

Review

Effectiveness of Family Empowerment towards Diet Compliance and Family Independence in Caring for Family Members with Diabetes Mellitus: A Systematic Review

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ABSTRACT

Diabetes mellitus has now become a major problem in non-communicable diseases whose prevalence continues to increase. Lack of family independence and client non-compliance with the diet program greatly affects blood sugar levels. This study needs to evaluate the effectiveness of family empowerment towards diet compliance and family independence in caring for family members with diabetes mellitus. A systematic review searched five electronic databases (Scopus, sciencedirect, pubmed, research gate, and google scholar) with the last ten years (2011-2021). The quality of the articles used in this study was assessed using the Joanna Briggs Institute Guideline. The prism protocol is also used to review each journal. We found 15 studies out of a total of 5,865 studies that discussed family empowerment in increasing family independence and dietary adherence in family members suffering from diabetes mellitus. Family empowerment is one method that is quite effective in increasing family independence and adherence to diet programs. There are six articles (40%) that state that planned behavior theory is effective in increasing family independence and dietary adherence to family members suffering from diabetes mellitus. From all the articles analyzed, there are several effective theories to empower families to change the behavior of family independence and individual diet compliance, namely the theory of planned behavior. However, this study is not strong enough to provide an assessment that family empowerment based on the theory of planned behavior and empowerment is the best way to increase independence, therefore further research is needed.

Key words: *Diabetes Mellitus, Compliance or Adherence Dietary, Family Empowerment, Theory of Planned Behavior*

<https://doi.org/10.33860/jik.v15i1.435>



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INTRODUCTION

Diabetes mellitus has now become a major problem in non-communicable diseases whose prevalence continues to increase ¹. DM is also called the mother of disease because DM is the parent of various other diseases such as heart disease, hypertension, stroke, kidney failure, blindness, and amputation of the feet ². DM cannot be cured, but blood sugar levels can be controlled ³. DM can be well controlled by diet, exercise, and anti-diabetic drug therapy ⁴. Diet and exercise arrangements are the main things that support the therapy program for patients with diabetes mellitus. If these two things are done well, primary and secondary

treatment programs will be carried out optimally ⁵. According to data from the International Diabetes Federation (IDF), DM sufferers have reached around 463 million people, and with a death rate of around 3.2 million people, placing DM as one of the diseases that does not have the sixth rank with the most mortality in the world ⁶. Indonesia ranks sixth in the world as a country with the highest number of DM sufferers. DM is the seventh leading cause of death in the world ⁷.

The intervention program from the government in efforts to manage DM disease through primary service units, namely Pusat Kesehatan Masyarakat (Puskesmas) or Health

Centre Service, includes the Prolanis Program, Older Adult Posyandu for routine health checks for the older adults, and Posbindu Penyakit Tidak Menular (PTM) or Non-Communicable Disease for screening health status and risk behavior of people at productive age⁸. Treatment and management programs for DM disease that focus on the family have not been appropriately applied to date. Lack of family independence and client non-compliance with the diet program significantly affects the instability of blood sugar levels⁹. This is reasons for the increase in the prevalence of chronic diseases, especially DM, every year in several developed countries, especially in developing countries such as Indonesia¹⁰.

Various efforts to manage non-communicable DM diseases that have been carried out are deemed ineffective. This is because the increase in DM patients continues, and it is found that more than half of DM patients at Health Center do not comply with the diet program so that other effort are needed to improve dietary adherence to DM patients, namely empowerment models family¹¹. Family empowerment has been proven effective in increasing family independence in several other diseases. Even so, family empowerment interventions through a nursing theory approach need to be studied based on relevant studies. Therefore it is necessary to conduct an in-depth systematic study to test family empowerment nursing approaches to improve dietary compliance and family independence with diabetes mellitus..

METHOD

Study Design

A systematic review without meta-analysis was carried out for this study. This review followed the steps that elements for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement¹².

Data Sources and Searches

Five databases were collected by Scopus, Ebsco, PubMed, ProQuest, and Science Direct published between 2016 and 2020. The article's scope was limited to randomized controlled trials (RCTs) and protocol, human studies, and English publications. The researchers develop search terms to collect items related to self-management intervention¹³. The databases search used the following terms (diabetes mellitus OR diabetes mellitus type 2) AND

(compliance or adherence dietary) AND (family empowerment or empowerment) AND (diet compliance or family independence)¹⁴. A comprehensive search strategy has been shown in figure 1.

Eligibility Criteria

Patients who had been diagnosed with diabetes mellitus were eligible for this review. This study only targeted patients categorized by age group > 16 years, and data for patients with T2DM will be extracted. T2 diabetes is hyperglycemia which is initially insulin resistance¹⁵. This type is managed effectively and supported by education and a healthy lifestyle, combined with medication as a requirement¹⁶. All subjects in the intervention group used family empowerment interventions, but the approach in nursing theory varied. Meanwhile, the exclusion criteria, namely the experimental group, did not meet the basic scientific requirements, and the study results did not include a target value¹⁷. The outcome measure of this review is dietary adherence or family independence¹⁸. Secondary outcomes are changes in clinical outcomes and health-related quality of life¹⁹.

Type of Intervention

The intervention that researchers identified as research data was family empowerment which was defined in multi-definitions, and there was no standard system for classifying it²⁰. The World Health Organization (WHO) states that empowering families can provide health services that are more effective in overcoming chronic diseases²¹. This study focuses on using family empowerment interventions to improve dietary adherence or family independence based on the nursing theory approach.

Data Extraction

The researcher inferentially extracted the data from each article. Data were extracted using narrative analysis to reveal data synthesis, including the characteristics of the study, participants, interventions, and results²². The following characteristics report individual studies, such as publication details and methods. The intervention describes the content and characteristics of family empowerment, nursing theory approaches, family roles, and family responses²³.

Data Synthesis

Qualitative and quantitative analyses were used for this review. The results presented narratively based on each outcome.

RESULTS

In the initial searching the databases, there were 5,865 articles. After removing duplicates and screen the report, 15 articles were finally enrolled in the study (Table 1). Table 1 also showed that the papers were published between 2015 and 2020, with most articles published in 2020 (30.8 %).

Of the 15 articles that have been analyzed, various research designs include randomized controlled trials, quasi-experiments, prospective randomized studies, and case studies. The articles obtained were randomized controlled trials (RCT design), namely four articles. A total of nine articles

used a cross-sectional design, and the rest used quasi-experiment design. Participants used in articles vary with a maximum sample size of 991 respondents with an average sample rate in research articles of more than 200 respondents. There are various nursing approaches used in this articles, with most of them use the theory of planned behavior (TPB) with a percentage of 40%. Table 2 showed that there were several studies ranged from moderate and high quality. JBI tool indicated the most of the studies have good quality (11 studies), and only three studies have a moderate bias.

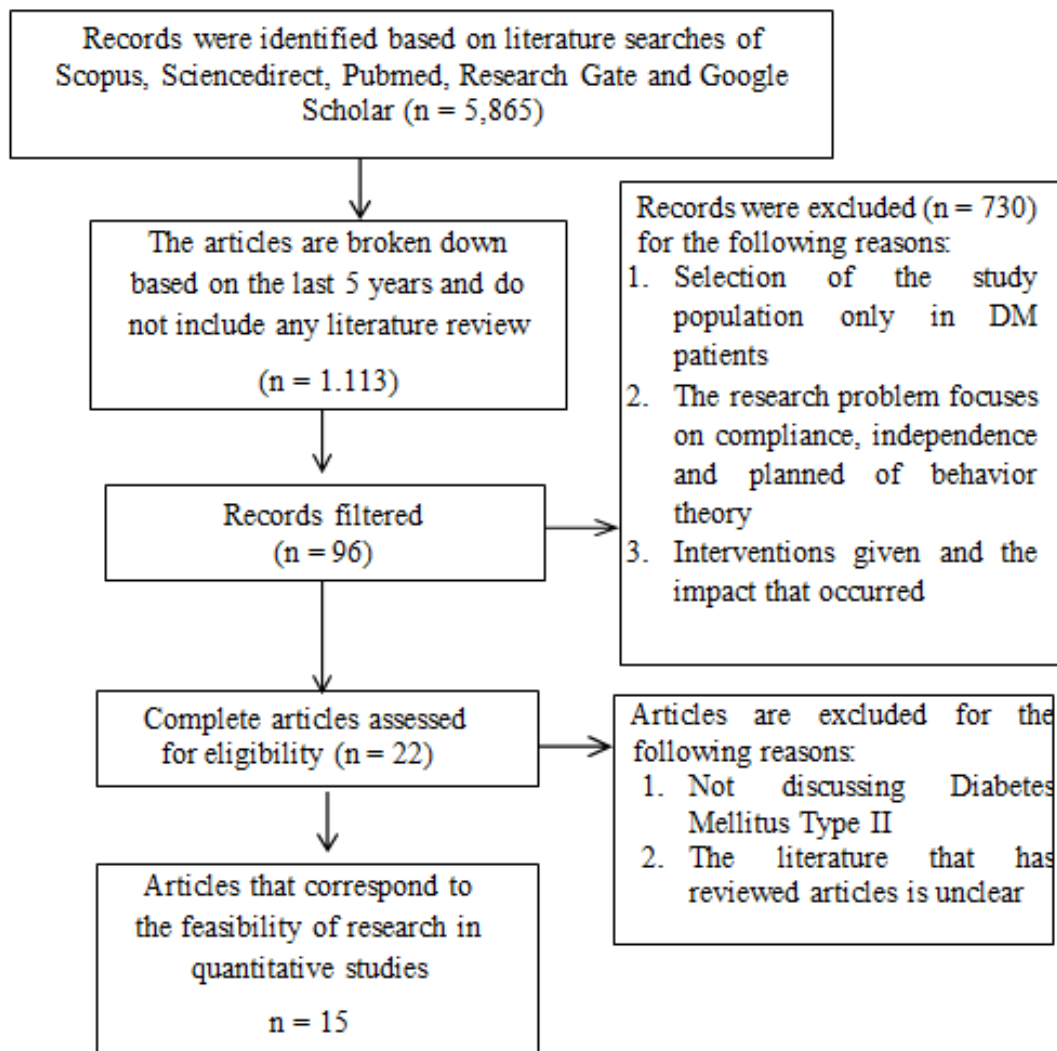


Figure 1. Flow chart of the study identification process

Table 1. Summarize of selected studies

No	Title	DSVIA Method	Result
1	<i>Adherence to self care practices and empowerment of people with diabetes mellitus: a randomized clinical trial</i> Source : ²⁴	Design : Randomized Control Trial Sample: 183 responden digunakan pada kelompok ini. Kelompok kontrol menggunakan 111 responden, sedangkan kelompok perlakuan menggunakan 72 responden. Variables: independent: age, gender, education level, marital status, occupation, duration of suffering from diabetes Dependent variable: Hb1c, MHN, Diabetes mellitus self-care support Instruments: Dalam penelitian ini menggunakan instrumen Adherence to Self care practice for DM (ESM demographic data (ie, province, gender, age, education and occupation), Hba1c examination, diabetes questionnaire sheet Empowerment Scale Short Form (DES SF). Analysis: penelitian ini menggunakan uji pearson, uji mann whitney u test, uji T berpasangan dan uji wilcoxon sign rank test	Based on the statistical test, it was found that the P value was <0.001, thus indicating a significant decrease in the hemoglobin glycation score. In the self-care and empowerment statistical test, the P value in the treatment group was <0.001, so that there was an increase in the self-care and empowerment compliance score. So that in this study, it was concluded that there was an increase in client participation in disease management, increased empowerment, increased self-care compliance such as a healthy and regular diet, physical activity and exercise as well as regular monitoring of blood sugar levels..
2	<i>Dietary knowledge among adults with type 2 diabetes – kingdom of Saudi Arabia</i> Source : ²⁵	Design: cross sectional study Sample: 350 respondents with type 2 diabetes mellitus Variables: Dependent: Length of suffering from diabetes, family history, smoking behavior, BMI, diagnosis, and the treating doctor. Independent: The respondent's level of knowledge about dietary knowledge Instruments: using a valid and reliable self-prepared questionnaire comprising of 21 questions Analysis: Mann Whitney U Test	In this study, it is known that adult respondents who suffer from diabetes mellitus in the Kingdom of Saudi Arabia have less knowledge about diet. Poor knowledge about diet, especially in the consumption of carbohydrates and determining the type of food consumed. Diet management is an important instrument in controlling blood sugar levels, so that a poor understanding of the diet will lead to uncontrolled blood sugar levels. Family empowerment can be used to increase client knowledge about diet management.
3	<i>Peer-Led empowerment based approach to self management efforts in diabetes (PLEASED) :</i> Source : ²⁶	Design: Randomized Controlled Trial Sample: 106 respondents to type 2 diabetes research in Africa and the American community Variable: Dependents: Group 1 3 month diabetes self management education program (DSME). Group of 2 ongoing diabetes self management support (DSMS). Independent: Hba1c levels, secondary outcomes such as Lipid, LDL, HDL, BP, BMI, diabetes distress, diabetes social support Instruments: a 17-item diabetes distress scale, biophysiological examination. Analysis: Spearman chorelations	In this study, it was shown that the peer support group showed an increase in the main risk factors for CVD while in the control group there was a decrease. The peer support group significantly lowered blood pressure levels. Body mass index, and lower total cholesterol levels in the blood when compared with the DSME group without empowerment.
4	<i>Can a modified theory of planned behavior explain the effects of empowerment education for people</i>	Design: longitudinal design study Sample: 365 respondents with type 2 diabetes mellitus Variable: Factors that influence psychological empowerment based on theory of planned behavior	Based on the results of statistical tests, the P value was 0.04. So that there is an effect of PEP empowerment on sports activity behavior and skills in doing foot

	<i>with type 2 diabetes?</i> Source : ²⁷	Instrument: Chinese Health Literacy Scale for Diabetes, basic psychometric properties of the Chinese Risk, Perception Survey for Developing Diabetes, diabetes self-efficacy, Attitude, subjective, intention. Analysis: Dilakukan pengujian menggunakan Structural Equation modeling, Chi square test, root mean error of approximation, standardized root mean residual, Tucker index	care, where the relationship between the two is mediated through behavioral intention.
5	<i>Predicting Stage of Exercise Among Patients with Type 2 Diabetes : A Test of the Extended Theory of Planned Behavior</i> Source : ¹¹	Design: cross sectional study Sample: 791 respondents with type II diabetes mellitus Variable: Factors that influence the exercise stage in type 2 DM patients based on theory of planned behavior Instruments: TPB Scales, observation stage of exercise, Analysis: Kruskal wallis, WLSMV, Chi Square, RMSEA, CFI, TLI, WRMR	This study shows that there is a strong correlation of self-identity, descriptive norms, and perceived behavioral control of one's intentions. So that in increasing the client's intention to start doing sports and physical activities can increase self-identity, descriptive norms and PBC.
6	<i>A test of theory of planned behavior in type II diabetes adherence: The leading role of perceived behavioral control</i> Source : ²⁸	Design: cross sectional study Sample: 90 respondents with type II DM who were selected through convenient sampling. Variable: Dependents: attitudes, intention, diabetes duration, food supply difficulty, constant, subjective norms, PBC. Independent: Intention, adherence behavior Instruments: TPB tools, perceived behavioral control (PBC), behavioral intentions, and behavior of type II diabetes questionnaire Analysis: Chi square, Confidance interval	In this study, it is revealed that a person's behavior is influenced by the intention to regulate an attitude, perspective and subjective norms. So that in making an intervention to improve behavior in clients with type II diabetes mellitus, it is necessary to pay attention to aspects of perceived behavioral control, subjective norms, and intentions.
7	Improved patient empowerment, patient motivation, and adherence to medical treatment programs in uncontrolled type 2 diabetes patients Source : ¹⁰	Design: RCT research design Sample: 97 respondents with type II DM Variable: Dependent: In this study, it was divided into a control group and an intervention group. The intervention group was provided with online consultation services, with doctors, nurses, and nutrition workers. In addition, if something is unclear, clients can come directly to consult offline. Meanwhile, the control group was given services as usual. Independent: Empowerment, motivation, and medical adherence Instruments: Questionnaire to assess the characteristics of health care climate (HCCQ), Questionnaire to identify self-regulation on medication (TSRQ), Percaived Competence in diabetes (PCD), self-care activity questionnaire (SDSCA), WHO Well Being Index, description of barriers found when suffering from diabetes mellitus (PAID-5), HbA1c, BP, and BMI Analysis: interquartile range, standard deviations, Kruskal Wallis test	The results of this study found that there was an increase in the goal setting of clients with diabetes mellitus in regulating diet and physical activity patterns, and there was an increase in autonomy support in the intervention group. This is different when compared to the control group which was relatively unchanged. Despite this increased autonomy support, and goal setting in diet and exercise, the intervention group was no better than the control group in terms of reducing blood sugar levels.
8	The effect of giving the intervention "implementation intention" to increase	Design: A randomized, parallel-group, single-center controlled trial Sample: 90 respondents who suffer from type II diabetes	The results of this study indicated that the intervention group showed increased adherence to the oral anti-diabetes treatment

	adherence to the use of oral anti-diabetes in type 2 diabetes patients in Brazil Source : ²⁹	Variable: Dependent: implementation intention intervention. Independent: adherence to consumption of OAD, diabetes related distress and glycemic control Instruments: Sociodemographic data, Instrument for the Global Evaluation of Medication Adherence (IAGAM), National Glycohemoglobin Standardization Program (NGSP), Diabetes Distress Scale (B-DDS), Analysis: Chi square test, Mann Whitney test, fisher exact, multivariate regression	regimen (p <0.0001), glycemic control (p <0.0001) and diabetes-related disorders (p <0.0001) relative to CG. Thus the implementation intention intervention improves adherence to the oral antidiabetic treatment regime, which has a positive effect on blood glucose levels and diabetes-related pressure.
9	<i>Predisposing factors for type 2 diabetes sufferers and complication prevention behavior in African Americans in Florida through phenomic family health history based on theory of planned behavior</i> Source : ¹³	Design: cross sectional study Sample: 394 respondents Variable: Independent; psychological intervention. Dependent mental health instruments: Diabetes Risk Factor Survey Tools, Analysis: Logistic regression	In this study, it was found that perceived behavioral control or PBC is an important element in the formation of an intention. Perceived behavioral control that is felt by a person will significantly influence behavior in preventing the occurrence of type 2 diabetes mellitus.
10	<i>Predicting Noninsulin Antidiabetic Drug Adherence Using a Theoretical Framework Based on the Theory of Planned Behavior in Adults With Type 2 Diabetes</i> Source : ¹⁴	Design: A prospective study Sample: Respondents in this study were 340 respondents with type 2 diabetes mellitus Variable: factors that influence medication adherence based on theory of planned behavior Instrument: questionnaire modified by Theory of planned behavior Analysis: Local regression with statistical analysis system (SAS), spearman correlation	This study shows that the TPB is a good tool for predicting intention to comply and adherence to NIAD in the future, particularly in past non-NIAD followers. TPB is a framework theory that is relevant to differentiating past adherents from non-believers in the past when someone wants to implement NIAD adherence enhancement interventions.
11	<i>Predicting Diabetic Self-Care Management Based On The Theory Of Planned Behavior Among Elderly With Type 2 Diabetes In Thailand</i> Source: ³⁰	Design: Crosssectional study Sample: 212 respondents with type 2 diabetes mellitus in Thailand Variable: Self care management, Behavioral Intention (BI) and Perceived behavioral control (PBC) Instruments: Demographic Characteristics, TPB tools, and diabetic self care management behaviors (DSCM) Analysis: Pearson product Moment, and Multiple regression analysis	The results illustrate that there is a significant influence and a strong correlation between subjective norms, behavioral control felt by clients with diabetes mellitus on the intention to carry out diabetes mellitus treatment behavior. Behavioral control was the most important variable that had the most significant influence in predicting intention (p <0.01) and self-care management (p <0.01).
12	<i>Psychosocial factors associated toward adherence to non-insulin antidiabetes treatments</i> Source : ⁹	Design: Cross sectional survey Sample: 991 respondents with type II diabetes mellitus Variable: Psychosocial factors that affect respondents' compliance in consuming NIAD Instrument: TPB questionnaire, Morisky Medication Adherence Scale based on web questionnaire Analysis: logistic regression	This study shows that the behavioral control felt by respondents, habits, age, duration of suffering, has a significant effect on the dietary compliance of clients with diabetes mellitus.

13	<i>Modelling of diabetes knowledge, attitudes, self-management, and quality of life: a cross-sectional study with an Australian sample</i>	<p>Design: Cross sectional study</p> <p>Sample: 291 respondents with diabetes mellitus</p> <p>Variable: Knowledge of diabetes mellitus behavior, self management and quality of life</p> <p>Instruments: diabetes knowledge scale questionnaire sheet), diabetes-19 integration scale attitude questionnaire sheet, self-management questionnaire sheet, questionnaire sheet that examines aspects of diet, exercise, blood glucose testing, foot care, and quality of life for clients with diabetes mellitus.</p> <p>Analysis: The statistical test of this study uses path analysis, T test, Structural Equation Modeling (SEM), Root Mean Square Error of Approximation (RMSEA) test, Goodness of Fit (GFI) test.</p>	<p>This study proves that improving self-management in increasing adherence to diet, exercise and activity patterns has a significant effect on improving the quality of life for people with type 2 diabetes mellitus in Australia.</p>
Source : ¹⁵			
14	<i>The role of perceptions of disease: Self-efficacy, depression rates, and self-care activities in Jordanians with type 2 diabetes</i>	<p>Design: Crosssectional survey</p> <p>Sample: 220 respondents Dm type II</p> <p>Variables: Self-care behavior, perceptions of diabetes, feelings of depression, support from social groups, factors of religiosity, individual spiritual coping and self-efficacy</p> <p>Instruments: The research instruments included a diabetes management self-efficacy scale, a short diabetes perception questionnaire, a 9-item patient health questionnaire, a social support instrument, a religious and spiritual coping subscale questionnaire.</p> <p>Analysis: The statistical test in this study uses the structure equation modeling to determine the relationship between the two variables.</p>	<p>The results of this study indicate that the empowerment program has a significant effect on improving self-skills. Psychosocial factors such as perception of disease, depressive symptoms, self-efficacy, social support, religiosity, spiritual coping have a correlation in improving self-care for clients with type 2 diabetes mellitus.</p>
Source : ³¹			
15	Identification of social support for people with diabetic foot ulcers	<p>Design: Cross sectional survey</p> <p>Sample: 240 respondents with diabetic foot ulcers</p> <p>Variables: perceived social support and factors affecting diabetic wounds.</p> <p>Instruments: Data collection including demographic, clinical, self-report, and perceived social support, measured by Multidimensional Scale of Perceived Social Support (MSPSS)</p> <p>Analysis: Kruskal Wallis, Mann Whitney, Spearman rho correlation coefficient</p>	<p>Based on the results of statistical tests between social support and the level of information, the level of family information, and behavior in examining diabetes wounds, the p value was <0.05. Social support has a significant influence on several of these factors.</p>
Source: ¹⁶			

Table 2. Critical appraisal

No	JBI critical appraisal/ Number of item													Total	Quality
	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	Y	Y	UN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	92,3	High
2	Y	Y	Y	Y	Y	UN	Y	Y	-	-	-	-	-	87,5	High
3	Y	Y	UN	Y	UN	Y	Y	Y	Y	Y	Y	Y	Y	84,6	High
4	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	76,9	High
5	Y	Y	Y	Y	Y	UN	Y	Y	-	-	-	-	-	87,5	High
6	Y	Y	Y	Y	UN	UN	Y	Y	-	-	-	-	-	75	Moderate
7	Y	Y	Y	UN	Y	Y	Y	Y	Y	Y	Y	Y	Y	92,3	High
8	Y	Y	Y	UN	Y	Y	Y	Y	Y	Y	Y	Y	Y	69,2	Moderate
9	Y	Y	Y	Y	Y	UN	Y	Y	-	-	-	-	-	87,5	High
10	Y	Y	Y	UN	Y	UN	Y	Y	Y	Y	Y	Y	Y	69,2	Moderate
11	Y	Y	Y	Y	UN	UN	Y	Y	-	-	-	-	-	75	Moderate
12	Y	Y	Y	Y	Y	N	Y	Y	-	-	-	-	-	87,5	High
13	Y	Y	Y	Y	UN	Y	Y	Y	-	-	-	-	-	87,5	High
14	Y	Y	Y	Y	Y	UN	Y	Y	-	-	-	-	-	87,5	High
15	Y	Y	Y	Y	N	UN	Y	Y	-	-	-	-	-	87,5	High

The scores : high = > 75%, moderate = 50-74%, low = 50%;

N= 0; UN = 0; Y = 1; NA=0 N = no;

UN = Unclear; Y = Yes; NA = Not Aplicable

DISCUSSION

From all articles obtained and analyzed, most of the articles discussed family adherence to a diet program based on family support²³. Through the empowerment approach, it provides allows the exchange of new information by sharing experiences²⁰ as well as active participation through activities in the learning process which are carried out with a focus on finding new meanings for the event that is being felt³². Family empowerment has the influence and effectiveness to increase family independence and client adherence to therapy and diet programs. The family

empowerment referred to in this article is family empowerment based on the theory of planned behavior²⁸, and family empowerment is based on analysis of client and family background factors¹⁸, personal factors¹⁴, social factors, and information factors from the family of patients suffering from DM³³. The use of behavior change based on a protocol will encourage others to understand and understand important aspects and a sense of responsibility for what has been done in self-care efforts¹⁵. Dietary control management carried out by diabetic clients has a very important role in controlling blood sugar⁹; however, it is still found that most

clients are not aware of this diet problem ³⁴.

One of the ways to increase patient knowledge about diet management is to use a family empowerment approach ³⁰. Through the family empowerment approach, the facilitator can provide materials to increase patient understanding and provide awareness to diabetics about the importance of maintaining diet and diet ³⁵. Family empowerment is an effective family approach to increase independence and dietary compliance in patients with diabetes mellitus ³⁶. Through the planned behavior theory approach, it is found that intention has a significant influence on perceived behavioral control ⁹ between the two there is a direct relationship that mutually affects each other ⁷. Based on previous research, it is proven that family empowerment influences and effectiveness in increasing family independence and client compliance in therapy and diet programs ²⁴. Family empowerment in this discussion is focused on the theory of planned behavior and empowerment focuses on analyzing background factors, personal factors, social factors, and information factors from the families of patients suffering from DM ³⁷.

One of the strong predictors of a behavior based on the theory of planned behavior is the existence of perceived behavioral control ³⁸. With the finding of a significant correlation between PBC and behavior, PBC is an important element that needs to be considered in improving diabetes mellitus management so that it becomes better. ³⁹, this is in line with the previous theory and explanation ⁴⁰. Facilitators or health workers must facilitate and pay more attention to the perception of control that is felt by the main patient in dietary behavior and activity patterns, this is because each patient has a different relationship so that it cannot be generalized ³⁰. Other writings include the policies carried out for routine blood glucose, routine medication, dietary management, physical activity and self-care ⁴¹. Family empowerment carried out by health workers must also pay attention to the multicultural in a patient and family such as social, cultural, demographic, financial and other supporting factors ⁴². The use of family empowerment will optimally improve treatment if family independence is carried out with a more holistic approach to managing diabetes mellitus adherence behaviors, taking into account the socio-cultural dynamics that occur in many

medical conditions ²⁸.

CONCLUSION

In conclusion, this systematic review found that family empowerment can effectively increase the role of the family in providing care for patients with diabetes mellitus. Several nursing approaches, one of which uses the theory of planned behavior, states that it effectively increases self-reliance, family roles, and dietary compliance. Based on the results of the literature study that the researchers conducted, it proved that family independence and treatment program adherence could be achieved better by using family empowerment methods based on theory of planned behavior and empowerment. However, this study is not strong enough to provide an assessment that family empowerment based on the theory of planned behavior and empowerment is the best way to increase independence and based, therefore further research is needed to prove the effectiveness of using this approach.

ACKNOWLEDGMENT

The authors would like to thank the Master of Nursing Study Program, Faculty of Nursing, Universitas Airlangga for providing the opportunity to present this study

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