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**INSULIN USE COMPLIANCE IN TYPE 2 DIABETES MELLITUS PATIENTS:
SYSTEMATIC REVIEW**

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ABSTRACT

Objective: identify adherence to insulin use in Patients with Type 2 Diabetes Mellitus. Design: Systematic Review. Methods: Search for quantitative studies published in 2020-2022. Results: There are five studies included in this systematic review. Quantitative Studies show insulin use adherence in type 2 DM patients is indispensable for achieving the success of bored factor therapy being the most dominant cause as respondents' inability to undergo adherence to using insulin. There is a meaningful relationship between compliance and regulation of blood sugar levels which means that patients with high adherence will be related to the controlled blood sugar levels of patients with type 2 diabetes mellitus. Conclusion: Adherence of type 2 DM patients in insulin therapy can control glycemic levels.

Keyword: Diabetes Mellitus Type 2, Blood Glucose, Hypoglycemic Agents, Insulin

INTRODUCTION

Diabetes is a condition of increasing sugar levels in the blood due to the body not being able to produce enough insulin hormone or use insulin effectively (Hafan Sutawardana et al., 2020). Diabetes Mellitus (DM) is a chronic and metabolic disease characterized by an increase in blood glucose levels that results in serious damage to the heart, blood vessels, eyes, kidneys, and nerves that increase over time. The most common is type 2 diabetes, usually experienced by adults when the body becomes resistant to insulin or does not make enough insulin in the body (WHO, 2022). Diabetes Mellitus is a chronically occurring and progressive clinical syndrome characterized by polyuri, polydipsy, and polyphagy accompanied by an increase in blood glucose or hyperglycemia (PERKENI., 2021).

Riskesdas data shows that Diabetes Mellitus type 2 in Indonesia was 4% from 2013 as much as 6.9% until 2018 as much as 10.9% (Basic Health Research (Riskesdas)., 2018). Diabetes Mellitus type 2 is a chronic multisystem disease, non-communicable but has reached epidemic proportions due to chronic exposure to hyperglycemia affecting the body's microvascular causing diabetic nephropathy, retinopathy, and neuropathy with a high impact on quality of life and life expectancy (Faselis et al., 2019). Type 2 DM also has macrovascular complications, namely coroner's heart disease, cardiomyopathy, arrhythmias, and sudden death, cerebrovascular disease and peripheral artery disease. Many clinical studies show other risk factors such as hypertension, obesity and dyslipidemia (Viigimaa et al., 2019). The management of type 2 DM which has an HbA1C test result of more than 9% is by insulin administration (PERKENI, 2021). One of the indicator parameters for the success of DM control is that the level of glycosylated hemoglobin (HbA1c) can be used as an indicator of blood control assessment in diabetic patients in the last 2-3 months (Krismayenti et al., 2022). Complications that occur in DM patients can be prevented by optimal glycemia

control, namely controlled blood glucose and HbA1c concentrations. Regularity of taking medications in DM patients is very important in preventing complications (Kandou et al., 2019). Adherence to treatment is a challenge in DM patients because DM is a chronic disease that is associated with a risk of comorbidity and requires lifestyle changes, especially after the start of insulin therapy (Hafan Sutawardana et al., 2020).

Insulin administration in type 2 DM patients can cause side effects such as hypoglycemia, obesity, lipodystrophy, osteoporosis, and allergic reactions to insulin, but this is rare. The insulin used to achieve the prandial blood glucose target is fast-acting insulin injected 5-10 minutes before meals or short-acting insulin injected 30 minutes before meals. Basal insulin administration can also be combined with oral antihyperglycemic drugs to lower prandial blood glucose such as short-acting insulin secretion-enhancing drugs (glinid group) or inhibitors of carbohydrate absorption from the intestinal lumen (acarbose) or metformin (biguanid group). In single or combination insulin therapy adjusted to the needs of the patient and individual responses assessed from the results of the examination of daily blood glucose levels (Zaim et al., 2021).

In clients, there is often a problem of non-compliance in carrying out the 5 pillars of diabetes mellitus management including education, physical exercise DM diet program that is in accordance with 3J, pharmacological therapy and sugar control (Chrisnawati, 2020). Adherence in taking the drug in people with diabetes mellitus is one of the successes of therapy by looking at the fact that 50% of patients with DM are compliant in treatment therapy. The factor that causes this to happen is discomfort in using the drug so that the patient stops and the condition is better than before (Zairina et al., 2022). The results of a study conducted on 1698 DM patients in 10 cities in Brazil obtained the results of 166 patients (9.8%) with high insulin therapy adherence, 717 patients (42.2%) with moderate insulin therapy adherence, 815 patients (48.0%) with high insulin therapy adherence (Hafan Sutawardana et al., 2020.).

Research (Rukminingsih et al., 2021) mentioned the error of administering insulin doses, where more than 52% of the reported events had or received the wrong dose and type of insulin so that it could cause hyperglycemia. So based on a systematic review of insulin use compliance in diabetes mellitus patients, it is found that it is not in accordance with the recommendations of diabetes mellitus treatment therapy, it is hoped that this systematic review can be used as an evidence-based intervention so that it can contribute to clinical nursing practice. The systematic purpose of this review was to evaluate adherence to insulin use in dm type 2 patients in controlling blood glucose levels.

METHODS

1. Study Protocol

Systematic reviews were conducted by looking for studies published between 2020 and 2022. This systematic review includes research articles, *Journal Galenika Journal of Pharmacy*, *Journal of Nursing Care & Biomolecular*, *Journal of Silampari Nursing*, *Journal of Health Research and Syntax Literate: An Indonesian scientific journal*.

2. Inclusion and Exclusion Criteria

Inclusion and exclusion criteria using the questionnaire format Morisky Medication Adherence Scale (MMAS-8) Defilia Anogra Riani., et al. 2017 which is often used to measure the level of patient compliance. The inclusion criteria for study respondents were diagnosed with type 2 DM, patients who used insulin, were ≥ 30 years old, could communicate well, and were willing to become research respondents. The exclusion criteria

in this study were type 2 DM patients using oral tablets, had physical disorders, physical limitations, and mental disorders.

Table 1. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Population	People with Type 2 DM > 30 years and use insulin	Non DM Tipe 2
Interventions/Phenomena of interest	Insulin Compliance	Oral methods of therapy
Checklists	Standard practices, alternative interventions and no comparisons	No restrictions
Result	Results for insulin use compliance	No restrictions
Study Designs and Types of Publications	Published with quantitative, descriptive-correlational studies with a cross-sectional approach	Qualitative studies, case studies and a single expert opinion
Year of Publication	2020-2022	Not from 2020-2022
Language	Indonesian	Not in English

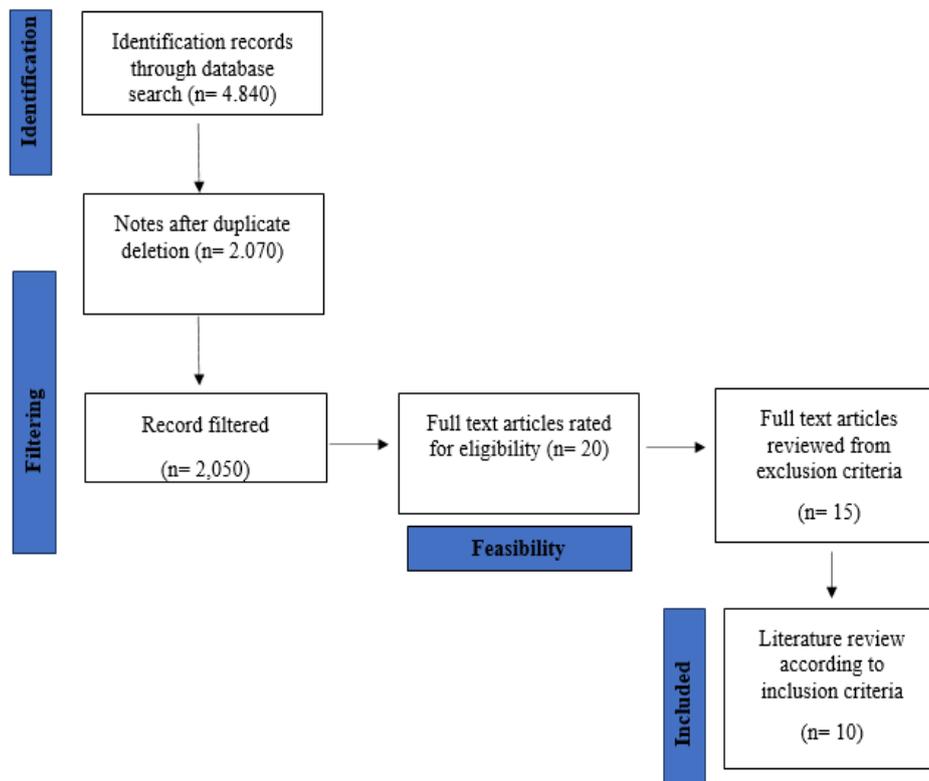
3. Search Strategy

In the first stage, an electronic bibliographic database (google scholar and science direct) is used to determine the right keywords between the title and the abstract to identify relevant articles in this database. In phase 2, a specific search for each database is performed using these keywords to identify relevant articles among the databases. In the last phase, full-text filtering for literature is carried out through a manual search of all reference lists of studies in order to identify additional relevant articles. We are looking for articles published between 2020 and 2022.

4. Study Screening and Selection

Using a literature search, 4840 studies were initially identified. After duplicates were removed, 2070 studies were screened. Researchers independently screened all identified research titles and abstracts for review, and 2050 studies were issued based on exclusion criteria and established from the journal, 20 underwent a full text review and 15 were issued. The reviewer described the results of the screening and selection process and reached a consensus on the feasibility of the study resulting in the remaining 10 studies meeting the inclusion criteria.

Figure 1. Shows prisma flowchart that represents the process of searching for study selection.



RESULTS

1. Yield Size

Except for three systematic reviews, seven studies measured insulin adherence outcomes in people with Type 2 DM with insulin effectiveness against blood sugar control. Two studies used the guttman scale, one study used observational descriptive using retrospective data, one case study while three studies used the likert scale, the seven studies measured adherence and effectiveness and knowledge of insulin use in Type 2 DM patients.

2. Characteristics of the Included Studies

Studies classified characteristics of the intervention: insulin adherence (type, dose, time).

3. Types of Insulin

One study compared the effects of human and analog insulin administration, statistically there was no meaningful difference between the average difference in early and late HbA1c in patients who received human insulin and analog insulin ($P=0.785$). One study said as much as 68.42% were appropriate in the use of insulin type. The selection of the type of insulin is declared appropriate if it meets the requirements / retriCTION of the national formulary, namely if the GDPP ≥ 200 mg / dL is given rapid acting insulin. When GDP ≥ 126 mg/dL is given long acting insulin. Meanwhile, if gdp ≥ 126 mg / dL and GDPP ≥ 200 mg / dL, then a combination insulin (mix insulin) is given (Kemenkes RI, 2018). The combination of rapid acting with long acting and intermediate acting. The combination of insulin can provide a better decrease in blood glucose levels because it can meet the needs of basal insulin and prendial insulin, control blood glucose fluctuations, the incidence of hypoglycemia and increase body weight more controlled (Rukminingsih et al., 2021).

The advantage of insulin analogues for people with type 2 diabetes is that it reduces the risk of hypoglycemia and gives them more flexibility when taking it, however, in cost comparison, human insulin is more economical than insulin analog. In the study (Jamaluddin et al., 2022) said on insulin drugs Most were ineffective as many as 14 people (77.8%), in combination drugs Most were ineffective as many as 9 people (52.9%). Comparison of the effectiveness of the drug in outpatients with dm type 2 at Al-Ihsan Hospital, based on the results of testing with independent t-tests obtained results, there was no difference because $p=0.21 > 0.05$. For diabetes mellitus therapy, data were obtained that respondents received the most mixed insulin therapy (novorapid flexpen® and Levemir flexpen®). The large use of mixed insulin can occur due to time efficiency factors, where mixed insulin has a combination of fast-acting insulin and intermediate work duration can provide basal and prendial insulin (mealtime) in one injection. Time efficiency factor can increase the effectiveness of Type 2 DM treatment (Vonna & Marlinda, 2020). (Hardianto et al., 2021) said based on the length of action insulin can be divided into 5, namely: (1) Insulin analogues that work fast (give an effect starting from 4-20 minutes and peaks between 20-30 minutes) such as Aspart (Novorapid TM, FiaspTM), Lispro (HumalogTM, LiprologTM, AdmelogTM), and Glulisine (ApidraTM), (2) Human insulin that works in a short period of time (effects ranging from 30 minutes and peaks of 2-4 hours) such as insulin (ActrapidTM, Humalin STM, and Insuman RapidTM), (3) Human insulin that works in the medium term with the addition of NPH (peak onset between 4-6 hours and effect 14-16 hours) such as Insulin Isophan (InsulatardTM, BasalTM Insuman, NovolinNTM, and Humulin NTM), (4) Insulin analogues that work in the long term (effect 24-36 hours) such as Glargine (LantusTM, AbasaglarTM) and Detemir (LevemirTM), as well as (5) Insulin analogues that work in a very long period of time (effect 30-90 minutes and lasts up to 42 hours) like Degludec (Tresiba TM).

a. Insulin Dosage

One study (Zaim et al., 2021) intervened algorithm insulin analog, can be used for insulin dosing based on monitoring of increased blood glucose levels in people with type 2 diabetes mellitus. Providing comprehensive education about monitoring blood glucose levels, diet and prevention for the occurrence of hypoglycemia in administering insulin. Research (Hafan Sutawardana et al., 2020) said that the dose in insulin administration is often not appropriate, namely the basis for the non-compliance of DM patients to inject insulin, namely forgetting the time of insulin, skipping the dose of insulin and not injecting insulin When it is felt that their body is in good condition. In the study (Jamaluddin et al., 2022a) said that the dosage, frequency, and accuracy of drug use are a limitation of the study. Meanwhile, research (Vonna et al., 2021) said that there were 87 patients with Type 2 DM who injected insulin according to the recommended dosage. (Intan, N., Dahlia, D., & Kurnia, D. et al., 2022) said insulin is available in three forms, namely short acting, intermediate acting, or long acting, generally NIDDM patients need at least a dose 2 times a day, usually given before breakfast or before dinner. On another schedule, insulin is given three injections a day, short and intermediate acting at bedtime. Blood sugar monitoring requires the full responsibility of the patient or his family, to monitor the proper blood sugar of insulin administration. The use of insulin therapy is the greatest risk for the occurrence of hypoglycemia if it is not accompanied by proper diet management.

b. Insulin Administration Time

One study (Hafan Sutawardana et al., 2020) said the main cause of low adherence to insulin therapy by patients was due to forgetting. Patients often forget to inject insulin at a predetermined time so that it can affect the effectiveness of insulin use in controlling blood glucose levels. In the study conducted (Vonna et al., 2021) the lowest level of knowledge

related to how to store insulin pen needles (21,6%) and the highest related to the timing of insulin injections carried out before (97,7%).

No	Title	Author	Journal Name	Design	Participants	Intervention	Size of Results	Key Findings
1	Analysis Effectiveness Insulin Analog and Human that Used in Sufferers Diabetes Mellitus Type 2 at a Cost BPJS in RS Islam Sukapura	Zaim, M., Purwastyasti, P., & Nafrialdi, N. (2021).	Muhammadiyah Journal of Geriatric	Research Observational in a Retrospective with Test statistics that used i.e differential test mann-whitney and chi test-square	Diabetic patients mellitus yang get human insulin and insulin analogues in RS. Islam Sukapura	Education a thorough about monitoring blood glucose levels, diet, and prevention for the occurrence of hypoglycemia in give insulin.	None the differences that meaningful statistics or effectiveness clinic human insulin Than insulin analog	Insulin is a type-2 diabetes mellitus drug mainly used in patients who are already unresponsive to oral medications . Known 2 groups of insulin are insulin analog and human insulin. The incidence of hypoglycemia is smaller in Diabetes mellitus patients who are given insulin analog and human insulin

2	Hubungan Self Compassion dengan kepatuhan Terapi Insulin pada pasien Diabetes Mellitus Type 2 di RSUD Dr. Soebandi Jember	Hafan Sutawardana, J., Nursyafiqoh Putri, W., Widayati, N. (2020).	Journall of Nursing Care & Biomolecular	This study used a descriptive research design-correlational with a cross-sectional approach. A total of 84 respondents were obtained using consecutive sampling. Data collection was carried out using the Self Compassion Scale (SCS) and Morisky Medication Adherence Scale (MMAS-8) questionnaires. Data analysis used the Spearman correlation test with a significance level of 0.05.	Diabetic Patients Mellitus Type 2 At Dr. Hospital Soebandi Jember	Reviewing holistic regarding psychological aspects patients who Related selfcompassion so that it can giving upbringing nursing optimal, so that may improve adherence therapy insulin dm patients type 2.	Research results show that there is the relationship between selfcompassion with adherence therapy insulin on type 2 DM patients at RSD dr. Soebandi Jember.	selfcompassion and insulin therapy adherence shows that selfcompassion has a role in compliance with insulin therapy in type 2 DM patients. In this case individuals who have selfcompassion the high will comply with the treatment that is being carried out, namely adherence to the insulin therapy that is being undergone.
3	Insulin Use in Dm Type 2 patients JKN participant s in Outpatient Pharmacy Installations	Rukminingsih, F., Catur, V. (2021)	Scientific Journal of Ibn Sina	This study is an observational descriptive study using retrospective sampling data using purposive sampling techniques	JKN Participant Patients with type 2 DM at the Outpatient Pharmacy Installation of St. Elisabeth Hospital Semarang who only received insulin therapy in January 2020, aged 26-65 years, and had the results of the GDP, GDPP and HbA1C	Adjusting the insulin dose is calculated based on the total daily insulin requirement (IHT) which is 0.2-0.5 units for each kilogram of body weight. The total prenodial insulin requirement (IPT) is 60% of IHT. Meanwhile, the need for total basal insulin (IBT) is 40% of IHT.	The suitability of insulin use in dm type 2 patients JKN participants at St. Elisabeth Hospital Semarang based on insulin type was 68.42% and most patients (80.70%) got an inappropriate insulin dose	Diabetes Mellitus (DM) type 2 is a chronic and progressive clinical syndrome characterized by polyuri, polydipsy and polyphagy accompanied by increased blood glucose or hyperglycemia. Management of dm

					examinations (examination results of the last 6 months).			type 2 in patients with HbA1C value >9% is by administration of insulin or combination of insulin with drugs
4	Adherence to Treatment of Type 2 Diabetes Mellitus Patients at Puskesmas East Jakarta	Saibi, Y., Romadhon, R., & Nasir, N. M. (2020).	Galenika Journal of Pharmacy	This study was designed with a cross-sectional design which was carried out from April 2019 to June 2019 with a total of 175 respondents of type 2 diabetes mellitus. Data collection was carried out by structured interview techniques using the MMAS-8 compliance questionnaire. The data was processed using statistical software and analyzed using frequency distribution analysis and chi square test.	Type 2 Diabetes Mellitus Patients at Puskesmas East Jakarta	To improve the patient's ability to follow the rules of treatment, it is necessary to make various efforts on the patient. Among the efforts that can be made to achieve this goal include: contacting patients or visiting homes as a form of follow-up after the administration of drugs to them by pharmacists; providing education to patients related to how to use drugs correctly and also education related to the disease they are suffering from.	The most common level of compliance with type 2 DM patients in the Puskesmas, Makassar District, East Jakarta, is compliance with the moderate category. The boredom factor is the most dominant cause as the responder's non-compliance. There is a meaningful relationship between adherence and blood sugar control which means that patients with high adherence will be associated with controlling their blood sugar levels.	The level of adherence to taking non-compliant category drugs can increase blood sugar levels to be uncontrolled in patients, while those who have high compliance will be able to keep blood sugar levels in the body controlled so that the patient's quality of life is maintained properly. Adherence is not the only determinant of therapeutic success. There are other factors that determine, including the accuracy of drug selection (rationality of drugs) and non-

								pharmacological therapies that must be adhered to by patients such as physical activity and diet.
5	Diabetes Mellitus Treatment: General Objectives and Management of Clinical Practice	Simó,R.(2022)	Review Article	Review Article	Type 2 Diabetes Mellitus Patients	Combined treatment with oral antidiabetics Regulates the type of insulin and the path of its administration Treatment of DM in special situations	Concept of Type 2 DM and clinical practice management	Diabetes Mellitus is associated with a marked increase in the incidence of cardiovascular. The strategy of treatment of diabetes should be based on its pathophysiological knowledge. Thus, insulin is essential for the treatment of type 1 diabetes because there are defects in insulin secretion. However, the treatment of type 2 diabetes patients is more complex because there are defects in insulin secretion and insulin action. Therefore, the selection of

								treatment will depend on the stage of the disease and the individual characteristics of the patient
6	Overview of Insulin and Metformin Use in Gestational Diabetes-Literature Review	Kara & Agargin, 2021	Syntax Literate: Jurnal Ilmiah Indonesia	The method used is literature review using primary data in the form of scientific articles or journals, searches are carried out through the Google Scholar, Elsevier, or PubMed databases with a period of publication years of the last 5 years.	People with Gestational Diabetes Mellitus	Metformin can control blood sugar levels without weight gain. Risks such as macrosomia and neonatal hypoglycemics in metformin use also occur less so that metformin is more widely used in the management of DMG therapy	The results of the review of the use of insulin and metformin showed no difference in effectiveness between insulin or metformin therapy in lowering the blood sugar levels of DMG patients. Metformin can control blood sugar levels without weight gain. Risks such as macrosomia and neonatal hypoglycemics in metformin use also occur less so that metformin is more widely used in the management of DMG therapy	Gestational Diabetes Mellitus (DMG) is a glucose intolerance disorder during pregnancy. Pharmacological therapies that are generally given are insulin and oral hypoglycemic drugs such as metformin. Metformin is often used on the treatment of DMG today. Metformin can cross the placenta barrier, but no evidence has been found of disability in the fetus or complications in infants.
7	Comparison of Insulin Effectiveness, Oral Antidiabetic Drugs and Combinations to Blood	Jamaluddin & Nalapraya, 2022	Bandung Conference Series: Medical Science	The research method used is observational analysis with a cross-sectional approach. Bivariate analysis using the	Type 2 DM Patients	Continue the treatment recommended by the doctor to avoid complications, control blood sugar levels by living a healthy life.	In this study, there was no difference in the effectiveness of the use of insulin, oral antidiabetic drugs and a combination of the two in	Diabetes mellitus (DM) is one of the non-communicable diseases and there is an increase every year. There are

	Sugar Levels in Outpatients with DM Type 2 Al-Ihsan Hospital			one way anova test. In the subject were as many as 97 patients. The data results obtained the use of OAD 63.9%, insulin 18.6% and a combination of 17.5%. The effectiveness of OAD 54.8% insulin 22.2% and combination 47.1%			dm type 2 patients at Al-Ihsan Hospital Bandung	two types of DM treatment, namely insulin therapy and oral antidiabetic drugs (OAD).
8	Evaluation of Knowledge and Skills of Diabetic patients	Vonna & Marlinda, 2020	SEL Journal of Health Research	This research is observational with cross-sectional methods. The study was conducted through interviews and observations in type 2 DM patients who received insulin pen therapy. The number of samples that met the inclusion criteria was 88 samples.	Patients with Diabetes Mellitus type 2 in insulin use	Edukasi penggunaan insulin	Berdasarkan hasil penelitian yang dilakukan, maka dapat disimpulkan bahwa responder umumnya memiliki tingkat pengetahuan yang baik namun sebagian besar responder masih salah dalam menginjeksi insulin pen (97,7%)	Diabetes mellitus (DM) is a disease with a high prevalence rate in Indonesia with the number of people with DM in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. Insulin is one of the most widely used treatments in Type 2 DM patients, therefore the correct use of insulin pen is very important to achieve blood glucose control

							targets, the knowledge and skills of type 2 DM patients are carried out to evaluate the success of treatment of type 2 DM patients in insulin use.	
9	Nursing Care of acute phase Type 2 Diabetes Mellitus patients with Roy's Adaptation model approach: A Case Study	Astuti, 2022	Silampari Journal of Nursing	This type of research is a case study	Diabetes Mellitus Type 2, Acute Phase	The importance of complying with therapeutic management, diet, adherence to control, and understanding in recognizing the initial symptoms of disease recurrence, as well as understanding when the patient should immediately come to the Health Service Collaboration of insulin administration , on the second day of treatment. Hypoglycemia management and hyperglycemia management	The implementation of blood sugar management nursing interventions which includes maintaining blood sugar within the normal range by providing dietary education and understanding and compliance with therapeutic management . Diabetes mellitus can be prevented by controlling blood sugar levels and carrying out a balanced and healthy lifestyle, starting from food to exercise, monitoring the effects of therapy, such as hypoglycemia after insulin	This study describes nursing care in diabetes mellitus patients in the acute phase, using the application of the roy application theory model

							correction, monitoring blood sugar values, HbA1C, monitoring signs of hypoglycemia and hyperglycemia, monitoring ECG changes, and monitoring signs of metabolic emergencies.	
10	Insulin: Production, Types, Analysis, and Routes of Administration	Hardianto, 2021	Indonesian Journal of Biotechnology & Biosciences	This study aims to explain the production, types, analysis, and routes of insulin administration	Aimed at people with Diabetes Mellitus	Produces large amounts of insulin and low production costs	Produces large amounts of insulin and low production costs and explanations regarding the different types of insulin and the routes of insulin administration	Human insulin and analog insulin are generally given by subcutaneous injection, subcutaneous injection using an insulin pen is more widely used compared to conventional injection, in addition to being more convenient, the dosage is more accurate, the pain is less due to the needles used are smaller, also easy to use, and resistant to storage at room temperature. In addition to being administered

subcutaneous, insulin can be administered through the nasal (nasal), oral, and transdermal. The selection of an appropriate insulin delivery route and monitoring blood sugar levels will lower the risk of hypoglycemia, improve compliance, comfort and lower the risk of DM complications.

DISCUSSION

Adherence to Insulin Use in Blood Sugar Level Control in Type 2 DM Patients Research conducted by (Rukminingsih et al., 2021) said that a high level of adherence to treatment will be related to whether or not the patient's blood sugar levels are controlled. The results of this study are also in line with research conducted at the Dinoyo Malang Health Center which shows that there is a meaningful relationship between blood sugar levels and compliance levels. Based on the results of the study, it can be understood that the level of adherence to the use of insulin in the less compliant category can increase blood sugar levels to be uncontrolled in patients, while those who have high strength will be able to keep blood sugar levels in the body controlled so that the patient's quality of life is maintained properly.

Adherence is not the only determinant of therapeutic success. DM patients who have controlled blood glucose must continue to undergo. This is because the blood glucose levels that have been controlled are the result of the work of drugs taken by patients, it is possible that if the drug is stopped, blood glucose levels can rise again. In addition, continuing the treatment recommended by the doctor has the use of avoiding the occurrence of DM-related complications. Poor glycemic control usually occurs in patients who do not follow a diet regimen, do not exercise, do not comply with the treatment given, and do not monitor blood glucose levels regularly. Diabetes becomes worse glycemic control among patients who increase the duration of the disease, low knowledge, increased body mass index, hypercholesterol, hypertriglycerides, and increased LDL (Jamaluddin et al., 2022).

In addition to adherence, skills in the use of insulin also provide success in therapy in people with Type 2 DM. In the study (Vonna et al., 2021) the results of the evaluation of the skills of dm type 2 patients in the use of insulin pen at ZA Hospital showed that most respondents were still wrong in injecting insulin pen (97.7%). The skill most ignored by respondents was in terms of hygiene (aseptic technique). Good skills in using insulin injections are important to control the patient's normal blood glucose and avoid the incidence of hypoglycemia due to incorrect insulin use.

LIMITATIONS

The systematics of this review has limitations. First, it does not assess the risk of whistleblower bias and cannot contact the authors of the included studies about the "unclear" criteria in the journal or related research. Therefore, it is impossible to consider whether the authors report all the results of the study or related methods of intervention. Second, searches in this review could not search by assigning keywords to DM type 2 patients with insulin use compliance.

CONCLUSION

The systematics of this review evaluates insulin use compliance in patients Type 2 Diabetes Mellitus is evidence-based for controlling blood sugar levels. As a result, found the following:

1. Adherence to the use of insulin is effective in controlling blood sugar levels.
2. Insulin therapy is complicated and individualized, a large part of the patient still has not reached the target and there is a potential for drug-related problems in this group of patients. So it is necessary concerns from a solid interprofessional Health Cooperation.

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