A Design-Led, Culturally Responsive Services Model for Gestational Diabetes care in Canadian Hospital Settings

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Abstract

Gestational diabetes mellitus (GDM) is a common blood pregnancy-related metabolic condition associated with significant short-term obstetric complications and long-term health risks, including an increased chance of developing type 2 diabetes for the mother and metabolic disorders for the child. Although there are biomedical management strategies for gestational diabetes well established in Canadian hospital settings, existing care models often overlook the experiential, cultural, and systemic dimensions of care, particularly for newcomers and culturally diverse populations.

This study will illustrate a design-led qualitative literature synthesis to identify system-level gaps in gestational diabetes care within Canadian hospital environments and to develop a service design proposal that addresses communication barriers, cultural misalignment, fragmented care pathways, and limited psychosocial support.

In response, this design research project proposes a culturally responsive services framwork that integrates multilingual communication tool, navigation supports, psychosocial interventions, and continuity of care strategies. Rather than replacing biomedical systems, this model strengthens the existing programs by improving accessibility, usability, and patient engagements. Drawing on interdisciplinary research spanning clinical medicine, public health, and service design, this design intervention will propose a culturally responsive service framework that integrates multilingual communication tools. Navigation supports, psychosocial interventions, and continuity-of-care strategies. This proposed model complements the existing biomedical programs rather than replacing them to improve engagement, equity, and long-term health outcomes for both mother and child.

Introduction

Gestational diabetes mellitus (GDM) is a pregnancy-related metabolic disorder characterized by glucose intolerance during one's pregnancy journey. The conditions are associated with increased maternal and neonatal morbidity and are a strong predictor of future type 2 diabetes in both mother and child's health (Corathers et al., 2013; Feghali et al., 2019). Current management strategies for gestational diabetes primarily focus on biomedical control through glucose monitoring, dietary restrictions, and insulin therapy when necessary. While these approaches are clinically effective in managing physiological outcomes, they often do not address the broader experiential and systemic factors that influence patients' engagement, understanding, and long-term health behaviours.

Research has shown that the experiences of gestational diabetes extend beyond medical management and affect their daily routines, food practices, family relationships, and emotional well-being. For newcomers and culturally diverse populations in Canada, these challenges are intensified by language barriers, unfamiliar healthcare systems, cultural differences related to pregnancy and diet, and limited social support networks (Higginbottom et al., 2015; Kandasamy et al., 2020). Although hospital-based programs such as the Diabetes in Pregnancy Clinic at Michael Garron Hospital provide structured education and specialized follow-up, these programs are typically designed around standardized biomedical protocols. They may not fully meet the needs of diverse populations in terms of communication accessibility, cultural responsiveness, and navigation supports.

This research positions gestational diabetes care as a complex system-level challenge, particularly for newcomers' populations navigating unfamiliar healthcare environments. This study focuses on newcomers and culturally diverse populations in Canada, whose healthcare experiences are shaped by language barriers, cultural execrations, and unfamiliarity with system navigation. As a designer researcher positioned outside clinical practices, this study does not focus on medical treatment itself, but on how care is communicated, navigated, and experienced particularly for newcomers facing cultural and systemic barriers.

Importantly, gestational diabetes is not experiences uniformly across patients. Induvial brings diverse cultural backgrounds, dietary practices, family dynamics, and varying levels of health literacy, all of which shapes how they interpret and manage their conditions. These differences influence not only patients' ability to follow medical guidance's, but also how they experience care in relation to their identity, values, and sense of dignity.

For some patients, dietary recommendations may conflict with deeply rooted cultural foods practices, for other, languages barriers or unfamiliarity with the healthcare system may shape their ability to engage with care. Additionally, personal preferences, emotional readiness, and social support systems further influences how care is received and sustained. As a result, standardized care model, while clinically effective may not adequately respond to the individualized needs of diverse patients' populations.

Recognizing this variability is critical, Gestational diabetes care must move beyond a one-size-fit-all approach and instead acknowledge that effective care is inherently relational, contextual, and culturally situated. When care models fail to account for these differences, patients may experience disconnection, reduced autonomy, or diminished dignity, even when services are available. This highlights the need for flexible, culturally responsive approaches that can adapt to the diverse realities of patients' lives.

While access to services often exist, usability, comprehensions, and meaningful engagement remain limited which highlights the gap between services availability and services accessibility. As a research health designer, this project does not aim to replace clinical system, but to illustrate how design can enhance accessibility, communication, and patient experiences within existing care structures.

The research question guiding this study are: “How can design-led, culturally responsive system interventions enhance communications, navigation, and psychosocial integration within gestational diabetes care for newcomer populations in Canadian Hospital settings?”

Study Impact - PICO statement

A PICO statement is a structured way of framing a research question. It stands for Population, Intervention, Comparison, and Outcomes, and helps break down complex healthcare topics into clearly defined components. In this study, the PICO framework was used to structure the research focused on gestational diabetes care by clearly identifying the population of interest, the proposed design led intervention, the existing standard of care for comparison, and the intended outcomes related to accessibility, usability, and patient experiences. This approach strengthens the clarity and rigor of the study by ensuring that the research question is specific, focused and aligned with evidences-based health research methods.

This research explores how the design-led, culturally responsive services model for gestational diabetes care, incorporating multilingual communications, culturally adapted education, navigation support, and psychosocial integration, can improve the usability, accessibility, and patient experiences of care for newcomers and culturally diverse populations in Canadian hospital settings, compared to existing biomedical care models that primarily focus on clinical outcomes.

The **population** of focus includes newcomers and culturally diverse induvial in Canada diagnosed with gestational diabetes and receiving care within hospital-based settings. This group is particularly relevant due to the additional barriers they may experiences, including language differences, unfamiliarity with healthcare system, and misalignments between clinical recommendations and cultural practices.

The **intervention** proposed in this study is a design-led, culturally responsive services models for gestational diabetes care. This model integrate multilingual communication tools, culturally adapted educational resources, navigation supports, and psychosocial care elements, with the goal of improving how care is accessed, understood, and experiences.

The **comparison** is the existing standard of care in Canadian hospital settings, which is primarily grounded in biomedical models that focuses on clinical managements, such as glucose monitoring, dietary regulation, and pharmacological interventions, with more limited attention to cultural, communicative, and experiential factors.

The **outcomes** explored in this research include improvements in the usability and accessibility of care, enhanced patient understanding and engagement, and more supportive and culturally aligned care experiences. In the longer term, these outcomes may contribute to improved adherences to care plans, greater continuity of care, and reduced health risk for both mother and child. By structuring the study through this framework, the research positions designs not only as a conceptual contribution, but as a clearly defined intervention with measurable implications for patient-centered care.

Stakeholder and Intended Audience

This research is positioned at the intersection of healthcare delivery, public health, and service design, and it intended to inform multiple stakeholders groups involved in the planning, delivery, and improvement of gestational diabetes care within Canadian hospital settings. Rather than addressing a single professional audience, this work engages a network of actors who collectively shape patient experiences across the care continuum.

A primary stakeholders includes healthcare providers, such as physicians, obstetricians, diabetes educators, nurse, and dietitians, who are directly involved in the clinical management of gestational diabetes. For these practitioners, the research offers insights into how care extends beyond biomedical treatments and highlights the importances of communication, cultural alignments, and patient engagement in achieving effective outcomes. By illustrating system-levels gaps and patient experiences challenges, this work providers a framework through which providers can reflect on current practices and identify opportunities to deliver care in more conclusive and responsive way. Importantly, it does not aim to increase clinical burden, but rather to support providers with tools and strategies that enhances clarity, efficient and patient understanding within existing workflows.

Hospital administrators and healthcare system planners represent another key audience. These stakeholders are responsible for the organization, coordination, and evaluation of care services within institutional settings. For this group, the research contributes a system-level perspective, demonstrating how fragmentation, communication breakdowns, and lack of navigation support can impact both patient experiences and overall system efficiency. The proposed services model offers a structured approach to integrating supportive interventions, such as navigation tools and culturally responsive communication into the existing programs without requiring fundamental restricting of clinical services. This positions the work as relevant to ongoing efforts in healthcare innovation, quality improvement and patient-centered care design.

Design and Health Systems Practices

This research is also highly relevant to services designers and health design practitioners, who are increasingly engaged in addressing complex challenges within healthcare systems. By applying these design methodologies in such system mappings and journey mappings, and iterative synthesis, this project demonstrates how design can translate research evidence into actionable interventions. It provides a model for how designers can work within the clinical environments to identify system challenges, visualize complexity, and co-create solutions that respond to both system constraints and human needs. In doing so, the study contributes to the growing field of health design by reinforcing the role of design as an integrative and translational practices within healthcare.

Policy and Community Relevance

Beyond clinical and design audiences, this work also speaks to policymakers and public health processionals concerned with health equity and access to care. The findings highlight how disparities in gestational diabetes outcomes are not solely the result of induvial behaviours, but are shaped by structural and systemic factors, including languages accessibility, cultural alignments, and continuity of care. By framing these challenges through a design lens, the research offers a complementary respective to policy approaches, suggesting that improvements in-service delivery and patient experiences can play a significant role in addressing inequities. The proposed framework can inform policy discussion related to culturally responsive care, patient engagement stagiest and the integration of community-based support within hospital systems.

Community health organization and advocacy groups also represent an important audience, particularly those working with newcomers and immigrant populations. These organizations are often act as an intermediary between patient and healthcare systems, supporting induvial in navigating services and accessing culturally relevant resources. For these stakeholders, the research provides insights into the systemic barriers faced by their communities and offers potential strategies for strengthening connection between community-based support and hospital-based care. This creates opportunities for collaboration and co-design, where community knowledge and lived experiences can directly inform services improvements.

Purpose of the Research

The purpose of this research extends beyond identifying continuing issues; it seeks to translate interdisciplinary knowledge into actionable design opportunities that can be implemented within real-world context. Drawing on clinical literature, public health research, and lived experiences insights, the study bridges the divide between what is known and what is practiced. In doing so, it addresses a critical challenge within healthcare system: the barriers in care delivery between evidence-based guidelines and patients' ability to meaningfully engage with them.

By framing gestational diabetes care as both a clinical process and an experiential patient journey, this project emphasizes that improving health outcomes requires attention not only to treatment protocols, but also to how care is communicated, navigated, and experienced. The proposed services model reflects this perspective by integrating communication, navigation, and psychosocial support into existing care pathways. These interventions are intentionally designed to be adaptable and scalable, allowing them to be implemented across different hospital settings and patient populations.

Ultimately, the purpose of this research is to contribute to the development of more equitable, accessible, and patient-centered healthcare systems. It positions design as a critical tool for aligning clinical effectiveness with human experiences, ensuring that care is not only available, but also understandable, relevant, and supportive for those who receive it. By engaging multiple audiences and emphasizing practical application, this work aims to support meaningful changes at both services and system levels.

Context of Lived Experiences

The experience of gestational diabetes unfolds across multiple moments of uncertainty, adaptation, and emotional response. At the point of diagnosis, patients must often quickly process complex medical information while simultaneously managing concerns about their pregnancy and the health of their child. This moment can be overwhelming, particularly when information is delivered in unfamiliar language or without sufficient context explanation.

For newcomers' populations, this experience is compounded by limited familiarity with the healthcare system. Patients may struggle to understand referral processes, appointment structures, or follow-up expectations, leading to confusions and increased anxiety. Without clear guidance's, induvial are often required to navigations complex systems independently while managing a high-risk condition.

Cultural factors further shape these experiences. Dietary recommendations central to gestational diabetes managements are often based on western nutritional guidelines that may not align with traditional foods, religious practices, or family-based eating patterns. As a result, patients may attempt to adapt recommendations in ways that are not fully supported by clinical guidance, leading to perceived non-compliance, or frustration with medical guidance.

Additionally, family dynamics and cultural expectations around pregnancy and influences how medical advice is interpreted and followed. In some contexts, family members play a significant role in decision-making, while in others, stigma or lack of awareness may limit open discussion about the condition.

As a health design researcher, understanding of these experiences is informed by lived experiences observed and shared within community contexts in South Asian communities. As a South Asian woman, I have also observed how cultural food practices and health beliefs shape how metabolic conditions are understood and managed in everyday life. People living with prediabetes have described experiencing disorientation when navigating dietary and lifestyle modification within a Western healthcare framework. These recommendations often require significant shifts away from culturally familiar foods and established daily practices, contributing to experiences of loss, uncertainty, and diminished dignity. Such experiences are further shaped by the limited integration of cultural context within dietary guidance's, resulting in care approaches that may not fully reflect everyday lived realities.

These lived accounts highlight how health recommendations, when not culturally contextualized, may be experiences as restrictive rather than supportive, and can unintentionally create emotional and cultural distances between induvial and their care pathways.

This perspective reinforces the understanding that metabolic conditions such as gestational diabetes and prediabetes extend beyond biomedical definitions. They are deeply embedded within cultural identity, food practices, and emotional well-being. When care models do not meaningfully integrate these dimensions, induvial may experiences misrecognitions or marginalization, even in content where clinical services are accessible.

These layered experiences proves that gestational diabetes care is not Soley a clinical issue, but a deeply contextual and reaction one, which requires approaches such that prioritizing cultural responsiveness, emotional supports, and accessible communication. These variation in experience further demonstrates that gestational diabetes cannot be understood as a singular or uniform condition. Rather it is shaped by individual, cultural, and contextual differences that influences how care is interpreted, negotiated and enacted in everyday life.

Literature Review

The literature on gestational diabetes mellitus (GDM) in Canada reflects a complex intersection of clinical care, population health trends, and lived patient experiences. While current models are grounded in strong biomedical framework that prioritize diagnosis, monitoring, and risk management, emerging research highlights important gaps related to equity, accessibility, and patient engagement. This body of literatures spans several key areas which includes biomedical management practices, epidemiological trends, health system inequities, cultural influences on health behaviours, immigrant experiences, psychosocial impacts, and challenges related to care fragmentation and long-term preventions. Together, these perspectives illustrate that gestational diabetes is not solely a clinical condition, but a multifaceted experiences shaped by social, cultural, and systemic factors. This section synthesizes these themes to identify critical system challenges within existing care models and to set up the need for more integrated, culturally responsive, and patient-centered approaches to gestational diabetes in Canadian hospital settings.

Biomedical Foundations of Gestational Diabetes Care

The management of gestational diabetes mellitus (GDM) in Canada remains grounded in biomedical models of care that prioritize clinical measurement, risk reduction, and standardized treatment protocols. The Diabetes Canada Clinical Practice Guidelines Committee (2023) outlines core practices, including universal screening during pregnancy, diagnostic testing, and structured management strategies such as blood glucose monitoring, medical nutrition therapy, and individualized care planning. These approaches aim to reduce immediate maternal and neonatal complications.

At the system levels, this biomedical framing also reflects how hospitals and clinics are organized around efficiency, standardization, and risk management. Care pathways are designed to reduce variability between providers and ensure that patients are managed according to evidences-based thresholder, while this improves safety and consistency, it can also unintentionally reduce flexibility in how care is delivered, particularly when patients present with divers cultural, linguistic, and social needs that fall outside standardized assumptions.

While these biomedical frameworks are essential for ensuring safety and clinical effectiveness, they tend to focus primarily on physiological outcomes rather than on patients' broader lived experiences. As a result, care is often focused on meeting treatment targets rather than on addressing the contextual factors that shape a patient's ability to manage their condition.

This creates an implicit hierarchy in care priorities, where measurable clinic indicators such as fasting glucose levels or HbA1c equivalents becomes the main markers of “success,” while lived experiences indicators such as understanding, emotional readiness, cultural alignments or recommendations, or confidences in self-management are less systematically assessed. This can result in gaps where is technically appropriate but experientially hard to follow.

The clinical literature further emphasizes pharmacological intervention when lifestyle medications are insufficient. These treatments are critical for stabilizing blood glucose levels and improving pregnancy outcomes (Feghali et al., 2019). However, emerging research (Dubois & Giroux, 2025) highlights the importance of integrating non-pharmacological strategies, such as culturally appropriate nutrition support and behavioural interventions, to support both short-term management and long-term metabolic health. This reflects a gradual shift towards more comprehensive care, though biomedical priorities still dominate.

In practices, this means that even when nonpharmacological approaches are acknowledged in guidelines, their implementation is often depended on available time, resources, and institutional capacity. For example, access to dietitians, diabetes educators, or culturally tailored counseling may vary significantly between hospital or regions. This variability can lead to an unequal patient experience, where some individuals receive highly supported care while others must navigate complex self-management task with limited guidance’s.

Another important dimension within the biomedical model is the emphasis on patient compliances and adherence. With clinical workflow, success if often framed in terms of whether patients are “following instructions” correctly. However, this framing can overlook the structural and cultural constraints that shape behaviours. For example, dietary recommendations may assume access to specific foods or cooking practices that are not feasible for all populations. Similarity, self-monitoring routines may not account for work schedules, caregiving responsibility, or emotional burden during pregnancies.

As a result, continuing issues may emerge between clinical intent and real-world implementation. These gaps are not necessarily due to a lack of understanding or willingness from patients, but rathe reflects a mismatch between standardized care expectations and diverse lived realities. This highlights the importances of interpreting GDM not only as a metabolic conditions, but also as a situated experiences shaped by environments, identify and access.

Overall, while biomedical care provides an essential foundation for managing gestational diabetes safety, it also established a structures system that can unintentionally limits responsiveness to induvial context. This creates an important space for complementary approaches that enhances communications, accessibility, and cultural relevance's within existing clinical models, without replacing their core medical functions.

Epidemiological Trends and Population Health Context

From a population health perspective, GDM is an increasingly significant concern in Canada, particularly in provinces like Ontario. Epidemiological studies (Luo, 2024) indicate rising incidence rates, driven by factors such as increasing maternal age, higher pre-pregnancy body mass index (BMI), and changing population demographics, including immigration patterns.

In addition to these well-established risk factors, recent population health analyses also suggest that change in dietary environments, sedentary lifestyle, and urban living conditions may further contribute to the rising prevalences of gestational diabetes. These factors interact with biomedical risks in complex ways, meaning that GDM cannot be understood solely through induvial level characteristics, but must also be examined within broader environmental and societal context that shape everyday health behaviours.

These findings emphasize that GDM is not only a clinical condition but also a population health issue that is shaped by broader social and demographic shifts in Canada. Viewing GDM through a population health lens shifts the focus from individual responsibility to upstream factors that influence risk and outcomes.

Importantly, this shift reframes GDM as a condition that is unevenly distributed across populations, rather than randomly occurring. Certain groups, including immigrants' communities, racialized populations, and induvial facing socioeconomic barriers, may experiences disproportionate exposure to risk factors such as limited access to preventive care, food insecurity, or reduced opportunities for early screening. This highlights how structural determinates of health contributes to patterns of incidences and outcomes across different communities.

Within this context, immigrant's patterns play a particularly significant role in shaping epidemiological trends in Canada. Many newcomers' populations arrive with diverse genetic backgrounds, dietary practices, and health profiles, and may experiences changes in lifestyle and healthcare access after migration. These transitions can sometimes increase vulnerability to metabolic conditions such as GDM, especially when combined with barriers such as language differences, unfamiliarity with preventives healthcare systems, and limited continuity of care.

At the same time, it is important to recognize that higher risk does not imply homogeneity within groups. There is significant variability within immigrants and culturally diverse population in terms of health behaviours, access to resources, and engagement with healthcare systems. This reinforces the needs for population health approaches that avoid generalizations and instead forces on understanding layered, intersecting determinates of health's.

Overall, a population health perspective broadens the understanding of GDM from an individually managed pregnancy conditions to a systemically shaped health outcomes influenced by social, cultural, economic, and environmental factors. This perspective strengthens the argument for interventions that go beyond clinical management to include prevention, equity-focused design, and improved accessibility of care across diverse populations.

Health System Inequities and Access to Care

Research in the Canadian healthcare system reveals persistent inequities in diabetes care delivery. For example, population-based studies show that immigrant populations often experience disparities in the quality and continuity of diabetes care compared to non-immigrant populations (Adekunte et al., 2025). These inequities are shaped by multiple dimensions of marginalization, including language barriers, income, health literacy, and access to culturally appropriate services. However, it is also important to recognize that diabetes care in Canada is not consistently optimized for chronic disease management across populations. This absence of a fully standardized, patient-centered model for long-term diabetes care may contribute to variability in patient experiences more broadly, including among non-immigrant population who may have had longer exposure and adaptation to existing healthcare system expectations. Within this context, disparities in care are shaped not only by induvial levels barriers, but also by broader system design limitations in supporting chronic disease management.

These inequities are not experienced at the level of induvial interactions but are also embedded within how healthcare systems are structured and delivered. For instances, appointment-based care models, limited consultation times, and reliance on standardized communications formats may unintentionally disadvantages patients who require additional time, interpretation support, or culturally tailored explanations. As a result, even when services are technically available, they may not be equally accessible or usable for all populations.

Such findings have highlighted that health outcomes are not determined solely by clinical interventions but are also deeply influenced by structural determinants and healthcare system design. Inequitable access to consistent, high-quality care can lead to poorer management of GDM and an increased risk of complications.

In the context of gestational diabetes, continuity of care is particularly critical, as management requires regular monitoring, follow-up appointments, and coordinated communications between multiple providers. When patients experience~~s~~ disruptions such as missed referrals, unclear follow-up instructions, or having a hard time accessing specialist these barriers in care delivery can accumulate and negatively impact both short-term pregnancy outcomes and long-term health trajectories.

Language barriers further compound these challenges by limited patients’ ability to fully understand medical information, ask question, or advocate for their needs. While interpreter services may exist, they are not always consistently integrated into care workflows, and patients may rely on informal translations through family members, which can affect accuracy, privacy, and autonomy in decision-making.

Health literacy also plays a significant role in shaping access to care. Patients who are unfamiliar with medical terminology or healthcare systems may struggle to interpret instructions related to glucose monitoring, dietary changes, or medications uses. Without proper supports, this can lead to misunderstanding that are often interpreted as non-adherences rather than as gaps in communications or system design.

Additionally, socioeconomic factors as incomes and employment conditions can influences a patient’s ability to attend appointments, purchase recommended foods, or support consistent self-management routines. These constraints highlight how access to care extends beyond the clinical settings is closely tied to broader social conditions that shape everyday life.

Overall, these inequities point to the need for healthcare systems that are not only clinically effective but also intentionally designed to be inclusive, flexible, and responsive to diverse patients needs. Addressing disparities in GDM care therefore requires attentions to both medical treatments and the structural conditions that influences how acre is accessed, understood, and sustained over time.

Cultural Context and Health Behaviour

Cultural and contextual factors are consistently identified as central to GDM management in Canada. Research conducted in Southern Ontario has shown that South Asian women experience both barriers and facilitators to lifestyle changes, shaped by cultural dietary practices, family expectations, and challenges in healthcare communication (Kandasamy et al., 2020).

These findings highlights that healthcare behaviours are not formed in isolation, but are deeply embedded within everyday routines, traditions, and social relationships. Food practices, for example, are often tied to cultural identity, religious practices, and family structures, making dietary changes not simply a medical adjustment but a significant social and emotional shift. As a result, recommendation that do not account for this context may be difficult to adopt or sustained over time.

These factors can act as both barriers and facilitators to the use of lifestyle medications. For instance, traditional diets may conflict with clinical nutritional advice, while family influences can either support or hinder adherence to care plans. Broader literature by Tan & Canadian Journal of Diabetes Contributors (2020) has reinforced the idea that health behaviours are deeply embedded in cultural and psychosocial contexts.

Family dynamics play a particularly important role in shaping how gestational diabetes is managed. In many cultural contexts, food preparation, decision-making, and caregiving responsibilities are shared within the household. This means that an individual's ability to follow dietary or lifestyle recommendations may depend not only on personal understanding, but also on the willingness and capacity of family members to adapt alongside them. Without inclusive approaches that engages this broader support system, care plans may be difficulty to implement in practices.

In addition, cultural beliefs about pregnancy and health influences how gestational diabetes is perceived. In some cases, pregnancy may be viewed as a time when dietary restrictions are discouraged, or when traditional foods are considered essential for maternal and fetal well-being. When clinical advice conflicts with these beliefs, patients may experience~~s~~ tensions between medical guidance's and cultural expectations, which can affect trust and decision-making.

Communication challenges further intersect with cultural context. Even when translation services are available, meaning is not always fully transferable across language and cultural frameworks in healthcare settings. This has been observed in maternity care contexts, where immigrant women report difficulties in interpreting clinical concepts beyond linguistic translation, reflecting deeper differences in health beliefs and understandings of risk (Higginbottom et al., 2015).

This underscores the need for culturally responsive care models that move beyond standardized recommendations and instead adapt to patients lived realities.

A culturally responsive approach does not simply translate existing materials, but rethinks how information~~'s~~ is framed, delivered, and contextualized. This may include adapting dietary guidance to reflect culturally familiar foods, incorporating family inclusive educations strategies, and creating space for dialogue where patients can express concerns, preferences, and constraints. By aligning care with patients lived experiences, such approach can improve both engagement and long-term adherences.

Ultimately, recognizing the central role of cultural and contextual factors shifts the focus of care from compliances to collaboration. It emphasized the importance of designing care models that are flexible, respectful, and responsive to diversity, ensuring that recommendations are not only clinically appropriate but also meaningful and achievable within patients' everyday lives.

Immigrant Experiences and Cultural Safety in Maternity Care

Systematic reviews by Higginbottom et al. (2015) have highlighted that immigrant women in Canada often face challenges that are related to cultural safety, which includes communication barriers, a lack of culturally appropriate care, and fragmented healthcare experiences.

Cultural safety extends beyond the presences of translation services or diverse representation; it involves creating healthcare enlivenments where patients feel~~s~~ respected, understood, and free from judgement. This includes recognizing power~~s~~ dynamics between providers and patients, as well as acknowledging how historical, social, and cultural context shapes healthcare interactions. When these elements are not addressed, patients may feel hesitant to ask questions, share concerns or fully engage in their care.

These issues can reduce trust in healthcare providers, limit patient engagement, and disrupt continuity of care, particularly during pregnancy, which is already complex. For an individual managing GDM, these barriers can further complicate adherence to care plans and access to necessary resources.

Trust plays a central role in healthcare engagement, especially in conditions like gestational diabetes that require~~s~~ ongoing monitoring, behaviour~~s~~ changes, and frequent interaction with providers. When patient perceive care as culturally insensitive or misaligned with their values, they may disengage from services, delay follow up appointments or rely on informal sources of information instead of clinical guidance.

Fragmentation of care pathways and transitions further intensifies these challenges. When patients encounter multiple providers who do not consistently communicate with one another, or when care instructions vary across appointments, it can create confusion and reduce confidences in the healthcare system. For immigrant women who may already be navigating an unfamiliar system, this lack of coherences can be particularly overwhelming.

Additionally, experiences of cultural misunderstanding or dismissal, whether international or unintentional can contribute to feeling or marginalization within the healthcare setting. Patients may feel that their cultural practices, beliefs, or concerns are not valued, which can impact their sense of dignity and belonging within the care environments. These experiences are especially significant during pregnancy, a time that is often closely tied to cultural traditions and expectations.

Culturally safe care is therefore not just an ethical consideration but a critical part of effective healthcare delivery.

Embedding cultural safety into healthcare systems requires more than individual providers awareness; it involves systemic changes such as training, policy development, and the integration of culturally responsive practices into everyday workflows. This includes design processes that allows time for meaningful communication, incorporating patients' perspectives into decision-making, and ensuring that's services are adaptable to diverse needs.

Culturally safe care supports not only ethical and equitable healthcare delivery, but also improved clinical effectiveness by fostering trust, enhancing communications, and enabling patients to engage more fully in their care. In the context of gestational diabetes, this can lead better adherences, improved patient experiences, and more positive health outcomes for both and child.

Psychosocial Impacts of Gestational Diabetes

The psychosocial impact of diabetes during pregnancy is increasingly recognized but remains under-integrated into clinical care pathways. Women often report stress, anxiety, and emotional burden associated with managing blood glucose levels, dietary restrictions, and concerns about fetal outcomes (Corathers et al., 2013; Pham et al., 2022).

These emotional responses are often intensified by the suddenness of diagnosis, which typically occurs during routine prenatal screening without warning. Patients may be required to rapidly adjust their daily routines, adopt new monitoring practices, and process complex medical information within a short period of time. These abrupt transitions can create feeling of loss of control, uncertainty, and pressure to perform "correctly" for the health of the baby.

These emotional experiences can directly influence engagement with care. For example, anxiety or feeling overwhelmed may reduce adherence to monitoring routines, while stigma or fear may limit communications with healthcare providers.

In addition, the perception of gestational diabetes as a "high-risk" condition can contribute to feeling guilt of self-blame, particularly when patients interpret the diagnoses as a personal failure rather than medically influenced condition. This can be further reinforced when care interactions focused heavily on compliances and outcomes without acknowledging the emotional challenges involved in managing the condition.

Social isolation is another important psychosocial dimension. Induvial managing GDM may feel disconnected from their usual support system, especially when dietary restriction or lifestyle changes differ from those of family and peers. This can be particularly pronounced in cultural contexts where food plays a central role in social connection, leading to feelings of exclusion of frustration.

The emotional burden of GDM also extends beyond pregnancy. Concerns about long-term health risk, including the development of type 2 diabetes an create ongoing anxiety during the postpartum period. However, without structured psychosocial or mental health support, these concerns are often left unaddressed within standard care pathways.

Recognizing GDM as both a medical and emotional experience can highlight the need to integrate mental health and psychosocial support into standard care practices.

Integrating psychosocial care may involve incorporating routine emotional check-ins during clinical visits, providing access to counseling or peer support groups, and creating care environments that normalize emotional responses rather than framing them as barriers to compliances. These approaches can help patients feel supported, reduce stigma, and improve overall engagement with care.

Ultimately, addressing the psychosocial dimension of gestational diabetes is essential for delivering holistic, patients-centered care. By acknowledging and supporting the emotional experiences associated with GDM, healthcare systems can enhance~~s~~ both patient well-being and the effectiveness of clinical interventions.

Care Fragmentation and Long-Term Prevention Challenges

Fragmentation of care and limited postpartum support remain significant challenges in the management of GDM in Canada. Evidence has shown that women who have a history of GDM face barriers to sustained lifestyle modifications after pregnancy, which include a lack of continuity in preventive care and insufficient system-level follow-up (Lipscombe et al., 2014).

This fragmentation often occurs as patient transition between different phase of care, from prenatal monitoring to delivery and then into postpartum follow-up. While care during pregnancy is typically structured and closely monitored, support frequently decreases after delivery, creating a gap at a critical moment when long-term risk management should be. This discontinuity can leave patients without clear guidance on how to maintain lifestyle changes or access ongoing support.

This is particularly concerning given that GDM significantly increases the risk of developing type 2 diabetes later in life, with studies estimating that approximately 30-50% of induvial with a history of GDM will develop type 2 diabetes 2 diabetes in their lifetime (Diabetes Canada Clinical Practices Guidelines Committee, 2023). Without sustained follow-up and preventive care, opportunities for easily interventions are often missed (Luo et al., 2024).

Postpartum care pathways are often not well integrated with earlier gestational diabetes management, meaning that patients may not receive timely reminders for follow-up screening, such as glucose tolerances testing after pregnancy. In some cases, responsibility for follow up shift from specialized prenatal clinics to primary care providers without clear communication or coordination, increasing the likelihood that patients may fall through system challenges in the systems.

Additionally, the postpartum period is often characterized significant physical, emotional, and social adjustments, including recovery from childbirth, caregiving responsibilities, and change in daily routines. These factors can make it difficult for induvial to prioritize their own health needs, particularly in the absences of structured support systems. As a result, even when patients are aware of long-term risk, they may face practical barriers to engaging in preventive care.

These continuing issues reflect broader issues in healthcare systems-level constraints within healthcare delivery, where primary care is often episodic and condition-specific rather than continuous and preventive, due to how healthcare services are structured and coordinated within existing system workflows (Komashie et al., 2021). As a result, opportunities for sustained preventive care often limited, highlighting prevention and continuity of care as key opportunities for design intervention in chronic disease management.

This episodic structure reinforces a model of care that focuses on managing immediate conditions rather than supporting long-term health trajectories. In the case of GDM, this means that care is concentrated during pregnancy, while the ongoing risk of type 2 diabetes is not consistently addressed through sustained engagement of preventive strategies.

Addressing these challenges requires rethinking how continuity of care is designed and delivered across distinct stages of the patient journey. This may involve creating clearer transitions between services, integrating follow up protocols, inro routine care, and ensuring that patients are supported beyond the clinical settings. Strengthening these connections can help shifts care from reactive, short-term managements towards initiative-taking, long-term preventions.

Integrated Approaches and System-Level Gaps

Recent literature increasingly emphasizes the need for integrated and holistic care approaches. A scoping review (Pham et al., 2022) highlights that current care pathways are often fragmented, with inconsistent coordination among clinical services, community resources, and patient support systems.

This fragmentation is not only structural but also experiential, as patients often perceive their care as a series of disconnected encounters rather than a cohesive journey. Each integration whether with a physician, dietitian, or laboratory services may provide valuable information, but without clear integration, patients are left to piece together guidance on their own. This can lead to confusion, duplication of information, or gaps is understanding, particularly for those navigating the system for the first time.

An integrated model would connect to biomedical care with culturally responsive psychosocial support and system navigation resources. This approach recognizes that effective GDM management requires more than just clinical treatment; it requires addressing the full spectrum of patients' needs across the care pathway.

Integration in this context involves not only linking services but also aligning them around the patient’s experience. This includes ensuring that communication is consistent across providers, that educational materials reinforce rather than contradict one another, and that patients receive coordinated guidance that reflects both their medical and personal contexts. For example, integrated gestational diabetes care is often delivered through multidisciplinary diabetes in pregnancy clinics involving obstetricians, endocrinologist, and diabetes educators (Diabetes Canada Clinical Practices Guidelines Committee, 2023). It also involves bridging health programs, peer support networks, and culturally specific services that address immigrant and newcomer populations (Higginbottom et al., de Sequeira et al., 2019).

A key aspect of integrated care is the inclusion of system navigation supports. Patients often require assistances in understanding where to go, what to expect, and how different part of the system connect. Without these supports, the burden of coordination falls on the individual, which can be especially challenging for those managing a high-risk pregnancy alongside others life responsibilities. Navigation tools, whether in the form of care coordinators, visual pathways, or digital supports, can help reduce this burden and improve continuity.

Overall, this literature suggests that while Canada has a strong biomedical foundation for managing GDM, there are significant opportunities to improve through integration, equity-focused design, and patient-centred approaches.

An equity-focused approach to integration ensures that improvement is not applied uniformly but are intentionally designed to address disparities in access and experiences. This means prioritizing populations who face the greatest barriers, such as newcomers and culturally diverse communities, and designing systems that are flexible enough to adapt to unique needs.

Patient-centred care within an integrated model also shifts the role of patient from passive recipients of care to active participants in their health journey. This involves creating opportunities for shared decision-making, incorporating patient feedback into services design, and ensuring that care is responsive to individual preferences and values.

Integrated approaches aim to transform gestational diabetes care forma a fragmented set of services into a coordinated, continuous system that supports patients across clinical, cultural and emotional dimensions. By strengthening these connections between services and centering patient experiences, such models have the potential to improve both health outcomes and overall quality of care.

Conclusion

The literature showed that while gestational diabetes mellitus (GDM) care in Canada is grounded in strong biomedical frameworks focused on clinical safety and risk reduction, it does not fully address the broader social, cultural, and experiential factors that shape patient outcomes. Across the reviewed themes, key barriers in care delivery appear, which includes inequities in access to care, cultural and communication barriers, psychosocial burden, and fragmented care pathways, particularly for newcomers and culturally diverse populations. These challenges influences by structural and contextual factors. As a result, there is a need to move beyond purely biomedical approaches towards more integrated, fair, and patient-centred models that support continuity, accessibility, and meaningful engagement across the care pathway. In this context, design offers a complementary role by translating these systemic gaps into actionable strategies that enhances how care is delivered and experienced, bridging the dived between clinical evidence and real-world practices.

Opportunity Context

Gestational diabetes care typically involves multiple institutional layers, including obstetric services, endocrinology clinics, diabetes education programs, laboratory testing, public health follow-up, and community-based supports. Patients must often transition between these services with limited coordination, inconsistent communications, and varying levels of cultural accommodations. These transitions can create confusion and stress, particularly for individuals who are unfamiliar with the Canadian healthcare system.

The literature consistently identifies several structural gaps within current models of care. These include language discordances and limited health literacy support, which can result in insufficient cultural alignment in the dietary and lifestyle recommendations, a lack of providers' preparations for culturally diverse care environments, fragmented care pathways, limited integration of psychosocial supports, and an overemphasis on measurable clinical indicators at the expense of patient experiences. Although these are evidence-based care guidelines from a biomedical perspective, they frequently underdress the experiential and systemic dimensions that influence whether patients can understand, follow, and sustain recommended care practices.

The opportunity for design lies not in replacing clinical protocols, but in strengthening and augmenting existing programs through tools and frameworks that improves communications, continuity, dignity, and accessibility. Rather than intervening at the level of medical treatment, design operates at the levels of experiences, interaction, and system integration. This distinction is critical, as it allows clinical expertise to remain intact while addressing the system challenges that influences how care is understood and enacted in everyday contexts.

In practice, this mean identifying where breakdowns occur across the care pathways and introducing design interventions that makes these moments more supportive, clear, and responsive. For example, communication can be enhanced through multilingual and multimodal tools that translate complex medical information into formats that are not only linguistically accessible but also culturally meaningful. Visual aids, simplified language, and culturally relevant examples can help bridge the gaps between clinical instructions and patient understanding, particularly for induvial with varying levels of health literacy. These tools do not change the content of care but transform how it is delivered and received.

Continuity of care represent another key area where service design can contribute within healthcare systems. Gestational diabetes care often involves multiple transition between providers and settings, which can result in fragmented patient experiences. Within this context, service design functions as a collaborative, multidisciplinary practices involving clinicians, administrators, and design practitioners working together involving clinicians, administrators, and design practitioners working together to analyse and improve care delivery pathways. Rather than being limited to visual or conceptual tools, services design applies structured methods such as patient journey mapping, services design applies structured methods such as patient journey mapping, services blueprinting, and care pathways analysis to identify gaps, inefficiencies, and breakdowns in continuity (Simonse et al., 2019 McCarthy et al., 2016).

These methods are already used in healthcare settings to support system improvement. For example, journey mapping has been applied in hospital quality improvement initiatives to understand patient experiences across antenatal and chronic disease care pathways, while services blueprints are used to align clinical processes with patient-facing touchpoints (McCarthy et al., 2016; Simonse et al., 2019). In gestational diabetes care specifically, such tools can support cleaner follow up processes, coordinated communication between providers, and structured care roadmaps that helps patients anticipate next steps. In this way, service design contributes to connecting existing services into more cohesive and navigable experiences, supporting continuity of care without necessarily requiring major structural changes to healthcare delivery.

Dignity is also a central consideration within this opportunity. When care models do not reflect patients' cultural identities, lived experiences, or personal circumstances, induvial may feel misunderstood or marginalized, even when receiving appropriate clinical treatments. Design offers a way to reintroduce dignity into care by ensuring that services are respectful, inclusive, and responsive to diverse needs. This can involve incorporating culturally relevant dietary guidance, recognizing the role of family and community in decision-making, and designing interactions that foster trust and empathy between patient and providers. By acknowledging the individuality f each patient's experiences, design helps shift care from being standardized to being person-centred.

Accessibility, in this context, extends beyond physical access to services and includes the ability to meaningfully engage with care. Even when services are available, they may not be usable if patients cannot understand instructions, navigate systems, or align recommendation with their daily lives. Design addresses these gaps by focusing on usability, ensuring that information, services and pathways are intuitive, clear, and adaptable to different context. This includes simplifying complex processes, reducing cognitive burden, and creating supportive environments that enable patients to participate actively in their care.

Taken together, these contribute positions design as a supportive and integrative layer within the healthcare system. Rather than altering clinical care itself, design enhance how care is delivered, understood, and experienced. It works alongside biomedical models to ensure that clinical effectiveness is matched by experiential accessibility, supporting better engagement, improved patients experiences and more equitable health outcomes.

Positionality as a Designer

This research project developed from the perspective of a design researcher rather than a clinical or policy-maker role. As an outsider to the Ontario healthcare system, in this project I had to learn the provincial system and then focus on identifying the gaps in communication, navigation, and patient experiences. Through a design-led approach, this work translates systems-level challenges into actionable design opportunities that can support healthcare providers, patients, and institutions. This positioning allows for critical yet collaborative perspective where design complements existing biomedical models rather than replacing them.

Building from this position, the role of the design researcher is not to diagnose or treat medical conditions, but to examine how care is structured, delivered, and experienced across different points of interaction. This perspective shifts attention from solely what care is proceed to how care is met by patient within complex systems. In the context of gestational diabetes, where clinical protocols are well-established and showed-based, the challenge is less about the absent of medical knowledge and more about the continuing issues between clinical integration and patient experiences. These barriers in care delivery often emerge in moments of communication breakdown, unclear navigation pathways, and misalignment between standardized care models and diverse lived realities.

Operating as an “Outsider” enables a form of critical distance that is essential for identifying these gaps. Rather than being embedded within the routines and assumptions of the healthcare system, the design researcher can question taken- for-granted practices and uncover inefficiencies or exclusion that may otherwise go unnoticed. For instances, while clinical workflows may prioritize efficiency and standardized delivery, they may unintentionally overlook whether patients fully understanding the information being provided or feel supported in applying it within their own context. This perspective allows the research to highlight how systemic structures rather than induvial behaviours that shapes patients experiences and outcomes.

At the same time, this positionality is mot oppositional. It does not seek to critique healthcare systems in isolation, but rather to engage with them in constrictive and collaborative manner. Design operates as a complementary discipline that works alongside clinical expertise, offering tools and methods to enhances the delivery and accessibility of care. This includes translating complex system into more understandable formats through visualization, identifying friction points across patient journeys, and proposing interventions that improve clarity, coordination and engagement. In this way, design acts as a bridge between different stakeholders within the system, including patient providers and institutions.

A central contribution of this perspective is its emphasis on system thinking. Healthcare is not experiences a single interaction but as a series of interconnected touchpoints that unfolds over time. Patients navigating gestational diabetes care must move better diagnoses, educations elf0managements, follow-up appointments, and postpartum care, often across multiple providers and settings. From a design standpoint, these interactions are not isolated events, but as part of a broader services ecosystem. By mapping these relationships and identifying where breakdowns occurring, design research can reframe complex challenges into opportunities for improved integration and continuity.

This approach also foregrounds the importance of lived experience as a valid and necessary source of insights. While clinical and epidemiological data provide critical information about health outcomes, they do not fully capture how patients interpret, responded to, or engage with care in their daily lives. A design researcher prioritizes these experiential dimensions, recognizing that factors such as language, cultural, emotional well-being, and social context play significant role in shaping health behaviours. In the case of gestational diabetes, this means acknowledging the dietary practices, family dynamic, and cultural belief are not peripheral concerns, but central components of how care is understood and enacted.

Importantly, this perspective recognized that patients are not a homogenous group. Each individuals brings different needs, preferences, and circumstances to their care experiences. Standardized models, while efficient from a clinical standpoint, may fail to account for this diversity, leading to gaps in accessibility and engagement. Within healthcare system, service and information design address this challenge through specific application such as patient journey mapping, care pathway redesign, and service blueprinting, which help identify where different patient needs diverge within standardized processes (Simonse et al., McCarthy et al., 2016). Information design approaches are also used to develop culturally adapted education materials, including multilingual diabetes management guides and visual nutrient tools that support comprehension across different literacy levels and cultural contexts.

At a system level, design contributes through the development of coordinated care tools, such as shared care plans and structed follow up systems that allows flexibility in how patient engage with care over time. Together, these approaches demonstrates that equitable acre is not achieved through uniformity, but through intentionally designed systems that respond to variability in patient needs contexts, and experiences.

Another key aspect of this positionality is its focused-on translation on both literal and conceptual. Design research translates complex medical information into more accessible forms, translate system level challenges into tangible interventions, and translate diverse stakeholder perspective into cohesive solutions. This acts of a transition are particularly important in bridging the system challenges between evidence and practices. While research may identify what should be done, design helps determine how it can be implemented in ways that are practical, understandable, and meaningful within real-world settings.

However, this positioning also comes with important limitation that must be acknowledge. As a design researcher working primarily with secondary data, the insights generated in this project are shaped by existing literature and do not include direct engagement with patients or healthcare providers. This means that while the research can identify patterns and proposes informed interventions, it cannot fully capture the nuances of specific context or validate solutions with end users. Recognising this limitation highlights the importances of future work that incorporates participatory and co-design methods, where stakeholders are actively involved in shaping and refining proposed interventions.

Despite these limitations, the design research perspective offers a valuable contribution to the field of healthcare innovations. It expands the scope of inquiry beyond clinical effectiveness to include questions of usability, accessibility, and experiences. It challenges the assumptions that care is effective simply because it is available, instead emphasizing the importances of whether it can be meaningfully access and sustained by diverse populations,

This positionality situates design as an integrative layer within healthcare systems, one that helps enhances rather than replaces the existing structures. By focussing on communications, navigation, and patients' experiences, design helps ensures that care is not only clinically sound but also understandable, inclusive, and responsive. In doing so, it supports a more comprehensive approach to gestational diabetes care, where biomedical excellences are complemented by attention to the human and contextual dimensions of health.

Methodology

Approach

This project employs a design-led qualitative evidence synthesis to identify system-levels gaps and inform services opportunities in gestational diabetes care within Canadian hospital settings. The study draws on secondary sources, including peer reviewed literature, clinical guidelines, populations health studies, and institutional reports (Peters et al., 2015; Simonse et al., 2019).

Search Strategy

This approach is grounded in design research principles that prioritize interpretation, synthesis, and translation over measurement alone (Simonse et al., 2019; McCarthey et al., 2016). Unlike traditional systematic reviews that aims to aggregate findings for statistical generalization, this approach emphasizes understanding patterns, relationships, and experiential dimensions across diverse sources (Arksey & O'Malley, 2005; Munn et al., 2018). By treating literature as a form of indirect stakeholder input, the study captures perspective that reflect both clinical priorities and lived realities. This allows for a more holistic understanding of gestational diabetes care as a system that is simultaneously medical, social, and experiential.

Search terms included combinations of: "gestational diabetes," "diabetes in pregnancy," maternal health Canada" "immigrant women," "healthcare access," "care continuity," "patient journey mapping," and "culturally responsive care." Boolean operators (AND/OR) were used to refine and expand the result across concepts. Databases searched included PubMed, Google Scholar, Scopus, and organizational sources such as Diabetes Canada. The search was conducted for publication between 2013 and 2025 to ensure relevance to contemporary healthcare systems. An initial search yielded 65-80 records across all databases. After title, abstract, and full text screening, 28 studies included in the final synthesis.

Analysis

The analysis involved iterative thematic synthesis of extracted findings across included sources. Key concepts related to access to care, cultural barriers, and system-level gaps were coded and grouped into recurring themes. These themes were then compared across clinical, public health, and design literature to identify overlaps, tension, and gaps in gestational diabetes care pathways. This interpretive process supported the development of system-level insights and informed subsequent mapping of care experiences and service opportunities.

Mapping Methods

A scoping review methodology was selected because it is particularly suited for mapping complex and interdisciplinary healthcare topics where evidence is heterogeneous and not easily comparable (Arksey & O'malley, 2005; Peters et al., 2015). Unlike the systemic reviews, this approach does not aim to assess effect size or produce statistical generalizations but instead seeks to map the breadth of available evidence and identify continuing issues in knowledge and care delivery (Munn et al., 2018). This makes it especially appropriate for services design research, where understanding systems complexity and lived experiences is prioritized.

Search Strategy and Study Selection

The search was limited to English-language publication between 2013 and 2025 to ensure relevance to contemporary healthcare contexts (Peters et al., 2015). Reference list screening (snowballing) was used to identify further relevant studies from key scoping reviews, systematic reviews, and patient journey mapping literature. This approach ensured that both peer-reviewed empirical studies and foundational methodological and guideline-based sources.

Source	Records Identified	After screening	Included in Final Review
PubMed	~30-40	~20-25	~10
Google Scholar	~30-35	~15-20	~8
Guideline/Organizational sources	5-6	5-6	3
References list screening	-	5-7	2-3
Total	**~65-80**	**~45-55**	**28 total sources**

Discussion of Findings

Overall, the findings indicate that gestational diabetes care in Canada is clinically robust but experientially fragmented. Across the literature, recurring challenges include communication barriers, cultural misalignment, psychosocial burden, and lack of care continuity. (Heslehurt et al., 2022; de Sequeira et al., 2019; OuYang et al., 2021; Higginbottom et al., 2017). These issues are interconnected and reflect system-level limitations rather than individual patient behaviours.

The thematic patterns identified across the selected studies consistently showed that challenges do not exist in isolation. For example, communication barriers between patients and providers often intersect with cultural and linguistic differences, which in turn contribute to misunderstandings in treatment adherences and reduced patient confidence (Heslehurt et al., 2022; de Sequeira et al., 2019; Higginbottom et al., 2017). Qualitative studies conducted in Canada specifically found that immigrant women report a lack of culturally tailored dietary recommendations, and that the absence of translated or culturally adapted educational materials significantly impedes their understanding of the engagement with care options (de Sequeira et al., 2019; Higginbottom et al., 2017).

Similarly, fragmented care pathways and inconsistent follow up systems amplify psychosocial stress, particularly for patients navigating pregnancy alongside chronic conditions managements (OuYang et al., 2021; Benton et al., 2023). Women with GDM have been found to be 2 to 4 times more likely to develop antenatal or postnatal depression compared to those without the conditions, and psychosocial distress, which includes guilts, shames, and self-blame which is frequently documented across the emotional literature (Benton et al., 2023; OnYang et al., 2021). These findings underscore that the emotional burden of GDM is not incidental but is structurally produced by how care is organized and communicated.

To move from thematic insights to design understanding, these patterns were translated into system maps and patient journey maps (McMarthy et al., 2016; Philpot et al., 2019; Simonse et al., 2019). This allowed for the relationships between actors, services, and patient experiences to be visualized spatially and temporally, highlighting where breakdowns in cate continuity and communication occur.

System Gaps in Gestational Diabetes care

Rather than producing isolated findings, the literature reviews, thematic synthesis, and systems mapping process collectively revealed a set of interrelated patterns that shapes the delivery and experience of gestational diabetes care for newcomers and culturally diverse populations. Through iterative comparison across clinical literature, public health studies, and series design frameworks, recurring issues were daintified and mapped across the care journey, highlighting how challenges accumulate across multiple points of contact within the system (Peter et al., 2015; Munn et al., Simonse et al., 2019).

This integrated analysis demonstrated that issues in gestational diabetes care are not isolated to single stages of treatment, but are distributed across diagnosis, education, follow up, and self-management processes. These interconnected patterns point to several systemic gaps that consistently affects the quality and usability of gestational diabetes care for newcomers and culturally diverse populations.

Communication Barriers

Communication barriers are a major obstacle to effective gestational diabetes care. Patients frequently report difficulty understanding medical instructions, dietary recommendations, and self-management expectations when information's is delivered in complex medical language or in English only. For newcomers' populations, this creates a disconnect between receiving care and being able to act on it. While services may be available, they are not always accessible in meaningful way. This highlights a critical distinction between access and usability where information must not only be provided, but also understood, culturally relevant and actionable.

Cultural Misalignment

Another recurring gap that limits cultural responsiveness in the standardized care model is dietary and lifestyle factors. Dietary and lifestyle recommendations are often based on the Western nutrition guidelines that may not reflect traditional foods, religious practices and family structures common amongst immigrant populations (Kandasamy et al., 2020). Patients may appear noncompliant despite efforts to follow recommendations within their cultural context. This indicates that standardized care models can unintentionally create barriers when they do not account for diverse cultural realities.

This literature also highlighted insufficient preparations among healthcare providers for working in culturally diverse environments. Providers frequently reported feeling underprepared to address cultural differences, while patients described experiences of feeling misunderstood or dismissed (Haigh et al., 2023). These challenges suggest that barriers to equitable care are not only patient-related but are also embedded within institutional practices and training structures.

Fragmentation of Care

Fragmentation of care pathways was another issue amongst individuals struggling with gestational diabetes care. This often requires coordination between multiple services, yet follow-up instructions, appointments, and referrals are not always clearly communicated. This problem is particularly difficult for newcomers who are unfamiliar with the healthcare system and may lack social support to help navigate it (Adekunle et al., 2025).

System Mapping Analysis

Figure 1. Gestational diabetes navigation map

Figure 1 illustrates the complexity of gestational diabetes care within Canadian hospital system, highlighting the multiple actors, relationships, and systemic layers that shape patient experiences. Rather than presenting care as a linear pathway, the figure proves how gestational diabetes management operates as an interconnected system involving clinical, social, cultural, and policy-level influences.

At the center of figure 1 is the pregnant induvial living with gestational diabetes, positioned as a health-seekers navigating a complex care environment with agency, lived experiences, and decision-making capacity. Surrounding this central figure are multiple interacting system layers, structured in alignment with a socio-ecological models of health.

The most immediate layer (micro-system) includes family members, household dynamics, and close interpersonal relationships, which play a significant role in shaping dietary practices, health beliefs, and day to day management of the condition. The meso-system includes clinical care providers such as obstetricians, endocrinologist, diabetes educators, and dietitians, who engage with the induvial through episodic but structured clinical encounters. The exo-system includes institutional and organizational structures such as hospitals, diabetes in pregnancy clinics, and health services delivery systems that shapes how care is coordinated and accessed. Finally, the macro-system encompasses broader policy and structural factors, including healthcare funding models, cultural norms within healthcare delivery, and public health guidelines.

These layers interaction emphasized that care is not delivered by a single provider, but is shaped through the coordination, alignment, or fragmentation of multiple actors across different system levels.

Clinical Care Connections

As shown in **Figure 1,** the innermost layers stand for clinical care connections, including the family doctors, OB/GYN, endocrinologist, diabetes educator, laboratory services, pharmacy and emergency care. These actors handle diagnosis, monitoring, and treatment through biomedical interventions such as glucoses testing, dietary management, and medications.

While these providers are connected through referrals, and shared medical information's, **Figure 1** highlights that these connections are often inconsistent or fragmented. Patients may receive overlapping or unclear information, particularly when communication between providers is not well coordinated. This fragmentation can lead to confusion, especially when medical advice, such as dietary recommendation does not align with patient's cultural practices.

System Navigation Connections

The second layer n **Figure 1** stands for system navigation, including hospitals, public health services, social workers, and community services. These actors play a key role in supporting patients as they move between various parts of the healthcare system.

However, **Figure 1** proves that these connections are often weak or missing, meaning that patients are not consistently supported in navigation care pathways. As a result, individuals must often manage appointments, referrals, and follow up care independently. This lack of integration places a significant burden on patients, particularly newcomers who may be unfamiliar with the healthcare system.

Family and Cultural Connections

The third layer of **Figure 1** highlights the role of family and cultural context in shaping patient experiences. Family members often provide informal support, assisting with daily management and decision-making. Cultural communities also influence beliefs about pregnancy, diet, and illness.

As illustrate in **Figure 1,** these actors can act as informal translators between the patient and the healthcare system. However, their role is not formally integrated into care delivery. This creates challenges when clinical recommendations do not align with cultural practices, potentially leading to misunderstanding or reduced adherences.

Policy and Structural Connections

The outermost layer in **Figure 1** stands for policy and structural factors, such as government fundings and clinical practices guidelines. These elements shapes how care is delivered by influencing resources allocation, service availability, and institutional priorities.

Although these factors operate at a distance from the patient, **Figure 1** shows that they have a significant indirect impact on patient experiences. For example, funding limitations may restrict access to culturally appropriate services, while standardized guidelines may not fully account for diverse patient needs.

System Interaction and Design Implications

A key insight from **Figure 1** is that gestational diabetes care functions as an interconnected system, where barriers in care delivery in one area affect the entire experiences. Weak communication between providers, limited navigation support, and cultural misalignments all contribute to a fragmented patient journey.

Figure 1 highlights that the primary issues that is not absence if care, but the lack of coordination's between different parts of the system. This creates the opportunity for design interventions that strengthen connections, improve communications, and integrate cultural and psychological support into existing care pathways.

Figure 2. System map of gestational diabetes care within Canadian hospital settings

Figure 2 illustrates how the system of care is involved in the management of gestational diabetes. The patient is placed at the center of the diagram, surrounded by different healthcare providers and services, including physicians, laboratory services, pharmacies, hospital care, public health programs, community supports, and family networks. The diagram proves that gestational diabetes care involves multiple parts of the healthcare system rather than a single provider.

Although these services exist, the connections between them are not always strong. Patients often need to move between appointments, instructions, and referrals without clear guidance. This can create confusion, especially for newcomers unfamiliar with the Canadian healthcare system. The illustration highlights that the main challenge is not the absence of care but the lack of coordination, communication, and navigation support between different parts of the system.

In addition, the emotional and psychosocial burden of gestational diabetes is frequently overlooked as well. Women reported feelings of stress, anxiety, isolation, and stigma, especially when expectations around pregnancy differed from those in their cultural communities (Corathers et al., 2013). Despite these findings, mental health and emotional support are rarely integrated into gestational diabetes programs.

Finally, many population-level studies have emphasized that these clinical outcomes have been examined without patients' experiences. Although disparities in the quality of diabetes care have been documented, experiential factors such as trust, understanding, and cultural alignment remain underexplored (Adekunle et al., 2025). These findings support the need for a design-led approach that considers both clinical effectiveness and lived experiences.

How might we

How might we design culturally responsive gestational diabetes care experiences within Canadian hospital settings that improve communication, system navigation, and psychosocial support for newcomers and culturally diverse populations?

Services Design Concept Proposal

Based on these findings, this project illustrates a culturally responsive service model that can strengthen the existing hospital-based gestational diabetes programs rather than replacing them. The concept focuses on three interconnected intervention areas: communications, navigation, and psychosocial support.

Figure 3a. Standardized (one-size-fits-all) gestational diabetes care model

Figure 3b. Proposed culturally responsive services model for gestational diabetes care

This illustration presents the proposed service design model developed in this project. The diagram shows how added supports can be integrated into existing gestational diabetes programs to improve patient understanding, navigation, and overall experiences. The model includes multilingual communication tools, visual education materials, culturally responsive dietary guidance, and clearer care pathway information to help patients move between services more easily.

The illustration explains how emotional and social support elements, such as peer support, family involvement, and improved providers' patient communication strategies, are involved. These additions aim to reduce stress, increase understanding, and encourage long-term engagement

with care. The purpose of this model is not to replace the current hospital programs, but to strengthen them by making care more accessible, culturally responsive, and easier to navigate.

The first component involved culturally responsive communication tools, including multilingual educational materials, visual self-management guides, and culturally adapted dietary resources. These tools aim to improve comprehension and make medical information accessible to patients with different language abilities and literacy levels.

The second part addresses system navigation. Clear care pathway diagrams, simplified journey maps, and follow-up coordination tools are proposed to help patients understand what to expect at each stage of care. These tools are designed to reduce confusion and improve continuity across services.

The third part integrates the psychosocial and emotional support into clinical encounters. Peer-support structures, emotional check-in prompts, and family-inclusive education strategies are proposed to help patients feel supported rather than judged. These interventions aim to promote dignity, agency, and sustained engagement in care.

The Proposed model is designed to work within existing hospital programs, such as the Diabetes in Pregnancy Clinic at Michael Garron Hospital and to enhance their accessibility and cultural responsiveness without increasing clinical burden.

Journey Mapping and Long-Term Outcomes

Journey mapping revealed several disruption points within the current care pathways, including diagnosis communication, the first hospital encounter, home self-management, and postpartum transitions. At each stage, the system tends to prioritize clinical indicators while providing limited support for cultural understanding, emotional needs, and navigation.

Figure 4. Patient Journey through gestational diabetes care

This illustration presents a patient journey map showing the stages of gestational diabetes care from diagnosis to postpartum follow-up. The diagram outlines the sequence of events that a patient typically experiences, including screening, referral to the diabetes clinic, education session, home glucose monitoring, ongoing appointments, delivery, and follow-up care after pregnancy.

The journey map highlights points where patients may experience stress, confusion, or lack of support, particularly during diagnosis, self-management at home, and postpartum follow-up. At this stage, patients must understand complex medical instructions while also managing emotional, cultural and family responsibilities.

The diagram also illustrates that follow-up care after pregnancy, which is often not well-connected to earlier treatments, even though gestational diabetes increases the risk of developing type 2 diabetes later in life. This shows the need for better continuity of care and clearer navigation throughout the patient's experiences.

When follow-up care is not clearly integrated, women with gestational diabetes may not return for postpartum screening, increasing their risk of developing type 2 diabetes later in life (Feghali et al., 2019; Lipscombe et al., 2014). The proposed intervention strengthens continuity of care by providing prevention roadmaps and clearer follow-up pathways, which may improve both short-term management and long-term health outcomes.

Future Research and Limitations

Proposed Future Research

Future research should also build on this work by incorporating participatory and co-design methodologies to ensure that proposed interventions are grounded in lived experienced and practical applicability. A key next step involves setting up partnerships with relevant stakeholders, including healthcare include hospitals with maternity and diabetes care services, community health centres that serve newcomers populations, and non-profit organization, and public health agencies. Potential collaborators may include hospitals with maternity and diabetes care services, community health centres that serve newcomers populations, and non-profit organization focused on immigrant health nutrition. Engaging with frontlines healthcare providers such as dietitian, diabetes educators, nurses and primary care physicians will also be critical in understanding workflow integration, feasibility, and constraints within clinical settings.

In parallel, collaboration with community leaders and cultural organization standing for South Asian and other newcomer populations will be essential to ensure culturally responsive engagements. These partnerships can support recruitment, trust-building, and the co-creation of interventions that are both respectful and relevant. Establishing relationships with settlement services, language support programs, and peer support networks can further broaden outreach and ensure inclusivity in the design process.

Co-design workshops represent a central methodological next step. These workshops should be structured to include diverse participants, including induvial with lived experiences of gestational diabetes or prediabetes, healthcare providers, and community advocates. Activities may include journey mappings, storytelling, scenario0building, and prototyping exercises to explore how current care pathways are experienced and where gaps or opportunities exists. Workshops should be designed with accessibility in mind, including consideration of language interpretation, culturally appropriate facilitations, and flexible participation formats, such as in person, virtual and hybrid.

In additions to workshops, semi-structured interviews and focused groups can provide deeper insights into individual experiences, particularly for participants who may not feel comfortable sharing in groups settings. These methods can help uncover sensitive or complex dimensions of care, such as stigma, emotional burden, or challenges related to dietary changes, and cultural identity. Engaging healthcare providers through interviews or shadowing can also reveal system-level constraints, such as time limitation, resources availability, and institutional priorities, which are critical for implementations.

Following the co-design phase, iterative prototyping and refinement of the proposed services models should be conducted. This may involve developing low and high-fidelity prototypes, such as educational materials, digital tools, spatial interventions, or service workflows. These prototypes can then be tested with users through usability testing sessions to assess clarity, accessibility, and relevance.

Pilot testing within clinical or community-based settings represents another critical step towards implementation. Partnering with a hospital, community health centre, or diabetes clinic would allow for real-world evaluation of the proposed interventions. During this phase, key outcomes such as patient comprehension, emotional experiences, cultural relevance's, and continuity of care can be assessed. From a provider perspective, feasibility, workflow integrations, and perceived value should also be evaluated. Mixed methods approach, combining qualitative feedback with quantitative measures such as engagement rates, satisfactions score can provide a comprehensive understanding of impacts.

The intended audiences for this work extend across multiple sectors. Within healthcare, the findings are relevant to clinicians, administrators, and policymakers seeking to improve culturally responsive care delivery. Within design, this work contributes to the growing fields of health design by demonstrating how spatial, services, and communication design can address systemic gaps in care. Community organizations, and advocacy groups may also find values in these insights as they work to support newcomers' populations and promote health equity.

The next step phase of this research is to aim to transition from conceptual design to applied, context-sensitive interventions. By engaging directly with stakeholders and embedding co-design into research process, future work can ensure that prosed solutions are not only theoretically sound but also meaningful, usable, and sustainable within real-world environments.

Limitations

This study is limited by its reliance on secondary data sources and the absence of direct engagement with patients or healthcare providers. While the use of literature as a proxy for stakeholder insight enables the inclusion of a wide range of perspectives across contexts, its does not fully capture the situated, nuanced, and evolving realities of individuals navigating gestational diabetes within specific local healthcare systems. In particular, the lived experiences of newcomer populations are shaped by intersecting factors such as language, cultural food practices, migration histories, and varying levels of familiarity with healthcare infrastructures. These dimensions are often underrepresented or generalized within existing literatures, limiting the ability of this study to fully account for context-specific barriers and opportunities.

Additionally, the interpretation and synthesis of secondary data introduce potential bias, as insights are mediated through previously published frameworks, methodologies, and research priorities. This may result in system challenges between documented experiences and the realities encountered in practices, particularly within underrepresented or marginalized populations. The absences of direct co-design engagement also limit the ability to validate whether the proposed service models align with the needs, preferences, and values of intended users, including both patients and healthcare providers. As such, while the findings offer a strong conceptual foundation, they should be understood as exploratory and generative rather than definitive.

Conclusion

Gestational diabetes care in Canadian hospital setting is grounded in strong biomedical frameworks that prioritize early diagnosis, glucose monitoring, and clinical risk managements. These approaches are essential in reducing immediate maternal and neonatal complications and form the foundations in reducing immediate maternal and neonatal complications and form the foundation of current care delivery. However, as outlined, communicative, and systemic needs of newcomer and culturally diverse populations. While care is clinically effective, it does not always translate int meaningful accessibility, comprehension, or sustained engagement for patients navigating complex healthcare environments.

This gap reflects a broader distinction identified within this research between services availability and service accessibility. Although structured programs, such as hospitals-based diabetes clinics, provide standardized education and follow up, patients may still experience challenges in understanding medical information, aligning recommendations with cultural practices, and navigating fragmentated care pathways. These barriers are not a reflection of inadequate clinical care, but rather of limitation in how care is communicated, delivered, and experienced within diverse social and cultural contexts.

Within this context, this research positions design as a critical, yet underutilized, component of healthcare innovation. Through a design-led service approach, this project demonstrates how design can operate as an integrative layer within existing biomedical systems. Rather than replacing clinical models, design contributes by enhancing the usability, accessibility, and relational aspects of care. This includes improving how patients receive, interpret, and act upon health information, as well as how they navigate care pathways and engage with providers over time.

The proposed culturally responsive service model directly responds to the system-level gaps identified in the literature and findings. By integrating multilingual communication tools, culturally adapted educational resources, and visual aids, the model addresses barriers related to language and health literacy. These interventions aim to transform information from being technically accurate yet inaccessible, into formats that are understandable, relevant, and actionable within patients' everyday lives.

In addition, the incorporation of navigation supports such as simplified care pathways, journey maps, and follow up coordination tools addresses the fragmentation of care which identifies across the hospitals and communities' settings. These tools are designed to reduce uncertainty, support continuity, and enable patients to move more confidently between different points of care. This is particularly significant for newcomers, who may lack familiarity with the structure and expectations of the Canadian healthcare systems.

Equally important is the integration of psychosocial supports within the proposed models. As highlighted in both of the literature and lived experience sections of this study, gestational diabetes is not solely a clinical condition but also an emotional and social experiences. The feeling of stress, isolation, and stigma can significantly impact how patient engaged with care. By incorporating elements such as peer support, family-inclusive education, and emotionally responsive provider interactions, the model seeks to create a more supportive and dignified care environment.

Importantly, these design interventions are not conceptualized as standalone additions, but as embedded enhancements within existing clinical workflows. This ensure that the proposed model remains feasible and scalable within real-world hospital settings, aligning with institutional priorities while addressing gaps in patient experiences. By working within, rather than outside of, current systems, the model strengthens continuity between biomedical care and everyday lived experiences.

The implications of this approach extend beyond immediate patient experiences. When patients are able to better understand their diagnosis, see their cultural identities reflected in care recommendations, and navigate healthcare systems with greater confidences, they are more likely to engage in self-managements behaviours and maintain continuity of care. This has direct implications for improving glycemic control during pregnancy and reducing the risk of complication. Furthermore, strengthened postpartum follow up and prevention pathways can contribute to lowering long-term risk, including the development of type 2 diabetes for both mother and child.

This reinforces a central argument of this research: that improving health outcomes is not solely dependent on advancing clinical treatments, but also on improving how care is accessed, understood, and experienced. A design-led, culturally responsive service model provides a pathway for addressing these dimensions in a structured and actionable way.

Ultimately, this project demonstrates that gestational diabetes care must be approached as a system-level experiences-based challenge, rather than solely a biomedical conditions. By integrating design into healthcare delivery, there is an opportunity to bridge the continuing issues between clinical effectiveness and patient-centered care. In doing so, the proposed framework contributes to broader efforts towards health equity, ensuring that care is not only available, but also accessible, inclusive, and responsive to the diverse realities of the populations it serves. This further emphasizes that gestational diabetes care must respond to diverse patient needs, preferences, and cultural context, rather than relying on standardized approaches alone.

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