



# Effect of Family Empowerment on Self Care of Patients with Type-2 Diabetes Mellitus: A Systematic Review

Rianti Pramita<sup>1</sup>, Siti Saidah Nasution\*<sup>1</sup>, Jenny Marlindawani<sup>1</sup>

Department of Medical Surgical Nursing, Faculty of Nursing, Universitas Sumatera Utara, Medan, Indonesia

## Abstract

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**\*Correspondence:** Siti Saidah Nasution, Department of Maternity and Pediatric Nursing, Faculty of Nursing, Universitas Sumatera Utara, Jl. Prof. Maas No. 3 Campus USU Medan 20155, Indonesia. E-mail: [siti.saidah@usu.ac.id](mailto:siti.saidah@usu.ac.id)  
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**BACKGROUND:** Type-2 Diabetes Mellitus (T2DM) is a chronic disease that will be suffered for life that is necessary to provide education to patients and families to easily understand the course of disease, prevention, and obstacles in the management of T2DM. Family empowerment can be initiated by optimizing family functions to help patients with T2DM adapt and adhere to self-care through four dimensions, empathy (emotional), motivation (reward), facilitative (instrumental), and participatory (participation).

**AIM:** Systematic review aims to identify and evaluate the influence of family empowerment interventions on self-care for T2DM patients.

**METHODS:** The database for article search consisted of EBSCO, PubMed, and ProQuest using relevant keywords based on research topics and titles. Selection of articles used the diagram Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The overall results of 2635 articles and eight articles that fit the criteria of inclusion had obtained and was analyzed with descriptive narrative and had fulfilled the methodological quality in accordance with Joanna Briggs Institute guidelines (Joanna Briggs Critical Appraising Methodology).

**RESULTS:** There were eight articles with the Family Empowerment Process Model intervention program and the Diabetes Mellitus Education Program which is a family-oriented program that includes educational classes, group discussions, home visits, and follow-up by phone. Education is provided to families through live discussions and by phone calls with a duration of approximately 15–20 min scheduled from 9 a.m. to 12 p.m. Follow-up was done over the phone in the intervention group for approximately 3 months–12 months.

**CONCLUSION:** The findings of this systematic review suggest that family empowerment interventions based on health education can have a good influence on improving self-care for T2DM patients.

## Introduction

Type-2 diabetes mellitus (T2DM) is a disease caused by an absolute and relative insulin deficit so that its impact results in increased plasma glucose levels or hyperglycemia (ADA, 2018). About 422 million people worldwide have diabetes. Of 1.6 million deaths were directly from diabetes occurring each year and another 2.2 million deaths were caused by increasing blood sugar levels. By 2030, it is expected to increase to more than 422 million. The prevalence of diabetes has increased faster in low- and middle-income countries than in high-income countries. Diabetes is the leading cause of blindness, kidney failure, heart attack, stroke, and lower limb amputation [1], [2].

International Diabetes Federation (IDF, 2017) estimates that the prevalence of T2DM disease incidence in all countries is higher than the incidence of T1DM. In 2015–2018, the prevalence rate of T2DM reached 415 million patients from several countries, such as the United States ranged from 10% to 15%, Caucasians ranged from 4% to 6%, and 2–4% in Africa suffered from T2DM. It is estimated that by 2040 the

prevalence of T2DM incidence rate will increase by a very high number of approximately 642 million people in the world.

T2DM becomes a chronic disease that will be suffered for life, it is necessary to provide education to patients and families to easily understand the course of disease, prevention, and obstacles in the management of T2DM. Family empowerment can be started by optimizing family functions to help T2DM patients to adapt and adhere to self-care measures through four dimensions, empathy (emotional), encouragement (reward), facilitative (instrumental), and participatory (participation) [3], [4]. Family members are the primary source of instrumental and emotional support. Instrumental supports include helping patient' specific tasks completion, such as making an appointment with a healthcare provider or injecting insulin's, while emotional support can include providing comfort and encouragement when the patient faces pressure or frustration during long-term diabetes treatment [5].

Basically, humans need self-care for themselves, except for people who are unable to treat themselves independently but the need for help from others. Self-care is an activity performed

by an individual for himself or herself in order to maintain health, life, and well-being. Self-care is a form of behavior that focuses on the participation and responsibility of individuals in disease management. Diabetes self-care is an effort to treat individuals in diabetes control including taking medication and preventing complications. The purpose of self-care is to obtain ideal blood glucose levels [6].

Family empowerment is a nursing intervention used by nurses to assist families in caring for and providing support to family members with chronic diseases that are seen as the most important element for successful treatment. Nurses as health-care providers must not only examine the characteristics of respondents from the knowledge, attitudes, and health-care skills but also examine the family and cultural characteristics that can influence the health assessments. Nursing interventions are not only given to sick individuals but also families who care for them [7]. Family empowerment intervention is expected to be an approach that can be done to improve the self-care activities of people with diabetes mellitus. For the suppression and prevention of diseases for people with diabetes mellitus, and the increasing ability of the family and support the independence of care acceptance, the approach of empowerment and involving the family as a companion is expected to be effective [8].

Some research confirms that using family-centered education and using patterns such as family-centered empowerment can be effectively promoting individual self-care behaviors. Family empowerment improves knowledge and attitudes, leading to improved performance and quality of care, improved self-care, accelerated patient recovery, and reduced complications of disease [9]. Health-care strategies involving family members can improve self-efficacy, knowledge of the disease condition, and self-care skills in individuals with chronic conditions such as T2DM in managing blood glucose levels, maintaining personal hygiene, consuming appropriate food, complying with medications, and maintaining physical activity levels [10]. The results of the study [11] also said that community or family empowerment is one of the effective strategies to improve health status through family engagement with an educational approach. Facilitating the involvement of all family members and communities in assisting individuals and families in decision making, helps families get positive experiences that are in line with expectations, addressing problems in self-care.

Through the writing of this systematic review will be given an overview of the influence of family empowerment programs on improving self-care for T2DM patients. The purpose of writing systematic review is to identify the influence of family empowerment programs conducted on T2DM patients on self-care improvement.

## Methods

Systematic review is essential to accurately and reliably summarize evidence; the selected systematic method can minimize bias thus providing reliable findings. This method of writing a systematic review was carried out and reported in accordance with the guidelines of diagram Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) and uses analysis of descriptive narratives from the findings of several research articles that discuss the influence of family empowerment on self-care of T2DM patients.

Prisma guidelines focused on ways in which authors could ensure systematic report and transparent review as well as meta-analysis that could help authors report a variety of systematic reviews to assess the benefits and dangers of health-care interventions (Liberati *et al.*, 2009). In addition, the structured approach to facilitate the analysis process of research articles in this systematic review also used PICOS model consisting of population, intervention, comparator, outcome, and study design. PICOS was used to help authors determine inclusion and exclusion criteria so that authors can perform an article filtering process to assess the feasibility of all studies obtained from the database.

### Inclusion criteria and exclusion criteria

#### Search strategies and search information resources

The author used an international electronic database consisting of EBSCO, PubMed, and ProQuest as the source of articles in this systematic review with a time span of research articles ranging from 2016 to 2021 (the last 5 years). Article search performed to complete this systematic review used keywords on a database tailored to research topics and titles and used Boolean operators' standard and equivalent words obtained from Medical Heading Subject. Keywords used include "Family Empowerment" OR "Family Support" AND "Self Care" AND "Diabetes Mellitus Type 2."

**Table 1: Inclusion and exclusion criteria**

No.	Inclusion criteria	Exclusion criteria
1.	Population in study focuses on T2DM patients	Population in study is not T2DM patients
2.	A study that examines the provision of family empowerment intervention programs with self-care	A study that does not address family empowerment interventions that are not aimed at self-care of T2DM patients
3.	The control group for other interventions is not as a comparison, the use of other groups is only limited to observe without intervention	None
4.	A study that discusses interventions that affect self-care improvement in T2DM patients	A study that discusses self-care in addition to T2DM patients
5.	Quasi-experiment and RCT	Case study, cross-sectional study, qualitative research, systematic review, and meta-analysis
6.	Research articles published in the period 2016–2021 and full text	Research articles published before 2016 and not full text
7.	Articles in English	Articles not in English

### **Article selection**

The authors performed the process of filtering research articles using the PRISMA method with four stages. The first stage was the identification stage where the author combined all research articles from the search results on the database. The second stage was screening, in this stage the author conducted a selection based on the title of the research article then adjusted to the criteria of inclusion and exclusion criteria that have been set (Table 1), the article was included if it met the inclusion criteria and would be excluded if the article had the requirement of exclusion criteria. The third was the eligibility stage where the author conducted a selection based on abstracts from research articles obtained and adapted to the inclusion criteria. The fourth stage was the including stage, in this stage the author conducted a selection again with full text that was adjusted to the inclusion criteria as well as reviewing the quality of each research article so that at this stage research articles that were completely appropriate and relevant to the topic of research for review or systematic review obtained.

### **Quality assessment**

Systematic review is essentially an analysis of the available literature (i.e. evidence) and an assessment of effectiveness or practice, involving a complex set of steps. The Joanna Briggs Institute (JBI) guide takes a specific view of what is considered evidence and the methods used to synthesize these types of evidence. In line with the broader view of evidence, the institute has developed rigorous theories, methodologies, and processes for critical assessment and synthesis of these diverse forms of evidence to aid clinical decision making in healthcare. In this systematic review, the assessment of articles used JBI Critical Appraisal guidelines. JBI Critical Appraisal is an instrument used to assess the methodological quality of a study and to determine the extent to which it has discussed possible biases in its design, intervention, and analysis [12], [13]. JBI Critical Appraisal instrument is also adapted to several types of research used, including JBI Critical Appraisal for Randomized controlled trial, JBI Critical Appraisal for quasi-experiment, JBI Critical Appraisal tools for systematic reviews and research syntheses and others [14].

### **Data extraction**

In the writing of this systematic review, relevant data were extracted to a computer-based spreadsheet. The author filtered the selected information based on PRISMA method with categories consisting of author name, year of publication, publisher's journal, language, country of study, article title, research objectives, population of research, number of respondents, research

design, intervention, method, instrument, validity and reliability value, statistical tests, research limitations, and findings of the research as attached to Table 2.

## **Results**

### **Search results**

Based on the flowchart for the article search strategy method or PRISMA diagram, at the identification stage there were 2635 articles obtained from several electronic databases with the following details from EBSCO as many as eight articles, PubMed 1985 articles, and ProQuest 640 articles. At the screening stage after the selection, there was a reduction of 46 articles because several article titles from different databases were the same, so that the remaining 2589 articles were then screened based on title and abstract. After screening, 2370 articles were excluded because there were types of research, design, family empowerment interventions, publishing years, and languages that did not meet the inclusion criteria. Furthermore, at the eligibility stage, there were 135 articles that would be reviewed in full text and 127 articles were excluded because they did not match with the population of T2DM patients, did not provide family empowerment interventions, articles were not in English and published before 2016. At the included stage, a full text review and quality assessment of articles was performed so that eight articles that met the inclusion criteria and had the same purpose that was to see the influence of family empowerment interventions on the improvement of self-care T2DM patients.

### **Research design**

The description of the eight articles in this systematic review consisted of two research designs, namely, seven articles that use RCT research design [7], [10], [16], [17], [19], [20] and one article with quasi-experiment design [15].

### **Characteristics of respondents**

The total number of research respondents from the eight research articles reviewed was 1203 respondents with DM. The highest number of respondents was found in RCT design articles with 242 respondents [16], [17]. From the ten research articles, it was found that the respondents involved in the study were patients with T2DM, the average age of respondents in the range of 30–70 years, male and female gender, and the level of high school education. The research conducted in eight articles came from several countries, three articles from China, and two

**Table 2: Summary of data extraction results**

No.	Author, year, journal, country	Title article	Aim & total respondent	Study design	Intervention	Validity and reliability instrument	Statistic test	Key finding	Quality appraisal	Ethics approval	Limitation
1.	[15] Diabetes Educator China	Effectiveness of a Family-based Diabetes Self-management Educational Intervention for Chinese Adults with Type 2 Diabetes in Wuhan, China	Aim: The purpose of the study was to examine the effects of a family-based self-management educational intervention on self-management in adults with T2DM in Wuhan, China Total Respondents: 57 patients with T2DM	A quasi-experimental	The intervention group (n1 = 29) received a tailored 7-session educational intervention and the control group (n2 = 28) received routine care in the community	The Cronbach's alpha was 0.89 in older Chinese adults with diabetes The Cronbach's alpha was 0.86 in Chinese with T2DM Self-efficacy Scale (C-DWSES) has an average content validity index (CVI) score of 0.86, and Cronbach's alpha was 0.934 The Chinese version of the Summary of Diabetes Self-care Activities Scale (C-SDSCA) The Cronbach's alpha was 0.68 in Chinese adults with T2DM	Parametric Test: · Chi-square tests · independent t tests	diabetes knowledge, diabetes self-efficacy, self-care activities, and health-related quality of life	Reasonable	Non-Mentioned	Convenience sampling and a small sample size may not be sufficient to represent the target population. Also, face-to-face interviews may cause social desirability bias. Finally, the intervention was provided in a short-term period, and the sustained effects of the intervention need to be followed up
2	[16] International Journal of Nursing Studies China	Effectiveness of a patient-centered, empowerment-based intervention program among patients with poorly controlled type 2 diabetes: A randomised controlled trial	Aim: To evaluate the effectiveness of a patient-centred, empowerment-based program on glycemic control and self-management behaviors among patients with poorly controlled type 2 diabetes Total Respondents: 242 patients	RCT	Intervention group received a 6-week patient-centred, empowerment-based self-management program, which is theoretically grounded on the principles of the Empowerment Process Model-setting personally meaningful goals, taking action towards goals and reflecting on the impact of action plans control group received health education classes and post-discharge follow-up	The Summary of Diabetes Self-Care Activities (SDSCA) Cronbach's $\alpha = 0.96$ for the General Diet Management, 0.62 for Specific Diet Management, 0.94 for Medication Use, 0.87 for Exercise, 0.84 for Blood Glucose Self-monitoring, and 0.78 for Foot Care	independent t-test, chi-square test or Fisher's exact test	Behaviour Clinical trial Empowerment Poorly controlled type 2 diabetes Self-management education Transitional care	Good	Mentioned	Participation was limited to patients receiving diabetes care in tertiary hospitals, and we did not collect information from those who refused to participate in the study. The whole population with poorly controlled type 2 diabetes is uncertain. Furthermore, the success of concealment of group assignment was not assessed in the study. Although outcome assessors were blinded to group allocation, we cannot be sure that participants did not disclose this information, which would cause damage to allocation concealment
3.	[17] International Journal of Nursing Studies China	The effects of an empowerment-based intervention on empowerment level, psychological distress, and quality of life in patients with poorly controlled type 2 diabetes: A randomized controlled trial	Aim: To evaluate the effectiveness of an empowerment-based intervention on empowerment level, psychological distress, and quality of life among patients with poorly controlled type 2 diabetes Total Respondents: 242 adults' patients with poorly controlled type 2 diabetes	RCT	Empowerment Process Model Intervention Group: n: 121 • The intervention group received a 6-week empowerment-based transitional care program, with significant emphasis on establishing personally meaningful goals, facilitating collaborative partnership and shared decision-making, resolving life-disease conflicts through situational reflection Control Group: n: 121 • received two general health education classes and post-discharge social calls on top of routine care	Patients' empowerment: Diabetes Empowerment Scale-Short Form (DES-SF) Diabetes distress: Diabetes Distress Scale (DDS) Quality of life: Audit Diabetes Dependent Quality of Life (ADDQoL)	analyzed according	Clinical trial; Diabetes distress; Empowerment; Poorly controlled type 2 diabetes; Self-life; Self-management; Transitional care	Reasonable	Non Mentioned	First, recruitment for participants were conducted using a convenience sampling method and only less than 50% of eligible people were willing to participate. Second, provision of face-to-face small group discussion sessions and usual care within the same general practice leads to risk of contamination and thus might have diluted intervention effects. Finally, psychological improvement in people with poorly controlled type 2 diabetes is often a gradual process and the fairly short duration of follow-up is another limitation of this trial

(Contd...)

Table 2: (Continued)

No.	Author, year, journal, country	Title article	Aim & total respondent	Study design	Intervention	Validity and reliability instrument	Statistic test	Key finding	Quality appraisal	Ethics approval	Limitation
4	[7] Applied Nursing Research Brazil	Contribution of family social support to the metabolic control of people with diabetes mellitus: A randomized controlled clinical trial	Aim: This randomized controlled clinical trial aimed to evaluate the contribution of family social support to the clinical/metabolic control of people with T2DM Total Respondents: 164 people	RCT	The Diabetes Mellitus Education Program Intervention Group: 82 17 telephone calls were made to each family caregiver of the patients in the IG, each lasting an average of 8 min and occurring at a frequency of 10 to 30 days, based on the dates of the patient's return visits. To ensure that the guidance provided was documented, a digital phone recorder was used; at the end of each call, the families confirmed their interest in continuing the study Control Group: 82 • Two telephone calls were made to the families of participants, one at the beginning and the other at the end of the study. The first telephone contact to both groups facilitated the blinding of participants at baseline, as this procedure helped ensure that the participants did not know to which group, they had been assigned	Non-parametric test: Chi-square test	Nursing care Diabetes mellitus Health education Social support Clinical trial.	Good	Mentioned	Its effectiveness when applied with family care-givers is uncertain. Moreover, the few studies involving family care-givers that used the same theoretical framework and that evaluated the same outcomes as this study limited further discussions of these results	
5	[10] Diabetes Research and Clinical Practice Australia	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	Aim: evaluated a theoretically-derived family-oriented intervention aimed to improve self-efficacy, self-management, glycemic control and quality of life in individuals living with Type 2 diabetes in Thailand. Total Respondents: 140 volunteer individuals with Type 2 diabetes	RCT	Intervention arm received routine care plus a family-oriented program that included education classes, group discussions, a home visit, and a telephone follow-up control arm only received routine care	Diabetes self-management: Summary of Diabetes Self-Care Activities Scale (SDSCA)  diabetes self-efficacy: Diabetes Management Self-Efficacy Scale (DMSES) Quality of life: Thai version of 12-item Short-Form Health Survey (SF-12) diabetes knowledge: Diabetes Knowledge Questionnaire	Pearson Chi square, Mann-Whitney test	Health outcome Family-oriented Self-management Type 2 diabetes Randomized controlled trial	Reasonable	Non Mentioned	As this study focused on self-efficacy and self-management abilities, standardization of the hypoglycemic agent dose was not undertaken. No significant difference in the numbers of hypoglycemic agents taken by participants in the control or intervention groups. No measures of the patients diet or exercise units were taken and variation in these activities may have influenced the HbA1c. This study was conducted in a community-based hospital within a rural setting and therefore may not be generalizable to urban settings

(Contd...)

Table 2: (Continued)

No.	Author, year, journal, country	Title article	Aim & total respondent	Study design	Intervention	Validity and reliability instrument	Statistic test	Key finding	Quality appraisal	Ethics approval	Limitation
6	[18] Women, Health, Bull Iran	Effectiveness of Family Empowerment Therapy Based on Self-Care and Glycosylated Hemoglobin in Female Patients with T2DM: A Randomized Controlled Clinical Trial	aimed to determine the effectiveness of family empowerment therapy based on self-compassion on self-care and glycosylated hemoglobin in female patients with T2DM Total Respondents: 60 women with type 2 diabetes	RCT	The experimental group (n=30) was treated with family empowerment therapy based on self-compassion for eight weekly 90-minute sessions control group (n=30) received usual hospital treatments	self-care: Summary of Diabetes Self-Care Activities (SDSCA) Cronbach's alpha for the construct of self-care activities was 0.66	MANOVA Bonfironi post-hoc test	Self-care, Family empowerment therapy based on self-compassion, Glycosylated hemoglobin	Good	Mentioned	Although the present study did not have many drop outs, its small sample size was among the limitations that prevented the accurate estimation of the effect size for the program. The second limitation concerns the use of self-report instruments. Instruments of such ilk have inherent shortcomings, among which mention can be made of measurement error and lack of self-observation. Furthermore, the sample of this study was limited to female patients with diabetes, which requires more caution in generalizing the findings First, telephone monitoring that may have reduced evasion in IG, since the CG has not been monitored. At the same time it may have encouraged the subjects to achieve the goals they proposed. Second, medication adjustments are inevitable in managing diabetes mellitus, which can influence the findings of the study. Third, it is known that the charisma and the skills that researchers use to guide the groups directly influence increased or decreased user participation in achieving goals
7	[19] BMC Public Health Brazil	Evaluating the effectiveness of an empowerment program for self-care in type 2 diabetes: a cluster randomized trial	This study evaluated the effectiveness of an empowerment program providing support for psychosocial, behavioral, and clinical aspects of diabetes to help Brazilian users of public health services obtain metabolic control of this condition. Total Respondents: 238 participants	RCT	The intervention took place over 12 months; this was divided into the initial period when the pre-education tests occurred (T1), period 0 when cycle 1 occurred (T0), period 3 when cycle 2 occurred (T3), period 6 when cycle 3 occurred (T6), period 12 when cycle 4 occurred (T12), and the final period when the post-education tests took place (Tf). Each cycle lasted 3 months. There- fore, program unfolded over six distinct periods, as seen in the model	The questionnaire that evaluates knowledge (DKN) The questionnaire about user attitudes (ATT) The self-care questionnaire (ESM) The short form empowerment scale (DES)	Parametric Test: ANOVA	Diabetes type 2, Health education, Randomized controlled trial, Self-care, Primary health care	Good	Mentioned	

(Contd...)

**Table 2: (Continued)**

No.	Author, year, journal, country	Title article	Aim & total respondent	Study design	Intervention	Validity and reliability instrument	Statistic test	Key finding	Quality appraisal	Ethics approval	Limitation
8	[20] Journal of Holistic Nursing and Midwifery Iran	The Effect of Family-Based Telephone Follow-Up on Self-Care of Patients with Diabetes	Aim: The present study aims to determine the effect of family-based telephone follow-up about self-care in patients with T2DM in Uromia Total Respondents: 60 Patients with DM	RCT	Intervention Group: 30 <ul style="list-style-type: none"> <li>The call time was agreed between the subjects and one family member. It was scheduled between 9 am and 2 pm. The duration of each call was approximately 15–20 min. Telephone follow-up was conducted in the intervention group for 3 months. The content of the follow-up was determined based on the information obtained by the needs assessment and characteristics of the study population, including assessing self-care status of subjects in diet, exercise, blood glucose self-control, and foot care, and the response to questions of the subjects and their families</li> <li>Follow-up: 3 months</li> </ul> Control Group: 30 <ul style="list-style-type: none"> <li>Family-centered follow-up for 3 months</li> </ul>	Diabetes self-care questionnaire Cronbach's alpha coefficient of 0.89 for diet, 0.78 for exercise, 0.87 for blood glucose control, and 0.85 for total self-care	Chi-square, T-test, dan Mann-Whitney test	The results of this study showed that after the family-based telephone follow-up, the mean self-care scores and the dimensions (nutrition, physical activity, blood glucose control, foot care, and self-care) were significantly different between the intervention and control groups (P = 0.001). However, there was no significant difference between the mean scores of adherences to the medication regimen after the intervention between the two groups	Good	Mentioned	Despite advising patients in the intervention group not to attend the Diabetes Association classes as well as other classes, one of the limitations of this study was the probability of informational interaction between intervention and control groups in Diabetes Association classes

T2DM: Type 2 Diabetes Mellitus

articles each from Brazil, Iran, and one article from Australia.

### Characteristics of intervention

The intervention in eight articles consisted of several types of family empowerment programs given to patients with T2DM as respondents. Family empowerment intervention programs in these eight articles included the Family Empowerment Process Model [16], [17] and the Diabetes Mellitus Education Program [7], [10], [15], [19], [20] which is a family-oriented program that includes educational classes, group discussions, home visits, and follow-up by phone. The call time was agreed between the subject and one family member. That was scheduled between 9 a.m. and 2 p.m. The duration of each call was approximately 15–20 min. Follow-up was done over the phone in the intervention group for approximately 3 months–12 months, while the control group only receive regular treatment as usual. Based on the results of all studies from the intervention program, it showed that the intervention program of Family Empowerment Process Model and Diabetes Mellitus Education Program significantly affected the self-care of patients with T2DM.

### Result of methodological quality assessment

Quality assessment result of the research article is shown in Table 3 above, where from seven articles with RCT design, five articles have good quality [7], [16], [18], [20]. Of the 13 questions, 11 were answered with Yes and two questions with No answers. Two other articles with RCT designs had sufficient quality [10], [17]. Of the 13 questions, nine answered with Yes and four answered with No. As for research articles with quasi-experiment design, there was one article with good quality [15] where of nine questions, all answers were Yes. From the quality assessment results of the research article, the risk of bias that occurs from writing this systematic review can be minimized.

**Table 3: The result of article assessment for systematic review using JBI critical appraisal tools**

Citations	Criteria													Result
	1	2	3	4	5	6	7	8	9	10	11	12	13	
<b>RCT:</b>														
[20]	√	√	√	√	√	√	√	√	√	√	√	√	√	11/13 (69.2%) (Good)
[17]	√	√	√	√	√	√	√	√	√	√	√	√	√	9/13 (69.2%) (Reasonable)
[7]	√	√	√	√	√	√	√	√	√	√	√	√	√	12/13 (92.3%) (Good)
[10]	√	√	√	√	√	√	√	√	√	√	√	√	√	9/13 (69.2%) (Reasonable)
[19]	√	√	√	√	√	√	√	√	√	√	√	√	√	11/13 (84.6%) (Good)
[19]	√	√	√	√	√	√	√	√	√	√	√	√	√	11/13 (69.2%) (Good)
[16]	√	√	√	√	√	√	√	√	√	√	√	√	√	11/13 (69.2%) (Good)
<b>Quasy-experiment</b>														
[15]	√	√	√	√	√	√	√	√	√	√	√	√	√	9/9 (100%) (Good)

### Additional results

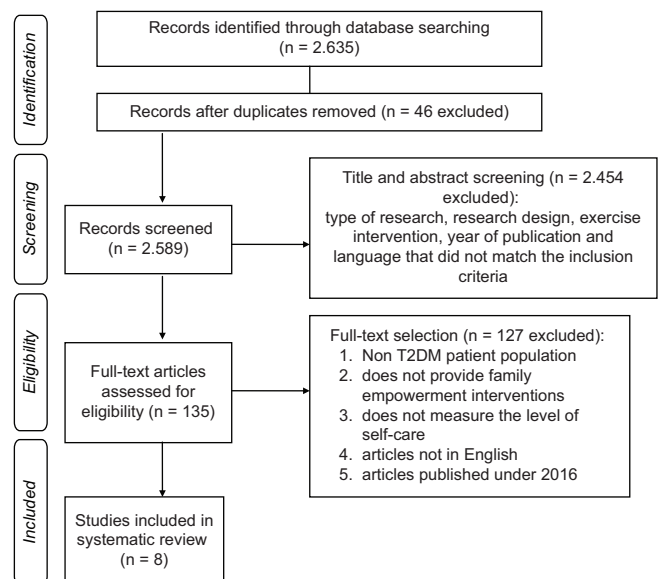
From the eight research articles listed in this systematic review, there were several research articles that not only assessed self-care but also discussed and assessed other results, including assessing quality of life, glycemic control, foot care, and nutrition [15], [17], [20].

### Risk of bias

There are three ways of assessing the risk of bias namely individual components, checked list and scale Liberati *et al.*, (2009). Scale and checklist are rarely used because they are considered to potentially cause a lot of consideration and error. Assessing the risk of bias with the approach of individual components is more recommended because it is based on a domain that has empirical evidence and strong clinical reasons. Therefore, the risk of bias in writing this systematic review is carried out by determining the extraction of data conducted by the authors from the research article findings both in terms of methods, objectives and outcomes resulting from research as well as from the assessment of the quality of research articles. Of the eight articles in this systematic review, there is still a tendency for the risk of bias because of some research articles, especially in articles with RCT design that has not included blinding techniques in the article.

### Discussion

The interventions from eight articles in this systematic review obtained family empowerment



**Figure 1: Preferred reporting items for systematic reviews and meta-analyses flow diagram of identification and selection of articles**



intervention programs including the Family Empowerment Process Model program [16], [17] and Diabetes Mellitus Education Program [7], [10], [15], [17], [19], [20]. Based on the results of the article research listed in this systematic review, the intervention was a family-oriented program that included health education, group discussions, home visits, and follow-ups by phone. Education was given to families through live discussions and by phone calls with a duration of approximately 15–20 min scheduled from 9 a.m. to 12 p.m. Follow-up was done over the phone in the intervention group for approximately 3 months–12 months. According to Razmara *et al.*, (2018), family-oriented intervention programs provided by nurses contribute an effective influence on self-care and its dimensions such as (nutrition, physical activity, blood glucose control, and foot care) in diabetic patients [20]. Therefore, nurses are advised to follow-up and make family empowerment programs through education by educating family members of patients to participate in diabetes treatment.

Family empowerment program based on health education related to disease care is one of the intervention programs used by nurses to help families in caring for and providing support to family members with chronic diseases. Nursing interventions are not only given to sick individuals, but also families who care for them [7]. Family empowerment intervention is expected to be an approach that can be done to increase self-care activities of people with diabetes mellitus [8]. The research results of Rahmani *et al.*, (2020) also said that compassion-based family empowerment therapy with affection in providing care to family members suffering from DM can provide an effective influence in improving self-care and lowering glycosylated hemoglobin in women with type-2 diabetes [18]. According to Al *et al.*, (2021), self-care is one of the important aspects in the treatment of patients with chronic diseases. Applying a family-centered empowerment model to patients by strengthening the care capabilities of patients and their families are significantly able to improve the patients' quality of life for the better [21].

There are several studies using the Summary of Diabetes Self Care Activities measuring instruments that have 14 question items. The questionnaire consisted of 12 favorable items [1], [2], [3], [4], [7], [8], [9], [10], [11], [12], [13], [14] and two unfavorable items (5 and 6). The lowest possible score is 14 and the highest score is 98. The higher the number of scores, the better the self-care behavior of T2DM patients. The assessment range in this questionnaire is 84 which is divided into assessment categories namely: 70–98= Good, 42–69= Fair, 14–41= Poor. It is continued with the provision of family empowerment interventions by providing education related to family empowerment interventions [10], [15], [16], [18].

This systematic review still has some limitations. In eight studies that had been reviewed,

among others, the use of RCT design that has not used blinding technique in the study and follow-up time for self-care measurement that is still considered too short in just 3 months.

### **Further research advice**

The findings of several studies in this systematic review indicate the need for further research. Applying blinding techniques as well as the use of control groups or by comparison interventions need to be conducted to strengthen the results of the study and observe more effective intervention programs to be applied. In addition, researchers also need to pay attention to other factors that contribute to influence self-care in T2DM patients.

### **Implications for practice**

The findings obtained in this systematic review can support the implementation of intervention programs empowering patients' families by nurses in conducting self-care specifically when the patient has returned home. The implementation of this intervention program can be done in hospitals when the patient is inpatient or outpatient.

## **Conclusion**

Physical exercise intervention programs of eight studies in this systematic review provide significant results on increasing self-care for T2DM patients, this systematic review can be used as reliable evidence in providing family empowerment intervention programs for the improvement of self-care for T2DM patients.

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## **Authors Contribution**

Rianti Pramita: Compiling and conducting systematic reviews and writing manuscripts Siti Saidah Nasution and Jenny Marlindawani Purba: Conducting

guidance and contributing important intellectual content during the process of drafting and revising manuscripts.

## References

- American Diabetes Association. Updates to the standards of medical care in diabetes-2018. *Diabetes Care*. 2018;41(9):2045-7. <https://doi.org/10.2337/dc18-su09>  
PMid:30135199
- World Health Organization. Diabetes Mellitus. Geneva: World Health Organization; 2021. Available from: <https://www.who.int/news-room/fact-sheets/detail/diabetes>. [Last accessed on 2021 Mar 17].
- Karuranga S, Fernandes J, Huang Y, Malanda B. *IDF Diabetes Atlas*. 8<sup>th</sup> ed. Belgium: International Diabetes Federation; 2017.
- McEwen MM, Pasvogel A, Murdaugh C, Hepworth J. Effects of a family-based diabetes intervention on behavioral and biological outcomes for mexican american adults. *Diabetes Educ*. 2017;43(3):272-85. <https://doi.org/10.1177/0145721717706031>  
PMid:28447545
- Baig AA, Benitez A, Quinn MT, Burnet DL. Family interventions to improve diabetes outcomes for adults. *Ann N Y Acad Sci*. 2015;1353(1):89-112. <https://doi.org/10.1111/nyas.12844>  
PMid:26250784
- Amelia R, Lelo A, Lindarto D, Mutiara E. Analysis of factors affecting the self-care behaviors of diabetes mellitus Type 2 patients in Binjai, North Sumatera-Indonesia. *Asian J Microbiol Biotechnol Environ Sci*. 2018;20(2):361-7.
- Gomes LC, Coelho AC, Dos Santos Gomides D, Foss-Freitas MC, Foss MC, Pace AE. Contribution of family social support to the metabolic control of people with diabetes mellitus: A randomized controlled clinical trial. *Appl Nurs Res*. 2017;36:68-76. <https://doi.org/10.1016/j.apnr.2017.05.009>  
PMid:28720242
- Sakanashi S, Fujita K. Empowerment of family caregivers of adults and elderly persons: A concept analysis. *Int J Nurs Pract*. 2017;23(5):1-9. <https://doi.org/10.1111/ijn.12573>  
PMid:28691266
- Sürücü HA, Büyükkaya Besen D, Erbil EY. Empowerment and social support as predictors of self-care behaviors and glycemic control in individuals with Type 2 diabetes. *Clin Nurs Res*. 2018;27(4):395-413. <https://doi.org/10.1177/1054773816688940>  
PMid:28132513
- Wichit N, Mnatzaganian G, Courtney M, Schulz P, Johnson M. 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. *Diabetes Res Clin Pract*. 2017;123:37-48. <https://doi.org/10.1016/j.diabres.2016.11.013>  
PMid:27918976
- Nasution SS, Erniyati E. The intervention of community role for improving health status of pregnant women suffering HIV-AIDS in medan. *Open Access Maced J Med Sci*. 2018;6(9):1768-72. <https://doi.org/10.3889/oamjms.2018.324>  
PMid:30338005
- Moher D, Liberati A, Tetzlaff J, Altman DG, Altman D, Antes G, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;6(7):e1000097. <https://doi.org/10.1371/journal.pmed.1000097>  
PMid:19621072
- The Joanna Briggs Institute. Checklist for Quasi-Experimental Studies. Australia: Joanna Briggs Institute; 2017. p. 1-7.
- The Joanna Briggs Institute. Checklist for Systematic Reviews and Research Syntheses. Australia: Joanna Briggs Institute; 2017.
- Cai C, Hu J. Effectiveness of a family-based diabetes self-management educational intervention for chinese adults with Type2 diabetes in Wuhan, China. *Diabetes Educ*. 2016;42(6):697-711. <https://doi.org/10.1177/0145721716674325>  
PMid:27831523
- Cheng L, Sit JW, Choi KC, Chair SY, Li X, Wu Y, et al. Effectiveness of a patient-centred, empowerment-based intervention programme among patients with poorly controlled Type 2 diabetes: A randomised controlled trial. *Int J Nurs Stud*. 2018;79(74):43-51. <https://doi.org/10.1016/j.ijnurstu.2017.10.021>  
PMid:29149618
- Cheng L, Sit JW, Choi KC, Chair SY, Li X, Wu Y, et al. The effects of an empowerment-based self-management intervention on empowerment level, psychological distress, and quality of life in patients with poorly controlled Type 2 diabetes: A randomized controlled trial. *Int J Nurs Stud*. 2019;3(21):1-8. <https://doi.org/10.1016/j.ijnurstu.2019.103407>
- Rahmani S, Mansoobifar M, Sirifi MR, Ashayeri H, Bermas H. Effectiveness of family empowerment therapy based on self-compassion on self-care and glycosylated hemoglobin in female patients with Type 2 diabetes mellitus: A randomized controlled clinical trial. *Womens Health Bull*. 2020;7(2):33-42.
- Cortez DN, Macedo MM, Souza DA, Dos Santos JC, Afonso GS, Reis IA, et al. Evaluating the effectiveness of an empowerment program for self-care in Type 2 diabetes: A cluster randomized trial. *BMC Public Health*. 2017;17(1):41. <https://doi.org/10.1186/s12889-016-3937-5>  
PMid:28061840
- Iranagh SR, Hemmati Maslakkpak M. The effect of family-based telephone follow-up on self-care of patients with diabetes. *J Holist Nurs Midwifery*. 2018;28(1):84-91.
- Al Hoda Taheri B, Salar A. The Effect of Family Empowerment Model on Self-care in Hemodialysis Patients of Zahedan, Iran. *Health Scope*. 2021;10(1):1-6. <https://doi.org/10.5812/jhealthscope.90951>