

Conference Paper

Implementation of Diabetes Self Management Education (DSME) Intervention On Glycemic Control with Diabetes Mellitus Type 2: A Systematic Review

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ABSTRACT

Diabetes Mellitus is a metabolic condition commonly caused by deficiencies in insulin secretion or activity. Chronic non-communicable diseases (DM) have emerged as a significant health problem worldwide. By 2035, approximately 9% of the world's population will have type 2 diabetes mellitus (T2DM). Solutions are needed to address further management of T2DM, including education for comprehensive care that can be provided to people with type 2 DM through Diabetes Self Management Education (DSME). This study aims to determine how patients with type 2 diabetes mellitus can reduce their blood glucose levels by applying the Diabetes Self-Management Education (DSME) intervention. This systematic review followed the design and outcome stages' reporting item guidelines (PRISMA). Based on the Cochrane database, ScienceDirect, PubMed, and Scopus, 15,789 research articles used related keywords. The inclusion criteria were Type 2 Diabetes Mellitus patients, patients without severe symptoms or other complications, patients capable of self-care, studies published between 2017 and 2023 as the year of publication, full-text articles, and English-only publications. After the screening process, twelve research articles were obtained according to the inclusion criteria. The analysis method used was the descriptive method. The results of this review are described in narrative form. Diabetes Self Management Education (DSME) positively impacts monitoring blood glucose and HbA1c levels in patients with type 2 diabetes mellitus. It is practical to be implemented as a support program to improve diabetes management.

Keywords: Diabetes mellitus type 2, Diabetes Self Management Education (DSME), glycemic control

Introduction

One of the degenerative diseases that needs to be watched out for today is Diabetes Mellitus. Diabetes mellitus is a serious problem worldwide because it tends to increase in the future (Artasensi et al., 2020). Metabolic disorders such as elevated blood glucose levels as well as disorders of the endocrine system can be defined as diabetes mellitus (DM), This disease is caused by damage to the amount of insulin released to pancreatic beta cells or both (Sudirman & Modjo, 2021).

The World Health Organisation (WHO) estimates that the number of people with diabetes mellitus worldwide currently stands at 171 million and will increase to 366 million by 2030. RISKESDAS data from 2018 shows that the prevalence of DM in Indonesia is 1.5%, estimated to increase to 21.3 million by 2030. Type 2 diabetes makes up 90–95% of cases worldwide, making it one of the most prevalent diseases.

Hyperglycemia or elevated blood glucose levels plays an important role in clinical manifestations associated with DM, the presence of complications, and several other pathologies

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that occur due to high glucose in the blood Hyperglycemia is also one of the metabolic system disorders with glucose levels exceeding normal limits and developing into several deadly diseases, especially DM and other diseases (Black, 2014). In addition, DM is also a very dangerous disease today and is a threat to health. Based on the cause, diabetes mellitus (DM) is classified into four categories: type 1 DM, type 2 DM, gestational DM in expectant mothers, and other kinds of DM (Soelistijo, 2019).

Regular blood glucose control and insulin treatment are necessary for the comprehensive management of diabetes mellitus. Blood glucose control is the key to successful treatment of patients with Diabetes mellitus (Saraswati et al., 2022). According to the 2019 Independent Blood Glucose Monitoring Guidelines, the five main pillars of DM management are education, nutritional management, physical activity, medication administration, and blood glucose monitoring. One form of education for comprehensive care that can be given to type 2 diabetics is through Diabetes Self Management Education (DSME).

DSME is an ongoing process to facilitate the knowledge, skills, and abilities required for diabetics' self-care. DSME aims to support informed decision-making, self-care behaviors, problem-solving, and active collaboration with the healthcare team to improve clinical outcomes, health status, and quality of life (Sari et al., 2022). DSME provides education that contains an explanation of the disease, diet, physical activity, blood glucose monitoring, prevention of complications, and management in making health and behavior changes (Bekele et al., 2021). Based on the description above, related to the importance of the application of Diabetes Self Management Education (DSME) will affect the reduction of blood glucose levels in a person with type 2 diabetes. Hence, this study aims to explore the application of Diabetes Self Management Education (DSME) interventions to reduce blood glucose levels in patients with type 2 diabetes.

Material and Methods

Design

This systematic review followed the systematic review reporting item guidelines (PRISMA) for the design and outcome stages.

Population, sample, and sampling

The population characteristics in this study were patients diagnosed with DM, especially those with Type 2 DM, with no severe symptoms and complications, and who were undergoing diabetes self-management education (DSME), aged 18 to 65 years. The sample size was 1,979 patients.

Article selection

A literature search was conducted in February 2024. The data used in this study are secondary data obtained from the results of studies that have been done before. The feasibility of the study was assessed using PICO (Population, Intervention, Comparison, Outcome) based on the Joanna Briggs Institute (JBI), used to create inclusion criteria for reviewing articles. with the inclusion criteria as follows (1) patients diagnosed with Type 2 Diabetes Mellitus (2) patients who do not have severe symptoms or other complications patients (3) able to perform self-care (5) publication year is limited to studies published between 2017 to 2023 (6) only articles published in English are included (7) full text articles.

Data sources

This systematic review contained twelve studies. The primary search approach for the discovered publications involved the use of internet databases, namely Scopus, PubMed, ScienceDirect, and Cochrane. Boolean operators along with words and Medical Subject Headings (MeSH) were used to design the entire search strategy. The journal was searched using the

following keywords: "Diabetes Self Management" OR "DSME" AND "Glycemic Control" OR "Blood Glucose Control" AND "Type 2DM" OR "Type 2 Diabetes Mellitus".

Data collection

Based on the results of the literature search, 15,789 articles were found according to these keywords. Following a confirmation merge using Mendeley software, the search results were examined for duplicates. A total of 350 articles were discovered to be identical. After that, we screened based on the title that matched the theme of the systematic review, 94 articles were excluded because they did not match, and the remaining 158 articles. The selection based on exclusion and inclusion criteria excluded 69 and the remaining 64 articles. The eligibility assessment of 64 articles based on the text as a whole and by the eligibility criteria resulted in 25 articles. The quality assessment of the articles resulted in 12 articles that could be used in the systematic review. The results of the selection of study articles can be described in Figure 1.

Data analysis

The analysis method used in this systematic review is a descriptive method based on topics that have been determined in the systematic review. The results of this review are described in a narrative. The description of the results explains: (1) DSME program in patients with type 2 diabetes and (2) how the impact of DSME on changes in glycemic control in patients with type 2 diabetes.

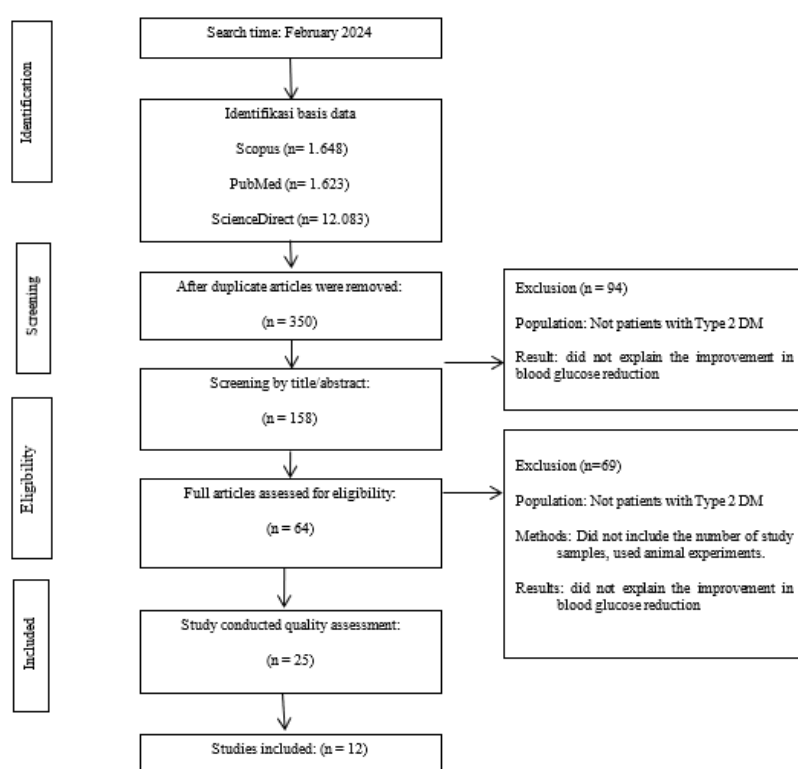


Figure 1. Article submission flow

Results and Discussion

A three-step approach was employed to search the literature using specific keywords in four databases. This yielded 15,789 articles, of which 1,648 were from Scopus, 1,623 from PubMed, 12,083 from ScienceDirect, and 435 from Cochrane. Step two involved looking for qualifying criteria in the abstracts that were retrieved. The researchers excluded specific papers that did not

meet the inclusion criteria. The researchers included Twelve studies, five Randomized Controlled Trials (RCTs), three quasi-experimental studies, three cross-sectional studies, and one single-subject study after the procedure.

Table 1. Review of articles on Diabetes Self-Management Education (DSME)

Author (year)	Method	Sampel	Result
Eroglu, N., & Sabuncu, N. (2021)	Randomized controlled trial	<ul style="list-style-type: none"> 80 respondents with type 2 DM who have HbA1c more than 6.5% 	<ul style="list-style-type: none"> There was a statistically significant effect on HbA1c values and self management for the experimental group compared to the control group.
Gao et al., (2023)	Randomized controlled trial	<ul style="list-style-type: none"> Patients with type 2 DM in Changcun Hospital 84 respondents. 	<ul style="list-style-type: none"> There is a significant influence on self management with a p value of 0.002
Alzaheb, R. A., & Altemani, A. H. (2018)	Randomized controlled trial	<ul style="list-style-type: none"> Patients with Type 2 DM 45 respondents in Duhok City. Divided into control group 23 respondents and intervention 22 respondents. 	<ul style="list-style-type: none"> The outcomes demonstrated that the diabetic self-management intervention group which included walking, physical exercise, and eating fruits and vegetables had a substantial impact in comparison to the control group and that their blood glucose reduction was less than that of the control group.
Bilger et al., (2021)	Randomized controlled trial	<ul style="list-style-type: none"> There were 240 patients with type 2 DM with HbA1c values of 8.0% or more during the last 6 months at Geylang and Bedok polyclinics in Singapore. 	<p>The results showed that in applying the self management treatment there was a better HbA1c value than before (difference -0.31; 95% confidence interval (CI) - 0.67 – 0.06).</p>
Nishimura et al., (2017)	Randomized controlled trial	<ul style="list-style-type: none"> Patients with Type 2 DM 62 respondents at Kyoto Hospital. Divided into STG 30 respondents and RTG 30 respondents. 	<ul style="list-style-type: none"> The results showed that HbA1c levels decreased significantly by 0.32% (3.50 mmol/mol), there was a change in the RTG score on self-care management for 24 weeks by 0.83 points with a p value <0.001.

To be continued...

Tamiru et al., (2023)	Quasi-Experimental	<ul style="list-style-type: none"> Type 2 DM patients undergoing diabetes follow-up clinic in Ilu ababor and Buno Bedelle general hospitals Ethiopia 	<ul style="list-style-type: none"> Before the intervention, 84.3% of respondents had poor self management and 15.7% had good, but after the intervention, 76.4% of respondents had good self management while 23.6% had poor.
Sumathi, C. S., & Arjunan, P. (2020)	Quasi-Experimental	<ul style="list-style-type: none"> Type 2 DM patients in the diabetes outpatient department of Sri Ramachandra Hospital, Porur, Chennai. A total of 70 respondents. 35 control group and 35 intervention group. 	<ul style="list-style-type: none"> There is a difference and influence on self management on glycemic reduction with a p-value <0.001.
Storch et al., (2019)	Quasi-Experimental	<ul style="list-style-type: none"> DM Type 2 patients as many as 60 respondents in the intervention group and 55 in the control group at Central Kran Health Insurance. kenversicherung AG 	<p>There is a significant effect on the intervention group on the control group, there is a decrease in HbA1c, the intervention group gets a Diabetes Self-Management score and BMI has increased compared to the control group.</p>
Ji et al., (2019)	Cross Sectional	<ul style="list-style-type: none"> 207 respondents with type 2 DM 	<ul style="list-style-type: none"> There is a relationship between behavior and self-management of dietary and drug adherence to glycemic p-value <0.005
Jackson et al., (2021)	Cross Sectional	<ul style="list-style-type: none"> Patients with Type 2 DM above the age of 18 years were 226 respondents in Nigerian hospitals. 	<ul style="list-style-type: none"> The results showed a mean \pm SD value of blood glucose of 7.1 ± 2.1 mmol / L and a significant relationship with self-care management p value <0.001.
Hurst et al., (2020)	Cross Sectional	<ul style="list-style-type: none"> There were 700 patients with type 2 DM in urban and rural areas of Thailand. 	<ul style="list-style-type: none"> p-value of less than 0.001 indicated a link between self-management and glycemic control in the results.

To be continued...

Alibrahim et al., (2021)	Single subject research	<ul style="list-style-type: none"> • 150 respondents who had Type 2 DM Al- yarmouk Primary Health Center (PHC) Kuwait. 	<ul style="list-style-type: none"> • Respondents who received DSME sessions showed better glycemic control than before for 12 months with p-value <0.001.
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Setting the right criteria in the method greatly affects the number of articles obtained. The articles obtained that fit the desired criteria were twelve articles. Articles with research methods Experimental, Randomized control trial, Cross-sectional, and single subject research. Research years 2017 to 2023. The study investigated Diabetes Self Management (DESM) to improve self-management, especially glycemic control patients with Type 2 DM with professional assessment through educational programs, closed interviews, and DESM questionnaires. It is beneficial to improve the health and well-being of patients by understanding the disease and knowing how to manage it themselves so that they can take care of themselves (Alzaheb & Altemani, 2018).

Diabetes Self Management (DESM) is an educational activity carried out to spread messages and instill beliefs that can change a person's attitude, and behavior, which includes knowledge of DM disease, the importance of DM control, and signs of hypoglycemia. In carrying out Diabetes Self Management (DESM), assessment, planning, implementation, and evaluation are needed. The benefits are to live a longer and quality life, minimal complications, reduced financial burden, and independent living (Jackson et al., 2021).

In searching for research in the Diabetes Self Management (DESM) journal on glycemic levels, both the first and last journals state that self-management is very influential and important for type 2 DM patients because it is the basis for carrying out short-term, long-term, and long-term goals and achievements. By knowing the importance of Diabetes Self Management (DESM), glycemic levels will be controlled. Thus reducing the risk of complications and improving the patient's quality of life. So DM patients, especially Type 2 DM, must increase their knowledge and the importance of Diabetes Self Management (DESM) (Nishimura et al., 2017).

Glycemic control and self-management are two crucial components of diabetes care that help prevent complications. In this scientific study, diabetes self-management (DSME) is administered in groups using the method of educational programs or providing interventions. It consisted of a close interview using questionnaires for the respondents. One of these results significantly improved, including decreased HbA1c levels and increased self-management (Jackson et al., 2021).

Conclusion

After reviewing related studies, it can be concluded that Diabetes self-management (DSME) positively impacts the self-monitoring of blood glucose and HbA1c levels of Type 2 Diabetes Mellitus patients. This finding could be suggested as a support program to improve diabetes self-management.

Acknowledgment

This work was written to provide readers with a deeper understanding of the scientific data supporting the outcomes of using the DSME technique to manage diabetes and lower blood glucose levels as a sustainable first step toward practicing self-care on their own in daily life.

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