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ОГЛЯДИ

FAMILY SUPPORT TOWARD ADHERENCE AND GLYCEMIC CONTROL OF TYPE 2 DIABETES PATIENT: A SYSTEMATIC REVIEW*

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Diabetes mellitus is known as the silent killer disease because it is often unknown to the person who has it and when it is known that complications have occurred to the eye (diabetic retinopathy), heart (diabetic cardiomyopathy), repeated infections can occur, ulcers that do not heal and even amputation of fingers / toes [1–6]. So that diabetes is already one of the main threats to human health in the 21st century [7–11].

According to the Data and Information Center of the Ministry of Health of the Republic of Indonesia in 2013 regarding diabetes mellitus, the number of Indonesian people from 33 provinces aged > 14 years is 176,689,336 people. There are 2,650,340 people who have been diagnosed with diabetes mellitus by doctors and 1,060,136 people who have never been diagnosed with diabetes by a doctor but in the last month experienced symptoms of frequent thirst, frequent hunger, frequent urination in large quantities and weight loss. Of the total number diagnosed, there are 88,531 people in Central Java, the 9th most of 33 provinces [12].

Estimates from WHO, Indonesia will be estimated to be in the 5th place with the highest number of people with diabetes in the world in 2025 with 12.4 million people, below India, China, USA and Pakistan [13–18]. This data is up two levels from the previous data. Conducted in 1995, where in that year Indonesia was only ranked 7th in the world with a total of 4.5 million people.

Diabetes mellitus or better known as diabetes is a chronic condition that occurs when there is an increase in glucose levels in the blood [19–22]. The increase in glucose levels is because the body is unable to produce or use insulin. Insulin is a hormone produced in the pancreatic gland and "transports" glucose from the bloodstream into the body, then in the cells, glucose is converted into energy [23–27]. The characteristics of diabetes are lack of insulin or the cells are unable to respond to insulin, causing high blood glucose levels, known as hyperglycemia [28–34]. Hyperglycemia, if left untreated for a long time, will cause organ damage and will lead to complications such as

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nephropathy, cardiovascular disease, neuropathy, eye diseases such as retinopathy and blindness. If effective diabetes control is established, complications can be delayed [23, 33–39].

Complications can be overcome by managing diabetes properly. Patients' compliance is critical for good self-care management, which can assist prevent extended hyperglycemia, which can lead to a variety of problems. Training diabetic patients with adherence allows patients to take more responsibility for caring for themselves [40].

Adherence is the amount of acceptance and adaptability to health advice [41]. According to WHO, adherence includes changes in individual behavior, administration of drugs, advanced regimens, lifestyle changes and application of medical advice [42]. Medication adherence for type 2 diabetes patients is poor in 36% to 93% of instances. Different studies are cited several low adherence factors such as the number of drugs given, the complexity of treatment regimens, comorbidities, weak family's support and inaccessible drugs or lack of insurance coverage for needed drugs [41, 43, 44]. In terms of the relevance of adherence in the care of diabetic patients, the factors that influence medication adherence and dietary rules in type 2 diabetic patients may be determined, and different techniques for intervention planning can be offered [44]. A reasonable goal for educational treatments to modify diabetes self-management is to improve family support, treatment beliefs, and the tendency to consume glucose and vegetables [44].

Diabetes self-care is a crucial part of adult diabetes management. Family members are involved in self-care measures that might improve the health outcomes of people with the disease as part of care management [40]. Improving glycemic control and preventing complications due to diabetes are important treatment activities for adults with type 2 diabetes [45–48]. The family and social environment have a big impact on diabetes management. Diabetes treatment is critical for adults since it allows them to overcome the disease's symptoms [40].

Families can provide many forms of support, such as instrumental support in directing patients to visit health services or helping inject insulin, and emotional social support in helping patients deal with their illness [49]. Through their communication and attitude, family members often have an impact on the patient's psychological well-being, the decision to follow recommendations for medical care, and the ability to initiate and maintain changes in diet and exercise [40]. Family support can affect diabetes care. Although good support from family and friends can help overcome challenges in diabetes self-management, family members' actions can also be detrimental [50]. The structure of a family, as well as its beliefs and problem-solving abilities or lack thereof, might intensify the stress associated with disease treatment [42]. Optimal diabetes self-management necessitates lifestyle adjustments that frequently conflict with established family routines [50]. Self-management necessitates alterations in the types of food made and consumed at home, as well as time to attend medical appointments with patients and prioritize family finances, all of which might disrupt family routines [40].

Although the benefits of family support are generally discussed, several comprehensive reviews are explicitly explored this issue in the family support literature. As a result, the **goal** of this study is to examine the relationship between different types of family support and patient adherence in diabetes mellitus management in terms of glycemic control and adaptation, as well as the relationship between different types of family support and patient adherence in diabetes mellitus management.

MATERIAL AND METHODS

This study discusses the form of family support, the relationship between family support and adherence and adaptation of type 2 diabetes mellitus (T2DM) patients. This study uses the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) method from all review stages. The search results and the number of studies are included in this review. A total of 155 articles were retrieved from three databases (Pubmed = 134, Ebscho = 11, Wiley = 10). After the duplicates were removed, 150 articles remained. After filtering the ar-

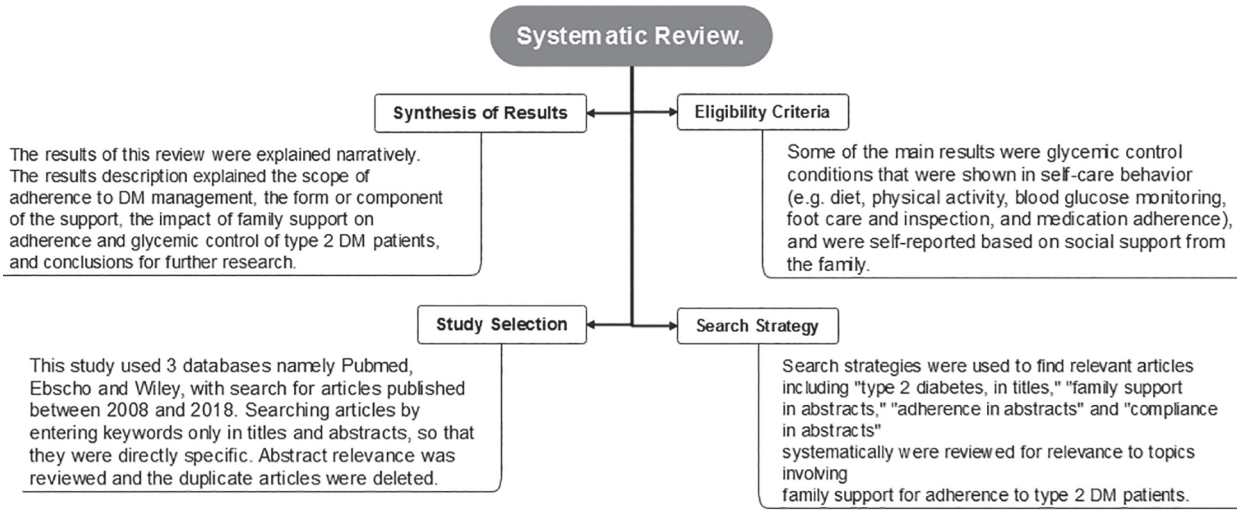

Fig. 1. This preliminary review includes 15 articles of close relevance to the systematic review. Source: Analysis Results.

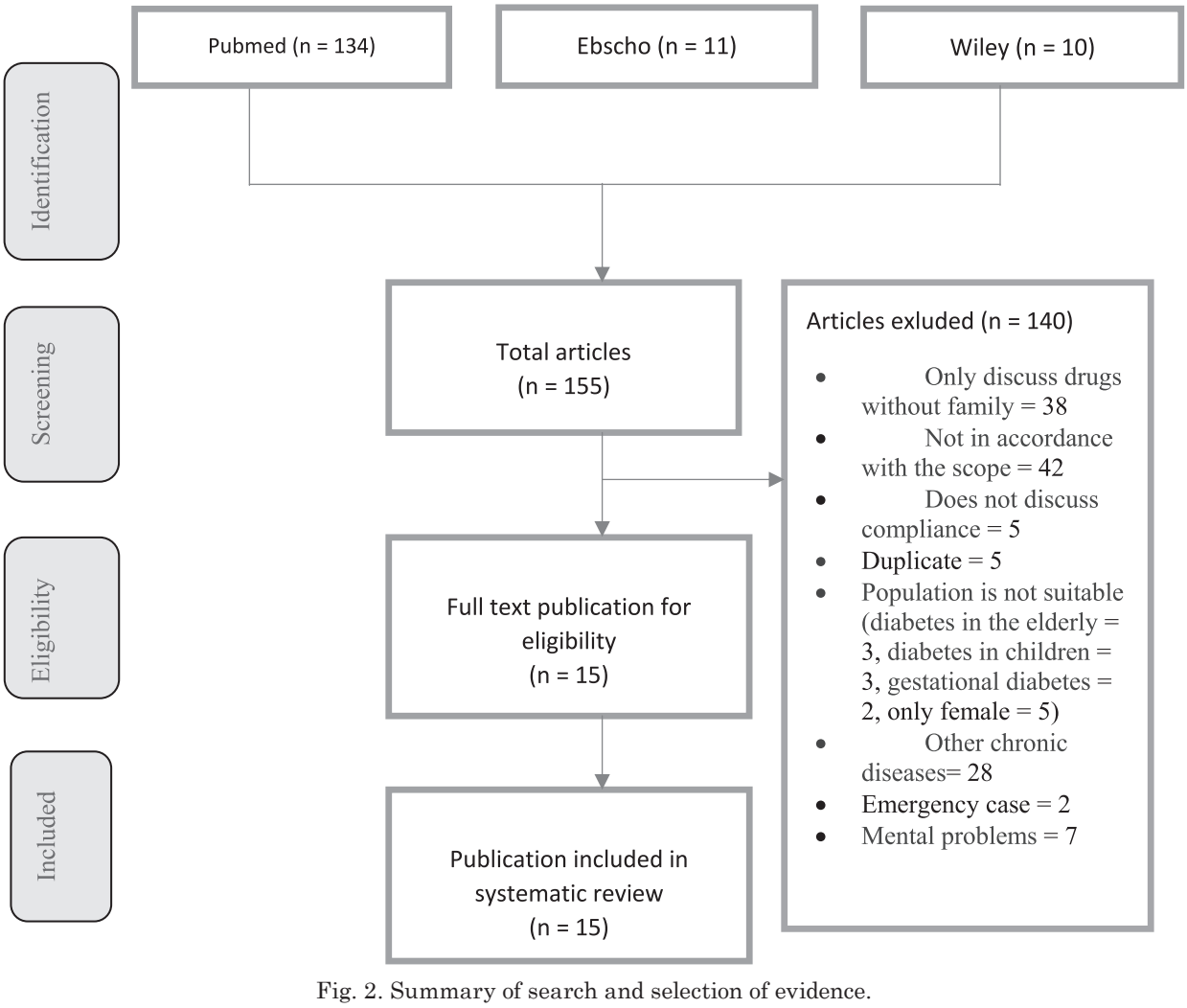

Fig. 2. Summary of search and selection of evidence.

ticle titles and abstracts, 135 articles were removed because they were reviewed articles, did not include adult participants with T2DM, were not family support, or did not assess adherence and did not include people with T2DM. Thus, 15 full text articles were screened for further eligibility.

RESULTS AND THEIR DISCUSSION

A. Results

The impact of family support on adherence/compliance, glycemic stability, and self-care management adherence was investigated in fifteen research. Eight studies used quasi-experimental designs [51-58], two studies used qualitative designs [63, 64], and four studies used mixed method designs [54, 59-61], and one study utilized a systematic review [62]. Three investigations [55, 57, 62] were undertaken in Asian countries, while 12 studies were conducted in Western countries.

1) Component of adherence/compliance

Self-management, adherence to eat, exercise, take medication, educational visits, and efforts to adjust to therapy were all included in the scope of patient adherence. Diet/nutrition adherence was discussed in 20 % of studies [54, 62, 63], according to the researchers, adherence to physical activities was discussed in 13 % of studies [54, 63]. Glycemic control or blood glucose control adherence was reported in 26 % studies [55, 58, 59, 63]. 1 study discussed about adherence to education in T2DM patients [54]. Diabetes self-management behavior was found in 33 % of studies [51, 56, 57, 62, 65], while adaptation efforts to disease were reported in 1 study [64]. Treatment adherence was found in 40 % of studies [52, 55, 57, 59, 61, 64].

Fifteen studies were analyzed broadly stated categories about the size of adherence to T2DM patients, namely physical activity adherence, dietary adherence, educational attendance [54]. Adherence to lifestyle adjustments and diabetes self-management are then followed. Knowledge, glucose monitoring, proper nutrition, and regular physical activity were the most important aspects of diabetes self-management. Difficulties and frustrations with taking medication, acquiring medication and adhering to food restrictions, and exercising were also mentioned by diabetic individuals [60, 63, 65]. Furthermore, medication adherence [51-53, 57, 61] and adherence to glycemic control [55, 58, 59, 61, 66].

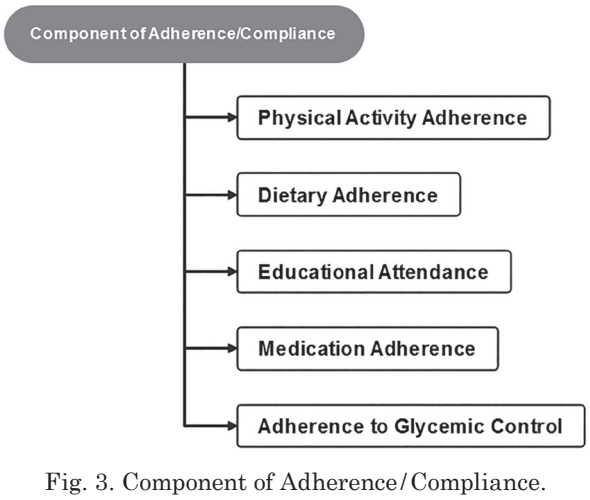

Fig. 3. Component of Adherence/Compliance.

2) Family support component

The researchers found that 33 % of the studies expressed family support about diet regulation [54, 59, 63-65, 67]. 33 % of studies convey treatment support from families [54, 59, 63-65]. Family support for medical visits was 20 % [54, 59, 64]. 20% of studies were about supporting for glycemic or blood glucose control [59, 62, 65]. Based on the dimensions of support there was emotional support as much as 26 % of studies [53, 55, 63, 64], similar to instrumental support as much as 26 % of studies [54, 59, 61, 64].

3) Impact of support

This strategy showed family support from various dimensions of support, namely emotional, instrumental, counseling [53-55, 59, 61-64]. The impact of support was adherence to self-care, efforts to adapt to treatment, weight loss, good glycemic control. This combination can be used as goal setting, action planning and problem solving so that the positive impact can improve health outcomes and effective health behavior or good glycemic control [55, 62].

Good blood glucose management was substantially connected with patients who received assistance from friends and family. The majority of patients received the most help from their partners in managing their self-care [56]. As a patient supporter, the family acted as an advisor who encouraged diet and exercise behavior, facilitated adherence to drugs and helped patients to "live with diabetes" [53]. Family support played an important role in medication adherence among diabetic subjects. Therefore, it was important to regularly assess patients for medication adherence and to include their

families in counseling sessions [57]. Family support, affordability of medicines and communication of good health care providers were important factors in ensuring adherence with medication [58].

Five studies explained that patients who had higher perceived support showed significantly more glycemic control [55, 56, 59, 62, 65]. One study received social support from friends and family [56]. This could boost self-esteem and diabetes management behavior, as well as glycemic control. A drop-in patient weight was observed in one trial [54]. Diet, exercise, treatment, health visits [53, 54, 57, 59, 63-65], and effective blood sugar control [56, 59, 65] are all examples of patient self-care management. Higher levels of support still be a strong factor for the success of self-care behavior. Four studies discussed emotional support [53, 55, 63, 64]. Higher levels of family support had a positive impact on reducing depression symptoms [46, 48, 68, 69] and positive emotional control [49], psychosocial well-being [50, 62, 63], quality of life [54, 69] and related diabetes with distress [70]. As a result, a reduction in depression had a good impact on self-management and clinical outcomes.

B. Discussion

The researchers did a systematic analysis of 15 current papers / articles on the impact of family support on T2DM patients' adherence, as well as family as the primary source of social support for T2DM patients' self-management. Between 2008 and 2018, studies were used. The findings support the impact of family integration on several patient health outcomes. The majority of studies [58, 59] employed quasi-experimental research designs, while some used mixed methods study designs.

Self-management, adherence to eat, exercise, take medication, educational visits, and efforts to adjust to therapy were all included in the scope of patient adherence. This technique demonstrated family support on multiple levels, including emotional, instrumental, and counseling [53-55, 59, 61-64]. The impact of support was adherence to self-care, efforts to adapt to treatment, weight loss, and good glycemic control. This combination can be used as goal setting, action planning and problem solving so that the positive impact can improve health outcomes and health behavior or good glycemic control [55, 62].

The literature review also found that family involvement using a collaborative approach was widely involved throughout the study. Many studies included details of family members in program activities such as providing emotional support for problem solving and helping patients to break their emotional stress or providing information and roles to facilitate, accommodate, remind, motivate and partner with behavior change and doing assignments. Several studies in this literature review found that family members were included in the intervention program. However, there was a dearth of information about how family members supported diabetes behavior and self-management, involved in programs, and what the family had to deal with throughout intervention. Only a few studies described the role of family members using the participatory learning approach. In order to be effective in involving family members in interventions, a clear understanding is needed for patients about the theoretical basis of having to involve family members, so that they can help T2DM patients when managing diabetes.

Receiving support and attitudes from friends and family are significantly associated with good control of blood glucose levels. The majority of patients received the most help from their partners in managing their diabetic self-care [56]. As a result, families must act, motivate, and counsel patients so that they adhere to diet and exercise habits, as well as therapy and adaptation to their disease [53]. Family support plays an important role in adherence to diabetic patients; therefore, it is important to include families in counseling sessions [57].

Diabetes self-management in individuals with chronic diseases relies heavily on follow-up strategies. Generally, the follow-up method is categorized into several strategies, including encouraging continuous participation of the family, increasing family knowledge and skills so that families are able to provide support to patients [63]. Family participation in patient care plans must be encouraged [64]. The relationship between glycemic control and lifestyle factors was tested again using methodologically appropriate study designs [62]. Things

that affect glycemic control such as lifestyle, social support, and cognitive function need to be adequately investigated [62]. Interventions must include relevant cultural resources, family support, and diabetes self-management skills education [63]. Future interventions for control and prevention of diabetes must also involve family members or primary caregivers to improve their motivation and behavioral skills [56]. Their families should also be counseled about the importance of medication adherence and their role in motivating diabetics [57].

Diabetes self-management interventions may need to place greater emphasis on targeting family members 'communication skills and teaching them positive ways to influence patients' health behaviors [67]. Family members may feel pressured by loved ones (diabetic patients) [69, 71] because of limited knowledge about diabetes or do not know how to support their loved ones [53, 68, 72]. Families may also have misunderstandings, such as trusting patients who know more about diabetes than families in terms of diabetes management [68]. Knowledge of disease, strategies for changing family routines, and optimal ways to deal with the emotional aspects of this disease are some aspects of diabetes self-management that family members need [73].

One strategy to assist in the management of T2DM patients is to approach the closest person, namely the family. Family is the main support system for problems that occur in family members. In general, people who receive the attention and help needed from the closest person or group of people tend to follow medical advice than those who do not receive support at all [74].

According to Friedman [74] explains that the family has a very important role in determining the behavior of family members who are sick. Families are also instrumental in deciding where patients should receive treatment. According to Mujib [74] regarding the analysis that affects medication adherence in diabetes mellitus patients at the Bluto Sumenep community health center, the results show that the main factor affecting non-compliance is a lack of information and there is a significant relationship between family support and treatment adherence of diabetes mellitus patients.

Table I

Family support towards the adherence / compliance of type 2 diabetes mellitus patients

No	References	Design	Component of Adherence	Component of Family Support	Outcomes	Recommendation
1	Santos (2014) [64]	Qualitative study	Changes of behaviour Efforts to adapt to the disease	Preparing nourishment Providing medicine Attending health care visits Patient's cultural standards, individual needs, and environmental conditions Family support includes emotional, practical, material, and / financial support, besides counceling	Acknowledging the importance of family for diabetic treatment. Patients regard family as the source of support and stimulus for compliance and healthy practices, which allows them to control their disease.	Family participation in the patient's treatment plans must be urged.
2	Alramadan (2018) [62]	Systematic Review	Dietary compliance, medication Self management behaviour	Family support and cognitive functions may be crucial in glycemic control The value of family support in the	Risk factors for poor glycemic control: level of education, duration of the diabetes,	Future researchers should also reevaluate the relation between

No	References	Design	Component of Adherence	Component of Family Support	Outcomes	Recommendation
			Anxiety, depression Diabetes management compliance	management of diabetes mellitus	adherence to diet, medication, self management, anxiety, and depression.	glycemic control and lifestyle factors, and social support.
3	Marquez (2017) [54]	A quasi-experiment	Threemeasures of compliance: Physical activitiy compliance Dietary compliance Educational compliance	Dietary and physical activity Instrumental support: shopping, attending medical visits, and comunicating with doctors	Functional support in the form of involvement in physical activity with family members and friends causes weight loss and increases physical activity adherence.	The involvement of family in physical activity as a strategy to promote important behavior for losing weight.
4	Bennich (2017) [65]	A mixed-methods study	Maintain the lifestyle change and self management diabetes	Encourage family communication and collaboration in managing diet, medication, and blood glucose monitoring.	The importance of including patients and their families in clinical practices to target the patients' compliance and well-being.	Family functions and professional assistance have the potential to improve the daily life and well-being of the patients with type 2 diabetes mellitus.
5	Hu J (2013) [63]	Qualitative study	Self managementin diabetes: knowledge, glucose monitoring, healthy nutrient, and regular physical activity	Healthy nourishment Emotional support by being there, encouranging family member who is a diabetic to exercise and motivating others to stay healthy	Being able to provide support. Lacking of the knowledge regarding the matter.	Interventions include relevant cultural resources, family support, and diabetes self management skills education.
6	Mayberry (2012) [59]	A mixed-methods study	Medication compliance and glycemic control	Instrumental support from family members: diet, exercise, medication adherence, blood glucose monitoring, and health consultation.	Increasing the patient's motivation and behavioral skills as an effort to treat diabetes.	Identify all behaviors of the family that do not support and do not understand the role of family with diabetes.
7	Mayberry (2016) [52]	A quasi-experiment	Medication adherence	Family members become the proponent for the patient self-care behavior	Patients who are not complying and going through stress and / the signs of major depression can take advantage	

No	References	Design	Component of Adherence	Component of Family Support	Outcomes	Recommendation
					from interventions which decrease the family members' obstructive behavior.	
8	Mayberry (2017) [61]	A mixed-methods study	Compliance withself-care behavior	Enhance the patient's ability to begin or continue self-treatment.	Family member who is involved in intervention will positively influence the other family members.	The need for family intervention, especially in the low economic patient population.
9	Mayberry (2015) [51]	A quasi-experiment	Limitations on understanding diabetes management	Diabetes self-treatment requires family support.	Involving family members in the treatment for patient with limited Health Literacy.	Identify the content of intervention to reduce obstructive family behavior. Identify supportive family behaviors that might tend to be protective.
10	Jaurez-Ramírez (2015) [61]	A mixed methods study	Medication adherence	Economic support	It is important to involve the family in the intervention of patient. Four main dimensions: economic support, medical assistance, emotional support, and instrumental support.	Future research might as well expand the investigation to members of themain family.
11	Ramkis-son (2017) [55]	A quasi experiment	Medication adherence Low glycemic control	Emotional and social support from the family can help in the result of the treatment for patients	Social support to overcome the disease and to improve the patients' medication adherence. Family members must be educated of diabetes, and the importance of compliance and long-term complication from the disease.	

No	References	Design	Component of Adherence	Component of Family Support	Outcomes	Recommendation
12	Shawon (2016) [56]	A quasi-experiment	Low glycemic control Adequate diabetes management	Receiving support and attitudes from friends and family is significantly associated with a good control on the level of blood glucose The majority of patients rely on their spouses for the majority of their diabetes self-management..	Positive attitude towards the management of diabetes and support from friends and family is associated with adequate diabetes management. Motivating the family members to offer their greater support for the diabetic patient.	Involve family members and / main caregiver to enhance their motivation and behavioral skills to give a greater support to the diabetic patient. Educate and motivate family members to give a greater support.
13	Eschwe E (2012) [53]	A quasi-experiment	Medication adherence	As a support of patient acts. As an adviser who encourages diet behavioral and exercise, and facilitates patient's medication compliance, and helps the patients to «live with diabetes»	Difficulty in taking the medication. Decision making by the patient only. Poor acceptance from medical recommendation. The lack of support from family or society, and the needs for information about medication. Reporting about having no confidence in the future. The needs of medical support and followed up by a specialist doctor.	The need for medical assistance and followed up by a specialist doctor.
14	Arul-mozhi (2014) [57]	A quasi-experiment	Medication adherence Self-care compliance	Family support plays an important role inconducting medication adherence among diabetic subjects. Hence, it is important to regularly monitoring the patient's medication adherence and including the patient's family in the counseling session.	Only 49,3% of the subjects who adherence to anti-diabetes medicine. Only around a quarter of diabetics engage in self-care activities like as exercising / walking for 30 minutes at least four times a week, checking and treating their feet on a regular basis.	The needs of compliance and counseling, and motivating the diabetics.

No	References	Design	Component of Adherence	Component of Family Support	Outcomes	Recommendation
15	Waari (2018) [58]	A quasi-experiment	Medication adherence Lack of glycemic control	Family support, medicines affordability, and communication of good health care provider are important factors in ensuring patient's medication compliance.	The relevancy of family support for medication and compliance.	Participation of family membersin the process of treating diabetes, improving medication adherence for patients with type 2 diabetes mellitus.

CONCLUSION

In conclusion, this systematic review found that family support could improve health for patients with type 2 diabetes mellitus. Further studies need to provide details of adherence and family support components that have an impact on self-management of type 2 diabetes patients. Furthermore, it is necessary to increase family knowledge and skills in order to become a supporter of health for patients, especially type 2 diabetes.

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FAMILY SUPPORT TOWARD ADHERENCE AND GLYCEMIC CONTROL OF TYPE 2 DIABETES PATIENT: A SYSTEMATIC REVIEW

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The increase in diabetes epidemic, particularly type 2 diabetes in adults has occurred in the past three decades. This phenomenon happened especially in the developing countries. Patients' compliance is required in order to properly adopt self-care management and assist prevent consequences from persistent hyperglycaemia. Families can help patients by providing care, which has a positive impact on their adherence. This study intends to investigate the association between family support and type 2 diabetes patients' adherence to diabetes therapy in order to improve glycaemic control.

Materials and methods. Three databases of Pubmed, Ebscho and Wiley were used to obtain relevant articles. Article searches using Keywords «type 2 diabetes», «family support», «adherence» and «compliance». The PRISMA method and PICO concept were used to determine which study was worth to be reviewed, and it was obtained 15 selected studies to be identified in the period from January 2008 – December 2018. The studies discuss about the forms of family support and their impact on the adherence and glycaemic control of the patients. The designs of the 15 studies were 2 qualitative studies, 8 quasi experiments, 4 mixed-method studies and 1 systematic review.

Conclusion. The findings revealed that family support enhanced the health of patients with type 2 diabetes mellitus in a comprehensive study. Higher levels of support remained a key feature in the self-care management's success.

Keywords: adherence, compliance, family support, type 2 diabetes mellitus.

ПІДТРИМКА СІМ'Ї ЩОДО ПРИХИЛЬНОСТІ ТА КОНТРОЛЮ ГЛІКЕМІЇ ПАЦІЄНТІВ З ЦУКРОВИМ ДІАБЕТОМ 2 ТИПУ: СИСТЕМАТИЧНИЙ ОГЛЯД

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Зростання епідемії цукрового діабету, зокрема діабету 2 типу у дорослих, відбулося за останні три десятиліття. Особливо це явище сталося в країнах, що розвиваються. Комплаєнтність пацієнтів необхідна для того, щоб належним чином дотримуватися самоконтролю та запобігти наслідкам стійкої гіперглікемії. Сім'я може допомогти пацієнтам, надаючи догляд, що позитивно впливає на їх прихильність до лікування. Це дослідження має на меті визначити зв'язок між підтримкою сім'ї та прихильністю пацієнтів з цукровим діабетом 2 типу до терапії діабету з метою покращення глікемічного контролю.

Матеріали та методи. Три бази даних Pubmed, Ebscho та Wiley були використані для отримання відповідних статей. Пошук статей здійснювався за ключовими словами «діабет 2 типу», «підтримка сім'ї», «прихильність» та «комплаєнтність». Метод PRISMA та концепція PICO були використані для визначення того, яке дослідження варто було б переглянути, і було отримано 15 відібраних досліджень, які були визначені в період з січня 2008 року по грудень 2018 року. Дослідження обговорюють форми підтримки сім'ї та їх вплив щодо прихильності до лікування та контролю глікемії пацієнтів. Схеми цих 15 досліджень являли собою 2 якісних дослідження, 8 квазіекспериментів, 4 дослідження зі змішаними методами та 1 систематичний огляд.

Висновок. Результати комплексного дослідження довели, що підтримка сім'ї покращує здоров'я пацієнтів з цукровим діабетом 2 типу. Вищий рівень підтримки залишався ключовою ознакою успіху самоконтролю.

Ключові слова: прихильність, комплаєнтність, підтримка сім'ї, цукровий діабет 2 типу.