

ORIGINAL ARTICLE

Audit of Inpatient Monitoring and Management of Hypoglycemia in Diabetic Patients Compared to National Guidelines

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ABSTRACT

Background: Hypoglycemia is a serious and preventable complication in hospitalized diabetic patients, often resulting from treatment with insulin or insulin secretagogues. Effective inpatient monitoring and timely intervention are crucial for minimizing adverse outcomes.

Aims: To evaluate current inpatient practices for monitoring and managing hypoglycemia in diabetic patients at Lady Reading Hospital, Peshawar, and to compare these practices with National Guidelines for Management of Hypoglycemia in Hospitalized Patients.

Methods: A clinical audit was conducted from July to December 2024, reviewing 150 diabetic patient records with at least one hypoglycemic episode (blood glucose <70mg/dL). Data were collected using a structured proforma aligned with national standards and analyzed using SPSS v25.0. Parameters assessed included monitoring frequency, timeliness of treatment, reassessment, documentation, and preventive strategies.

Results: A total of 212 hypoglycemic episodes were recorded. While blood glucose rechecking within 30 minutes post-treatment showed 81.1% compliance, timely treatment initiation within 15 minutes was noted in only 33.5% of cases. Preventive measures and care escalation were documented in just 42% and 29.3% of cases, respectively.

Conclusion: Although some aspects of hypoglycemia management at LRH show acceptable adherence to guidelines, significant gaps remain, particularly in early intervention and documentation of preventive strategies.

Keywords: Hypoglycemia management, inpatient diabetes care, clinical audit, guideline adherence, blood glucose monitoring

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both (Lima, Moreira,

Sakamoto-Hojo, & Mutagenesis, 2022; Jadon et al., 2024). Globally, diabetes has reached epidemic proportions, with the International Diabetes Federation (IDF) estimating that approximately 537 million adults were living with

diabetes in 2021, a number projected to rise to 643 million by 2030. In Pakistan, the burden is equally alarming; recent estimates suggest that nearly 33 million adults are affected, ranking the country among the top nations in diabetes prevalence (Azeem, Khan, Liaquat, & surgery, 2022; Akhtar, Ali, Asghar, Hussain, & Sarwar, 2023).

Hypoglycemia, defined as a blood glucose level below 70 mg/dL, is a common and serious complication in diabetic patients, especially those receiving insulin or insulin secretagogues (Husain et al., 2023; Munugoti et al., 2024). In the inpatient setting, hypoglycemia poses a significant threat to patient safety, contributing to adverse outcomes such as seizures, cardiac arrhythmias, cognitive impairment, prolonged hospital stay, and even mortality (Hölzen, Schultes, Meyhöfer, & Meyhöfer, 2024; Lupaescu, Iavorschi, & Covasa, 2022). It also acts as a barrier to optimal glycemic control, as the fear of hypoglycemia often leads to therapeutic inertia and inadequate glucose management.

Effective monitoring and prompt management of hypoglycemia in hospitalized diabetic patients are critical components of inpatient diabetes care (Gerwer, Bacani, Juang, & Kulasa, 2022; Demidowich, Stanback, & Zilbermint, 2024).

Evidence suggests that up to 30% of hospitalized diabetic patients experience at least one hypoglycemic episode during their stay. These episodes are frequently iatrogenic and preventable, arising from factors such as inappropriate insulin dosing, missed meals, altered nutritional intake, or renal impairment. Consequently, national and international guidelines have emphasized the need for standardized protocols for monitoring, early recognition, and timely intervention in hypoglycemia management (Torres Roldan et al., 2023).

In several tertiary care hospitals in Pakistan, the National guidelines for the management of hypoglycemia in hospitalized patients has recommendations of the frequency of blood glucose monitoring, the threshold for initiating treatment, selection of the method of intervention (conscious or unconscious) and the reassessment protocols. In addition, documenting each hypoglycemic event and implementing preventive strategies to prevent recurrence are stressed in these guidelines. Despite this rich guidance available, practice in real life is compromised by gaps in awareness, incompleteness in documentation, inadequate staffing and lack of uniformity in ward workflows.

Also, clinical audits are important quality improvement tool to assess current practices in comparison to maintained standards in order to identify areas that require a change (Willis et al., 2022; Dickerson, 2023). Audits can also be used to assess adequacy of

monitoring and treatment in the hospitalized diabetic patient and whether care is consistent with national or institutional guidelines (Thabit & Schofield, 2024; Law et al., 2023). In addition, audits can provide feedback loops, encourage staff education, and assist in the development of corrective action strategies against the risk of patient harm.

Lady Reading Hospital (LRH), Peshawar, is one of the largest tertiary care teaching hospitals in Khyber Pakhtunkhwa, serving a vast population with a high burden of diabetes and its complications. Despite the hospital's growing focus on diabetes care through endocrinology services and diabetic education clinics, there is a paucity of data evaluating inpatient hypoglycemia management practices (McCall et al., 2023; Demidowich, Stanback, & Zilbermint, 2024). Given the complexity of managing diabetic inpatients, especially in general medical and surgical wards, an audit of hypoglycemia management practices is both timely and necessary (Sreedharan, Khanna, & Shaw, 2023).

This audit aims to evaluate the monitoring and management of hypoglycemia in hospitalized diabetic patients at Lady Reading Hospital and compare current practices with the National Guidelines for the Management of Hypoglycemia in Hospitalized Patients. Specific objectives include assessing the frequency and documentation of blood glucose monitoring, the timeliness and appropriateness of therapeutic interventions for hypoglycemia, escalation of care in severe or recurrent episodes, and the documentation of preventive strategies. The audit also seeks to identify inter-ward variations and explore systemic barriers to effective guideline implementation.

The audit aims to systematically look at these practices, identify gaps in what is currently in place for care, and produce action items for clinical teams. The results will help inform targeted training programs, protocol standardization and development of monitoring tools to enhance quality and safety of diabetes care in the hospital. The study will further contribute to the growing body of evidence in advocacy for improved inpatient diabetes management especially in resource limited healthcare systems.

In short, in the setting of a growing rate of diabetes incidence and its related complications, inpatient glycemic management remains a clinical and institutional priority. It is worth noting that although hypoglycemia is preventable, the incidence of hypoglycemia in hospital care is still a significant problem. The first step in improving outcomes for diabetic patients and ensuring that the appropriate care is delivered is to audit the current practice against established guidelines.

METHODOLOGY

The aim of this study was to perform this clinical audit evaluating inpatient monitoring and management of hypoglycemia in diabetic patients and to compare these with the National Guidelines for the Management of Hypoglycemia in Hospitalized Patients. The audit used both retrospective and progressive data collection in the assessment of clinical practice in a tertiary care hospital. The audit was over a six month period from July 2024 to December 2024 at Lady Reading Hospital (LRH) Peshawar. LRH is a tertiary care center in the region offering exclusive services in diabetes and endocrinology.

Hospitalized adult patients aged 18 years and over with a confirmed diagnosis of type 1 or type 2 diabetes mellitus admitted, documented to have had at least one episode of hypoglycemia (blood glucose level <70 mg/dL) during their admission in medical and surgical wards formed the study population. Eligible patients were included if they met all the criteria including patient admission between July to December 2024, at least one hypoglycemic episode while patient hospitalized and patients with pre existing diagnosis of diabetes. To ensure homogeneity in monitoring practice exclusion criteria were applied: patients with gestational diabetes; those in the intensive care (ICU) or high dependency unit (HDU); patients with incomplete medical records and those who had had hypoglycaemia in the emergency department prior to ambulance admission to hospital.

Data selection was made using a convenience sampling technique and a sample size of 150 records of patients was targeted from the anticipated number of diabetic admissions and the available data for the audit period. This sample also provided adequate evaluation of compliance with national guidelines and identification of critical gaps in the standard of care provided.

Structured audit proforma was used to collect data, which was developed as per National Guidelines of the Hypoglycemia Management of Hospital Patients. The proforma was created to cover a broad range of parameters, including frequency and utilization documentation of blood glucose monitoring, timing and appropriateness of hypoglycemia treatment; escalation of care and reassessment after any event; repeated events and preventive measures; and appropriateness of anti diabetic prescriptions. Electronic health records (EHRs) and paper based case notes were abstracted for patient data. The data extraction was performed by a trained team of data collectors (junior doctors and nursing staff) under the supervision of a senior endocrinologist. Orientation and training sessions were conducted prior to data gathering to ensure consistency and reliability of data collection.

Against clear defined criteria, within national and institutional standards, the audit was undertaken. The audit standards included: ensuring regular blood glucose monitoring in high-risk diabetic inpatients; immediate clinical intervention when blood glucose levels dropped below 70 mg/dL; administration of a rapid-acting carbohydrate—either oral or intravenous—within 15 minutes of detecting hypoglycemia; rechecking blood glucose levels within 15 to 30 minutes after treatment; escalation of care in cases of recurrent or severe hypoglycemia (e.g., when the patient is unconscious); appropriate documentation of hypoglycemic episodes and clear communication with the primary medical team; and the recording of preventive strategies such as dosage adjustment or diet review following recurrent episodes. All collected data were entered into Microsoft Excel and subsequently analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables. Compliance rates with each of the audit standards were calculated, and a comparative analysis was performed to assess the level of adherence to national guidelines. The analysis helped identify key deficiencies in the current practices and provided insight into opportunities for improvement in the inpatient management of hypoglycemia.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of Lady Reading Hospital, Peshawar. Patient confidentiality was maintained by anonymizing all data, and access to the data was limited to authorized audit personnel. As the study was a non-interventional audit of standard care, the requirement for informed consent was waived.

Feedback and Re-Audit Plan

Based on the audit findings, results were planned to be disseminated among relevant clinical departments, including endocrinology, internal medicine, surgery, and nursing. A re-audit was proposed within 6–12 months to evaluate the implementation of recommended improvements and reassess adherence to updated protocols.

RESULTS

A total of 150 patient records were reviewed during the audit period from July to December 2024. These included patients admitted to both medical and surgical wards of Lady Reading Hospital, Peshawar, who had a confirmed diagnosis of diabetes mellitus and experienced at least

one documented episode of hypoglycemia (blood glucose <70 mg/dL).

Patient Demographics and Clinical Characteristics

Out of the 150 patients, 90(60%) were male and 60 (40%) were female. The mean age of the patients was 58.3 ± 12.1 years, with an age range of 31 to 82 years. Type 2 diabetes mellitus was more prevalent 132(88%) compared to Type 1 diabetes mellitus 18(12%).

Most patients 102(68%) were admitted to medical wards, while the remaining 48(32%) were in surgical wards. The majority of hypoglycemic episodes occurred in patients on insulin therapy 106(70.7%), followed by those on oral hypoglycemic agents 44(29.3%).

Hypoglycemia Episode Characteristics

A total of 212 hypoglycemic episodes were recorded in 150 patients. The average number of episodes per patient was 1.41 ± 0.73 . Of these episodes, 64 (30.2%) were categorized as severe hypoglycemia (blood glucose <54 mg/dL or with altered consciousness). The remaining 148 episodes (69.8%) were classified as mild-to-moderate hypoglycemia.

Only 71 (33.5%) episodes were managed within 15 minutes of detection, as per the guidelines. In 37 (17.5%) of the cases, treatment was delayed beyond 30 minutes.

Adherence to National Guidelines

Table 1 summarizes adherence to the audit criteria based on national guidelines. The most consistently followed standard was blood glucose rechecking within 30 minutes post-treatment, which was done in 81.1% of the cases. However, documentation of preventive measures and escalation of care was poorly adhered to, with compliance rates of 42% and 29.3% respectively.

Appropriateness of Antidiabetic Therapy

Analysis of prescribed medications revealed that in 38 cases (25.3%), the antidiabetic regimen was deemed inappropriate, especially in elderly patients or those with fluctuating renal function. This included instances of high-dose insulin without sliding scale adjustment or use of sulfonylureas despite prior hypoglycemia (Table 2).

Ward-Wise Compliance with Hypoglycemia Protocol

Comparing ward types, it was observed that medical wards had significantly higher compliance with monitoring and timely intervention protocols compared to surgical wards. Only 52% of surgical ward cases were managed within 15 minutes, while medical wards achieved 68% compliance in the same parameter (Table 3).

Table 1: Adherence to National Guidelines (n=212 Hypoglycemic Episodes)

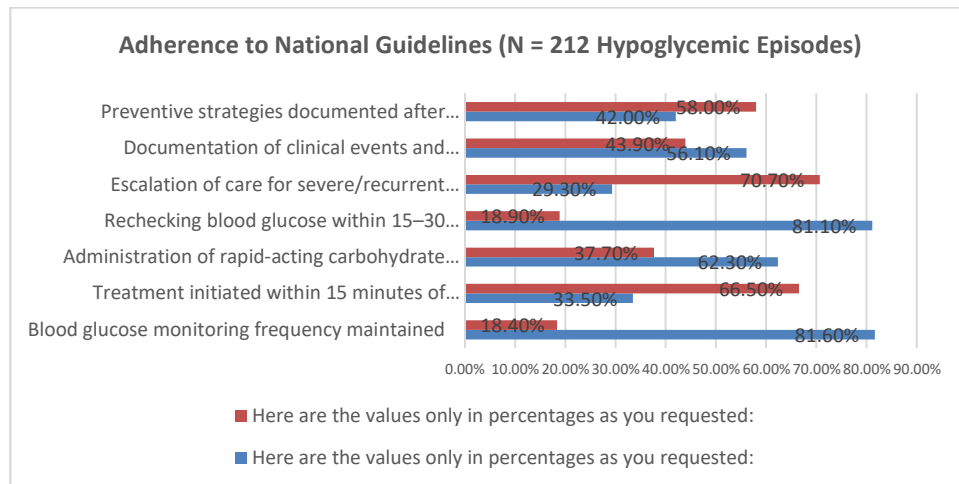
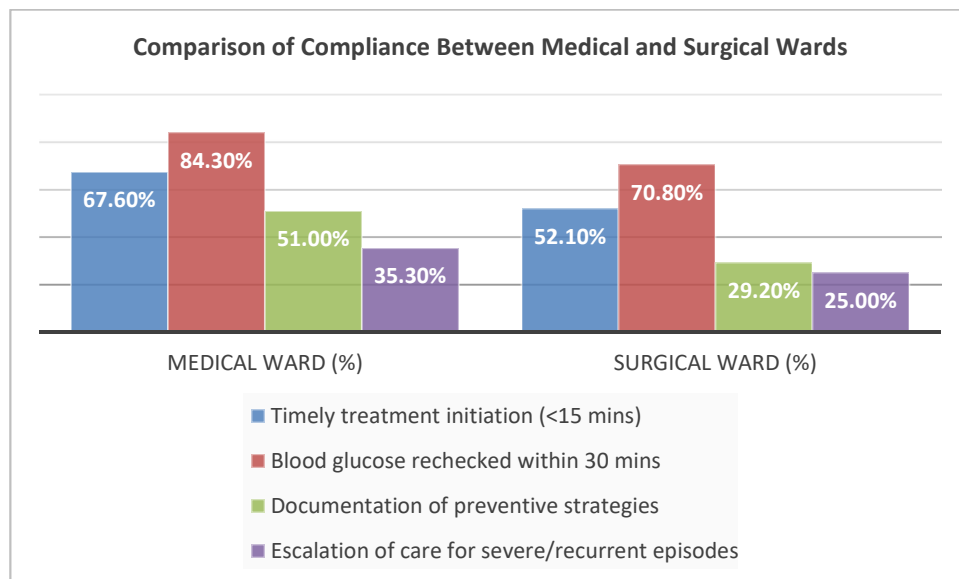
Audit Criterion	Compliant	Non-Compliant
Blood glucose monitoring frequency maintained	173 (81.6%)	39 (18.4%)
Treatment initiated within 15 minutes of detection	71 (33.5%)	141 (66.5%)
Administration of rapid-acting carbohydrate (oral/IV)	132 (62.3%)	80 (37.7%)
Rechecking blood glucose within 15–30 minutes post-intervention	172 (81.1%)	40 (18.9%)
Escalation of care for severe/recurrent hypoglycemia	62 (29.3%)	150 (70.7%)
Documentation of clinical events and communication with team	119 (56.1%)	93 (43.9%)
Preventive strategies documented after recurrent hypoglycemia	89 (42.0%)	123 (58.0%)

Table 2: Distribution of Hypoglycemic Episodes by Therapy Type

Therapy Type	Patients (n = 150)	Hypoglycemia Episodes (n = 212)
Insulin only	84 (56.0%)	129 (60.8%)
Oral hypoglycemics only	35 (23.3%)	51 (24.0%)
Combination therapy	31 (20.7%)	32 (15.2%)

Table 3: Comparison of Compliance between Medical and Surgical Wards

Audit Parameter	Medical Ward (n = 102)	Surgical Ward (n = 48)
Timely treatment initiation (<15 mins)	69 (67.6%)	25 (52.1%)
Blood glucose rechecked within 30 mins	86 (84.3%)	34 (70.8%)
Documentation of preventive strategies	52 (51.0%)	14 (29.2%)
Escalation of care for severe/recurrent episodes	36 (35.3%)	12 (25.0%)

Figure 1:**Figure 2:****Summary of Key Findings**

Overall compliance with national guidelines for the management of hypoglycemia in the hospitalized diabetic patient was suboptimal, according to the results of the audit. Particular key deficiencies were found in the time of intervention following a hypoglycemic episode and in the documentation of preventive strategies to prevent recurrence. A comparison of departments revealed that medical wards were more compliant to recommended practices than surgical wards. This discrepancy may imply shortcomings in standing orders, training, awareness or prioritization of hypoglycemia management in surgical units. Additionally, the audit noted that a few of patients had not been escalated from low glucose to appropriate treatment after severe or recurrent hypoglycemia. We found that in many circumstances, anti diabetic

medication was not adjusted appropriately for hypoglycemic events, a finding that demonstrates a major area for clinical improvement and emphasizes the need for more consistent and proactive glycemic management strategies.

These findings suggest that more training, improved documentation, and interventions at the system level are needed to attain timely and effective hypoglycemia management of hospitalized diabetic patients.

DISCUSSION

This clinical audit determined Hypoglycemia monitoring and management in Hospitalized diabetic patients in Lady Reading Hospital Peshawar from June, 2005 to December, 2005. The findings imply suboptimal adherence to

national guidelines, as regards timely initiation of treatment and the documentation of preventive strategies following hypoglycemic episodes. Consequently, these results underscore the need for structured intervention and for staff education to enhance patient safety and quality of care in inpatient settings.

In our audit the prevalence of hypoglycemia in admitted diabetic patients is in keeping with previous national and international studies that report rates of inpatient hypoglycemia of 5–30%, depending on population and monitors used. We had 150 patients recording 212 hypoglycemic episodes (30.2% severe). Especially in light of adverse outcomes associated with severe hypoglycemia including cognitive impairment, arrhythmias, and longer lengths of stay, this should serve as a reminder to monitor inpatient glucose and exercise vigilance in glucose management.

The most concerning finding was the lack of time to treatment initiation: only 33.5% of episodes were treated within 15 minutes of diagnosis. This is lesser than the national benchmark which stresses immediate correction of hypoglycemia, to avoid complications. There was an increased use of delayed management in surgical wards, indicating variability of awareness or protocol implementation between specialties. On the other side, Geller et al. (2014) reported similar findings where variation in inpatient response times were attributed variations in staff training and ward specific workflow.

Another area of concern was the poor documentation of preventive strategies following recurrent hypoglycemic events. Only 42% of such cases had documented measures such as insulin dose adjustment or dietary modifications. This gap in care continuity may contribute to repeated episodes, which were observed in approximately 24% of patients. Proper documentation is not only essential for guiding subsequent clinical decisions but also serves as a medico-legal safeguard and a tool for quality improvement.

Encouragingly, blood glucose monitoring and post-treatment rechecking were better adhered to, with compliance rates above 80%. This reflects the presence of routine nursing protocols for capillary glucose checks. However, this alone is insufficient without appropriate clinical action following abnormal readings. Importantly, while glucose monitoring was consistent, escalation of care (e.g., informing senior medical staff or transferring to a higher level of care) was poorly documented (only 29.3%). This represents a missed opportunity to mitigate the risks associated with severe or recurrent hypoglycemia, especially in elderly or multi-morbid patients.

Our audit also found a 25.3% rate of inappropriate antidiabetic therapy, often involving insulin overuse or sulfonylureas in elderly patients—both known risk factors for inpatient hypoglycemia. The importance of medication reconciliation and individualized treatment planning has been emphasized in the literature, particularly in the works of American Diabetes Association (2021), which recommends tailoring glucose-lowering regimens based on renal function, nutritional status, and comorbidity burden.

Inter-ward comparison showed better adherence to protocols in medical wards compared to surgical wards. This disparity may be due to the greater familiarity of medical staff with diabetes management and a more structured focus on chronic disease care. The findings suggest that targeted education for surgical teams and standardized hypoglycemia care pathways may help bridge this gap.

Limitations of this audit include the single-center design, retrospective nature of some data, and reliance on documentation, which may not always reflect clinical practice accurately. Moreover, the exclusion of ICU and HDU patients limits generalizability to high-dependency settings where hypoglycemia management may differ.

CONCLUSION

In conclusion, this audit demonstrates critical areas needing improvement in the inpatient management of hypoglycemia at Lady Reading Hospital. While monitoring practices are largely in place, there are clear deficiencies in timely intervention, escalation of care, and preventive strategy documentation. These findings will guide the development of hospital-wide training sessions, revision of hypoglycemia protocols, and implementation of standardized proformas. A re-audit is planned within 6–12 months to assess the impact of these interventions and ensure progress toward adherence with national standards.

DECLARATION

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Authors contribution

Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.

2. Drafting the manuscript or revising it critically for important intellectual content.
 3. Final approval of the version for publication.
- All authors agree to be responsible for all aspects of their research work.

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Competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Conflict of interest

The authors declared no conflict of interest.

REFERENCES

1. Lima, J. E., Moreira, N. C., Sakamoto-Hojo, E. T. J. M. R. G. T., & Mutagenesis, E. Mechanisms underlying the pathophysiology of type 2 diabetes: From risk factors to oxidative stress, metabolic dysfunction, and hyperglycemia. *2022; 874*, 503437.
2. Jadon, A. S., Kaushik, M. P., Anitha, K., Bhatt, S., Bhadauriya, P., & Sharma, M. Types of diabetes mellitus, mechanism of insulin resistance and associated complications. In *Biochemical immunology of diabetes and associated complications 2024*; (pp. 1-18): Elsevier.
3. Azeem, S., Khan, U., Liaquat, A. J. A. O. M., Surgery. The increasing rate of diabetes in Pakistan: A silent killer. *2022; 79*.
4. Akhtar, S., Ali, A., Asghar, M., Hussain, I., Sarwar, A. J. B. o. Prevalence of type 2 diabetes and pre-diabetes in Sri Lanka: a systematic review and meta-analysis. *2023; 13(8)*, e068445.
5. Husain, K. H., Sarhan, S. F., AlKhalifa, H. K. A. A., Buhasan, A., Moin, A. S. M., & Butler, A. E. J. I. J. o. M. S. (2023). Dementia in diabetes: the role of hypoglycemia. *24(12)*, 9846.
6. Munugoti, S., Reddy, G., Singh, R., Kakarlapudi, M., Muralidhara, S., Rosenfeld, C. J. E., & Science, M. Diabetes-related hypoglycemia, contributing risk factors, glucagon prescriptions in two community hospitals. *2024;15*, 100178
7. Hölzen, L., Schultes, B., Meyhöfer, S. M., Meyhöfer, S. Hypoglycemia unawareness—a review on pathophysiology and clinical implications. *Biomedicine*, 2024; *12(2)*, 391.
8. Lupaescu, A. V., Iavorschi, M., Covasa, M. The use of bioactive compounds in hyperglycemia-and amyloid fibrils-induced toxicity in type 2 diabetes and Alzheimer's disease. *Pharmaceutics*, 2022; *14(2)*, 235.
9. Gerwer, J. E., Bacani, G., Juang, P. S., & Kulasa, K. Electronic Health Record-Based Decision-Making Support in Inpatient Diabetes Management. *Current diabetes reports*, 2022; *22(9)*, 433-440.
10. Demidowich, A. P., Stanback, C., & Zilbermint, M. Inpatient diabetes management. *Annals of the New York Academy of Sciences*, 2024; *1538(1)*, 5-20.
11. Torres Roldan, V. D., Urtecho, M., Nayfeh, T., Firwana, M., Muthusamy, K., Hasan, B., Murad, M. H. A systematic review supporting the endocrine society guidelines: management of diabetes and high risk of hypoglycemia. *The Journal of Clinical Endocrinology & Metabolism*, 2023; *108(3)*, 592-603.
12. Willis, T. A., Wood, S., Brehaut, J., Colquhoun, H., Brown, B., Lorencatto, F., & Foy, R. Opportunities to improve the impact of two national clinical audit programmes: a theory-guided analysis. *Implementation Science Communications*, 2022; *3(1)*, 32.
13. Dickerson, J. E. Clinical audit, quality improvement and data quality. *Anaesthesia & Intensive Care Medicine*, 2023; *24(8)*, 486-489.
14. Thabit, H., & Schofield, J. Technology in the management of diabetes in hospitalised adults. *Diabetologia*, 2024; *67(10)*, 2114-2128.
15. Law, K. K., Coyle, D. H., Neal, B., Huang, L., Barrett, E. M., Arnott, C., Wu, J. H. Protocol for a randomized controlled trial of medically tailored meals compared to usual care among individuals with type 2 diabetes in Australia. *Contemporary Clinical Trials*, 2023; *132*, 107307.
16. McCall, A. L., Lieb, D. C., Gianchandani, R., MacMaster, H., Maynard, G. A., Murad, M. H., Wiercioch, W. Management of individuals with diabetes at high risk for hypoglycemia: an endocrine society clinical practice guideline. *The Journal of Clinical Endocrinology & Metabolism*, 2023; *108(3)*, 529-562.
17. Demidowich, A. P., Stanback, C., & Zilbermint, M. Inpatient diabetes management. *Annals of the New York Academy of Sciences*, 2024; *1538(1)*, 5-20.
18. Sreedharan, R., Khanna, S., & Shaw, A. Perioperative glycemic management in adults presenting for elective cardiac and non-cardiac surgery. *Perioperative Medicine*, 2023; *12(1)*, 13.

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