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Knowledge of Diabetes Mellitus Patients in Insulin Injection

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ABSTRACT

Diabetes Mellitus patients' awareness of the implementation and compliance with insulin therapy was influenced by several factors that affected treatment success and the risk of complications due to insulin injections. This study aims to determine the level of knowledge regarding insulin injections at Srengat Regional Hospital. The research employed an analytical method with a descriptive approach. The study population consisted of 30 patients with Diabetes Mellitus undergoing insulin injection therapy. The sampling technique used was accidental sampling, resulting in a sample size of 23 patients. The results showed that more than half of the respondents had a good level of knowledge about insulin injections, with 15 respondents (65%) falling into this category. Meanwhile, five respondents (22%) had a moderate level of knowledge, and three respondents (13%) had a low level of knowledge. The level of knowledge significantly influenced patient behavior. Good knowledge of insulin injections was associated with a higher success rate in diabetes mellitus therapy, as it contributed to proper injection practices. This study highlighted the importance of patient and family involvement in the treatment of Diabetes Mellitus, particularly in ensuring correct insulin injection practices.

Keywords: Diabetes Mellitus, Insulin Injection, Knowledge Level

Background

Diabetes mellitus is a chronic metabolic disorder that originates from the Greek word diabetes, meaning "to pass through," which reflects the symptom of excessive urination often experienced by individuals with this condition. The term mellitus, derived from Latin, means "sweet," referring to the presence of glucose in the urine. Together, the term diabetes mellitus describes a disease marked by high levels of blood glucose (hyperglycemia) due to the pancreas' inability to produce sufficient insulin or the body's failure to use insulin effectively. Insulin is a hormone essential for regulating blood sugar levels, and without it, glucose cannot be adequately absorbed into cells, leading to its accumulation in the bloodstream (1).

The prevalence of diabetes mellitus is rising rapidly worldwide. According to the International Diabetes Federation (IDF), the number of people living with diabetes was 463 million in 2019, increasing to 537 million in 2021. It is projected that this number will climb to 643 million by 2030 and reach 783 million by 2045 (2–4). These figures highlight diabetes as a growing global health concern that demands urgent attention, both in terms of prevention and management. In Indonesia, diabetes has become increasingly prevalent. Based on the 2018 Basic Health Research (RISKESDAS), 2% of Indonesians aged 15 and older had been diagnosed with diabetes by a physician, an increase from 1.5% in 2013. The prevalence varies

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regionally, with Jakarta showing the highest rate (3.4%) and East Nusa Tenggara the lowest (0.9%). In East Java, the prevalence stands at 2.6% among those aged 15 and above, with healthcare services having documented approximately 867,257 diabetic cases, which is 93.3% of the estimated total (5,6). In Blitar Regency alone, 24,196 people have been diagnosed with diabetes mellitus, accounting for 51.7% of estimated cases.

At RSUD Srengat Hospital in Blitar, diabetes management has been a significant focus. In 2023, out of 6,040 diabetic patients treated at the hospital, about 4,972 (roughly 80%) were undergoing insulin injection therapy. To enhance patient autonomy, the hospital implemented a self-injection insulin training program. Initially, insulin administration was carried out by nurses, followed by structured training sessions where patients learned how to inject insulin under nurse supervision. Around 1,513 patients have participated in this program. However, between January and August 2024, approximately 20-30% of these patients were readmitted to the hospital with complications such as hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar), indicating issues with adherence or improper insulin use.

Insulin is a commonly used and effective treatment for managing Diabetes Mellitus (DM) in outpatient settings to optimize therapeutic outcomes. Nevertheless, adherence to insulin therapy remains relatively low (7). Patient knowledge plays a crucial role in managing diabetes and ensuring effective insulin therapy. The success of insulin treatment heavily depends on the patient's understanding of the therapy, including correct injection techniques, medication timing, potential side effects, and lifestyle adjustments (8). Patient understanding of insulin therapy plays a vital role in the effective management of type 2 diabetes mellitus (9). However, insufficient knowledge about insulin administration can lead to dosing errors, incorrect injection timing, and an increased risk of hypoglycemia (10). Despite this, various studies have indicated that a higher level of knowledge does not always equate to better adherence to insulin therapy (11). Without this understanding, patients are at greater risk of poor glycemic control, leading to serious health issues.

Moreover, improper insulin injection techniques can result in complications beyond blood sugar imbalances. A study in Bangladesh found that incorrect injection methods caused bruising and bleeding (84.4%), pain (55%), infections, lipo hypertrophy (9.2%), persistent swelling, and insulin leakage (38.8%). These physical side effects not only cause discomfort but may also discourage patients from continuing treatment, further worsening their condition (12).

Diabetes mellitus is a significant health issue with growing prevalence both globally and in Indonesia. While hospitals like RSUD Srengat have made strides in improving patient education and promoting self-management through insulin therapy training, challenges remain. Many patients still struggle with technique, adherence, and understanding, resulting in preventable complications. Addressing these gaps through enhanced education, continuous support, and patient-centered care strategies is essential to improve health outcomes and quality of life for people living with diabetes. Based on the background above, the researcher aims to determine knowledge regarding insulin injections at Srengat Regional Hospital.

Methods

The research design in this study is an analytic descriptive approach. The population in this study consists of all diabetes mellitus patients receiving insulin injections, with an average of 30 patients per day in July 2024, who were being treated at the Internal Medicine Clinic of Srengat Regional General Hospital. The sample was selected using an accidental sampling technique in September 2024, totaling 23 individuals. The variable in this study is knowledge about insulin administration, which includes the definition of insulin, the purpose of administration, side effects, types of insulin, and insulin injection techniques. Data collection

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was carried out using questionnaires. The data were analyzed with univariate. This analysis provides the distribution and percentage of each studied variable and is used to process the data descriptively. In this study, the researcher will describe the level of knowledge of diabetes mellitus patients regarding insulin injection. This research has passed the ethical test at KEPK STIKES Patria Husada Blitar with Number: 06/PHB/KEPK/246/09.24.

Results

Table 1. Characteristics of Respondents

Characteristics of Respondents	Frequency	Percentage (%)
Gender		
Male	10	43
Female	13	57
School level		
Elementary school	0	0
Junior high school	5	22
Senior high school	8	35
Higher education	10	43
Age		
17-25 th	0	0
26-35 th	5	22
36-45 th	8	35
>46 th	10	43
Working as		
Civil Servant	5	22
Private Sector	4	17
Farmer	6	26
Housewife	8	35
Duration Diabetes Mellitus		
< 1 year	1	4
1-5 years	17	74
>5 years	5	22
Duration of Insulin Injections		
<1 year	1	4
1-5 years	19	83
>5 years	3	13
Diabetes Mellitus Complications		
Present	20	87
Not present	3	13
Information About Insulin Injection		
Yes	18	78
No	5	22
Family History of Diabetes Mellitus		
Yes	17	74
No	6	26

Based on Table 1, the data showed that nearly half of the respondents were over 46 years old, totaling 10 respondents (43%), nearly half of respondents were aged 36–45 years (35%), more

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than half of the respondents were female, totaling 13 respondents (57%), nearly half of the respondents had a higher education background, totaling 10 respondents (43%), nearly half of the respondents worked as housewives (35%), more than half of the respondents had been living with diabetes mellitus for more than 1 year (74%), the majority of respondents had been injecting insulin for more than 1 year (83%), the majority of respondents had complications related to diabetes mellitus (87%), the majority of respondents had received information about insulin injection (78%), and more than half of the respondents had a family history of diabetes mellitus (74%).

Table.2 Respondents' Knowledge Level About Insulin Injection

Level of Knowledge	Frequency	Percentage (%)
Poor Knowledge	3	13
Moderate knowledge	5	22
Good knowldge	15	65

Table 2 showed that more than half of the respondents (65%) demonstrated a good level of knowledge about insulin injections.

Discussion

The research results showed that more than half of the respondents had a good level of knowledge about insulin injection, totaling 15 respondents (65%). Respondents with a moderate level of knowledge totaled 5 (22%), and those with a low level of knowledge totaled 3 (13%).

The study also found that out of the 15 respondents with good knowledge about insulin injection, eight were male. In this case, males tend to think more rationally. As stated in the study, men tend to use rational thinking rather than emotion when solving problems. Achieving good understanding and awareness is partly influenced by gender, which determines lifestyle and habits. Jans stated that from the beginning, there are differences between the two genders that could be considered a form of conditioning matrix, which may be regarded as a biological basis allowing the two sexes to develop different behaviors. From a biological standpoint, it is acceptable that there are dispositional differences that lead to different learned behaviors between men and women, which also affects individual attitudes and behaviors in treating their illness (13).

The study revealed that 10 respondents with good knowledge of insulin injection were over the age of 45. This age group is considered adult, which is regarded as the most mature phase in terms of thought and decision-making. In a study by Kolodziej in 2019, it was stated that increasing age influences knowledge regarding supplement consumption (14). Age affects awareness and health knowledge. Age influences comprehension and thinking patterns; the older someone is, the more developed their cognitive abilities become, leading to increased knowledge. Another study also concluded that age and knowledge level are associated with healthy and clean living behaviors, while education level is not (15). Moreover, age differences affect preferences and tastes for products, making age a personal factor that influences consumer behavior.

The research showed that 10 respondents (43%) had a college education, and in the cross-tabulation, it was found that seven respondents with good knowledge of insulin injection had a college education. Education level determines the extent of a person’s knowledge. Education aims to change behavior and provide skills and knowledge so that individuals can shape their lives and show personality (16). With higher education, a person’s knowledge increases. The higher the education, the broader the perspective and understanding. People with

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higher education levels tend to have better thinking skills due to the wealth of knowledge they acquire. Thus, proper education leads to better knowledge regarding insulin injection (13).

The study also found that 17 respondents (74%) had been diagnosed with diabetes for over a year. In the cross-tabulation, nine respondents with good knowledge had been living with diabetes for over a year. Furthermore, 19 respondents (83%) had been injecting insulin for more than a year, and among them, 11 had a good level of knowledge. The duration of diabetes influences how a person manages treatment. Gaining good knowledge about insulin injection requires time. Therefore, individuals who have lived with diabetes for more than a year are more likely to be informed about insulin injections (14).

The study showed that 18 respondents (78%) had previously received information about insulin injection, and in the cross-tabulation, 11 respondents with good knowledge had received such information. Education level plays a significant role in shaping one's knowledge. Providing education about insulin to users is crucial for people with diabetes. A study by Yunitasari et al. in 2019 showed that education can significantly improve knowledge regarding diabetes management (16). Before receiving information or education, patients' knowledge was only moderate due to a lack of guidance from healthcare professionals prior to insulin therapy. Providing health education by qualified professionals in hospitals—especially before beginning therapy—is crucial to help patients understand their health condition, the benefits, and the importance of treatment. Effective health education, especially by experts, is expected to help patients become more independent in managing their condition, leading to better treatment outcomes (17).

The research also found that 17 respondents (74%) had a family history of diabetes, and among them, 10 had good knowledge of insulin injection. Individuals with a family history of diabetes are more likely to have information regarding diabetes treatment, including insulin injections. This knowledge also improves the accuracy of insulin injection techniques (17).

The study concluded that there is a strong and positive relationship between employment, formal education, and knowledge about insulin use. Employment affects a person's knowledge level, as work is closely related to social and cultural interaction, which in turn facilitates information exchange. Education also plays an important role in increasing knowledge because college graduates tend to have more knowledge and experience, making it easier for them to absorb and understand information about diseases and their treatments, including insulin usage.

The research further indicated that respondents' knowledge about insulin injection was generally good, which is supported by the fact that most respondents were over 45 years old, an age group capable of making sound treatment decisions. Having diabetes for more than a year influenced the reception of information related to diabetes treatment, including insulin injection. Likewise, injecting insulin for more than a year contributed to a higher knowledge level, as these respondents had more experience than those with less than a year. Respondents with a family history of diabetes had better knowledge because they had experience caring for others with the condition.

At the Internal Medicine Clinic of Srengat Regional Hospital, Blitar Regency, insulin administration to diabetes patients is accompanied by direct health education about insulin injection. The methods used include consultations and direct demonstrations of insulin injection before the patient is discharged. This approach is expected to help patients understand the correct insulin injection technique, which increases the success rate of diabetes therapy.

Conclusion and Recommendation

Based on the results of a study conducted on 23 diabetes mellitus (DM) patients at the Internal

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Medicine Clinic of Srengat Regional Hospital (RSUD Srengat) regarding the Description of Knowledge Level in Insulin Injection, more than half of the respondents had a good level of knowledge about insulin injection, with 15 respondents (65%). Meanwhile, five respondents (22%) had a moderate level of knowledge, and three respondents (13%) had a low level of knowledge. Based on the study results, several suggestions are offered: Patients and families should be more attentive to insulin injections. Hospitals are encouraged to improve diabetes care. Future researchers should explore insulin injection practices further. Healthcare professionals can use this study to guide blood glucose monitoring and improve diabetes management.

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References

1. Indriyani NPA. Gambaran Kadar Gula Darah Pada Pasien Diabetes Melitus Di Brus Tabanan Tahun 2021. Politeknik Kesehatan Kemenkes Denpasar; 2021.
2. IFD. IDF DIABETES ATLAS Ninth edition 2019 [Internet]. Ninth. Karuranga S, Malanda B, Saeedi P, Salpea P, editors. Vol. 266, The Lancet. BELGIUM: International Diabetes Federation; 2019. 1–164 p. Available from: https://www.diabetesatlas.org/en/resources/
3. IDF. IDF Diabetes Atlas. 10th editi. Boyko EJ, Magliano DJ, Karuranga S, Piemonte L, Riley P, Saeedi P, et al., editors. Vol. 102, Diabetes Research and Clinical Practice. IDF; 2021. 1–135 p.
4. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract. 2022 Jan;183:109119. https://doi.org/10.1016/j.diabres.2021.109119
5. Riskesdas K. Hasil Utama Riset Kesehata Dasar (RISKESDAS) [Internet]. 2018. Available from: http://arxiv.org/abs/1011.1669%0Ahttp://dx.doi.org/10.1088/1751-8113/44/8/085201%0Ahttp://stacks.iop.org/1751-8121/44/i=8/a=085201?key=crossref.abc74c979a75846b3de48a5587bf708f.
6. Kesehatan Badan Penelitian dan Pengembangan Kesehatan Puslitbang Humaniora dan Manajemen Kesehatan KR. Hasil Utama Riskesdas 2018 Provinsi Jawa Timur. 2018;1–82.
7. Dwiyatna S, Suprapti B, Nilamsari WP, Nugroho CW, Ardiana SM. Analysis of adherence and factors affecting insulin therapy outcomes in outpatients with Diabetes Mellitus. Pharmacia. 2024;71:1–9. https://doi.org/10.3897/pharmacia.71.e117126
8. Netere AK, Ashete E, Gebreyohannes EA, Belachew SA. Evaluations of knowledge, skills and practices of insulin storage and injection handling techniques of diabetic patients in Ethiopian primary hospitals. BMC Public Health. 2020 Oct;20(1):1537. https://doi.org/10.1186/s12889-020-09622-4https://doi.org/10.3897/pharmacia.71.e117126
9. Priscilla S, Malarvizhi S, Das AK, Natarajan V. The level of knowledge and attitude on insulin therapy in patients with diabetes mellitus in a teaching hospital of Southern India. J Fam Med Prim care. 2019 Oct;8(10):3287–91. https://doi.org/10.4103/jfmpc.jfmpc_622_19
10. Alfian R. Kepatuhan Tentang Penggunaan Insulin Pada Pasien Diabetes Mellitus Di Poliklinik Banjarmasin. J Ilm Ibnu Sina [Internet]. 2016;1(1):9–18. Available from: https://e-jurnal.stikes-isfi.ac.id

Correspondent*

11. Sri Rachmayanti A, Hasan N, Fitriani Sammulia S, Haryani R, Meilanda R, Sinaga A. The relationship between knowledge and adherence to insulin therapy in type 2 diabetes mellitus patients at the outpatient clinic of Budi Kemuliaan Hospital, Batam City. Sci Midwifery [Internet]. 2023;11(5):811–8. Available from: www.midwifery.iocspublisher.orgjournalhomepage:www.midwifery.iocspublisher.org
12. Kamrul-Hasan A, Paul AK, Amin MN, Gaffar MAJ, Asaduzzaman M, Saifuddin M, et al. Insulin Injection Practice and Injection Complications - Results from the Bangladesh Insulin Injection Technique Survey. Eur Endocrinol. 2020 Apr;16(1):41–8. https://doi.org/10.17925/EE.2020.16.1.41
13. Nito PJB, Tjomiadi CEF, Manto OAD. Hubungan Jenis Kelamin dengan Tingkat Pengetahuan Comprehensive Sexuality Education (CSE) pada Mahasiswa. Din Kesehat J Kebidanan Dan Keperawatan. 2021;12(2):396–405. https://doi.org/10.33859/dksm.v12i2.736
14. B. S. IN, F. A A, R. C, Ayu S. D, K F, Fitria F, et al. Hubungan Usia Dengan Pengetahuan Dan Perilaku Penggunaan Suplemen Pada Mahasiswa Institut Teknologi Sepuluh Nopember. J Farm Komunitas. 2020;7(1):1. https://doi.org/10.20473/jfk.v7i1.21657
15. Prihatini GS, Lista DA, Habibi R, Arsinta II, Hanggara SP, Galih RP, et al. Faktor-Faktor Yang Mempengaruhi Tingkat Perilaku Hidup Bersih dan Sehat Pada Tatanan Rumah Tangga Di Wilayah Kerja Puskesmas Ponde x. Saintika Med. 2018;14(1):7–14. https://doi.org/10.22219/sm.Vol14.SMUMM1.6644
16. Fidia F, Nuria Achmad N. Gambaran Pengetahuan Penggunaan Insulin Pen Pasien Dibetes Mellitus RS Bhakti Kartini Bekasi. PHRASE (Pharmaceutical Sci J. 2021;1(1).
17. Simamora S, Sarmadi, Mona Rahmi Rulianty, Ferawati Suzalin. Peduli Penggunaan Insulin. Din J Pengabdi Kpd Masy. 2021;5(3):638–44. https://doi.org/10.31849/dinamisia.v5i3.4823

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