



Overcoming barriers to diabetes care in the hospital: The power of qualitative observations to promote positive change

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Abstract

Aims: Despite advocacy by diabetes societies and evidence about how to prevent the deleterious consequences of dysglycemia among hospitalized patients, deficits in clinical practice continue to present barriers to care. The purpose of this study was to examine inpatient rounding practices using a qualitative research lens to assess challenges on the care of hospitalized patients with diabetes and to develop ideas for positive changes in hospital management of diabetes and hyperglycemia.

Methods: We conducted an interpretive analysis of qualitative observations during medical and surgical inpatient rounds at an academic institution. We coded, analysed, and reported data as thematic findings.

Results: Emerging themes include omissions in discussions during rounds; unpreparedness to address diabetes or dysglycemia during rounds; identifying practice improvement opportunities to address diabetes issues; and recognizing accountability within the routine of practice.

Conclusions: This work guides clinicians and informs systems of practice about improvement strategies that can emerge from within hospital teams. These recommendations emphasize the interconnectedness of practice elements including thoughtful review of glucose status during rounds among patients with and without diabetes; fostering doctors and nurses to work in unison; promoting awareness and integration within and across disciplines; and advocating for better use of existing resources.

KEYWORDS

hospital rounds, inpatient diabetes, qualitative observations, qualitative research, systems of practice

1 | INTRODUCTION

Ample evidence exists detailing reasons for and methods to effectively manage diabetes and abnormal glucose states among hospitalized patients. This includes studies on clinical outcomes associated with dysglycemia in different inpatient populations,¹⁻⁴ efficacy of insulin treatments and technological approaches,⁵⁻⁸ diabetes quality improvement,⁹ and analyses of clinical and economic impact of dysglycemia

and glycemic control programs in hospitals.¹⁰⁻¹⁵ Recognizing the need to promote better glycemic control in the hospital setting, leading diabetes societies have issued calls to action, clinical practice guidelines, and consensus statements. Consensus on glycemic management in the hospital setting include documentation of glycemic status; adequate monitoring of glucose and insulin adjustments based on glycemic patterns; use of scheduled basal and/or prandial insulin and avoidance of insulin sliding scale as monotherapy; glucose targets between 140 and

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180 mg/dL for most patients with individualization of these target to prevent hypoglycemia; and attending to diabetes care changes in the transitions or care to and from hospital.^{1,5,16,17} The thought process and execution of clinical decisions leading to successful achievement of these goals take place to a great extent during clinical rounds across hospitals regardless of their category; training or non-training, acute or long-term, community or non-community, urban or rural, and federal or state/local. Despite existing guidelines, diabetes care and glycemic management in hospitals remain underachieved, and multiple gaps exist between the recommended quality targets and actual glycemic metrics.¹⁸⁻²¹ Some of the significant gaps in practice include inadequate and/or suboptimal use of insulin therapies, lack of documentation of dysglycemia, under recognition of both diabetes as a diagnosis and hyperglycemia during the hospital stay, failure to adjust preadmission medications upon discharge for patients with uncontrolled diabetes, and preventable medical errors.²²⁻²⁸

A host of barriers related to health care providers and systems of practice seem to perpetuate gaps in care. Many of these barriers to diabetes care have been identified through surveys conducted among health care practitioners, or inferred by findings of quantitative observational studies.^{22,24-26,29-35} However there is limited knowledge related to perspectives or experiences of health care providers on diabetes deriving from qualitative research.³⁶ The available evidence offers width to the field by pointing out opportunities for improvement in the management of hospitalized patients with diabetes or hyperglycemia. While this work provides a good base for the identification of barriers and treatment strategies, what does not currently exist is a deep understanding regarding what determines persistence of barriers in practice among providers. Furthermore, there is a need to understand how providers may effectively adopt better practices, maintain adherence to clinical recommendations, and remain engaged to address the existing gaps in the workplace related to diabetes care. A qualitative approach to understanding these gaps could be useful, but to date has not been undertaken.

Responding to these needs, the purpose of this study was to examine clinical practices of health care providers and hospital rounding processes related to diabetes management. We applied a qualitative lens to generate ideas for positive change in the management of diabetes in hospital settings and developed a conceptual framework for practice recommendations.

2 | METHODS: RESEARCH DESIGN, SETTING, PARTICIPANTS, AND ANALYSIS

We employed a qualitative approach for this study as it would enable direct observation of the routines of hospital rounds, health care providers' practices, teams' interactions, and work dynamics leading to management decisions during clinical rounds. The design included an interpretive qualitative analysis using observation techniques. Qualitative methods are often chosen when little is known or understood about a topic, or when studying a process, a culture, or how people make meaning of phenomena.^{37,38} Qualitative research is concerned with interpretation and understanding of these phenomena in a particular context and at a particular time and locates the investigator in the natural setting of practice to identify practical solutions to problems.³⁷

Observational data represent first hand encounter with the phenomenon of interest, and they constitute a primary source of information in qualitative research.³⁷

We conducted direct observations by incorporating the investigators into clinical rounds. We constructed written annotations about hospital rounds using a field note guide that operationalized critical aspects of the conduct of good observations for qualitative research as recommended by Merriam and Tisdell.³⁷ These critical components of the guide included events, behaviours and persons, the context and physical setting, and the description and roles of participants. Our observations considered the activities and interactions among members of the clinical teams during rounds, particularly as these related to diabetes care issues such as monitoring, treatment choices, nutritional issues, and glucose control. The observation guide also directed attention to subtle factors such as informal and unplanned activities, and non-verbal communication such as interest or enthusiasm in the topic of discussion by the members of the clinical team.³⁷ Before beginning field observations, this guide was examined and revised by a medical anthropologist with expertise in ethnographic and observational studies. The observation guide is included as an appendix. The observers annotated whether observed events seemed to facilitate or hinder guideline-driven clinical decisions for managing diabetes in the hospital setting.

Two members of the research team conducted the observations. One is an endocrinologist (A.P.L.), and the other is a medical student (M. F.). These observers offered a contrasting level of appreciation of clinical rounds and clinic practice. The study design deliberately included a joint approach using these two observers who, respectively, had (1) deep understanding of diabetes management in the hospital (A.P.L.) and (2) a fresh perspective on clinical practice, and general knowledge of the health care profession without preset expectations about how diabetes care should be approached in the hospital (M.F.). This collaboration fostered two unique viewpoints and interpretations of phenomena, allowing for a broader and more diverse understanding of observations in clinical practice. In this study, the researchers assumed a stance where the purpose of joining the clinical teams during rounds was known by the team. The observers interacted closely with the members of the team, but without participating in the teams' decisions or work.³⁷

We elected to observe clinical teams based on a purposeful sample representing medical and surgical teams in both non-intensive and intensive care settings. The sample was selected under the assumption that these would yield information rich cases representing the phenomenon of interest.³⁹ A.P.L. requested faculty leading inpatient teams to allow the researchers to be present on clinical rounds. As with most inpatient teams in academic centers, we anticipated that rounding teams would consist of a faculty member, physicians in training including fellows and/or residents, medical students, and in many cases nurses, pharmacists, care coordinators, or social workers. Observations of hospital rounds took place among inpatient teams for Medicine, Surgery, Cardiology, Obstetrics and Gynecology, and Neurology in general wards, and in Medical, Surgical, and Neurological intensive care units. The research team conducted a total of nine observation sessions of hospital rounds representing the study sample. These sessions took place over approximately 2 hours each and examined multiple clinical cases during rounds among various inpatient teams. These primary teams were composed by members representing different disciplines and providers at different

levels of training and experience rank. Patient care provided by these clinical teams encompassed non-intensive care and intensive care settings in medical and surgical services, with a wide geographical distribution of patients across the academic center. This distribution enabled exposure to patients admitted for various medical and surgical conditions and at different stages of admission from newly admitted patient from the emergency department to prolonged hospitalizations due to protracted illnesses. To assess consistency, accuracy, and depth of findings in the process, researchers (A.P.L. and M.F.) compared their initial annotations for the first field observation. The annotations referred to 17 aspects of clinical rounds considered in the observation guide. In addition, we reviewed the narratives of the cases observed during rounds. This comparison allowed optimization of the subsequent process of observation and annotation of findings. This was accomplished by agreeing on the physical place the researchers would take within the groups to best capture details of rounds, and by expanding on the level of details of annotations. This process of field site observations accounted for 18 hours of clinical rounds and generated 14 observation documents. These 14 field documents were transcribed into electronic files and coded. The coding method used was a directed content analysis⁴⁰ based on a priori knowledge of existing barriers to diabetes care in the hospital.^{22,24-26,29-35} In addition to known barriers, we coded observations representing newly identified barriers and themes that suggested potential approaches to solve existing or newly identified barriers. We analysed data according to the constant comparative method and continued coding observations until no new categories of findings emerged thus allowing for saturation.³⁷ We gained comprehensive understanding of the observation data by iteratively expanding the sample until no new substantive information was acquired. This process was a determinant in the final sample. We grouped recorded observations during field site visits into themes of findings. Three coders (A.P.L., M.F., and L.D., [acknowledged for her assistance in the coding process]) worked concurrently on the review and coding of data for thematic analysis. We enhanced the trustworthiness of our conclusions by employing a multiple coder approach to data analysis.^{37,38} Additionally, we created an audit trail by keeping a research journal of data collection, analysis, and the team's decision-making process throughout the study. This included reflections on the process, decisions on problems, and review of questions and ideas encountered while collecting data. A peer review of thematic findings was also conducted. This review enabled the investigators to assess whether specific findings supporting themes were perceived as congruent to other clinical diabetes experts' perspectives. We described key study findings using vignettes of exemplar field notes annotated during observations. These vignettes, presented below, illustrate rounding scenarios that represent the thematic findings of the study. The Institutional Review Board at Penn State Milton S. Hershey Medical Center and College of Medicine approved this study.

3 | RESULTS

Our analysis yielded four themes that illustrate aspects of hospital practice related to diabetes care: (1) omissions in discussions during rounds; (2) unpreparedness to address diabetes or dysglycemia during rounds; (3) identifying practice improvement opportunities to address

diabetes issues; and (4) recognizing accountability within the routine of practice. These themes reflect both positive and negative aspects of clinical rounds.

Our observations of medical and surgical ICU and non-ICU inpatient rounding teams included 48 healthcare providers from different disciplines and yielded multiple observations related to 49 patients. Codes supporting each theme ranged from 5 to 13, and each code was substantiated by multiple observations within and across rounding teams.

3.1 | Omissions in discussions during rounds

We observed 13 scenarios where glycemic control issues were omitted during clinical discussions in hospital rounds at times when clinical teams were discussing patients with or without diabetes.

"An inpatient team addressed the management of an elderly woman admitted for COPD exacerbation. Various other diagnoses and their respective plan of care surfaced in the discussion. Objective data, including laboratory results of the past 24 hours, were reported during rounds. In the midst of busy rounds by faculty, residents, students, pharmacist, nurses and unit coordinator, the patient's blood glucoses was reported to range between 113 to 279 mg/dl. While glucose data indicating mild hyperglycemia were reported, there was no further action taken".

We observed that conversations about blood glucose status may not take place when addressing the care of patients who, despite not having a history of diabetes, have glucose levels requiring further attention. We observed four different scenarios where this occurred: (1) when capillary glucose testing was obtained regularly and results were readily available in records; (2) in clinical situations that could predispose to more severe hyperglycemia such as use of high dose steroids or pancreatitis; (3) when patients were hospitalized for conditions in which diabetes represents an important risk factor, such as a cerebrovascular or cardiovascular events; and (4) when glucose results indicated definitive hyperglycemia.

In patients with a diagnosis of diabetes, omissions in rounding conversations were evident in various circumstances. Omissions were noted when it was pertinent to (1) report diabetes in the list of current hospital problems to address; (2) report current or updated blood glucose levels and glycemic status; (3) review medications for diabetes being used during the hospital stay; (4) determine follow-up for management of hyperglycemia as part of daily discussion in rounds; (5) discuss blood glucose trends or patterns, particularly when patterns suggested action for treatment initiation or adjustment; and (6) state glucose test results while reporting other labs such as a chemistry panel. Omission of glycemic control data or diabetes status of patients occurred at different levels of training and among different disciplines.

3.2 | Unpreparedness to address diabetes or dysglycemia during rounds

In addition to omissions during rounds, we observed five different encounters suggesting that clinicians lacked either the knowledge or

focus to adequately discuss glycemic control when guidelines would suggest active decision-making.

"An 87 year old woman with a history of diabetes had shown clear evidence of improvement of the clinical condition for which she required hospital admission. The resident physician presenting her case during rounds reported that she was receiving a reduced dose of her long acting insulin home regimen while in the hospital. It was also stated that no adjustment to her insulin dose was indicated since her blood glucose had not been followed for 24 hours yet, and that the patient had been fasting. Further probing of the situation by the leading faculty made evident the resident's insufficient knowledge regarding the patient's outpatient diabetes treatment and how treatment for her diabetes had been changed in the hospital during this admission. Observations further revealed the limited understanding of the resident regarding blood glucose patterns and glycemic targets for management of hyperglycemia in the hospital".

This vignette makes evident a lack of relevant knowledge and contextual medical evidence to inform insulin use decisions. Clinical practice recommendations include monitoring of glycemia for all patients with diabetes and adjustment of basal insulin according to fasting glucose levels.^{1,5} The limited preparedness observed in the study occurred in the following domains: (1) knowledge about details of diabetes or glycemic status of patients; (2) preparation and participation of trainees at different levels of training in discussion during rounds; (3) interest in diabetes and glucose management among providers within and across teams; (4) nursing staff participation in decision making for diabetes care; and (5) communication about plan of action aiming to prevent omissions or errors in management.

3.3 | Identifying practice improvement opportunities to address diabetes issues

Seven distinct scenarios pointed to what we refer as "golden" opportunities to advance practice, to integrate disciplines in care, or to adequately hand off care which were seemingly missed in clinical practice.

An attending vividly quoted what one of her patients with type 1 diabetes had commented the day prior when speaking to the team during rounds: 'My sugar level is higher in the hospital and I need more insulin'. 'I am really worried when I get in the 300's [blood glucose]. I spoke to my nurse and she told me that she could give me only the dose the computer order said. I really wish that she could ask the doctor. This dose does not work for me but she could not help me'.

This vignette exemplifies one of many opportunities to optimize practice. In terms of missed opportunities, we noticed underutilization of endocrinology and diabetes consultative teams, and a lack of integration with other disciplines such as nursing and pharmacists. On the other hand, we noticed that when providers had awareness of

incidence and relevance of hyperglycemia in the hospital, they seemed more interested and appropriately focused on glycemic management.

3.4 | Recognizing accountability within the routine of practice

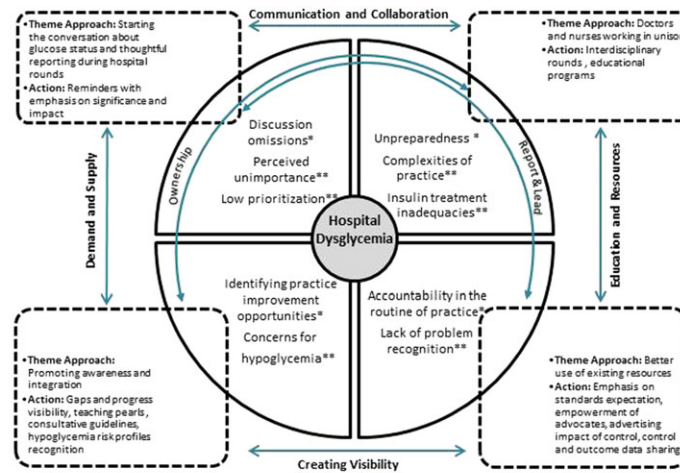
A seemingly energetic faculty indicated during rounds; "we can't be dinged by Joint Commission for using sliding scale insulin alone when they visit. We have too many patients with diabetes. About one in five patients in the hospital have diabetes, and many more have elevated blood glucose whether they have diabetes or not".

This scenario and the five observations reported below expand our views regarding providers' practices and behaviours that seem to promote improving care. First, we observed that providers' acknowledgement of hospitals' regulatory processes seemed to represent a motivator for better management. Next, providers who are deliberate about glucose control in the hospital tended to identify pertinent scenarios, request appropriate testing, and aim for adequate glycemic goals. Third, diabetes care gained more credibility among providers when they were aware that glucose control may have an impact on the outcome of certain admission diagnosis, Fourth, awareness that diabetes control in the hospital was being examined increased responsiveness of providers to management issues. And finally, providers tended to be proactive in rectifying and preventing identified mismanagement in their practices.

4 | DISCUSSION

Our study's thematic findings allowed us to identify previously unarticulated barriers as well as features of support towards diabetes care in the hospital. We simultaneously corroborated known barriers acknowledged in the literature and merged these concepts into a conceptual framework of gaps and potential solutions, as shown in Figure 1. We also examine the interconnectedness of these potential solutions which are further explained in Figure 2. This study's observations expose an array of scenarios that individually or collectively can help explain and suggest how to address some of the issues often encountered in the hospital that can hinder adequate diabetes management. The findings of our study may seem like common sense, and we believe that they are. However, given the continuing lack of adherence to diabetes management guidelines,^{19-23,25,26,41} and continuing barriers to adequate in-hospital glycemic control, we believe renewed focus on such barriers is warranted, and the strategies we propose may provide an organizing framework for efforts to address the problem during clinical interactions.

The four themes that emerged from this study form a foundation for the actionable practice recommendations we propose and describe below. These are as follows: (1) omissions in discussions during rounds: "Starting the conversation about glucose status and thoughtful reporting during hospital rounds"; (2) unpreparedness to address diabetes or dysglycemia during rounds: "Doctors and nurses working in unison"; (3) identifying practice improvement opportunities to address diabetes issues: "Promoting awareness and integration"; and (4)



Quadrants in the circle represent our study's themes of barriers to care* and previously reported barriers**, dotted line rectangles shows proposed strategies for positive change derived from themes and actionable recommendations, and the arrows connecting proposed strategies for positive change name the bidirectional relationship between these strategies.

FIGURE 1 Conceptual framework of hospital diabetes care. Quadrants in the circle represent our study's themes of barriers to care* and previously reported barriers**, dotted line rectangles show proposed strategies for positive change derived from themes and actionable recommendations, and the arrows connecting proposed strategies for positive change name the bidirectional relationship between these strategies

Communication and Collaboration	Reporting of glucose control issues needs to occur in multiple directions among participants of the caring team. This approach may enhance the common effort of teams and help relevant information regarding glucose status surface during the time of rounds.
Demand and Supply	Providing reminders of resources available can bring providers closer to action when glucose conversations are taking place. This awareness of existing resources can generate a supportive environment to find guidance to when needed.
Creating Visibility	Making challenges and achievements at various hospital levels visible, and promoting professional resources and expectations can stimulate a sense of relevancy regarding diabetes care in the hospital.
Education and Resources	Educational programs offered to collaborating teams can highlight expected standards of care, publicize professional and technical support, and advise on lines of communication providers may turn to for support. In turn, clinical teams can become advocates to obtain resources that can advance practice and improve care.
Ownership	Members of the rounding teams should take pride of their achievements, take ownership of existing processes, indicate needs, and point out opportunities for improvement. Simultaneously, efforts to promote awareness and integration should continue in order to advance readiness to address diabetes and glycemic issues.
Report and Lead	Providers working in collaboration bring up front ongoing practice challenges through the appropriate channels in the organization. Members of the rounding team become leaders and advocates by bringing visibility of progress to their respective units or teams, advertising practice guidelines and sharing teaching points.

FIGURE 2 Elements of an ideal practice ecosystem to optimize inpatient diabetes care. This figure defines the characteristics of an ideal practice ecosystem that can help optimize inpatient diabetes care

recognizing accountability within the routine of practice: "Better use of existing resources." Our hope is that these recommendations may generate positive ideas for providers and organizations to overcome some of the hurdles that obstruct the management of patients with diabetes in the hospital.

4.1 | Omissions in discussions during rounds: "Starting the conversation about glucose status and thoughtful reporting during hospital rounds"

The notion of effectively addressing omissions of diabetes and glycemic issues during clinical rounds pertains to two different patient

populations in this study; namely, those with and without diabetes. These omissions in rounding discussions suggest that glucose issues may not be at all included in the rounding agenda and are not assessed routinely by clinical teams. Such findings reveal a gap in practice that is more subtle than other known barriers related to lack of response to abnormal blood glucoses coined as "clinical inertia."⁴¹ Clinical inertia to diabetes care in the hospital may result from being unaware of, or from dismissing evidence indicating of poor glycemic control. In our study, we identified a gap in practice that results from simply not making glucose evidence available for analysis or discussion during rounds. We suggest that the uninformed status of providers we report here, added to the already known lack of reaction

to glycemic issues augments the gravity of glycemic mismanagement in the hospital.

“Starting the conversation about glucose status in patients without diabetes” articulates the need to advocate for greater attention to scenarios that point to certain glucose abnormalities or risk factors for hyperglycemia, which may be otherwise dismissed. In patients without diabetes, the level of attention to glycemic issues tends to be lower. However, data suggest that the outcome of hyperglycemia in this population is worse than in patients with diabetes with comparable hyperglycemia in the hospital.¹¹ Furthermore, glucose abnormalities may be indicators of undiagnosed diabetes, thus providing an opportunity to identify patients at risk.⁴²

“Thoughtful reporting during hospital rounds” calls for action to reduce omissions in reporting or discussing aspects of diabetes care that should inform clinical documents, guide the analysis of glucose trends, lead to adjustment of insulin dosing regimens, and facilitate discharge planning. Current clinical practice guidelines advocate for documentation, proactive glucose management, assessment of glycemic goals, prevention of hypoglycemia, and planning for adequate follow-up after hospitalization.^{1,5} Actionable recommendations that can facilitate achieving these goals may include “glucose conversation reminders” such as use of checklists, rounding sheets, electronic medical records clinical decision support, and quality dashboards emphasizing the significance of the care gap and the impact of addressing it.

4.2 | Unpreparedness to address diabetes or dysglycemia during rounds: *“Doctors and nurses working in unison”*

“Doctors and nurses working in unison” advocates for readiness to address diabetes and dysglycemia within rounding teams and in parallel with other clinical staff members. This notion calls for more comprehensive activities to coordinate diabetes care in the hospital. Providers across disciplines that are well informed of the details and status of diabetes care of their patients can bring useful information for decision making and can facilitate communication during rounds to advance care. Nurses confront challenges when caring for patients with diabetes that require careful decision making and communication. This resonates with the need to avoid inappropriately withholding of insulin, to promote contribution of nurses in diabetes discussions during clinical rounds, and to use their knowledge to think of glycemic issues in the hospital as a daily changing phenomenon. Implications for practice concerning this recommendation include reliance on interdisciplinary rounds, implementation and maintenance of regular educational activities across disciplines that also acknowledge the complexities of practice around diabetes, and use of programs aiming to prevent insulin errors and mismanagement.

4.3 | Identifying practice improvement opportunities to address diabetes issues: *“Promoting awareness and integration”*

“Promoting awareness and integration” appeals to the recognition and acknowledgement of situations that represent opportunities to enhance practice during clinical rounds. These opportunities may

present in different forms such as hands-on integration of practice and learning; inclusion of other disciplines such as nursing, pharmacy and care coordination into decision-making around diabetes-related issues; and adequate delegation or hand over of patient care. Also, bringing awareness of the impact of hyperglycemia and hypoglycemia can present as a strategy to augment the interest of clinicians about glycemic control. These notions urge health care providers to develop more cohesive and integrated inpatient clinical teams. Some of the recommendations for practice in this category include making diabetes barriers as well as achieved progress visible and celebrating accomplishments across disciplines, using units' glycemic control reports, featuring teaching pearls of the day, week, or month, defining guidelines for diabetes service consultation, and recognizing profiles of patients at greater risk for hypoglycemia.

4.4 | Recognizing accountability within the routine of practice: *“Better use of existing resources”*

“Better use of existing resources” invokes the notion that the systems of practice take into account resources and behaviours that are often under recognized and that can be optimally used to benefit diabetes care in the hospital. Our findings suggest that motivation for better practice exists when providers are cognizant of issues pertaining to hospitals' regulatory processes for glucose management; when aware of their local outcomes related to glycemic control; and by acknowledging persons or units functioning as local advocates for diabetes care and practice improvement. Improving use of resources in practice can be viewed as placing emphasis on meeting expectations for standards of care as part of educational programs, identifying and empowering diabetes advocates in various disciplines, advertising the impact of diabetes control in key hospital populations, and evaluating and visibly displaying glycemic control trends and practice care outcomes.

Our study adds new insight to barriers towards diabetes care and offers strategies on how to positively advance clinical practice. In addition to our findings, this study corroborates some of the known barriers to care previously reported.^{5,22,23,31-33,43} Current recommendations for glycemic control programs in the hospital include monitoring and managing hyperglycemia and hypoglycemia in intensive, non-intensive, and perioperative settings; having accurate devices for bedside glucose measurements; use of standardized order sets; establishing uniform methods of collecting and analysing glucose data; attending to transitions of care; and providing patient and professional education. These tasks should ideally occur with oversight from glycemic control programs supported by hospitals' administration.^{1,5,44} However, one of the limitations is that there is no consensus on the foundation or infrastructures of collaboration that can assist these programs achieve their goals.

The development of our conceptual framework depicted in Figure 1 was supported by the depth in understanding gained from the observation findings and the thematic analysis of the study, and the existing literature.^{22,24-26,29-35} We contrasted the gaps in care that surfaced as themes with positive actions contrary to those leading to gaps in our study. We connected positive behaviours themes with their corresponding positive actions. We used these associations to

propose actionable practice recommendations or solution concepts. We simultaneously referred to reports of barrier to inpatient diabetes care in the literature which were included in the model to support our recommendations. Executable tasks aligned with the actionable practice recommendations or solution concepts were incorporated in the model thus proposing venues to address barriers to care. We then looked at the interconnectedness between the proposed solutions concepts. From this interconnectedness emerged the concepts of the elements of an ideal practice ecosystem to optimize inpatient diabetes care as shown in Figure 2.

This study provides awareness of issues that influence dynamics of clinical practice and offers recommendations on how to overcome some of the barriers that hinder care. We present themes of barriers identified through our analysis, propose strategies for positive change derived from these themes, introduce actionable recommendations for practice, and define characteristics of an ideal practice ecosystem. Our conceptual framework addresses aspects of collaboration, communication, awareness, team interactions, and the interdisciplinary nature of diabetes care in the hospital. It illustrates the concepts of the bidirectional relationship between the practice domains presented. We remark that these practice domains are dynamic and do not occur in isolation. Hospitals may identify their unique or relevant needs and determine where efforts should be directed to in order to strengthen these relationships.

It is clear that there is more that practice barriers associated to the challenge of managing dysglycemia and diabetes in the hospital. Our findings do not address system-based issues beyond rounding practices and routines. However, these findings and proposed recommendations are an attempt to critically consider the influence of clinicians' and clinical teams on diabetes care in the hospital not as an isolated phenomenon, but as activities that reside in and depend on complex multi-pronged systems.

A limitation of this study was that our exposure to issues related to diabetes care was restricted to observations during rounds. While conducting field site observations, the investigators' role was strictly as observers interacting closely with the members of the team but without participating in the teams' activities or having access to patients' clinical records. This did not allow for an assessment of the extent of care or actions taken outside of clinical rounds, where other important clinical decisions may take place. Additionally, the latitude of efforts towards patient-centered care was not in the scope of this study. While care was taken to coordinate the observation sessions on days when clinical teams admitted patients with diabetes, the exposure to new cases with diabetes and opportunities to observe a wider spectrum of practice behaviours was variable within each team. Lastly, this study was conducted in a single academic center. The wide representation of patients and their clinical status, disciplines and clinical teams, and providers at different professional levels participating likely contributed to ameliorate this limitation.

5 | CONCLUSIONS

The findings in this qualitative study lead to strategies to address prevailing barriers in the care of hospitalized people with diabetes and hyperglycemia. This study emphasizes omissions that are evident

during clinical rounds and advocates for routine and thoughtful reporting of glycemic issues. It addresses the readiness gap to embrace diabetes in the hospital and aims to promote work in unison between clinicians and other members of clinical teams. It capitalizes on the need to identify opportunities that may promote awareness and integration in practice. It highlights the advantages that exist in the systems of practice that may improve the use of available resources.

Hospitals are complex systems where various constituents should function in synergy to achieve and maintain quality of care for patients. Health care providers are in the frontline of care-making decisions that can either depart from ideal practice or align with standards of optimal care. Therefore, promoting activities that can enable providers to improve diabetes care within and across clinical teams, and coordinating efforts to optimize hospitals' systems of practice beyond clinical rounds will help illuminate the path towards positive and impactful changes in inpatient diabetes care.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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