SCDNT), created by Dorothea E. Orem in 1971, is a philosophy of self-care for nurses (DeLaune & Ladner, 2002 in Nursalam, 2016). Dorothea Orem created the self-care deficit nursing hypothesis in 1956. Based on medical problems, developmental stages, and fundamental human needs, Orem's self-care theory has been applied to a variety of nursing techniques. Orem’s self-care theory was developed based on the philosophy that clients have a desire to be able to take care of themselves (Rahman, 2019). The theory of self-care is a regulatory function in an individual where an individual must do what must be done to maintain his life, maintain physiological, psychological functions, and grow and develop. To maintain glycemic control within normal limits, DM clients must carry out self-care activities such as monitoring blood glucose, meal planning, physical activity, and medication adherence. One of the methods in providing intervention in Orem’s self-care theory is teaching. In the teaching process, a nurse as an educator conducts teaching activities to DM clients so that they are able to carry out self-care.

**Quality of Life**

Quality of life (QOL) is an analytical concept that measures a person's capacity to lead a typical life in relation to their personal perceptions of their goals, expectations, standards, and particular attention to life as it is experienced while being influenced by the norms and culture of the environment they are in (Adam, 2006). The concept of quality of life (QoL) is used in the field of health services to assess a person's emotional, social, and functional capacity to meet the demands of everyday living as a whole. The impact of sickness has the potential to lower QoL in terms of health. (Brooks & Anderson, 2007).

According to Yudianto (2008), a patient’s quality of life is their ability to go about their daily lives with a sense of pleasure and happiness. The quality of life can be impacted by a variety of factors. These elements include the unique requirements that are ongoing in the management of DM, potential signs of unstable blood sugar levels, potential consequences associated with diabetes, and sexual dysfunction. If the patient is able to maintain adequate control through consistent, suitable, and long-term lifestyle modifications, this component can be avoided. in order to prevent problems that could harm individuals with diabetes mellitus and prevent them from living their daily lives as they should.

**Method**

A study approach for identifying issues before the final planning of data collection is the research design (Nursalam, 2013). This research is quantitative research with this type of research pre-experiment designs with one group pretest-posttest design. In this study, researchers only used one group, namely the intervention group (Telenursing).

**Participants**

The population in this study were 83 people who had Type 2 Diabetes Mellitus and were enrolled in the PROLANIS chronic disease management program at the Garuda Health Center in Bandung City. Respondents totalled 45 people, according to the calculation of the number of respondents who were sampled. The sampling technique in this study used accidental sampling.

**Instruments**

Data collection tools include the Self Care Management Questionnaire and the Summary of Diabetes Self Care Activities (SDSCA), both of which Toobert and Glasgow created (2000) with a total of 15 questions related to DSCM in type 2 DM clients, which include diet, exercise, physical activity, blood glucose monitoring, taking medication, foot care, and smoking status. And the QOL Questionnaire for DM patients, using the DQOL (Diabetes Quality of Life) questionnaire from Munoz and Thiagarajan (1998), which was adopted from Emila (2020), is valid and reliable with a total number of quality-of-life questions consisting of 46 items.

**Data analysis**

The data in this study after going through the processing stage, which includes research problems, and testing research problems using the Wilcoxon Signed Ranks Test. This analytical method aims to examine the relationship between two or more independent variables and one dependent variable.
Results

**The frequency distribution of the effects of telenursing on self-care management**

Based on the table below, shows that before being given treatment, 21 respondents (46.6%) were in the poor category, 16 respondents (35.5%) were in the sufficient category, and 8 respondents (17.7%) were in the good category. After being given treatment, respondents who experienced self-care management were less than 10 people (22.2%), those who experienced self-care management were quite reduced to 13 people (28.81%), and those who experienced good self-care management increased to 22 people (48.8%). So it can be concluded that 30 respondents (66.6%) experienced an increase in self-care management and as many as 15 respondents (33.3%) did not experience a change in the level of self-care management after being given treatment.

**Table 1. Frequency distribution of telenursing effect on self-care management**

<table>
<thead>
<tr>
<th>Self Care Management before intervention</th>
<th>Less</th>
<th>Quite</th>
<th>Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less</td>
<td>10</td>
<td>8</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Quite</td>
<td>0</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>13</td>
<td>22</td>
<td>45</td>
</tr>
</tbody>
</table>

**The frequency distribution of telenursing effects on quality of life**

Based on the table below, 5 respondents (11.2%) fall into the low quality of life category, 24 respondents (53.3%) fall into the moderate quality of life category, and 16 respondents (35.5%) fall into the high quality of life category. After being given treatment, respondents who experienced a lower quality of life became 3 people (6.6%), respondents who experienced a quality of life in the moderate category were reduced to 16 people (35.5%), and respondents who experienced a quality of life in the moderate category increased to become 26 people (57.7%). So it can be said that 28 respondents (66.6%) experienced an increase in their quality of life and as many as 17 respondents (37.7%) did not experience a change in their quality of life after being given treatment.

**Table 2. Frequency distribution of telenursing effect on the quality of life**

<table>
<thead>
<tr>
<th>Quality of life before intervention</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Moderate</td>
<td>0</td>
<td>14</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>High</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>16</td>
<td>26</td>
<td>45</td>
</tr>
</tbody>
</table>

**The frequency distribution of telenursing effect on improving self-care management and quality of life**

From the test results using the Wilcoxon test, the results of self-care management and quality of life of patients with type 2 diabetes mellitus both obtained a significance value = 0.001 (p < 0.05), thus it can be concluded that there is an increase in self-care management and quality of life, meaningful life between self-care management and quality of life before being given telenursing intervention with self-care management and quality of life after being given telenursing intervention for PROLANIS members with type 2 diabetes mellitus at the Garuda City Health Center, Bandung.

**Table 3. Frequency distribution of telenursing effect on improving self-care management and quality of life**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>Nilai p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-care management before telenursing</td>
<td>45</td>
<td>100</td>
<td>0,001</td>
</tr>
<tr>
<td>Self-care management after telenursing</td>
<td>45</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Quality of life before telenursing</td>
<td>45</td>
<td>100</td>
<td>0,001</td>
</tr>
<tr>
<td>Quality of life after telenursing</td>
<td>45</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

To improve self-care management and quality of life, telenursing interventions with DSME education can be used. DSME was conducted for 4 sessions. The first session discussed the concept of DM (definition, causes, signs and symptoms, classification, risk factors, and complications). The second session discussed the management of DM. The third session explained stress management. The fourth session discussed the prevention of complications and foot care. With learning techniques like this, respondents will find it easier to understand the material given because the material delivered is not directly about DM but the discussion is more specific (Umaroh, 2017).

DSME where every two weeks respondent is visited by researchers four times in 2 weeks, this is in accordance with one of the factors that affect compliance according to Niven (2008), namely increasing the interaction of health professionals with clients. In every session that is held, there is always feedback about the material that has been given. In the fourth session, follow-up from each session was also carried out so that respondents could better understand the material provided. Researchers argue that the success of the health education provided depends on how often the educator provides feedback on each material presented.

Telenursing provides health education and direct direction regarding the conditions given by nurses to patients and their families. On the other hand, the use of telenursing participates in empowering nurses to provide nursing care remotely with the ability to monitor, follow up, collect data, and provide multi-disciplinary services such as remote intervention, pain management, and family support in innovative forms.

Follow-up is one part of the mental health care process. By using the Telenursing (Telephone Follow-Up) method, patients need continuous monitoring of their ability to cope with the disease and learn how to change their lifestyle easily and effectively despite the limited human resource, time, and cost situation compared to traditional methods. Using the telephone, nurses can understand patients’ needs and help them meet their demands. This method can reduce patients’ stress, anxiety, and depression, increase their self-esteem, and transfer patient care from clinics and hospitals to patients’ homes.

Based on the results of the study there were still 3 respondents who experienced a low quality of life. The low quality of life experienced by respondents with type 2 DM is caused by the respondent’s own perception of the disease he is suffering from which does not experience healing and improvement so that his physical, psychological condition, activities, social relations and environment are disrupted. Respondents have negative feelings about themselves such as hopelessness, anger, and shame, so that in the end they don’t care about their health, they feel bored and can’t do anything else, this will affect their quality of life.

Conclusion

The researcher used the Wilcoxon test, with a 95% confidence value or $p$-value (0.001) less than <0.05, so H0 was rejected, which means that there is an effect of telenursing therapy on improving the quality of life of PROLANIS members with diabetes mellitus type 2 at the Garuda Health Center in Bandung.

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In the process of compiling this research, there are various difficulties and obstacles, but among those difficulties, there are people who always make it easy for researchers. Therefore, on this occasion, the researcher would like to express his deepest gratitude to the rector of the Strada Indonesia Institute of Health Sciences, Dr. dr. H. Sentot Imam Suprapto, M.M., thesis advisor Dr. Katmini, S.Kep., Ners, M.Kes., beloved parents and family who have helped and facilitated this research.

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