PSISULA : Prosiding Berkala Psikologi
Vol 6 : 2024
E-ISSN : 2715-002x

The Variety of Psychosocial Interventions for Patients with Type 2 Diabetes Mellitus: A Bibliometric Analysis and Narrative Study

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Abstract
Diabetes is considered a major global health issue that can lead to diabetes distress. Diabetes Mellitus (DM) is a chronic disease that requires holistic management, including psychosocial-based interventions. This study aims to conduct a bibliometric analysis of various types of psychosocial interventions that have been applied to patients with type II diabetes mellitus and to conduct a narrative review of the findings. This study uses a literature review using a bibliometric analysis approach. It begins with defining keywords such as "Diabetes Mellitus" and "journal" in the Publish or Perish application and searching the literature using databases like Scopus with related keywords like "diabetes", "intervention", and "psychosocial". This study uses VOSviewer software to analyze and visualize the topics of psychosocial interventions for patients with type II diabetes mellitus. The results of this study identified four main psychosocial interventions for patients with type II diabetes mellitus: psychotherapy, lifestyle programs, psychoeducation, and exercise. In conclusion, psychosocial-based interventions can positively influence the mental health and behavior of patients with type II diabetes mellitus.
Keywords: Intervention, Psychosocial, Type 2 Diabetes Mellitus.

1. Introduction

The prevalence of diabetes mellitus (DM) throughout the world continues to increase every year. According to data from the International Diabetes Federation (IDF), the five regions with the highest increase in diabetes prevalence are Africa at 134%, the Middle East and North Africa with 87%, Southeast Asia with 68%, South and Central America with 50%, and the Western Pacific with 27% (IDF, 2024). Diabetes mellitus sufferers consist of two types, namely type 1 and type 2. Type 1 diabetes is caused by hereditary history, geography, age, and other trigger factors. Treatment is different from type 2 diabetes, which is caused by obesity, high distribution of abdominal fat, lack of exercise, and a family history of type 2 diabetes.

Diabetes is considered a major global health problem that causes diabetes distress (Hu et al., 2020; Jeong & Reifsnider, 2018; Young et al., 2020). This distress arises due to the instability of blood glucose levels and the need for long-term treatment (Young et al., 2020). Blood glucose levels and diabetes distress are key factors influencing the outcomes of diabetes treatment and management (Hu et al., 2020). Diabetic distress triggers the release of excess glucocorticoid hormones which interfere with glucose production in the liver and reduce cell sensitivity to insulin, thereby causing hyperglycemia (Farm et al., 2017). The prevalence of this distress is high among diabetes patients (Batais et al., 2021), and increased blood glucose levels due to diabetes distress have also been reported (Dekkers & Hertroijs, 2018; Pranata et al., 2022).

Type II DM is a serious public health problem with a significant impact on human life and health costs. Rapid economic development and urbanization have increased the burden of diabetes in many parts of the world. This disease affects the functional capacity and quality of life of individuals, causing high morbidity and premature death. More than a third of diabetes-related deaths occur in people under 60 years of age, which is an increasing concern (Khan et al, 2020). Therefore, the role and assistance of the family is very necessary to avoid dangerous effects, because type II DM can cause complications for sufferers (Astuti & Dewi, 2022).

Help from family or community can be provided through psychosocial-based interventions for type II DM sufferers. Previous studies conducted literature reviews on type I and II DM sufferers or diabetes patients with depression (Harvey, 2015). Researchers are trying to see the variety of interventions and research trends in psychosocial-based interventions for Type 2 DM sufferers through bibliographic mapping.

2. Method

The method used is bibliometrics, which is a statistical method for collecting and measuring the number and growth of research on a subject or research topic (Mao et al., 2018; Soosaraei et al., 2018). This study uses software assistance VOSviewer to analyze and visualize psychosocial-based intervention topics for Type 2 DM sufferers (van Eck and Waltman, 2010). Next, the researcher looked for topics related to the interventions in the analysis results VOSviewer which is then analyzed and narrated with narrative review.

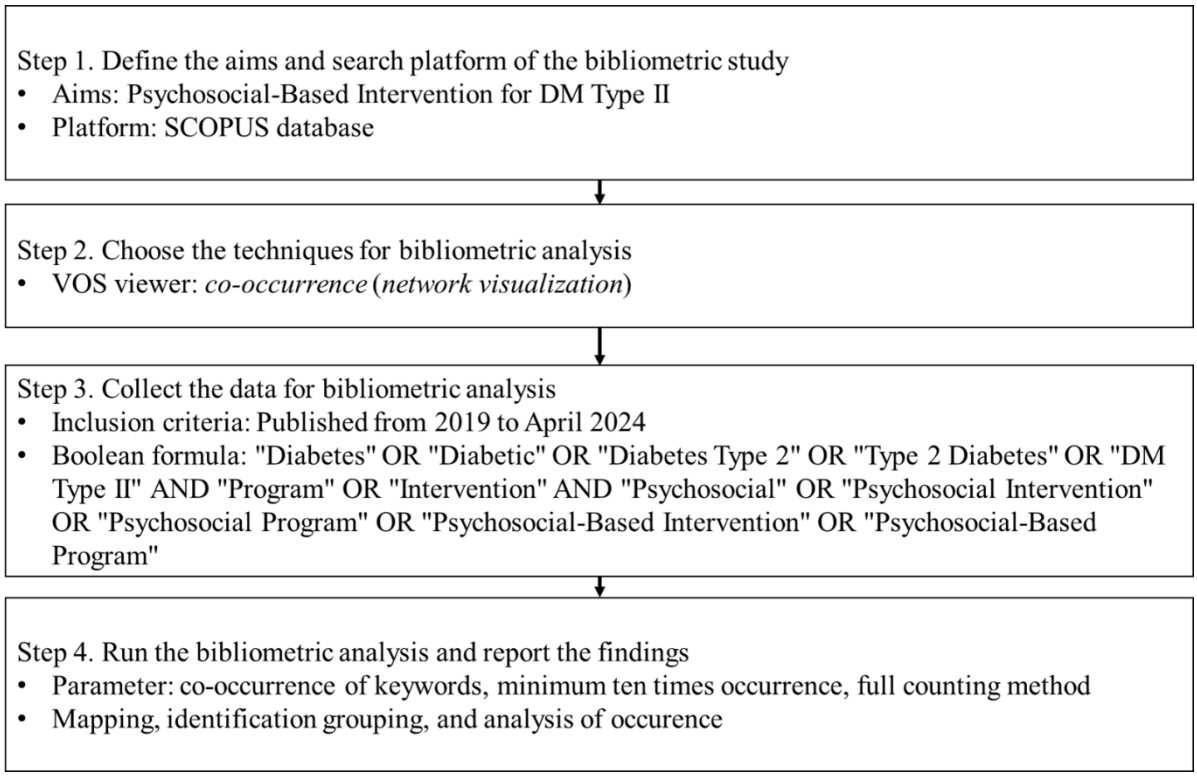

Figure. 1 ***Steps for Bibliometric Analysis***

3. Results

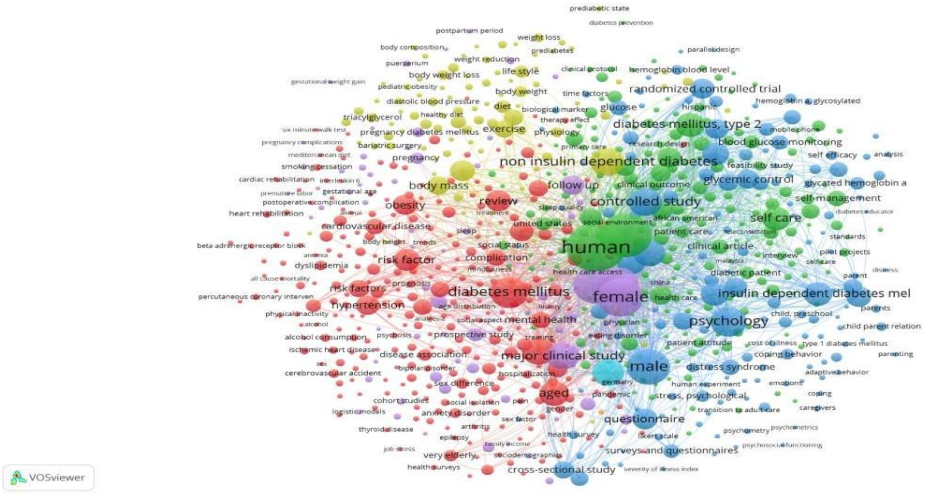

Figure 2. ***Network visualization by co-occurrence***

Based on test results (Figure 2) VOSviewer (co-occurences) found seven clusters, of which researchers eliminated two clusters (6th and 7th cluster) because they only consist of one item in each cluster. On the 6th cluster remove the item" middle-aged" and on the 7th cluster remove the "data analysis" item. Out of five clusters, 834 items were found, where cluster 1 consists of 301 items (red), cluster 2 consists of 210 items (green), cluster 3 consists of 154 items (dark blue), cluster 4 consists of 96 items (yellow), and cluster 5 consists of 73 items (purple). After finding related topics, then find appropriate themes from the analysis results bibliometrically which are presented in the **Table.1** :

Table. 1: Themes and Keywords

Themes	Keywords
Mental Health Issues	Alzheimer's disease, anxiety, bipolar disorder, depression, loneliness, job stress, mood disorder, Parkinson's disease, schizophrenia, sleep disorder, suicide, eating disorder, family conflict, fear, personality, posttraumatic stress disorder,
Demographics	Age, ethnicity, gender, low-income country, marriage, older adults, sex, women, workplace, african-american, caucasian, young adults, child, male, rural area,
Psychosocial-Based Intervention	Cognitive therapy, healthy lifestyle, mindfulness, psychoeducation, psychotherapy, smoking cessation, yoga, consultation, family therapy, group therapy, health promotion, peer group, telehealth, telemedicine, education program, stress management, aerobic exercise, exercise therapy, lifestyle intervention,
Countries	Australia, England, Europe, Germany, Malaysia, Canada, China, South Africa, India, United States,
Physical Illness	acute heart infarction, acute coronary syndrome, asthma, cardiovascular disease, gastrointestinal disease, heart disease, hypertension, osteoporosis, cancer, HIV, prematurity, anemia, COVID-19,

Methodologies	case report, case-control study, meta-analysis, systematic review, feasibility study, pilot study, quantitative analysis, randomized controlled trial, thematic analysis, clinical trial, cross-sectional study, descriptive research, human experiment, survey and questionnaire, longitudinal study, multivariate analysis, major clinical study,

4. Discussion

Psychotherapy

Psychotherapy for Type II DM patients varies greatly, including *cognitive therapy, mindfulness, family therapy, group therapy, peer group, consultation*, and *telemental health.* Cognitive therapy is very important to prevent relapse by increasing the patient's self-control (Muhlisin, et al. 2015). Dobson & Dozois (2009) explain that cognitive therapy triggers thought processes that influence behavior, and Leahy (2005) adds that this is a learning process that involves stimulation and response. Byrne and colleagues (2005 in Muhlisin et al, 2015) found that cognitive therapy was able to reduce negative behavior in DM sufferers, such as unhealthy eating patterns and lack of physical activity. This therapy involves interpersonal relationships that lead patients to change behavior through rational thinking (Safran, 1996; Wells, 2013).

Mindfulness, according to Zinn (2001), is awareness of the present moment without judgment, which is beneficial for happiness, resilience, and well-being (Kabat-Zinn, 2003). Research by Holzel, et al (2012) shows that exercise Mindfulness-Based Stress Reduction (MBSR) for 8 weeks increases the volume and density of gray areas in the brain, which decrease during stress or anxiety. The problem of boredom in DM patients must be treated immediately to prevent complications because continuous treatment often makes patients bored and non-compliant with treatment (Musripah et al, 2020). Family support is very important in diabetes management because it can improve patient compliance and quality of life (Chung, Cho, Chung, 2013; American Diabetes Association, 2017; Mayberry, 2012: Musripah et al, 2020). Family Support Groups can provide emotional and practical support for DM sufferers (Sri Lestari, 2012; Wijayanti, 2015; Muhibuddin, Sugiarto, & Wujoso, 2016: Musripah et al, 2020).

Group positive psychotherapy, according to Sujana, et al. (2015), is effective in improving psychological well-being but has not been widely studied in DM sufferers. This therapy consists of techniques that aim to achieve a pleasant life, involvement in activities, and meaningful life (Parks-Sheiner, 2009; Seligman, 2006). Support from *peer group* It is also important to improve compliance in the management of type 2 DM (*American Diabetes Association*, 2017; Fennell, 2011; Diantiningsih, 2012; Maria, et al, 2023). *Telehealth* is an important tool for providing mental health care by reducing in-person contact and adhering to physical distancing protocols (Moring et al., 2020; Fortney et al., 2020). *Telemedicine* has been shown to improve glycemic control and patient compliance with medical instructions (Marcolino et al., 2013; Heitkemper et al., 2017; Zhou et al., 2014).

Lifestyle Change

Intervention Program *Community-Based Healthy Lifestyle Intervention* The program (Co-HELP) from Malaysia is an educational program regarding Diabetes Mellitus that is by the culture and characteristics of Indonesian society. Implementation of Co-HELP involves components such as knowledge, diet, physical activity, and family and social support (Tubalawony & Prabawati, 2020). The main goal of treating Diabetes Mellitus is to improve the patient's quality of life through education, healthy eating patterns, regular physical activity, use of medication, and monitoring blood sugar levels (Alligood, et al. 2014). The Co-HELP program, which was originally developed by Ibrahim et al in 2016, was modified to suit the culture and characteristics of Indonesian society.

Lifestyle consists of diet and activity patterns. A healthy diet includes the 3J system: Amount, Type, and Regular Schedule. Diabetes sufferers can manage their lifestyle by increasing physical activity and adopting healthy eating patterns based on the 3J principles (Chaidir, Wahyuni, & Furkhani, 2017). Physical activity is the first step in managing diabetes, which helps maintain stable blood sugar levels and improves the quality of life (Panjaitan, 2013; Putri, 2016; Rondonuwu, Rompas, & Bataha, 2016). Exercising three times a week for 30 minutes can improve insulin response within 24-72 hours, helping control blood sugar levels (Putri, 2017). Dietary management, such as planning meal schedules, types of food, and calorie intake, can increase nutritional intake and maintain stable blood sugar levels (Susanti & Bistara, 2018; Setiyorini & Wulandari, 2017). Inconsistency in self-management can reduce the quality of life of diabetes sufferers, impacting physical health, and psychosocial and social relationships (Kusniawati, 2011).

Diabetes *Self-Management Education* (DSME) is an important part of health education for independent and sustainable diabetes management. This approach includes knowledge, practical skills, and psychological support to help individuals adapt their lifestyles (Poretsky, 2010). DSME adopted counseling guidelines and behavioral interventions to increase understanding of diabetes and assist individuals and families in managing the condition of DM (Jack, Liburd, Spencer & Airhihenbuwa, 2004). Health education such as DSME involves active participation and collaboration between people with diabetes and their families (Glasgow & Anderson, 2001).

Stress management helps people identify the causes of stress and learn techniques for managing them so that they can better cope with stress rather than feeling crushed by it (Schafer, 2000). Stress management includes motor control, attention, perception, planning, and memory, which helps increase motivation, and self-confidence, and reduce stress levels. Stress management techniques such as visualization exercises, combined with breathing relaxation, can change false perceptions about certain situations, reducing stress levels and blood sugar levels in diabetes sufferers (Puspitaningsih, 2017).

Psychoeducation

Health education programs help people with type 2 diabetes manage their condition by improving physical and emotional well-being, as well as focusing on problem-solving and self-management. This program includes sharing experiences, practicing communication skills, and providing social support to participants (Sudirman et al, 2021). Health education involves providing information and building individuals' beliefs, which shape their perception of their condition. A comprehensive understanding of type 2 diabetes, appropriate education methods, and family involvement have a positive impact on sufferers' understanding and confidence in dealing with their condition (Huzaimah, 2018).

Psychoeducation is an action to strengthen strategies for dealing with psychological problems, by conveying complete information about diabetes mellitus (DM) interestingly and uniquely to reduce anxiety (Sakitri & Nurkalis, 2022). Research by Kamalah et al. (2020) shows that psychoeducation is effective in reducing the burden on families of patients with diabetic ulcers. Overall psychoeducational interventions can increase the self-confidence of people with type 2 diabetes. The high internal locus of control in diabetes sufferers results in the belief that they have control over the success of controlling their diabetes condition through their efforts (Oktarinda et al, 2014).

Exercise

The main problem in Diabetes Mellitus is the lack of response to insulin (*insulin resistance*) so that glucose cannot enter the cells. Membrane permeability to glucose increases when muscles contract because muscle contraction has an insulin-like effect. Therefore, during physical activity such as exercise, insulin resistance is reduced, helping to control blood sugar and reduce weight in diabetes mellitus sufferers (Saputra, 2018).

Sports, which are considered to be the *'Gold standard'* in the management of diabetes, have an important role in controlling this disease (Rydén et al., 2013). Usually, the type of exercise recommended is aerobic because it can increase endurance, strength, flexibility, balance, agility, power, and speed. Physical activity includes all movements that increase energy expenditure, while exercise is structured and planned physical activity. Exercise helps control blood glucose in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being. Aerobic exercise involves large muscle groups and can be done continuously, including running, walking, cycling, swimming, and rowing (Colberg et al., 2016).

Physical activity aims to increase insulin sensitivity, prevent obesity, improve blood flow, stimulate the formation of new glycogen, and prevent further complications. Physical exercise is very important in managing diabetes because it can reduce blood glucose levels and reduce cardiovascular risk factors (Fajriati & Indarwati, 2021). One of the physical exercise activities that is beneficial for people with diabetes mellitus is leg exercises, which aim to improve blood circulation, strengthen small muscles, thigh muscles, and calf muscles, as well as overcome limitations in joint movement. These foot exercises can be given to all patients with type 1 and type 2 diabetes mellitus, and should

be started when the patient is diagnosed with diabetes mellitus to prevent complications as early as possible (Yulianti & January 2021).

Yoga, as a form of physical activity originating from India, can help muscles absorb excess glucose in the blood. Yoga also helps the pancreas and liver function more effectively by regulating blood sugar levels. Yoga movements are designed to stimulate pancreatic function, increase blood flow, rejuvenate pancreatic cells, and increase the pancreas' ability to produce insulin (Merdawati et al., 2018). A 12-week yoga intervention, with 60-minute yoga sessions twice a week, guided by a certified instructor and trained assistant, as well as home practice with daily diaries and peer support from a community mentor, showed significant benefits (Rahmadiya & Dahlia, 2022).

5. Conclusion

The conclusions of this study indicate that a multidimensional approach to treating type 2 diabetes mellitus, which includes psychotherapy, lifestyle changes, and health education, provides positive results. Psychotherapy, including cognitive therapy, mindfulness, family therapy, and group support, has been proven to be effective in reducing negative behavior, improving psychological well-being, and strengthening stress and anxiety management strategies in patients. Additionally, the use of technology such as telehealth also helps in providing mental health care more effectively, reducing in-person contact, and improving glycemic control and patient compliance with medical instructions.

On the other hand, lifestyle changes through educational programs such as Co-HELP, regular physical activity, and diet management using the 3J principles have been proven to improve the quality of life for diabetes sufferers. Physical activity, including leg exercises and yoga, plays an important role in improving insulin sensitivity, controlling blood sugar levels, and preventing further complications. Health education and psychoeducation help patients and their families understand the condition of diabetes, increase self-confidence, and motivate them to manage the disease independently and sustainably. This combination of approaches shows that comprehensive management of type 2 diabetes mellitus can improve patients' physical, emotional, and social well-being.

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