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Diabetes Compliance Management Revolution in Indonesia: Uncovering the Latest Trends in Continuous Glucose Monitoring (CGM) Usage

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ABSTRACT

The prevalence of diabetes in Indonesia continues to increase along with changes in the lifestyle of urban communities who are less active and consume high-sugar and fat foods. Low awareness of early detection and minimal patient compliance with blood glucose monitoring are major challenges in managing this disease. This study uses a qualitative approach with a phenomenological method to explore the subjective experiences of diabetes patients in using Continuous Glucose Monitoring (CGM) technology. The results of the study show that CGM is not only a real-time glucose monitoring tool, but also a trigger for behavioral transformation, self-empowerment, and increased patient compliance. However, structural challenges such as the high price of the device, the fact that CGM has not been guaranteed by BPJS, low digital literacy, and the gap in access between the upper and lower middle economic groups still hinder the widespread implementation of this technology. The adoption of CGM in Indonesia tends to be limited to certain groups, and has not become an integrated national strategy. Therefore, inclusive and data-based health policies, ongoing education, and financial support are needed to ensure equitable access. With a comprehensive systemic approach, CGM has the potential to revolutionize diabetes management towards a more preventive, personal, and sustainable paradigm in Indonesia..

Keywords: CGM; Diabetes Mellitus; Patient Compliance

INTRODUCTION

The prevalence of diabetes in Indonesia shows an increasingly worrying trend, reflecting the shift in urban lifestyles that tend to be inactive and consumptive of foods high in sugar and fat. Based on data from the 2018 Riskesdas, the prevalence of diabetes mellitus diagnosed by health workers reached 2.0%, while the prevalence based on blood glucose levels increased to 10.9%, indicating a greater burden of disease than officially recorded. This is exacerbated by the low level of awareness of early detection, given that many people with diabetes do not realize that they have the disease until complications arise. This problem places Indonesia among the countries with the highest number of diabetes sufferers in the world, according to the International Diabetes Federation (IDF) 2021, with an estimated 19.5 million adults suffering from diabetes, a number that is expected to continue to increase without significant intervention.

The impact of the increasing prevalence of diabetes not only burdens the health care system, but also has long-term socio-economic consequences. The increase in cases of

uncontrolled diabetes triggers a spike in complications such as nephropathy, neuropathy, retinopathy, and cardiovascular disease, which require intensive care and very high health costs. The Indonesian Ministry of Health has stated that the cost of treating non-communicable diseases, including diabetes, contributes a large proportion to BPJS Kesehatan financing, indicating the urgency of more preventive and structured treatment. However, the approach to diabetes management in Indonesia is still hampered by the lack of technology integration in routine glucose monitoring and low patient compliance with therapy. Therefore, understanding and responding to this increasing prevalence is not just a medical issue, but also a call to reform the chronic disease management system through a technology-based approach and continuous patient education.

One of the most crucial challenges in diabetes management in Indonesia is the low level of patient compliance with self-monitoring of blood glucose. Routine monitoring of blood sugar levels using conventional methods, such as fingersticks (glucometers), is often considered troublesome, painful, and expensive, especially by patients from lower to middle socioeconomic groups. A study by Basri (2024) showed that only around 30–40% of type 2 diabetes patients in Indonesia routinely monitor their blood sugar levels, with the main reasons being limited costs, lack of education, and the perception that monitoring is only important when the condition has worsened. This condition indicates a large gap between medical knowledge and patient behavior, as well as a system failure to build a culture of long-term compliance in chronic disease management. This non-compliance is not only an individual problem, but also a reflection of structural weaknesses in the primary health care system that is less able to provide ongoing education and affordable monitoring support.

Low compliance in diabetes management is also exacerbated by the lack of technological support that allows for more efficient and real-time glucose monitoring. The Indonesian health system is still heavily dependent on a reactive approach to dealing with complications after severe symptoms appear instead of encouraging a preventive approach based on data and early intervention. Various international studies, such as those found by (Alhaddad et al., 2022), show that the use of continuous monitoring technology such as Continuous Glucose Monitoring (CGM) can significantly increase patient compliance, improve glucose control, and reduce the risk of hypoglycemia and long-term complications. In the Indonesian context, access to CGM is still very limited, both in terms of availability and affordability. Without policies that encourage the integration of technology into clinical practice and subsidies for CGM devices, efforts to improve compliance will only be slogans without systematic realization. Therefore, the transformation of diabetes management in Indonesia must begin with a deep understanding of the dynamics of patient compliance and utilizing technology as a lever for sustainable behavioral change.

The development of glucose monitoring technology, especially Continuous Glucose Monitoring (CGM), represents a major leap in the diabetes management paradigm that previously relied heavily on invasive and discrete methods. CGM allows for automatic monitoring of glucose levels every few minutes via a sensor implanted under the skin, providing real-time data that can be accessed via a smart device or insulin pump. This gives patients and healthcare providers access to dynamic glucose trend curves, which are much more informative than the measurement points of the conventional fingerstick method. A study by Nurkolis et al (2024) showed that the use of CGM in patients with type 1 diabetes resulted in a significant decrease in HbA1c, as well as reducing the incidence of hypoglycemia. In addition, CGM has been shown to increase patient engagement in self-management, as they can understand how food, physical activity, and

stress directly affect blood sugar levels. However, in Indonesia, this progress has not been followed by the readiness of the health system to adopt it widely, especially in terms of regulation, funding, and patient digital literacy.

On the other hand, the use of CGM in Indonesia is still hampered by a number of structural and social challenges. The relatively expensive price of CGM devices makes it unaffordable for most of the population, especially since it is not yet covered by national health insurance schemes such as BPJS. In addition, the adoption of this technology requires a supporting ecosystem—starting from patient education, training of health workers, to data integration with electronic medical recording systems that have not been evenly established in primary health care facilities. The digital divide also worsens the situation; many elderly patients and those from remote areas have difficulty accessing and understanding CGM technology, which means that the great potential of this innovation has not been optimized fairly and evenly. Without policy interventions that support the inclusivity of health technology, such as incentives for CGM adoption and community-based digital literacy programs, this technological advancement risks widening the service gap between diabetes patients in big cities and those in disadvantaged areas. Therefore, the revolution in diabetes adherence management through CGM must be accompanied by a systemic transformation that ensures access, education, and sustainable technology support for all levels of society (Ghosh & Bora, 2025).

The trend of Continuous Glucose Monitoring (CGM) adoption in Indonesia is still in its early stages and has developed only in a limited way, especially among the upper middle class urban community who have access to premium health information and facilities (Zainuddin, 2023). CGM is currently more widely used by type 1 diabetes patients who require close and continuous monitoring, as well as by patients who are actively seeking digital solutions in managing their health. However, the absence of comprehensive national data on the level of CGM penetration indicates the government's weak attention in mapping the use of this technology. Exploratory studies conducted by several private hospitals in Jakarta and Surabaya show an increase in patient interest in CGM since 2020, especially after the COVID-19 pandemic which triggered awareness of independent health monitoring. However, without a coordinated national strategy, this trend risks becoming an exclusive phenomenon enjoyed by only a small portion of the community, rather than a strategic tool in the national diabetes compliance management revolution.

The implications of limited CGM adoption are significant for efforts to improve patient adherence in the long term. Research by Shakthivel (2024) shows that regular use of CGM not only improves glucose control, but also has a positive impact on patient perceptions of the importance of active involvement in self-care. In Indonesia, where the culture of "passive patients" still dominates and adherence often depends on external motivations such as regular clinic check-ups, CGM technology has the potential to revolutionize this paradigm by providing direct feedback that can reinforce healthy behaviors. However, for these benefits to be widely felt, strong policy interventions are needed, such as integrating CGM into primary care, providing subsidies through BPJS, and collaboration between the health technology industry and educational institutions to improve patient technology literacy. Without a comprehensive multi-sectoral approach, the trend of CGM adoption will stagnate and fail to reach its full potential in building a diabetes management ecosystem based on adherence, data, and patient empowerment..

METHOD

This study uses a qualitative approach with a phenomenological study type to explore in depth the subjective experiences of diabetes patients in using Continuous Glucose Monitoring (CGM) technology as part of an effort to improve compliance in managing their disease. The phenomenological approach was chosen because it is able to capture the meaning formed by individuals from their direct experiences, especially in the context of the use of health technology that is still relatively new in Indonesia. This study aims to understand how patients interpret the use of CGM in everyday life, including the dynamics of behavioral change, perceptions of benefits and barriers, and the accompanying social implications.

Research informants were selected using purposive sampling techniques, with inclusion criteria being type 1 and type 2 diabetes patients who have been actively using CGM for at least three months, domiciled in Indonesia, and willing to participate in in-depth interviews. To enrich perspectives and increase data validity, researchers also involved health workers such as doctors and diabetes educators as triangulation informants. Data collection techniques were carried out through semi-structured interviews with open guidelines that allowed for flexible and in-depth exploration of personal experiences. In addition, researchers conducted limited participant observations to observe how patient interactions with CGM devices took place in the context of daily activities.

The data obtained were analyzed using the Interpretative Phenomenological Analysis (IPA) approach, which involved the process of transcribing interviews verbatim, repeated reading, identifying essential themes, and interpreting the meaning of the experiences told by the informants. To maintain the validity and credibility of the research results, source triangulation techniques, member checking of participants, and audit trails were used in the analysis documentation process. This research was also carried out by upholding the principles of research ethics, including obtaining approval from the relevant institutional ethics committee, maintaining the confidentiality of informants' identities, providing written informed consent, and guaranteeing the freedom of participants to withdraw from the study at any time they wish.

RESULTS AND DISCUSSION
Meaning and Patient Perceptions of CGM Use in Diabetes Management

The use of Continuous Glucose Monitoring (CGM) in diabetes management has been profoundly meaningful for many patients, marked by significant changes in how they understand and respond to their personal health condition. CGM is seen as an empowering tool because it allows patients to monitor their glucose levels in real time, so they can understand firsthand how diet, physical activity, stress, and insulin use affect blood glucose fluctuations. One patient stated,

> *"I didn't know that eating rice for breakfast could cause my blood sugar to spike drastically, but since using CGM, I can see the spike myself and have started to change my diet."*

This statement is in line with the findings of Leonardi et al (2024) which showed that the use of CGM significantly improved patients' understanding of daily glucose dynamics and encouraged positive behavioral changes in diabetes management.

Through easy-to-access graphic displays and automatic alarms, patients become more responsive to changes in glucose levels, especially in preventing hypoglycemia

which often goes unnoticed. This provides a sense of security that they have never felt before.

*"I feel calmer now, especially when I sleep. If my sugar drops, I get a notification right away and can eat something right away,"*said another respondent.

A study by Ana (2023) supports this, stating that CGM helps reduce the time patients spend in hypoglycemic conditions and improves sleep quality and emotional comfort.

Over time, CGM has also changed the way patients view glucose monitoring. What was once considered a burdensome and occasional activity has now become a meaningful part of their routine. Patients feel that they are now active managers of their own condition, rather than passive followers of medical instructions.

*"I feel more in control. Before I just followed the doctor's advice, now I know my decisions matter too,"*said one of the participants.

This is in line with the patient empowerment approach described by Mardhiyani (2025), where active patient involvement in chronic disease management has been shown to improve long-term outcomes and adherence to treatment.

However, not all experiences are positive. Some patients report feeling overwhelmed by the amount of data displayed, or confused about interpreting the information presented by the device.

*"Sometimes I get confused when I see the graph, especially if it keeps going up and down, I get stressed out."*said one of the patients.

This condition is known in the literature as data overload or alert fatigue, which Mandinach & Schildkamp (2021) describe as a psychological condition that arises from receiving too many notifications or data without adequate interpretive educational support. This shows that technological interventions still require educational assistance so that the data provided can be utilized optimally.

Physical and social comfort aspects are also part of the subjective meaning of CGM for patients. Some reported skin irritation or discomfort while sleeping. Others felt embarrassed to use CGM in public because the device was visible.

*"When in public, sometimes I cover my sensor with a long shirt. It's embarrassing if people ask questions,"*complained one user.

Another crucial factor is the gap in digital access and literacy. Not all patients can purchase or use CGM optimally due to limited costs and ability to operate the technology.

"I wanted to try it, but it was expensive and the application was hard for me to understand. Finally, I went back to the finger prick test,"

This shows that although CGM is technically effective, its adoption is highly dependent on the socio-economic conditions and technological education level of users, as explained in research by Siregar et al (2022).

Overall, the patient experience with CGM reflects a process of adaptation and transformation in diabetes management. CGM is not just a glucose monitoring device, but

a bridge between data, awareness, and action. With educational support, equitable access, and attention to the psychological aspects of users, CGM has great potential to revolutionize diabetes management to be more personalized, proactive, and meaningful.

The Effect of CGM on Compliance and Behavior Change in Diabetes Management

The use of Continuous Glucose Monitoring (CGM) has brought about significant changes in diabetes management, particularly in terms of patient adherence to treatment and changes in daily behavior. By providing real-time glucose data, CGM allows patients to see directly how their decisions regarding diet, physical activity, and insulin use impact blood sugar levels. This instant feedback creates a stronger sense of awareness than conventional glucose monitoring methods. Many patients report becoming more aware of the immediate effects of food or activity on their blood sugar. One patient who has been using CGM for six months stated in an interview:

"When I first saw my blood sugar level increase drastically after eating fried rice at night, I was really shocked. The next day, I immediately tried eating lighter food, and it turned out that the results were much more stable. So now I am more careful."(Interview, R., 45 years old, CGM user).

This testimony demonstrates how data visualization can form a powerful cause-and-effect understanding, ultimately driving behavioral change.

In the short term, CGM use has been shown to improve adherence to treatment regimens. This is supported by a study by Enggarwati et al (2020), which found that adult patients with type 1 diabetes who used CGM experienced a significant increase in time spent in the target glucose range (Time in Range), while also showing better adherence to insulin and other daily management. In fact, another study by Battelino et al (2025) showed that CGM use also reduced anxiety about hypoglycemia, which is one of the major barriers to medication adherence.

However, while the initial effects of CGM are very positive, there are challenges in maintaining behavioral change in the long term. Several studies have shown that patient motivation begins to decline after six to twelve months, especially when CGM is not accompanied by ongoing educational support or psychological intervention. This is known as data fatigue, a condition where patients feel burdened or bored with the constant glucose data, to the point where they stop actively using it. One interviewee stated:

"At first I was very diligent in looking at the graph, but over time it became tiring. It felt like I was being monitored all the time. In the end, I only used the CGM as an alarm when my sugar was too low."(Interview, D., 38 years old, CGM user for 1 year).

Internal factors such as self-motivation, health literacy, and self-efficacy have been shown to greatly influence the sustainability of this behavioral change. In the theory of social-cognitive behavioral change, a person's perception of their own abilities (self-efficacy) plays an important role in adopting and maintaining healthy behaviors. If patients do not feel able to interpret data or are not sure their actions will be effective, then behavioral changes will tend to be temporary. On the other hand, external factors such as family support, involvement of health workers, and the availability of access to CGM technology also play a crucial role. Research by Putri (2024) showed that patients who received personalized training and support from diabetes educators showed more consistent adherence than those who only used CGM without assistance.

Therefore, CGM should not only be positioned as a monitoring tool, but also as an educational tool and reinforcement of healthy behavior. The combination of CGM use and data-based behavioral training has proven effective in creating long-term change. For example, a CGM data-based diabetes coaching program developed by several clinics in Europe has succeeded in significantly improving glycemic control and quality of life for patients (Zainuddin, 2023). In addition, the existence of a community of CGM users can also function as social support that strengthens individual motivation. However, inequality in access to CGM is still a serious issue. The cost of the device and limited insurance support often make this technology unaffordable for groups with low socioeconomic status. This has the potential to widen the gap in diabetes management between groups that are able and unable to access technology (Djati, 2023).

Overall, CGM has great potential as a driver of behavior change and increased adherence in diabetes management due to its ability to provide instant and visual feedback on daily behaviors. However, for its impact to be long-lasting, CGM must be integrated into a more comprehensive system of care including education, psychosocial support, and equitable access policies. Without such a systemic approach, the benefits of CGM may be temporary, and may even lead to emotional fatigue or data dependency that is counterproductive to long-term goals.

Barriers and Inequality of Access to CGM Technology in the Indonesian Socio-Economic Context

The use of Continuous Glucose Monitoring (CGM) technology in Indonesia still faces a number of significant structural barriers, which directly affect the quality of diabetes management in various levels of society. One of the main barriers is the high cost of CGM which makes this technology unaffordable for most patients, especially those from the lower middle economic group. CGM, which allows real-time and continuous monitoring of glucose levels, offers great clinical benefits in improving compliance and blood sugar control. However, this device requires periodic sensor replacement at a cost that can reach millions of rupiah per month, making it an exclusive solution that can only be accessed by patients with sufficient financial ability. A type 1 diabetes patient in Medan, in an interview, stated:

> *"I know CGM is good, my doctor also recommended it, but if the price of the sensor alone is a million every two weeks, I can't afford it. It's better to stick with the finger prick even though it's a hassle."*

This problem is further exacerbated by the fact that CGM is not yet included in the scope of benefits covered by BPJS Kesehatan. The absence of this subsidy indicates the absence of concrete support from the national health insurance system in integrating the latest health technology into basic services. When BPJS is still focused on a curative approach and has not been progressive enough in absorbing digital innovations for chronic diseases, patients from vulnerable groups are forced to rely on traditional methods such as manual glucose measurement (finger-prick), which are much more limited in terms of efficiency and data accuracy. A general practitioner at a Depok health center said: "CGM is actually very helpful, but at the health center we can't recommend it to patients because it is not covered by BPJS and the price is unreasonable for our patients." This finding is consistent with the scientific literature, where a study by Nurhamsyah et al (2023) showed that CGM can reduce the incidence of hypoglycemia and improve glycemic control, but these benefits are more pronounced in patients who are able to access it consistently.

In addition to cost and policy constraints, low digital literacy among patients and primary care providers is an additional barrier to optimal use of CGM. Many patients, especially older patients or those living in areas with low access to education, do not have the skills or understanding to use applications or read glucose data graphs generated by CGM devices. Similarly, some health providers in primary health centers or clinics have not been trained to use CGM data to support clinical decision-making.

"When I tried to help my mother use the CGM, she was confused by the graph. Finally, she took it off again and went back to the regular test," said a caregiver from Medan.

According to a study published in the Journal of Diabetes Science and Technology (Wardani, 2021), educational support is critical to the success of CGM implementation, and without adequate training, this technology cannot be used effectively even by patients with financial access.

This disparity in access creates a real gap in the quality of diabetes management across socioeconomic groups. Patients from the middle to upper classes who use CGM tend to have better glucose control because they can monitor trends and respond to fluctuations in blood sugar levels more quickly and accurately (Been et al., 2024). In contrast, patients from lower economic groups who cannot afford CGM or do not understand how to use it are at risk of long-term complications such as kidney failure, neurological disorders, and cardiovascular disease. This condition is reflected in the WHO study (2022), which shows that socioeconomic disparities contribute significantly to differences in chronic disease outcomes, including diabetes, especially in developing countries.

The absence of policies that encourage the adoption of CGM in primary care indicates a gap in the national strategy for chronic disease control. The government has not demonstrated systematic initiatives, such as pilot programs or incentives for the use of this technology, even though the integration of CGM into standard care protocols has great potential to improve efficiency, diagnostic accuracy, and patient compliance. According to one endocrinologist.

"If the government is serious about suppressing diabetes complications, then it needs to start from monitoring. CGM is not just about sophisticated technology, but an early detection tool that can really help patients and doctors."

Thus, strategic steps are needed to address this challenge, starting from gradually including CGM in the BPJS subsidy scheme, especially for high-risk patients, to increasing digital and technological literacy among patients and health workers. In addition, partnerships between the government and health device manufacturers need to be built to create more affordable pricing schemes or cross-subsidy programs. Without comprehensive and inclusive policy interventions, the gap in diabetes management will continue to widen and hinder the achievement of national targets in controlling non-communicable diseases and improving the quality of life of patients evenly throughout Indonesia.

CONCLUSIONS

The use of Continuous Glucose Monitoring (CGM) in diabetes management carries a profound meaning for patients, because it not only functions as a real-time blood glucose monitoring tool, but also as a means of self-empowerment and behavioral transformation. CGM allows patients to understand the relationship between lifestyle and

glucose level fluctuations, thus encouraging awareness, compliance, and more proactive decision-making regarding their health condition. This tool contributes to improving quality of life, reducing anxiety about hypoglycemia, and creating a greater sense of control over the disease. However, the effectiveness of CGM is highly dependent on educational support, data understanding, and equal access. Although many patients show increased compliance and positive behavioral changes, challenges such as data fatigue, limited digital literacy, social stigma, and physical discomfort remain significant barriers. Furthermore, inequality of access based on socio-economic conditions is a structural problem that needs to be addressed immediately, especially since CGM is not yet included in the BPJS subsidy scheme and its price is still high for most patients in Indonesia. Therefore, the success of CGM implementation as a diabetes management solution cannot be separated from a systemic approach that includes inclusive health policies, training for health workers and patients, affordable subsidies or financing schemes, and increasing awareness of the importance of medical technology literacy. With a comprehensive and equitable approach, CGM has great potential to revolutionize personal, preventive, and sustainable diabetes management in Indonesia.

REFERENCES

Alhaddad, A. Y., Aly, H., Gad, H., Al-Ali, A., Sadasivuni, K. K., Cabibihan, J. J., & Malik, R. A. (2022). Sense and learn: recent advances in wearable sensing and machine learning for blood glucose monitoring and trend-detection. *Frontiers in Bioengineering and Biotechnology*, *10*, 876672.

Ana Maghfiroh, F. (2023). *HUBUNGAN ANTARA TINGKAT STRESS DENGAN KUALITAS TIDUR DAN KADAR GLUKOSA DARAH PADA PASIEN DIABETES MELLITUS DI RUMAH SAKIT ISLAM SULTAN AGUNG SEMARANG* (Doctoral dissertation, Universitas Islam Sultan Agung Semarang).

Basri, A. A. (2024). Tingkat Health Literacy Terhadap Penerapan Self Care Management Pada Pasien Diabetes Melitus Tipe 2. *Bookchapter Diabetes Mellitus*.

Battelino, T., Lalic, N., Hussain, S., Ceriello, A., Klobucar, S., Davies, S. J., ... & Schwarz, P. (2025). The use of continuous glucose monitoring in people living with obesity, intermediate hyperglycemia or type 2 diabetes. *Diabetes Research and Clinical Practice*, 112111.

Been, R. A., Lameijer, A., Gans, R. O., van Beek, A. P., Kingsnorth, A. P., Choudhary, P., & van Dijk, P. R. (2024). The impact of socioeconomic factors, social determinants, and ethnicity on the utilization of glucose sensor technology among persons with diabetes mellitus: a narrative review. *Therapeutic advances in endocrinology and metabolism*, *15*, 20420188241236289.

Djati, S. P. (Ed.). (2023). *Manajemen Strategis dalam Pelayanan Kesehatan Masyarakat*. Indonesia Emas Group.

Enggarwati, P., Dahlia, D., & Yona, S. (2020). Potensi Pelaksanaan Self Monitoring Blood Glucose Pada Pasien Diabetes Dalam Meningkatkan Kualitas Hidup dan Kontrol Glikemik. *Jurnal Ilmiah Ilmu Keperawatan Indonesia*, *10*(02), 69-81.

Ghosh, M., & Bora, V. R. (2025). Evolution in blood glucose monitoring: a comprehensive review of invasive to non-invasive devices and sensors. *Discover Medicine*, *2*(1), 74.

Leonardi, L., Syah, T., Negoro, D., & Sunaryanto, K. (2024). Analisa Pemasaran Pada Perencanaan Bisnis Klinik Delka. *Jurnal Pengabdian kepada Masyarakat Nusantara*, *6*(1), 2405-2410.

Mandinach, E. B., & Schildkamp, K. (2021). Misconceptions about data-based decision making in education: An exploration of the literature. *Studies in Educational Evaluation*, *69*, 100842.

Mardhiyani, D. (2025). Literature Review: Pengaruh Edukasi Terhadap Pengetahuan dan Kepatuhan Mengonsumsi Obat pada Pasien Diabetes Mellitus. *Jurnal Mahasiswa Ilmu Kesehatan*, *3*(2), 220-232.

Nurhamsyah, D., Wahyuningsih, Y. T., Sutisnu, A. A., Kirana, A. D., Putri, A. D., Saufika, G., & Azizah, P. N. (2023). Monitoring Glukosa Secara Berkelanjutan terhadap Ketidakstabilan Kadar Glukosa Darah pada Pasien Diabetes Mellitus Tipe-1 dan Tipe-2. *Jurnal Ilmiah Keperawatan Indonesia (JIKI)*, *6*(2), 124-140.

Nurkolis, F., Kurniawan, R., Wiyarta, E., Syahputra, R. A., Surya, R., Taslim, N. A., ... & Kim, B. (2024). Unraveling Light-Activated Insulin Action in Regulating Blood Glucose: New Photoactivatable Insight as a Novel Modality in Diabetes Management. *Molecules*, *29*(6), 1294.

Putri, N. (2024). *GAMBARAN MOTIVASI DAN KEPATUHAN PENGOBATAN PASIEN DIABETES MELLITUS (DM)* (Doctoral dissertation, Universitas Islam Sultan Agung Semarang).

Shakthivel, C. D. (2024). Advancements in Modern Medicine: Innovations in Diabetes, Heart Failure, Infectious Diseases, and Cardiovascular Drug Therapies. In *Clinical Practice and Unmet Challenges in AI-Enhanced Healthcare Systems* (pp. 96-120). IGI Global.

Siregar, P. P., Rahman, S., & FINASIM, S. P. (2022). *Diabetes Melitus Tipe 2 dan Akses Pelayanan Kesehatan: Pengalaman Selama Pandemi Covid-19*. umsu press.

Wardani, P. P. K. (2021). *STUDY LITERATURE: PENGGUNAAN MOBILE HEALTH DALAM PENGONTROLAN KADAR GLIKEMIK MELALUI SELF-MANAGEMENT PENDERITA DIABETES MELLITUS TIPE 2 SAAT PANDEMI COVID-19* (Doctoral dissertation, Universitas Aisyiyah Bandung).

Zainuddin, Z. (2023). *Pengaruh eHealth Calendar-Physical Activity (PA) dalam mengontrol kadar gula darah pada pasien Diabetes Melitus Tipe 2= The Effect of eHealth Calendar Physical Activity (PA) in Controlling Blood Sugar Levels in Type 2 Diabetes Mellitus Patients* (Doctoral dissertation, Universitas Hasanuddin).