Jurnal Aisyah: Jurnal Ilmu Kesehatan
Volume 10, Issue 1, 03 2025, p. 456-464
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

THE EFFECT OF SELF-MANAGEMENT INTERVENTION ON ATTITUDES AND BEHAVIOR IN DIABETES MELLITUS PATIENTS: A *SYSTEMATIC LITERATURE REVIEW*

Authors:

Muhamad Alif Rezeki[1], Azizah Khoiriyati[2]

[1]Master Of Nursing Universitas Muhammadiyah Yogyakarta; Jalan Brawijaya, Geblagan, Tamantirto, Kecamatan Kasihan, Kabupaten Bantul, Daerah Istimewa Yogyakarta, Indonesia (55183)

[2]Universitas Muhammadiyah Yogyakarta; Jalan Brawijaya, Geblagan, Tamantirto, Kecamatan Kasihan, Kabupaten Bantul, Daerah Istimewa Yogyakarta, Indonesia (55183)

Co Responden: azizah.khoiriyati@umy.ac.id

About the Author

1st Author	: Ns.Muhamad Alif Rezeki, S.Kep
Affiliation	: Master Of Nursing Universitas Muhammadiyah Yogyakarta
Mailing address	: Jalan Brawijaya, Geblagan, Tamantirto, Kecamatan Kasihan, Kabupaten Bantul, Daerah Istimewa Yogyakarta, Indonesia (55183)
Email of author	: muhamadalifrezeki@gmail.com
Orcid ID	: https://orcid.org/0000-0002-3612-0966
Google Scholar URL	: https://scholar.google.com/citations?user=5cfQqn0AAAJ&hl=id
Phone number	: 085226201975

2nd Author	: Dr. Azizah Khoiriyati, Ns., M.Kep
Affiliation	: Universitas Muhammadiyah Yogyakarta
Mailing address	: Jalan Brawijaya, Geblagan, Tamantirto, Kecamatan Kasihan, Kabupaten Bantul, Daerah Istimewa Yogyakarta, Indonesia (55183)
Email of author	: azizah.khoiriyati@umy.ac.id
Orcid ID	: https://orcid.org/0000-0001-7754-4880
Google Scholar URL	: https://scholar.google.co.id/citations?user=gUdlx4cAAAAJ&hl=id&oi=ao
Phone number	: 081391423264

Abstrak

Backgorund: *Metabolic disorders cause diabetes mellitus (DM) which are indicated the presence of blood sugar levels that exceed normal. Consists of the attitude aspect: knowledge: of symptoms, treatment, lifestyle, prevention, treatment, treating complications, and developing personal strategies for making decisions. emotional: stress. diet, self-management skills, and transitions in life. While the behavioural aspects include, diet, physical activity: aerobic exercise and physical activity using DM drugs regularly: anti-diabetes and insulin drugs, monitoring blood sugar self-care*

Purpose: *To ascertain how a self-management intervention affects attitudes and behavior, in DM patients.*

Method: *The method used is a systematic literature review taken from international journals. Search for library sources and numbers in this article through the Scopus, Pubmed, and ScienceDirect databases, 2018-2022 with a total of 3,862 articles. data search for each database using keywords: self-management, attitude, behaviour, diabetes mellitus.*

Result: *Based on the review of the articles, the results showed that the quality of self-management education in diabetes patients includes attitudes and behaviour. Attitude variables include knowledge: symptoms, treatment, lifestyle, prevention, treatment, treating complications, and developing personal strategies for making decisions. emotional: stress. diet, self-management skills, and transitions in life($p<0.05$). While behavioral variables include, eating patterns ($p = <0.00$), physical activity: aerobic exercise and physical activity($p=<0.001$), use*

DM drugs regularly: anti-dibates drugs and insulin(P<0,001), blood sugar monitoring (P<0,05), self care (P<0,01).
Conclusions: *Self-management of behavioural aspects consisting of diet, physical activity, regular use of DM medication, blood sugar monitoring, and foot care. Likewise, the attitude aspects consisting of knowledge, emotions, lifestyle, self-management skills and transitions in life are very effective for providing prevention, controlling complications and improving the quality of life in patients with diabetes mellitus independently*

Keywords: Self management, attitude, behaviour, diabetes mellitus

Abstrak

Latar Belakang: Gangguan metabolisme menyebabkan penyakit diabetes melitus (DM) yang ditandai dengan adanya kadar gula darah yang melebihi normal. Terdiri dari aspek sikap: pengetahuan: tentang gejala, pengobatan, gaya hidup, pencegahan, pengobatan, pengobatan komplikasi, dan mengembangkan strategi pribadi untuk mengambil keputusan. emosional: stres. pola makan, keterampilan manajemen diri, dan transisi dalam hidup. Sedangkan aspek perilaku meliputi, pola makan, aktivitas fisik: senam aerobik dan aktivitas fisik menggunakan obat DM secara rutin: obat antidiabetes dan insulin, pemantauan gula darah, perawatan diri.
Tujuan: Untuk memastikan bagaimana intervensi manajemen diri mempengaruhi sikap dan perilaku, pada pasien DM.
metode: Metode tinjauan literatur sistematis yang diambil dari jurnal internasional. Pencarian sumber pustaka dan nomor artikel ini melalui database Scopus, Pubmed, dan ScienceDirect, 2018-2022 dengan jumlah artikel sebanyak 3.862 artikel. pencarian data tiap database menggunakan kata kunci: manajemen diri, sikap, perilaku, diabetes melitus.
Hasil: Berdasarkan review artikel diperoleh hasil kualitas pendidikan manajemen diri pasien diabetes meliputi sikap dan perilaku. Variabel sikap meliputi pengetahuan: gejala, pengobatan, gaya hidup, pencegahan, pengobatan, komplikasi, dan pengembangan strategi pribadi dalam mengambil keputusan. emosional: stres. pola makan, keterampilan manajemen diri, dan transisi dalam hidup(hal<0,05). Sedangkan variabel perilaku meliputi, pola makan (p = <0,00), aktivitas fisik: latihan aerobik dan aktivitas fisik(hal=<0,001), menggunakan obat DM secara teratur: obat anti dibate dan insulin (P<0,001), pemantauan gula darah (P<0,05), perawatan diri(P<0,01).
Kesimpulan: Manajemen diri aspek perilaku yang terdiri dari pola makan, aktivitas fisik, penggunaan obat DM secara teratur, pemantauan gula darah, dan perawatan kaki. Begitu pula dengan aspek sikap yang terdiri dari pengetahuan, emosi, gaya hidup, keterampilan manajemen diri dan transisi dalam hidup sangat efektif untuk memberikan pencegahan, pengendalian komplikasi dan peningkatan kualitas hidup pada pasien diabetes melitus secara mandiri.

Kata kunci: Manajemen Diri, Sikap, Perilaku, Diabetes Melitus

INTRODUCTION

A condition known as diabetes mellitus (DM) is brought on by high blood sugar that exceed normal. Diabetes mellitus occurs as a result of inadequate insulin action, the impaired insulin release from the pancreas, or a combination of both. This cause is proven to be experienced by 90% of DM patients. A person suffers from DM when there is a decrease in insulin production so glucose metabolism in the body is disrupted (Declori, 2019).

Management of DM patients can be done by indirectly modifying modifiable risk factors. Patients with DM can stop smoking, not consume alcohol, increase daily physical activity, and maintain body weight. This is done so that the body can overcome insulin resistance experienced by DM patients and prevent uncontrolled symptoms (Fatimah, 2015: Kusumadewi, 2011).

International diabetes federation (IDF) states DM sufferers aged 20-79 years, there are 10 China is the nation with the greatest number of patients worldwide. 116.4 million people, 77 million in India, and 31 million in the US, these three countries rank in the top 3 in 2019. Indonesia is ranked 7th out of 10 countries with a total of 10.7 million sufferers (IDF, 2019).

DM disease ranks as a non-communicable disease (PTM) (Setyawati et al., 2020) the number of cases continues to increase every year in Indonesia. The 2018 basic health research report (Riskesdas) shows the prevalence of DM in the adult population in Indonesia by 6.9% in 2013 increasing to 8.5% in 2018 (Ministry of Health, 2018) World Health Organization (WHO) Predicts an increase in the incidence DM in Indonesia reaches up to 21.

Self-management is the most important strategy for people with chronic diseases like diabetes mellitus. The goal is to lessen the likelihood of problems and can improve health status. Self-management, individuals are required to change their previous lifestyle for the better and manage the conditions that will occur related to the disease they have, (Mbanya JC, 2010 De-Graft Aikins A, 2013 in rugby et al, 2017).

According to the consensus on the control and prevention of DM in Indonesia in 2011, healthy behaviours that represent DM patients can take care of themselves by eating a balanced diet, getting more exercise, and taking their medications including eating a balanced diet and doing more exercise, and using medications and DM. – Medication in unique situations securely and frequently, track your blood sugar levels and perform regular foot care (Indonesian Endocrinology Association, 2011).

According to Green et al., (2017), factors that can influence individuals in carrying out diabetes self-management are knowledge factors, emotional factors, motivational factors, lifestyle factors of self-management experience, ability to create routine self-management, and a transition in life. Individuals who suffer from Diabetes Mellitus are expected to have a positive attitude from within so that they can survive and still have good expectations so that the self-management needed in diabetes care can be carried out.

Therefore, researchers aim to ascertain how self-management affects attitudes and behaviour in patients with diabetes mellitus.

METHOD

This study used A systematic methodology and four-stage selection process, namely identification and screening, eligibility and the outcomes obtained. A literature search is done by accessing *databases* international and national online, including Scopus, PubMed, and Science Direct. The search was limited to publications from 2018 to 2022. This research method used Systematic Reviews and PRISMA (Preferred Reporting Items for Metaanalyses). This research used a systematic strategy and a foursteps in the selection process: eligibility, screening, identification, and results, which were approved.

The inclusion criteria in this review were patients with diabetes mellitus, self-management, attitudes and behaviour of patients with diabetes mellitus, journal period of the last 5 years, and the study design was a quasi-experimental, randomized controlled trial. Then the exclusion criteria were old publications or more than 10 years, diabetic patients who did not exhibit the attitudes, behaviors, or self-management typical of diabetes mellitus patients. A language limit was also implemented to limit searches to articles published in English only

A grading tool was utilized to evaluate the quality of each relevant article before it was reviewed and examined for possible inclusion or exclusion from review evaluations.Institute of Briggs, Joanna (JBI).literature chosen for its excellent quality and suitability for the review's objectives, themes, and questions. In order to arrange the article findings, researchers utilize bibliographic tools such as Mendeley to assist in organizing search results articles.. In Mendeley, researchers build unique folders named by the databases from which they retrieve articles. Subsequently, the researcher checked the five databases to see if any duplicate papers

had been obtained. Following the removal of duplicate articles and their storage in distinct Furthermore, the researcher carefully examined the article titles and abstracts to determine the publications' applicability or relevance.

The search technique uses specific keywords from the research question. Keywords/phrases to be used in the search: Self-management, Diabetes mellitus, Attitude, Every article that is included in the review goes through a process of assessing the quality of the research methodology.

RESULTS

Literature search

article search results through databases namely Pubmed, Science Direct, and Scopus totalling 3,862 journals with keywords ("Self Management" AND "Diabetes Mellitus"), ALL ("self-management" AND "diabetes" AND "Mellitus" AND "behaviour")ALL ("self-management" AND "diabetes AND Mellitus " AND " attitude " OR "behaviour'), self-management AND diabetes, self-management AND diabetes AND BEHAVIOR, "Self-management" AND "diabetes" AND "Attitude"((("SELF MANAGEMENT") AND ("DIABETES MELLITUS") (((self-management) AND (diabetes mellitus)) AND (behaviour)) OR (attitude).

Pico

Pico is **t**he strategy used to analyze the journal articles that were carried out. P (Populacion): All patients with DM, I (intervention): Self-management, C (comparison), O (outcome): Knowing the effect of self-management, in,

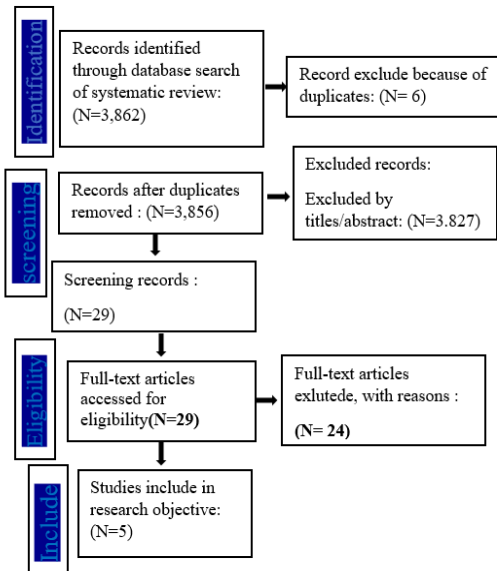
Table 1

Population	All patients with DM
Intervention	Self-management
comparison	
Outcomes	Knowing the effect of self-management

Prisma

Based on the results of searching articles through databases namely PubMed, Scopus, science direct, showing results, identification: using a database to identify the records systematically reviews the literature (N = 3,862) forms excluded due to duplication (N=6), screening: records after duplication deleted (N=3,856), notes excluded by title/abstract (N=3,827), note screening (N=29), eligibility: full-text articles accessed for readability (N=29), full articles excluded with reasons (N = 24), including the study was included in the research objectives (N = 5).

Chart 1.



Extraction data

Haril reviews the average provision of interventions on self-management of behaviour and attitudes given at a vulnerable time, 3 to 6 months. By way of implementation in each different session. Table 2

Attitude

In the attitude aspect research knowledge: symptoms, treatment, lifestyle, preventing, treating complications, and developing personal strategies for making decisions. emotional: stress. diet, self-management skills, and transitions in life. a five-stage An approach of self-management education is employed, which involves measuring glucose regularly, prescribing and consuming drugs regularly, choosing an appropriate diet, exercising, and obeying doctor's orders and prescriptions (Borhani F, 2013). For the intervention group, management education took occurred over the course of 20 weeks (5 months); training materials were posted on the weblog three days a week, with a 1:30-hour duration for each session.(yu, 2014).60 sessions are estimated to educate diabetes patients in this way. Each session has a duration of administration time starting from 1:30 hours, regarding lifestyle or choosing a good diet (20 sessions), measuring glucose (5 sessions), and obeying doctor's orders and prescriptions (5 sessions), Furthermore, 10 sessions are committed to the ongoing administration the patient-prescribed medications, such as insulin or antidiabetic treatments.Then 45 minutes, associated with physical activity, an exercise involving aerobic exercise and physical activity in two parts (20 sessions).

A diabetes mellitus based on self-management development DMSM program was created using a self-management concept as its foundation. Three interactive learning sessions make up the program, which aims to improve patient comprehension of diabetes care. The curriculum includes a wide range of diabetes self-management experiences and diabetes difficulties, as well as evaluating present behavior, keeping an eye on DMSM procedures, and calculating clinical results. setting objectives for engaging in regular physical activity and making good food choices; and 3) having conversations in small groups on cooking diabetic-friendly meals, the value of fitness and exercise, blood sugar tracking and medication compliance.

The self-management education program is divided into, an intervention group and a control group.two diabetes self-management education sessions were provided to the intervention group in addition to the standard education curriculum. There are two kinds of courses in the intervention education program: theoretical and practical. There are two class sessions for the theory course: the first takes place at the first clinic appointment, when the control group attends, and the second takes place during the second clinic visit, which occurs two days later. A

Behaviour

On research self-care practices, including exercising, eating well, keeping an eye on blood sugar levels, and taking medications as prescribed. every six weeks, there are three one-hour sessions. They scheduled the first session less than a month after seeing their main family physician for the first time. Participants took home a diabetic patient guide booklet and visual aids that illustrated various self-care tasks, such taking care of their feet, at the conclusion of the event. The purpose of the mainly feedback sessions that followed was to go over the topics that had already been covered, emphasize the main points, deal with any issues, and provide further details. Self-regulation that allows patients to effectively adhere to lifestyle treatments requires them to exercise control over their food and exercise habits as well as self-confidence. (Samdal GB, 2017)

Individual exercise guidance includes creating customized programs of exercise based on the Borg scale of perceived activity and the findings of cardiovascular exercise tests for every patient. In general, gym exercises are done three times a week for sixty to ninety minutes each. Every training regimen consists of one warm-up. sessions: 5–10 minutes of low-intensity aerobic exercise; (2) exercise sessions: 30 minutes of moderate-intensity aerobic exercise, which is 50%–60% of maximum oxygen absorption (VO2max), at a Borg scale level of 13–14 (very difficult), and 30 minutes of moderate-intensity resistance training, which is 50%–60% of 1RM; and (3) unwind for ten minutes.

The educational The intervention package includes customized take-home activities, peer support, motivational counseling, collaborative and interactive teaching, and illustrated teaching handouts. To enhance the utilization of interactive teaching methods, the intervention group was separated into three smaller groups, with a minimum of fifteen participants in each group. The intervention group participated in four sessions, each lasting roughly ninety minutes, of diabetic self-management education (DSME) based self-care model. Over the course of four months, four DSME based on a self-care model session were given. The principal investigator provided guidance to each subgroup. The AADE7 self-care model's self-care behaviors—healthy eating, exercise, blood glucose monitoring, medication adherence, foot care, stress management, and problem-solving abilities—were taught to them.. Diabetes self-management education (DSME) involves facilitating the knowledge, skills, and abilities necessary for the self-care of diabetic patients. Diabetes self-management support (DMSE) refers to the support needed to implement and maintain coping skills and behaviours that are continually required for self-management in diabetes patients. (Wallston K, 2007)

DISCUSSION

Attitude

The research was conducted on 60 respondents and was divided into two experimental groups and a control group. The results showed that patients who received DMSM coaching programs had a positive effect on DMSM practice and metabolic markers except for body mass index (BMI). Indonesia. Pamungkas et al. (2015) found that self-management in patients with

diabetes mellitus can effectively improve healthy diet habits/behaviours, and activity/exercise behaviour.

. Based on the results of this study, the mean age of the patients examined was 32.1 ± 4.9 years, with the majority of participants being male (n = 52 in the test group, 52.5%). The results show that where this difference is significant according to the independent t-test ($p < 0.05$)The results of this study reveal a positive effect of weblog-based self-management on the quality of life of patients with diabetes after the intervention. Quality of life is a multi-dimensional element of well-being consisting of the patient's physical, mental, emotional and social status The WHO defines health as being not just free from illness but also denotes being in good bodily, mental, and social health. A healthy individual will naturally have a high quality of life, which will in turn promote health. (Harmaini, 2006).

A total of 220 diabetes patients were screened, 140 of whom met eligibility criteria and were randomized. Approximately 96 patients (69%) completed the study; 55 (79%) were in the DSME group and 41 (59%) were in the usual care group. The mean baseline age and HbA1c of all patients were 48.8 (standard deviation DSME also did not make any extraordinary changes in any of the secondary outcome measures. From this study, the short-term biomedical benefits of a structured educational approach appear to be limited. This suggests that offering short, intensive educational programs may have limited additional benefits above and beyond the family physician's comprehensive approach to managing chronic conditions such as diabetes. Perdana et al., (2013) in their study stated that the level of knowledge of patients with diabetes mellitus is related to controlling their blood sugar levels, including self-care for patients with type 2 diabetes mellitus. In this study, the knowledge provided is not only related to the disease process but also includes stress management. Providing education can affect the level of knowledge of an individual.

Behaviour

The study was conducted on 60 patients with type 2 diabetes mellitus randomly allocated to the control group (n = 30) and the intervention group (n = 30). The total mean score of the summary measure of diabetes self-care activity was 17 60 ± 6 63 points. The problem area on the diabetes scale revealed that the total mean score was 29 82 ± 15 22 points; 27% of patients experienced diabetes-related distress, while 9% suffered from severe emotional distress. Compared to the control group, summary scores measuring diabetes self-care activities and problem areas on the diabetes scale, fasting blood glucose, 2-hour postprandial blood glucose, and HbA1c increased significantly in the intervention group after the intervention ($P<0.01$).

The study was conducted on 96 adolescents and grouped into an experimental group (48 respondents) and a control group (48 respondents). The results revealed a significant difference in the increase in DSM behavioural levels and the decrease in HbA1c ($p<0.05$), between the intervention and control groups at post-intervention. In conclusion, an educational intervention based on the self-care model is an effective program that can increase DSM Behavior and HbA1c levels. In addition, educational interventions based on self-care models need to be implemented continuously to prevent complications and improve self-care and HbA1c levels in diabetic patients. Diabetes self-management is to control blood sugar, prevent acute and chronic complications, and improve the patient's quality of life. In general, self-management is an important method for maintaining and improving healthy behaviour and patient status. (Quah JH, 2011)

CONCLUSION AND SUGGESTION

Diabetes mellitus (DM) is a chronic metabolic disease marked by high blood glucose levels brought on by inadequate or inefficient insulin synthesis. utilization by the body. The outcomes of the analysis of articles regarding the effect of self-management on behavioural aspects consisting of diet, physical activity, regular use of DM medication, blood sugar monitoring, and foot care. Likewise, aspects of attitude consist of, knowledge, emotions, lifestyle, self-management skills and transitions in life. very effective for providing prevention, controlling complications and improving the quality of life in patients with diabetes mellitus independently.

Suggestion It is hoped that future researchers can help examine the effect of self-management on the impact of self-management on leg injury patients' attitudes and behaviors with diabetes mellitus. It is hoped that health services can effectively implement self-management education interventions in diabetes mellitus patients so that complications do not occur in diabetes mellitus patients.

LIMITATION

This uses only search sources from three databases and some of the literary sourses obtained in the search in indonesian and English.

Funding statement
This research is not sponsored or endorsed by any institution or organization.

Conflict of interest statement
There is not conflict of interest

ACKNOWLEDGEMENT

All praise is due to Allah SWT, the god of the universe, for his extraordinary mercy and grace so that I can finish writing a systematic review.

REFERENCES

American Diabetes Association, “Standard medical treatment of diabetes—2014,” Diabetes Care, vol. 37, Supplement 1, p. S14–S80, 2012.

Al-Adawi, Al-Shookri AO, and Al-Maskari MY SH, Lin KG. Quality of life assessment in patients with diabetes mellitus type 2 in Oman. Saudi Med J. 2011; 32(12):1285–90

Ranjbar A, Abazari F, and Abbaszadeh A, Borhani F, and Ranjbar H. Effects of phone software, or telenursing, on Hemoglobin A1C in patients with type 2 diabetes mellitus. (2013) J Arm Univ Med Sci. 11(2):130–7Detroit E. Diabetes mellitus type 2. Padang; Science Section Publishing Center Faculty of Internal Medicine Andalas University Medicine;2019.

Eyübołlu, E., & Schulz, PJ (2016). Do health literacy and patient empowerment affect self-care behaviour? A survey study among Turkish patients with diabetes. BMJ Open, 6(3), 1–7. https://doi.org/10.1136/bmjopen-2015- 010186

Fatima RN. Type 2 diabetes mellitus. Journal majority. 2015;4(5): 93–101

Green, DS, SS Jaser, C. Park, R. Whittemore.(2017). A Meta-synthesis of Factors Affecting Self-Management of Chronic Illness. J Adv Nurs, 72,(7), 1469-1489.

Harmaini F. (2006). Reliability Test and European Quality Form Validity of Life – 5 Dimensions (EQ5D) for Measuring Related Quality of Life Health in Old Age at RSUPNCM. The University of Indonesia. Thesis.

International Diabetes Federation. (2017). Global Perspectives on Diabetes. Diabetes Voice, 64(4), 1–32. www.idf.org

Kusumadewi MD.The role of daily stressors, optimism and self-regulation to quality of life individual with diabetes mellitus type2. Psychoislamika-J Psychol and Psycho Islam. 2011;8:43–61.

IDF. (2019). International Diabetes Federation. In The Lancet (Vol. 266, Issue 6881). https://doi.org/10.1016/S0140-6736(55)92135-8

Republic of Indonesia Ministry of Health. (2018). Health Profile Indonesia 2016. In Health Profile Bali province. http://www.depkes.go.id/resources/do wnload/pusdatin/profil-kesehatanindonesia/Profil- Health-Indonesia-2016.pdf

Perdana, AA, Ichsan, B., & Rosyidah, D. U. (2013).Level Relations Knowledge about DM's disease By Controlling Glucose Levels Blood in Type Ii Dm Patients at Rsu Pku MuhammadiyahSurakarta. Biomedicine,5(2),17–21. https://doi.org/10.23917/biomedika.v5 i2.265.

Indonesian Endocrinology Society (Perkeni).2011. Type 2 Diabetes Mellitus: Consensus Management and Prevention in Indonesia.General Manager of the Association for Indonesian Endocrinology (Pb PERKENI)

Pamungkas, RA, Chinnawong, T., & Kritpracha, C. (2015). The effect of Dietary and Exercise Self-Management Support Program on Dietary Behavior Exercise Behavior and Clinical Outcomes in Muslims Patients with Poorly Controlled Type 2 DM in Community Settings in Indonesia. Nurse Media Journal of Nursing, 5(1), 1.

Padila, P., Ngo, T., Setyawati, A., D., & Andri, J. (2020). The relationship between diabetes mellitus in the elderly and obesity. Journal of Nursing and Health, 1(1), 26–31, JOSING.Josing, v1.1i1.149, https://doi.org/10.31539

Barth T, Samdal GB, Eide GE, and others. Technique for altering behavior that works for healthy eating and physical activity in overweight and obese individuals; includes meta-regression analysis and a systematic review. 2017; 4:42–6; Int J Behav Nutr Phys ActWHO. (2021). Diabetes mellitus.https://www.who.int/newsroom/factsheets/details/diabetes

Yu, et al. Web-based intervention for support patient self-management with type 2 diabetes mellitus: effect on self-efficacy, self-care, and diabetic pressure. BMC Med Inform Decis Mak. 2014;14:117

Wallston K, Rothman R, Cherrington A. Traits psychometrics of the self-management scaleperceived diabetes (PDSMS). J Behav Med. 2007;30:395–401

Quah JH, Luo N, Ng WY, How CH, Tay EG. Associated quality of life with health is associated with diabetes complications, but no with short-term diabetes control in primary care. Ann Acad Medi Singapore. 2011;40(6):276–86

Zheng, Y., Ley, SH, & Hu, FB (2018). Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. Nature Reviews Endocrinology, 14(2), 88–98. https://doi.org/10.1038/nrendo.2017.1 51