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The Impact of Self-Management on the Quality of Life of Patient with Diabetes Mellitus: A Systematic Review

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ABSTRACT

***Background**: Diabetes mellitus is a hereditary and degenerative disease that requires management throughout the patient's life to maintain blood sugar stability and psychosocial factors. **Aims**: This systematic review aims to determine the effect of self-management on the quality of life of patients with Type 2 DM. **Methods**: The selection of the studies refers to Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines and JBI's checklist was used to assess the quality of the study. The study selection came from 7 databases Scopus, ScienceDirect, Sage Journals, ProQuest, Emerald Insight, Pubmed dan Taylor & Francis. The number of studies included in the review was 7 articles, 5 articles used an RCT design, and 2 articles were quasi-experimental. **Results**: The finding showed 2 articles that provide interventions in the form of DSME, 1 article emphasizes self-management interventions based on self-efficacy theory that is oriented towards active family involvement, 1 article specifies interprofessional-based DSM through telemonitoring media, 1 article focuses on community-based self-management interventions, 1 article specializes in the use of weblogs in conducting self-management. Special 2 articles emphasize nurse leadership in managing interventions during the study. Five articles showed a significant effect of self-management on quality of life and 2 articles had no effect. **Conclusion**: The finding can be used to optimize self-management intervention in DM patients to improve the quality of life.*

***Keywords**: Diabetes mellitus, Self-management, Quality of life.*

INTRODUCTION

Diabetes Mellitus belongs to the category of chronic illness that occurs when the pancreas does not produce sufficient insulin or the body cannot effectively use the insulin. (WHO, 2021). On the whole, type 2 diabetes mellitus (T2DM) has become one of the most complicated chronic public health problems. T2DM is the cause of disability and untimely death, particularly cardiovascular and other chronic complications.

It is estimated that the number of DM patients will increase to 366 million in 2030 and 90% are type II. (American Diabetes Association, 2012). Epidemiological studies show an increase in the prevalence and incidence of T2DM in the world. The World Health Organization (WHO) estimates that more than 346 million people in the world will suffer from diabetes and in ASEAN countries there were 19.4 million in 2010. The number of patients is expected to more than double by 2030 if management is not carried out properly. According to the figures above, 80% of diabetes patient deaths occur in countries with low and middle economic levels (Wicaturatmashudi, 2020).

DM is a chronic disease that has a broad impact on the individual, family, social, financial, disability, and risk of death problems. The negative impact of T2DM disease on the patient's life is the difficulty of controlling blood glucose, avoiding foods that have a risk of increasing blood sugar and physical activity that has the potential to increase

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complications. Complications as a result of low patient compliance are musculoskeletal disorders, disability, sexual dysfunction and vascular disorders as well as psychosocial impacts. In addition, lost jobs, repeated treatments, costs to be borne by patients during hospitalization and daily care, disruption of family and social interactions and worsening of quality of life are some of the major problems affecting the patient's family, social and economy. (Abedini *et al.*, 2020). Diabetes causes a universal problem.

The impact of diabetes is growing rapidly in populations of developing countries and middle-income countries. Without action, death and disability from diabetes will continue to increase substantially (Fradkin and Rodgers, 2013). Management of Diabetes Mellitus patients requires a long time, costs a lot and this condition directly or indirectly affects the physiological and psychological aspects of the patient. This condition is further exacerbated if the patient has both microvascular and macrovascular complications. The level of dependence on other people and family is a separate stressor for patients. DM patients who have passed the critical period and are being treated at the hospital will continue treatment at home to keep their blood sugar levels under control so that complications that may arise can be prevented. Aspects that also require attention are the physiological and psychological aspects of the patient. Physiological aspects can be in the form of hemodynamics and blood sugar levels of the patient. While the psychological aspects can be in the form of quality of life, stress, depression. Although the treatment is often complex, patients are expected to bear many consequences to make alternative assurances that can affect their health status while living with diabetes.

Quality of life is the ultimate goal of meaningful health outcomes and a major issue in the care of patients with chronic diseases, especially diabetes. Quality of life is one of the main complications of patients with diabetes that affects other aspects of life. Based on the WHO statement the recommendations for quality of life refer to the individual's personal perception of his life situation about the culture and value system of society and its relationship to their goals, expectations, standards and needs. ((Rasoul et al., 2019).

Self-management is an important aspect in the ongoing care of DM patients. Self-management is defined as the patient's active participation in their treatment. According to Corbin and Strauss, self-management consists of three different activities which include management of medical (taking medication and adhere to the recommended diet), management of behavioral (adopting new behaviors) and management of emotional (frustration, fear and hopelessness) associated with chronic illness. T2DM patients need the ability to manage and control it while living with DM (Van Smoorenburg *et al.*, 2019).

METHODS

At the review stage, the researcher referred to the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines and the JBI checklist used to assess the quality of the review (critical appraisal).

Search Strategy

A systematic literature search was carried out by searching 7 Scopus electronic databases which included ProQuest, PubMed, Science Direct, Taylor and Francis, Emerald Insight and sage journals published between 2013-2022 with a combination of 3 groups of keywords in English. An article search was conducted on April 3, 2022. This database comprises biomedical sciences, life and physical sciences, behavioral and social sciences, arts and humanities and information sciences. Keywords and Medical subject headings (MeSH) terms used are 'diabetes mellitus', “self management”, “quality of life”. These keywords are combined using the 'AND' Boolean system to find relevant studies. The studies searched were published studies. In the next stage, the reference list of the identified articles is reviewed to consider additional articles.

Criteria of Inclusion and Exclusion

The criteria of inclusion determined to ensure that the search for data is more focused and in accordance with the objectives of the systematic review are articles in a RCT or design of quasi-experimental, population are Type

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2 Diabetes Mellitus patients, full text articles in English, publications from 2013 to 2022, search literature will use Scopus, ScienceDirect, Sage Journals, ProQuest, Emerald Insight, Pubmed and Taylor & Francis databases. The exclusion criteria determined to limit searches in order to get more data and articles that are in accordance with the purpose of the review are articles other than English and articles that are not open access.

Selection of Study

Based on the PRISMA guidelines, potential articles were first obtained from electronic databases. Potential articles were screened to assess feasibility after duplication, title and abstract selection. From each selected article, it was then selected which had the complete text that met the inclusion criteria for further review. A secondary search was performed from the study reference list to identify additional articles. At the final stage of selection, eligible studies that met the inclusion criteria were included in a systematic review. The search and selection process was carried out by two independent reviewers. Any disagreements were resolved by a third reviewer.

Biased Risk

Assessment of the quality of the methodology of the articles that will be carried out systematic review using the JBI checklist critical assessment list. In this systematic review, there are 7 articles that are eligible to be reviewed. Of the 7 articles, 5 articles used an RCT design and 2 articles used a quasi-experimental design. Risk of bias based on JBI protocol for RCT design using 13 assessment items (Institute, 2017). While the quasi-experimental design uses 9 assessment items (JBI, 2017). Based on the assessment results, all articles showed a small risk of bias.

Data Extraction

Data extraction was done manually using a format in Microsoft Excel to extract all information from the included articles which will be presented in the study characteristics and review results. The process of extracting information from the articles reviewed includes the author, year, country, design, sample, objectives, interventions, instruments used and the results of the articles used to evaluate the impact of self-management interventions on quality of life in T2DM patients.

RESULTS AND DISCUSSION

Selection of Study

Researchers have identified 19547 articles. After removing duplicates, title and abstract, there were 1141 articles. After further selection of 1141 articles, 7 full articles were retrieved and were eligible for review (Table 1).

Biased Risk

There are 7 articles assessed to identify the risk of bias using the JBI critical assessment items. From 5 articles with RCT design the results of the assessment are as follows score 100% (n = 1) ((Balcha Hailu, Hjortdahl and Moen, 2021)), score 85% (n = 2) (Wichit *et al.*, 2017)(Azami *et al.*, 2018) and a score of 92% (n = 2)(Lee *et al.*, 2020)(Sugiyama *et al.*, 2015). Articles with a quasi-experimental design score 100% (n = 1)(Nooseisai *et al.*, 2021) and score 85% (n = 1) (Rasoul *et al.*, 2019).

Characteristics Of Study

The total number of respondents in this systematic review was 1317 with a distribution of 685 respondents in the intervention group and 670 in the control group.

Of the 7 articles reviewed, all discussed how self-management impacts the quality of life of T2DM patients. Although each article has specificities in achieving its research objectives. Based on the research design used, there were 5 articles using RCTs with pragmatic cluster and single blinded variations and 2 articles using quasi experiments. The various designs in this review are to get an overview of self-management interventions through various research methods conducted to answer the hypothesis.

Judging from the duration of the research, the results of the review show that research to determine the impact of self-management on quality of life and the various variables studied requires quite a long time. The results of the review of 7 articles provide an illustration, the shortest time for research, in a design that provides self management interventions is 3 months (Nooseisai *et al.*, 2021) and the longest time is 1 year (Sugiyama *et al.*, 2015). The length of time needed to research will have an impact on costs, participant compliance and the risk of bias that arises during the course of the study.

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In the population and sample, all 7 articles were type II DM patients with variations in the inclusion and exclusion criteria set by the researchers. Some articles have female gender sample specifications (Nooseisai *et al.*, 2021).

In the aspect of the intervention given, there are variations that give novelty meaning to research. Most of the interventions are given in the form of DSM (diabetic self-management). There are 2 articles providing interventions in the form of DSME (Hailu, Moen and Hjortdahl, 2019)(Nooseisai *et al.*, 2021). The article (Wichit *et al.*, 2017) emphasizes self-management interventions based on self-efficacy theory that is oriented toward active family involvement. The article (Lee *et al.*, 2020) specifies cross-professional-based DSM interventions through telemonitoring. Meanwhile, the article (Sugiyama *et al.*, 2015)focuses more on community-based self-management interventions. In the article (Rasoul et al., 2019), specializing in the use of weblogs in conducting self-management interventions. Specifically the articles (Hailu, Moen and Hjortdahl, 2019)and (Azami *et al.*, 2018)emphasize nurse leadership in managing interventions during research.

Table 1. Characteristics Of Study.

Title	Authors	Country	Design	Variables	Instruments
Effect of locally-contextualized nurse-led diabetes self-management education on psychosocial health and quality of life: A controlled before-after study	(Balcha Hailu, Hjortdahl and Moen, 2021)	Ethiopia	Controlled before-after study a single-blinded randomized controlled trial	Health-related quality of life	Generic HowRU tool (Benson et al., 2013, 2010; Hendriks et al., 2015)
Randomized controlled trial of a family-oriented self-management program to improve self-efficacy, glycemic control and quality of life among Thai individuals with Type 2 diabetes	(Wichit *et al.*, 2017)	Thailand	a single-blinded randomized controlled trial	self-efficacy, self management, glycemic control and quality of life	The Thai version of 12-item Short-Form Health Survey (SF-12)
Telemonitoring and Team-Based Management of Glycemic Control on People with Type 2 Diabetes: a Cluster-Randomized Controlled Trial	(Lee *et al.*, 2020)	Malaysia	pragmatic 52-week cluster-randomized controlled study	HbA1c levels, fasting plasma glucose, blood pressure and lipid levels at each time point and Health related quality of life	The EuroQol-5D questionnaire
Effect of a community-based diabetes self-management empowerment program on mental health-related quality of life: A causal mediation analysis from a randomized controlled trial	(Sugiyama *et al.*, 2015)	USA	Randomized controlled trial	Mental health related quality of life (HRQoL) and glycemic control.	Health Related Quality of Life (HRQoL)
Effects of diabetes self-management	(Nooseisai *et al.*,	Thailand	quasi-experimental	Blood glucose levels, stress,	World Health

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education program on lowering blood glucose level, stress, and quality of life among females with type 2 diabetes mellitus in Thailand	2021)			and quality of life (QoL)	Organization Quality of Life-BREF (WHOQOL-BREF)
The effect of self-management education through weblogs on the quality of life of diabetic patients	(Rasoul *et al.*, 2019)	Iran	quasi-experimental	patient's quality of life	Diabetes quality of life (DQOL), Persia version
Effect of a Nurse-Led Diabetes Self-Management Education Program on Glycosylated Hemoglobin among Adults with Type 2 Diabetes	(Azami *et al.*, 2018)	Iran	A two-arm parallel-group randomized controlled trial with the blinded outcome assessors was designed	HbA1C Blood pressure, body weight, lipid profile, self-efficacy (efficacy expectations and outcome expectations), self-management behavior, quality of life, social support, and depression	The World Health Organization Quality of Life Scale WHOQOL-BREF

In terms of results and conclusions, the results of the review illustrate that the articles (Hailu, Moen and Hjortdahl, 2019) and (Wichit *et al.*, 2017) show no significant differences between interventions on quality of life and quality of life related to health in the intervention and control groups . While the 5 articles all showed that there were significant differences and also a significant relationship between self-management interventions with a variety of methods on quality of life and health-related quality of life.

Based on the results and conclusions, almost all articles provide recommendations and only 1 article does not include recommendations. The recommendations essentially emphasize the importance of further research with culture-based specific instruments(Hailu, Moen and Hjortdahl, 2019), increasing active participant involvement(Lee *et al.*, 2020), as well as DSME interventions in the context of improving the quality of life of Type II DM patients as part of health promotion (Rasoul *et al.*, 2019).

The use of instruments used to measure the quality of life is quite diverse. Of the 7 articles reviewed, 2 articles used the WHOQoL-BREF instrument (Azami *et al.*, 2018) (Nooseisai *et al.*, 2021), Generic HowRU tool (Hailu, Moen and Hjortdahl, 2019), 1 article used The Thai version of 12-item Short-Form Health Survey (SF-12)(Wichit *et al.*, 2017), 1 article using the Persian version of DQoL (Rasoul *et al.*, 2019) and Health Related Quality of Life (HRQoL)(Sugiyama *et al.*, 2015). These instruments are valid and reliable enough to measure quality of life in research although there are still opportunities for confounding variables that interfere with the accuracy of the measurement results. Several articles have made instrument adjustments to the language and culture of the country where the research is conducted so that it is expected to be able to measure the quality of life variable more validly.

Basically no research is perfect, so all the articles reviewed include the limitations of the research as a basis for recommendations for further research. Research on self-management requires a long time and good cooperation with participants because the risk of dropping out is quite high until the end of the study. Opportunities are quite large in subsequent research to integrate self-management interventions with other interventions to

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obtain a synergistic effect on quality of life and other relevant variables.

The author has conducted a systematic review and filtered using the PRISMA method as many as 19547 articles and found 7 articles containing information about self-management interventions integrated with other interventions. The 7 articles obtained have gone through the process of data extraction and assessment of the quality of the articles.

The articles obtained were in accordance with the PIO formulation, in which the author used the PIO formulation in his search by ignoring the criteria for the type of comparison or control. The article has also answered the clinical question about whether self-management can improve quality of life. Although there are 3 articles that do not show any significant influence or relationship. The article has also answered the second clinical question, namely the types of self-management that can be integrated. This systematic review will provide a broad description of self-management in T2DM patients, especially on the patient's quality of life. Self-management is an activity that refers to tasks related to the long-term management of patient health. Support for patients in self-management is a key component for the successful management of all T2DM patients. (Hanlon *et al.*, 2021).

Self management of chronic disease, especially DM, refers to the patient's daily activities to control the disease and minimize its impact on physical and psychological health status. Diabetes self-management education (DSME) is an important program for patients to control glycemia regularly and has been scientifically proven and evidence-based support to be an effective approach (Chrvala, Sherr and Lipman, 2016). DSME is a comprehensive and multidisciplinary professional program that is beneficial for patients to prevent complications and achieve a better quality of life.

In T2DM patients, psychosocial problems are associated as a result of the development of complications, longer hospital stays, increased health care costs both while in hospital and daily care. This condition has a significant influence on the worsening of the patient's quality of life. The patient's ability to carry out self-management and emotional ineffectiveness and adaptation indirectly triggers unstable blood sugar levels so that the signs and symptoms are more obvious and the risk of complications increases. (Hailu, Moen and Hjortdahl, 2019). Diabetes mellitus (DM) is considered a major public health problem that has a negative impact on the quality of life (QoL) of patients. The high prevalence of DM greatly affects patient health and results in several complications with poor quality of life (Abedini *et al.*, 2020).

QoL is the most important conditions as the most expected end result of the self-management process. The patient's QoL is strongly influenced by the patient's expectations, attitude and knowledge of the patient towards the disease (Borg *et al.*, 2019). Self-management interventions can be carried out in various ways by actively involving patients as well as involving families, communities and health workers. Of the 7 articles reviewed, 5 articles used an RCT design and 2 were quasi-experimental which allowed for the given intervention. RCT design is the best research design because it is accompanied by an allocation randomization process so that it is possible to avoid research bias, control confounding variables and ensure the validity and reliability of research results.

Self-management in Type 2 DM patients provides a wide enough space to be developed in various aspects whose ultimate goal is how patients are able to control their blood sugar levels and improve their psychosocial conditions, especially to improve their quality of life. Each additional intervention and integrated into self-management has advantages and disadvantages. Self-management articles identified in the literature are gender influences.

Several researchers have explored self-management activities specifically in female patients and discussed gender and cultural differences. For female respondents, diabetes management is considered as their own responsibility which must be discussed in the family context. In Pakistani and Saudi cultures, women often subordinate their own needs to those of family members. Women especially play an important role in the diet and overall health of family members so that self-management in female diabetes patients will be more beneficial. Therefore, the social and historical position of women as mothers and wives

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has an impact on how diabetes management is understood and implemented by the whole family. (Ansari *et al.*, 2017). The use of weblogs, on the one hand, is good enough to reach a wider population, but on the other hand, it creates obstacles because it is stated in the article that not all respondents understand the use of weblogs or the limitations in accessing weblogs.

Another study showed that the implementation of online self-management had a small beneficial effect on the control of HbA1c levels. Online self-management interventions are recommended because they represent patient-centered, effective, efficient and quality care. Further research is recommended to identify online self-management with digital consultation as effective in improving patient well-being and quality of life. (Celik, Forde and Sturt, 2020).

Other articles provide family-based self-management interventions. Management of DM patients is an effort to prevent both short and long-term complications and improve the quality of life of T2DM patients. The American Diabetes Association (ADA) has developed Diabetes self-management education (DSME) guidelines as a reference for standardized diabetes patient care. DSME is very important in the management of T2DM patients because the problem is very complex and requires a long time span even throughout the patient's age. Patients are burdened with many tasks including regular consultations, adhering to recommended treatment regimens and engaging in self-care behaviors including self-monitoring of blood glucose at home.

Other aspects of self-management behavior activities are changing healthy eating patterns and increasing physical activity. However, patients often find it difficult to consistently perform good health behaviors for good glycemic control. Common obstacles come from oneself and the surrounding environment such as the demands of daily life, feelings of frustration, unstable emotions and low patient commitment. Poor self-management can be caused by many things, such as lack of patient knowledge, inadequate self-efficacy for carrying out activities and less strong social and family support. Research reports that family support has a positive effect on patient self-management behavior (Pamungkas, Chamroonsawasdi and Vatanasomboon, 2017).

The larger family and social environment contributes to the patient's diabetes care. Family members are the main source of instrumental and emotional support. Instrumental support is done by helping patients complete tasks such as consulting with health care workers or assisting with insulin injections. Emotional support is provided by providing comfort and encouragement when patients are coping with difficulties or frustrations during diabetes treatment. Be aware of the impact. Families can use diabetes self-management guidelines including providing education to family members or integrating family support as part of patient care planning. Thus, educational programs can be elaborated with the active involvement of the family. (Pamungkas, Chamroonsawasdi and Vatanasomboon, 2017).

The results of the review are also supported by research which states that the resulting a model which states that social demographic, behavioral and psychological characteristics, social support, barriers to self-management, and cultural characteristics have an effect on the self-management of T2DM patients. These factors can predict health outcomes in patients. In culture of Pakistani, strong family ties are important and highly valued. Treatment processes and action of medical decisions should be discussed within the family and not by individual wishes. So, the resulting model also assumes that self-management of T2DM patient mainly occurs in the family context, and both individuals and members of family are influenced by Pakistani culture(Ansari *et al.*, 2017).

Judging from the duration of study follow-up, the shortest study time was 2 months and the longest was 1 year. This review illustrates that it takes quite a long time to conduct research to see the effect of self-management on quality of life and the dependent variables that contribute to quality of life. A sufficiently long time will certainly have a significant impact on the follow-up process of the study. The biggest risk is that respondents do not have the consistency to follow a given series of self-management interventions. The results of the review are in line with the systematic review conducted (Pal *et al.*, 2013) which

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stated that the intervention period is also between 2 and 12 months.

In the aspect of significance of the results of the study, out of 7 articles, 5 articles showed a significant effect of self-management with various variations of its implementation on quality of life and 2 articles showed no significant effect/relationship between self-management on quality of life of Type 2 DM patients. Articles presenting the results The absence of influence or relationship between self-management and quality of life is certainly a concern for subsequent studies to identify the factors that cause it. This is because quality of life and resilience are the main outcomes for DM patients, especially Type 2. The results of the review are in line with what was done (Mikhael, Hassali and Hussain, 2020) which states that there is a significant relationship between self-management and quality of life.

CONCLUSION

Self-management interventions can be carried out with various variations in implementation. Most of the implementation is carried out in an integrated manner with the educational process. Apart from being integrated with education, self-management interventions can be carried out through weblogs and telemonitoring methods. Self-management in Type 2 DM patients can also be implemented based on self-efficacy, team, family and community. Good glycemic control and quality of life are hopes for Type 2 DM patients, considering that patients need a long time in the treatment process and even have to live with their DM disease for the rest of their lives. In the implementation of self-management, of course, the patient is the key to success. Although the key to success of self-management requires cooperation and collaboration from various health professions so that implementation can be carried out in a comprehensive manner.

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