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## It's About Time! GDM: A Transformative Postpartum Process. A Constructivist Grounded Theory Study

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## **Abstract**

Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance with onset or first diagnosis during pregnancy, and affects 3.7%-18% of Canadian women (Canadian Diabetes Association, 2013). Social support can help women with a history of GDM be successful in achieving optimal health postpartum. The purpose of this constructivist grounded theory (GT) study (Charmaz, 2011) was twofold: (1) To explore the social support processes of women with a history of GDM as they navigate through the healthcare system postpartum, to restore and maintain their health, and (2) To critically examine facilitating factors and barriers to engaging in health behaviours within the context of the individual, interpersonal, organizational, community, and political environments in which the women live. A total of 29 postpartum women with history of GDM participated in this study. In line with constructivist GT methodology data from semi-structured interviews and documents were simultaneously collected and analyzed using the constant comparative method. N-Vivo qualitative software was used to assist with data analysis. Time, social support, individual characteristics, extrinsic variables and barriers & facilitators to engaging in healthy behaviours were the main concepts identified. A model was developed titled *It's About Time! GDM: A Transformative Postpartum Process*. Three themes were identified: *Dealing with a GDM Diagnosis*, *Adjusting to Life without Diabetes While Maintaining or Restoring Health* and, *Reconciling a New Normal*. The results from this study were used to guide interventions on the provision of social support to postpartum women targeting various levels of influence to support health promotion and type-2 diabetes prevention.

Keywords: Gestational, Diabetes, Postpartum, Social Support, Diabetes Prevention,  
Health Promotion

## Co-Authorship Statement

I, Natalie Giannotti, acknowledge that this thesis includes three integrated manuscripts that evolved as a result of collaboration with my supervisor and committee members. In the three manuscripts, the primary contributions were made by the first author in terms of the methodology, study design, ethics application, conducting literature review, collecting data, reviewing the interview records, coding and analyzing the data, and writing the manuscript. The contribution of the co-authors, Dr. Marilyn Evans, Dr, Sandra Regan, and Dr. Erin Keely was the provision of supervision, guidance, and intellectual and editorial support in writing the manuscripts.

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## Chapter 1

### Introduction

It is well documented that gestational diabetes mellitus (GDM) is a precursor to developing type 2 diabetes later in life (Bellamy, Casas, Hingorani, & Williams, 2009). Postpartum women with a history of GDM have a seven-fold risk of developing type 2 diabetes compared to normo-glycemic postpartum women (Bellamy et al., 2009). A diagnosis of gestational diabetes mellitus (GDM) presents opportunities for prevention of type 2 diabetes through the provision of health education, monitoring and social support to postpartum women.

The Canadian Diabetes Association [CDA] (2013) clinical practice guidelines for prevention of type 2 diabetes in women with a history of GDM recommend the following: screening for diabetes at six weeks to six months postpartum and subsequent annual screening, nutrition and lifestyle counseling, and exclusive breastfeeding for at least three months. Evidence shows however, that recommended postpartum protocols for women with GDM are not being followed by health providers and women (Case, Willoughby, & Haley-Zitlin, 2006; (England, Dietz, Njoroge, Calaghan, Bruce, Buus et al., 2009; Dietz, Vesco, Callaghan, Bachman, Bruce, Berg, et al., 2008; Tovar, Chasan-Taber, Eggelston & Okem, 2011). Poor adherence to recommendation protocols renders postpartum women with prior GDM at risk for type 2 diabetes.

Women with a history of GDM have consistently expressed a strong need for social support to make and sustain changes in dietary and physical activity habits (Dasgupta, Da Costa, Pillay, De Civita, Gougeon, Leong, et al., 2013; Evans, Patrick & Wellington, 2010; Jagiello & Chertok 2015; Razee, van der Ploeg, Blignault, Smith, Bauman, McLean et al., 2010). Women identified face to face engagement with peers and

healthcare providers as their primary preference for support (Dasgupta et al., 2013). Women who experienced GDM, however, report feeling disconnected from their healthcare providers postpartum (Evans et al., 2010; Thomas 2004) at a time when their need for support is the greatest (Thomas, 2004). Women who have experienced medical complications in pregnancy discussed additional stress postpartum. Not only are these women transitioning to motherhood with all of the demands of a newborn, they are also trying to regain control over their health (Thomas, 2004). These findings suggest that women who have experienced medically complicated pregnancies encounter additional challenges to regain health postpartum than in the general population, and would benefit from additional support to help overcome those challenges (Thomas, 2004).

Social support has been shown to play a significant role in people at risk for type 2 diabetes to engage in health promoting behaviours (Diabetes Prevention Program, 2002), and has been associated with increased involvement in health enhancing activities in postpartum women with prior GDM (Koh, Miller, Marshall, Brown, & McIntyre, 2010; Razee et al., 2010). Previous studies have focused on linking social support to positive physical health outcomes in at risk-populations (Ali, Merlo, Rosvall, Lithman, and Lindström, 2006; Tomaka, Thompson, and Palacios, 2006; & Zhang, Norris, Gregg, and Beckles, 2007). Newer research focusing on the link between the provision of social support and health outcomes is gaining momentum, as it considers the impact that social support plays in the health of at risk populations (Reblin and Uchino, 2008). While current literature highlights that recommended clinical practice guidelines (CPG's) are not being followed, this research study aimed to address why this is the case from the perspective of the women themselves. In this chapter, the background and significance of

the study, social support, purpose of the study, research questions, methodology, researcher reflexivity, and brief overview of all the chapters will be presented.

### **Background and Significance**

GDM is defined as glucose intolerance with onset or first diagnosis during pregnancy (CDA, 2013). According to the CDA (2013), the prevalence of gestational diabetes varies between 3.7% and 18% of Canadian women, depending on the population studied. Women diagnosed with GDM are at an increased risk for type 2 diabetes, metabolic syndrome later in life, as well as developing GDM in subsequent pregnancies (Feig, Zinman, Wang, & Hux, 2008; Gatullo, & Olubummo 2009; Khangura, Grimshaw, & Moher 2010; Reece, Leguizamon, & Wiznitzer 2009; Schneiderman 2010). A 2008 analysis of Ontario-wide data revealed that nearly 4% of women with prior GDM developed type 2 diabetes 9 months postpartum, and close to 20% had developed type 2 diabetes within 9 years (Feig et al., 2008). According to the CDA (2012), 30% of Canadian women with a history of GDM will develop type 2 diabetes within 15 years. This is concerning since the overall incidence of GDM has increased in Ontario from 3.2% in 1995, to 3.6% in 2001, (Feig et al., 2008) and has essentially doubled over the last 14 years ((Feig, Hwee, Shah, Booth, Bierman, and Lipscombe, 2014). Research by Lipscombe & Hux (2007) has shown that diabetes rates in Ontario have increased dramatically over the last decade with the biggest rise in diabetes seen in women aged 20 to 49 years. This increase appears to be a trend that we are contending with on a global level. According to the International Diabetes Federation (IDF), there were an estimated 199.5 million women with diabetes in 2015 and is expected to rise to 313.3 million by 2030.

The IDF (2015) estimates that 20.9 million or 16.2% of live births to women had some form of hyperglycaemia in pregnancy. An estimated 85.1% of diabetic pregnancies (or approximately 17.79 million) were due to gestational diabetes. Additionally, children of women with a history of GDM are also at an increased risk for obesity (Zhao, Liu, Qiao, Katzmarzyk, Chapput, Fogelholm, et al., 2016), developing pre-diabetes, and type 2 diabetes later in life (Clausen, Mathiesen, Hansen, Pedersen, Jensen, Lauenborg, et al., 2008; Dabelea & Pettit, 2001; Damm, 2009; Egeland & Meltzer, 2010). An increased incidence of GDM and type 2 diabetes is associated with higher healthcare costs related to diabetes management, and associated health complications. The costs associated with diabetes management and complications not only affects those individuals living with the disease, but also their families, communities, and society as a whole (CDA, 2009).

Risk factors for type 2 diabetes include: advanced maternal age, history of GDM, obesity, heart disease, high cholesterol, ethnicity (Aboriginal, Hispanic, Asian, South Asian or African), pre-diabetes, or family history of type 2 diabetes (CDA, 2013). Previous research indicates that development of type 2 diabetes can be delayed or prevented in at-risk populations through lifestyle modifications (Case et al., 2006; Delahanty & Nathan, 2008; Khangura et al., 2010). However, women with a history of GDM report difficulty making recommended lifestyle modifications, and postpartum follow-up remains suboptimal (Koh, Miller, Marshall, Brown & McIntyre, 2010; Smith, Cheung, Bauman, Zehle, & McLean, 2005). The lack of follow-up care and ongoing support postpartum for women with a history of GDM leaves them at high risk for developing type 2 diabetes.

The economic burden of diabetes on the Canadian healthcare system is enormous however; it is likely underestimated due to undiagnosed cases and the treatment resulting

from complications (Haydon, Roerecke, Giesbrecht, Rehm, & Kobus-Mathews, 2006). According to the CDA (2009), there are approximately 700,000 undiagnosed cases of type 2 diabetes in Canada. Medical costs for people with diabetes can be up to triple the amount for those without diabetes (CDA, 2008). Direct costs for individuals with diabetes include medications and diabetic supplies that range between \$1000 and \$15,000 per year (CDA, 2008) as well as the indirect costs due to associated complications, injury-related work disability and premature death. It is estimated that the direct cost of diabetes to the Canadian health care system accounts for 3.5% of total health care spending in Canada and has soared to \$12.2 billion in 2010, nearly double the cost reported in 2000, and is expected to increase by another \$4.7 billion by 2020 (CDA, 2009). The higher cost is the result of increased hospital stays, physicians' visits and medical procedures associated with diabetes management and its co-morbidities (CDA, 2008).

Current fiscal estimates are considered conservative as actual healthcare costs pertaining to diabetes are thought to be significantly higher (Haydon et al., 2006). The increasing financial demands on the healthcare system, paired with dwindling fiscal resources, require innovative planning for the future. Health promotion and diabetes prevention strategies are needed to reduce the growing burden of diabetes on women, their children and families, and on our healthcare system. The provision of social support can be used as a strategy to help successful prevention of type 2 diabetes as it is well-documented to be one of the most important psychosocial factors influencing positive health outcomes (Berkman, Glass, Brissette, & Seeman, 2000; Bishop, Irby, Isom, Blackwell, Vitolins, & Skelton, 2013; Goetz, Szecsenyi, Campbell, Rosemann, Rueter, Raum et al., 2012; McEwen, Pasvogel, Gallegos, & Barrera 2010; Uchino, 2004).



Empirical studies have shown that generally, people lacking social support have high mortality rates, most notably from cardiovascular disease (Brummett, Barefoot, Siegler, Clapp-Channing, Lytle, Bosworth et al., 2001; Frasure-Smith, Lesperance, Gravel, Masson, Juneau, Talajic, et al., 2000; Rutledge, Reis, Olson, Owen, Kelsey, Pepine et al., 2004). Social support has been studied and defined in many different ways and therefore, must be clearly defined to understand the overall construct (Schwarzer, Knoll, & Reikmann, 2004). Social support, social support networks, and social integration are concepts that are interrelated yet are quite different. Social support networks are objective in nature, referring to the people or providers of support within one's environment and provide the foundation upon which social integration and social support will eventually occur (Schwarzer et al., 2004). Social integration and social support on the other hand, are theoretical constructs that refer to one's social embeddedness, sense of belonging, closeness, and obligation (Schwarzer et al., 2004). There are two aspects of social integration: 1) configuration of social relationships (the size and degree of networks and how often they interact), and 2) one's perception of embeddedness within that network (Schwarzer et al., 2004). In contrast, the idea of social support in its broadest sense is subjective, is dependent on the context in which it is used, and represents the purpose and quality of social relationships that occurs through a process of engaging with others (Schwarzer et al., 2004).

For the purpose of this research, social support was defined as any resource provided by others, any exchange of resources, or any assistance with coping (Schwarzer et al., 2004). There are various types of social support that may be exchanged including instrumental (e.g., problem solving), informational (e.g., advice or education), tangible (e.g., material goods) or emotional support (e.g., reassurance) (Schwarzer et al., 2004). It

is important to note that the health of an individual is not solely dependent on the provision of social support itself. According to Rook (1990), health results from reciprocal process that occurs through the participation in a meaningful social context. This means that when people engage socially, they become vested and more embedded in their social networks over time. The more the individual engages socially and builds relationships, the greater their ties become, the higher their obligations, and the desire to give in return becomes greater (Schwarzer et al., 2004).

The Social Ecological Model of Health Promotion [SEMHP] (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokolos, 1996) offers a framework that portrays the intricate relationships amongst the various levels of influence. This model proposes that while individuals are responsible for implementing the necessary lifestyle modifications to improve their health, individual behaviour is predominantly dictated by the social environment in which they live (Stokolos, 1996). The various levels of influence on individual health include individual, interpersonal, organizational, community, and political (Stokolos, 1996). The SEMHP was used to guide this research as it helped to understand the variables that either facilitate, or act as barriers to postpartum women with a history of GDM engaging in health behaviours. The SEMHP is particularly useful for understanding social processes (Stokolos, 1996), making it an ideal choice to help understand the social support processes of postpartum women with prior GDM. The SEMHP also helped address the multitude of complexities within the various levels of influence that contribute to health behaviours rather than focusing specifically on the individual (Stokolos, 1996).

A diagnosis of GDM presents opportunities for type 2 diabetes prevention through the provision of health education, follow-up, and social support to postpartum

women. These opportunities are often overlooked or missed by healthcare providers in Ontario, a symptom of the fragmented healthcare that is provided in our current healthcare system (Keely, 2012). This research study was designed to engage postpartum women with prior GDM in the research process to capture “their historical, social, and situational locations” (Charmaz, 2011, p. 366) while trying to make and maintain healthy lifestyles.

In summary, GDM is a well-known risk factor for the development of future diabetes. There is little known about how to specifically address barriers to prevent type 2 diabetes within the context of the Canadian healthcare system. Provision of social support has been shown to improve health outcomes for postpartum women yet, is lacking at a time when women have identified a need for it. Social support processes are not fully understood as experienced by postpartum women as they try to restore or maintain their health after having GDM. Knowledge on how social support is experienced by women as they transition from a GDM complicated pregnancy to life without diabetes, offers valuable insight on how to address their challenges maintaining or restoring health. This research explored the social support processes as experienced by postpartum women with prior GDM to help address this gap.

### **Research Purpose**

The goal of this research was to generate a substantive theory to explain the role that social support plays within various levels of influence, and on the health promoting behaviours of postpartum women with prior GDM. The purpose of this constructivist grounded theory research was twofold:

(1) To explore the social supports of postpartum women with a history of GDM, as they navigate the healthcare system postpartum to restore and maintain their health, and,

(2) To critically examine facilitators and barriers to engaging in health behaviours among postpartum women with a history of GDM, within the context of the individual, interpersonal, organizational, community, and political levels of influence on health.

### **Research Questions**

The research questions guiding this research were:

- 1) What are the social support processes experienced by postpartum women with prior GDM between 3 months and 24 months postpartum,
- 2) How do social supports and various levels of influence, impact engaging in, and maintaining healthy lifestyles in postpartum women with prior GDM?

### **Methodology**

This research study was guided by constructivist grounded theory methodology. Grounded theory originally developed by Glaser and Strauss (1967) was introduced in their book titled "The Discovery of Grounded Theory", and is now one of the most widely used methodologies in the social sciences (Strauss & Corbin, 1998). Grounded theory was established as a general qualitative methodology, and offered a "new way of thinking about and conceptualizing data" (Strauss & Corbin, 1994, p. 275). It was specifically developed to help narrow the gap between theory and empirical research, provide logic behind the theory it generated, and to validate qualitative research (Strauss and Corbin, 1994). Ultimately, grounded theory was designed to construct theory that captures issues of importance in people's lives (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998), by constructing "abstract theoretical explanations of social processes" (Charmaz, 2007, p. 5). According to Strauss and Corbin (1994), grounded theory was designed to assist researchers in creating theory that is 'conceptually dense'. In other words, grounded theory is best suited to provide rich descriptions and detailed

explanations of experiences and phenomena. They assert that theoretical conceptualizations are concerned with the interplay between a variety of social units, as well as patterns of action or processes (Strauss & Corbin, 1994).

Grounded theory has evolved over the years as various researchers have differing ideas on the implementation of grounded theory methods (Jones & Alony, 2011). Today, there are three prevalent variations of grounded theory, Traditional, Straussian, and Constructivist, and are differentiated by their philosophical underpinnings and methodological approach (Kenney & Fourie, 2015). It has been argued that "all variations of grounded theory exist on a methodological spiral and reflect their epistemological underpinnings" (Mills, Bonner, & Francis, 2006, p.9). This means that all versions of grounded theory share the same foundation, but may differ philosophically in their approach to the research process. Grounded theory was a natural fit with the purpose of this study as it intended to explore the social processes of women with prior GDM as they attempt to restore and maintain their health postpartum.

Constructivist grounded theory methods also allow the researcher to unveil complex social processes by integrating subjective experiences with social conditions in the analyses. This means that individual perspectives and social contexts are not ignored, but rather are valued and emphasized in the theory it produces. Constructivist grounded theory forces the researcher to go beyond the surface to co-construct theory with research participants. In doing so, constructivist grounded theory offers a means to elicit multiple realities, offering theoretical interpretations of peoples' experiences. Constructivist grounded theory was particularly relevant for this research as it pays attention to context and meaning (Charmaz, 2011). Gaining insight into the context and meaning provided

insight on how to best meet the needs of women with prior GDM as they transition to life without diabetes postpartum while maintaining or restoring health.

### **Chapter Overviews**

This dissertation follows an integrated article format whereby each chapter is a separate manuscript. Chapter 2 is a manuscript titled Health Promotion and Type 2 Diabetes Prevention in Postpartum Women with Prior GDM: A Socioecological Approach. This manuscript addresses the role that social determinants of health play in the health of postpartum women with prior GDM. The social determinants were an important consideration in this research study as they not only influence health behaviours, but they also help to address the health inequities that exist for women with prior GDM. The social ecological model is presented, and used as a conceptual framework to understand the multiple factors that serve as enablers, and/or barriers to postpartum women with a history of GDM engaging in health promoting activities.

Chapter 3 is a manuscript titled Gestational Diabetes Mellitus Management: How Well are we Doing Postpartum? A Scoping Review. The scoping review examines the current state of the literature on the global implementation of the International Diabetes Federation guidelines pertaining to diabetes prevention in women with prior GDM (blood glucose screening, breastfeeding, and lifestyle modifications). The scoping review also helped identify the role that social support plays for women to follow the CPG's. The results of this scoping review identified specific gaps in the research and provided the direction for this research study.

Chapter 4 is a manuscript titled It's About Time! GDM: A Transformative Postpartum Process. This manuscript presents a constructivist grounded theory (GT) study that sought to: (1) To explore the social support processes of women with a history

of GDM as they navigate the healthcare system postpartum, to restore and maintain their health, and (2) To critically examine facilitating factors and barriers to engaging in health behaviours within the context of the individual, interpersonal, organizational, community, and political environments in which the women live. Three phases of a transformative postpartum process are presented and discussed: dealing with a GDM diagnosis, adjusting to life without diabetes while maintaining or restoring health, and reconciling a new normal. Research methods including sampling and recruitment strategies, participant selection, inclusion and exclusion criteria, data collection, data analysis and category development, results, discussion, clinical implications and conclusion are presented.

Chapter 5 provides a discussion, implications, conclusion and a summary of the results of this research study for current and future practice. Clinical recommendations are identified and discussed that address current barriers and facilitators to engaging in health behaviours for postpartum women with prior GDM.

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## **Chapter 2**

### **Health promotion and type 2 diabetes prevention in postpartum women with prior**

#### **GDM: A socioecological approach**

##### **Introduction**

Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance with onset or first diagnosis during pregnancy, and affects 3.7%-18% of Canadian women (Canadian Diabetes Association [CDA], 2013). It is well documented that GDM is a precursor to developing type 2 diabetes later in life (Bellamy, Casas, Hingorani, & Williams, 2009). Postpartum women with a history of GDM have a seven-fold risk of developing type 2 diabetes compared to normo-glycemic postpartum women (Bellamy et al., 2009). The incidence of GDM in Canada has doubled over the last 14 years, and the overall burden of diabetes in pregnancy on society is growing (Feig, Hwee, Shah, Booth, Bierman, and Lipscombe, 2014). Approximately 30% of Canadian women with a history GDM will develop type 2-diabetes within 15 years post diagnosis (Canadian Diabetes Association [CDA], 2013).

A diagnosis of GDM presents opportunities for health promotion, and the prevention of type 2 diabetes. The CDA (2013) clinical practice guidelines for prevention of type 2 diabetes in women with a history of GDM recommend the following: screening for diabetes at six weeks to six months postpartum and subsequent annual screening, nutrition and lifestyle counseling, and exclusive breastfeeding for at least three months. Evidence shows however, that recommended postpartum protocols for women with GDM are not being followed (Case, Willoughby, & Haley-Zitlin, 2006; England et al., 2009; Dietz et al., 2008; Tovar, Chasan-Taber, Eggelston & Okem, 2011). Given that clinical practice guidelines (CPG's) for diabetes prevention are not consistently followed,

it is time to revisit our current health promotion and disease prevention strategies for women with prior GDM. The purpose of this paper is to explore a socioecological approach to health promotion in postpartum women with prior GDM.

The term *health promotion* became popular in the 1980's with a group of health activists who were opposed to the traditional individualistic approach to health education and disease prevention (International Union for Health Promotion and Education [IUHPE] 2007). There was a distinct shift in thinking during this time from a focus on modifying individual risk factors, to addressing the context and meaning of health (Kickbusch, 2003). In 1986, the Ottawa Charter was developed in response to a growing need for a new public health movement worldwide. The charter identifies the prerequisites for health as the basic conditions and resources necessary for health to exist. Provision of social support that targets a variety of influences on health, ensures a comprehensive approach to health promotion and disease prevention.

Clinical practice guidelines (CPG's) are designed to promote health and prevent disease for the target population that they are intended. While CPG's exist for postpartum women with prior GDM, they only offer recommendations for care. Despite these recommendations, evidence indicates that clinical practice guideline for postpartum women with prior GDM are not being followed by health providers and women (Case et al., 2006; England et al., 2009; Dietz et al., 2008; Tovar et al., 2011). Provision of social support is crucial to help ensure successful implementation of these guidelines for women with prior GDM as evidence indicates that social support plays a significant role in overcoming obstacles to promoting healthy behaviours (Berkman, Glass, Brissette, & Seeman, 2000; Seeman, 1996; Uchino, 2004).

## **Social Determinants of Health**

Social determinants of health (SDOH) significantly impact the extent to which people engage in healthy behaviours, and fundamentally influence people's health (Raphael, 2008). The determinants include the economic and social conditions that affect the health of individuals, communities, and populations as a whole (Raphael, 2008). Social determinants of health are influenced by various political, economic, and social forces within one's environment (Raphael, 2008). According to the World Health Organization's (WHO) Commission on the SDOH (2008), the determinants include, but not limited to the following: income, social support networks, education, employment, social and physical environments, coping skills, healthy child development, biology and genetics, access to health services, gender and culture.

The SDOH largely influence an individual's ability to identify and achieve personal aspirations, satisfy needs, cope with the environment, and changing life circumstances (Raphael, 2008). For example, research has shown that women with high education levels are more likely to engage in healthy behaviours (supplementing prenatally with folic acid, seeking early prenatal care, attending prenatal education programs and exclusively breastfeeding for six months), than women who have less education (Health Statistics, 2010). Pregnant women with low income, low levels of education, and few social supports are shown to have poorer birth outcomes than pregnant women with high incomes, high education levels and strong social supports (Canning, Frizzell, & Courage., 2010; Gennaro, 2005). The rates of preterm birth, small for gestational age, stillbirth, and infant mortality are reported to decrease as the level of the mother's education increases (Luo, Wilkins, & Kramer, 2006; Mostafavi, 2009).

Women are also more likely to have GDM or subsequent diagnosis of diabetes if they are of low socioeconomic status and live in an urban setting (Feig et al., 2008).

Women are more likely to complete postpartum glucose screening if they received prenatal care, are older, have had multiple pregnancies, earn a high income, have high education levels, and/or have attended their 6-week postpartum follow-up appointment (Tovar et al., 2011). The social determinants of health are an important consideration as they not only influence health and health outcomes, they help to understand the health inequities that may exist for women with prior GDM.

### **Social Ecological Model of Health Promotion**

The prevention of type 2 diabetes requires individuals to modify a complex set of lifestyle behaviours influenced by personal characteristics, interpersonal relationships, organizational structures, community supports, and political forces. Originally proposed by Urie Bronfenbrenner (1979), the Ecological Systems Theory of Development (ESTOD) is one of most well-known conceptual frameworks for understanding both personal and environmental influences that shape human development. In this framework, behaviour is thought to be affected by, as well as have an effect on, multiple levels of influence (Bronfenbrenner, 1979). According to Bronfenbrenner (1979), there are four levels of influence in which the environment can influence behaviour, and can in turn effect the environment. Those levels include microsystems, mesosystems, exosystems and macrosystems. Others have since built upon Bronfenbrenner's original work to develop the Social Ecological Model of Health Promotion [SEMHP] (McLeroy et al., 1988; Stokolos, 1996). McLeroy et al. (1988) developed five levels of influence and later Stokolos (1996), identified core assumptions of the social ecological model. In the social ecological model, patterned behaviour is of particular interest (McLeroy et al.,

1988). Much like Bronfenbrenner's model, McLeroy et al., (1988) and Stokolos (1996) believe that behaviour influences multiple levels including individual, interpersonal, and organizational, community and political levels.

The social ecological model of health promotion was developed to understand various areas of study, and is particularly useful for understanding social processes (Stokolos, 1996). This model proposes that while individuals are responsible for implementing necessary lifestyle modifications to improve their health, individual behaviour is predominantly dictated by the social environment in which they live (Stokolos, 1996). There are numerous variables that come into play when examining the lifestyle practices and health of individuals. Social determinants of health significantly impact the extent to which people engage in healthy behaviours and influence people's health. Health is determined by the physical, social, and economic environments (Tones & Tilford, 2001), yet health promoting practices for new mothers have been predominantly based on behavioural change models where the focus is directed at the individual level. The social ecological approach for health promotion (SEMHP) on the other hand, helps to address the interdependence between the multiple layers of influence, rather than focusing simply on the role that individuals have in their own health behaviours (Stokolos, 1996). There are many influencing factors that contribute to a woman's ability to implement healthy lifestyle modifications following a GDM complicated pregnancy. Personal characteristics, physical status, emotional status, personal relationships, income status, access to resources, geographical location are just a few examples of the countless influences that contribute to a woman's ability to maintain or implement a healthy lifestyle.

Behavioural change models offer interventions for diabetes prevention for women with prior GDM to implement however, these types of interventions are limited as they do not take into account personal characteristics or potential barriers. For example, a behavioural change intervention would be to encourage women with prior GDM to breastfeed postpartum. A SEMHP approach on the other hand would integrate facilitating factors, as well as address potential barriers to successful breastfeeding. In a SEMHP intervention, once the assessment is complete, interventions would capitalize on the positive influencing factors, and address the barriers to their implementation. For example, a SEMHP intervention would be to encourage women with prior GDM to breastfeed postpartum with the provision of ongoing support and education, until a good latch and regular feeding patterns have been established. This type of intervention would require the assessment and consideration of individual characteristics (physical, psychological, emotional etc.) while considering and accounting for potential extrinsic influences (intra-personal relationships, access to healthcare providers, access to resources etc).

### **Core Assumptions of the Social Ecological Model of Health Promotion**

According to Stokolos (1992), there are four core assumptions that underpin the SEMHP. The first assumption acknowledges the countless personal attributes and multiple factors in the environment that can influence behaviour (Stokolos, 1992). The second assumption asserts that environments are multidimensional and complex, and are characterized by several components (Stokolos, 1992). Social or physical components within the environment can be described in terms of their features or attributes, their actual or perceived qualities, as well as on their scale or proximity to the individual (Stokolos, 1992). The third assumption implies that individuals interact with their

environments, ranging from individual or small group interactions, to larger communities and populations, rather than focusing solely on the individual level (Stokolos, 1992). The last assumption acknowledges that interrelationships between people and their environments are dynamic (Stokolos, 1992) and reciprocal in nature. The physical, social and political environments influence one's behaviour, while at the same time, the behaviour of the individual, group or organization also impact on the wellbeing of their environments (Stokolos, 1992). The SEMHP acknowledges that individuals are situated within larger social systems that interact at various levels (Stokolos, 1992). The following discussion will identify some of the interactions that occur within those systems at each of the levels of influence.

### **Levels of the Social Ecological Model of Health Promotion**

#### **Individual Level**

Evidence suggests that personal attributes and behaviours are linked to the development of a number chronic conditions and diseases such as obesity and diabetes (Kaplan, Everson, & Lynch, 2000). Likewise, there are a number of individual characteristics that influence one's propensity to engage in health behaviours. The ability to change behaviour is influenced by one's knowledge, attitudes, beliefs, values, self-concept, skills, genetic heritage, personality dispositions, as well as emotional and developmental history (McLeroy et al., 1988; Stokolos, 1996). Many behaviour change models such as those directed at the prevention of diabetes, are based on the premise that individual behaviour is related to these individual characteristics, and consider these attributes within the context of the broader social environment and in fact, emphasize the interaction between them (Stokolos, 1996). Interventions at this level would use a variety of methods to attend to the characteristics of the individual (McLeroy et al., 1988).

Therefore, interventions primarily target individuals who are at risk for certain diseases. For example, to prevent type 2 diabetes in women with prior GDM, we need to determine the risks and benefits of blood glucose screening, examine current postpartum screening practices, determine women's intent to be screened for type 2 diabetes and establish women's motivation for implementing healthy lifestyle behaviours.

### **Interpersonal**

The interpersonal level of influence includes relationships that exist with family, friends, neighbours, and healthcare providers. These social relationships are considered crucial to the individual's social identity, and are thought to provide various sources of social support such as emotional, informational, and tangible support (McLeroy et al., 1988). The social ecological model proposes that individuals acquire norms through their interactions in social networks and in turn influence those within their social networks as well as those linked to those networks (McLeroy et al., 1988). At this level, interventions would be designed to alter existing social relationships in such a way as to support desired behaviours and discourage those that are undesirable with the ultimate goal of changing social norms, beliefs and social influences (McLeroy et al., 1988). For example, healthcare providers should provide counselling and support to women with prior GDM on type 2 diabetes prevention, provide blood glucose screening, offer reminders and follow-up, and should align women with tangible resources to help overcome barriers to accessing care.

### **Organizational/Institutional**

The organizational or institutional level of influence refers to any social institutions, such as schools, workplaces or professional associations that possess organizational characteristics and have both formal and informal rules and regulations



(McLeroy et al., 1988). Organizations provide individuals with both social and economic resources, convey board societal norms and values, and are essential to support long-term behavioural changes (McLeroy et al., 1988). People spend a great deal of time within their formal organizations, which can significantly influence health and health behaviours. Organizations can offer several advantages in terms of health promotion such as their potential to reach a large number of individuals. Interventions at this level of influence for health promotion would target overarching organizational culture and characteristics (McLeroy et al., 1988), such as rules and regulations (ex, smoking restrictions), employee benefits (insurance coverage), or work structure (time off for engaging in healthy activities) in order to change existing culture and encourage positive behavioural changes.

Organizations provide the context for health promoting behaviours and offer social support for behaviour change (Centers for Disease Control and Prevention, 2016; Whitemore, Melkus, & Grey, 2004). For example, evidence suggests that employment and culture environment can have a positive influence on health and health behaviours (Centers for Disease Control and Prevention, 2016) such as adding healthier cafeteria food and vending machine options, work-site anti-smoking policies and weight loss incentive initiatives (Kaplan et al., 2000). Regarding diabetes prevention, the CDA (2003) developed a healthy workplace initiative program targeting corporations to adopt health promotion strategies. Evidence has shown a decline in the number of sick days, loss of time due to injuries, and a reduction in the number of Workplace Safety and Insurance Board (WSIB) claims resulting from the adoption of this initiative (CDA, 2003). The results of this workplace initiative were so promising that the CDA (2008)

developed clinical practice guidelines for the prevention of diabetes in Canada which we are still utilized today (CDA, 2013).

### **Community**

Community influences on health can be defined in a number of ways. According to McLeroy et al. (1988), communities make up the larger social structures, and can serve in various ways; as mediating structures (such as families, informal social networks, churches, neighborhoods), they can exist as relationships among organizations within a political or geographic location, and can serve as power structures within towns, cities and provinces (media agendas, public agendas, developing partnerships etc.). Engaging in health behaviours is significantly influenced by the social context in which communities are situated, as well as by social norms surrounding a particular health issue (Quintiliani, Sattelmair, & Sorrenson, 2007). Social norms, values and beliefs are created by those individuals who make up the larger community.

Community based interventions to prevent or delay type 2 diabetes are becoming more prevalent. For example, the Diabetes Prevention Program (DPP, 2002) was a major clinical research study involving 3234 men and women in the United States. It sought to determine if modest weight loss through dietary changes and increased physical activity or the use of metformin (a medication to help reduce blood glucose levels) could prevent or delay the onset of type 2 diabetes. Participants receiving intensive individual counselling and motivational support on effective diet, exercise, and behaviour modification-reduced their risk of developing diabetes by 58 percent. This finding was consistent across all participating ethnic groups and for both men and women. While the Diabetes Prevention Program (2002) was originally developed to target individual and interpersonal support systems, it has since been adopted by multiple communities

throughout the United States. One study explored the effectiveness of the Diabetes Prevention Program adapted to incorporate community-based interventions in 11 underserved communities (Seidel, Powell, Zigbor, Siminerio, & Piat, 2008). There were 573 participants (both men and women) screened for metabolic syndrome however, 88 participants were eligible for the interventions (Siedel et al., 2008). Nearly 44% of the participants experienced improvements in one or more components of metabolic syndrome, 46.4% of participants lost more than 5% body weight and 26.1% lost greater than 7% body weight (Seidel et al., 2008).

Evidence suggests that community based interventions have led to increased knowledge, activity levels, self-esteem and other preventive behaviours (Satterfield, Volansky, Caspersen, Engelgau, Bauman, Gregg et al., 2003). Interventions at this level should focus on utilizing mediating or power structures to deliver services within those communities, or strengthen existing structures (McLeroy et al., 1988). Interventions at this level might include the provision of social resources (ex. health services, social services, welfare etc.), increasing community awareness, increasing coordination among community agencies and targeting public agenda items (McLeroy et al., 1988). For example, women with prior GDM should have access to the same nutritional and lifestyle counselling as received during pregnancy and should also be referred to local diabetes prevention programs within their community.

### **Political**

Political influences refer to any local, provincial, and national laws or policies that are in place to help protect the health of the community (McLeroy et al., 1988). This is the broadest level in the model and can influence all other levels as they are interconnected. Health promoting interventions at this level would target those mediating

structures (which serve as the connection between individuals and the greater social environment) that provide access to, as well as influence the policy development process (including policy analysis, advocacy and development) (McLeroy et al., 1988). For example, in 2011 the United Nations made a political declaration on non-communicable disease prevention and control (International Diabetes Federation, 2011). A commitment was made by member countries to strengthen national policies into health planning programs. The following commitments were made for diabetes prevention: to strengthen and implement public policies such as education and information programs; to eliminate industrially-produced trans-fat foods and promotion reduced consumption of salt, sugar and saturated fats; to adopt the WHO's recommendation on marketing of foods and non-alcoholic beverages to children and; to encourage policies that promote the production of healthy foods. This political declaration demonstrates how to strengthen the ability of those mediating structures to influence the policy development process.

### **Discussion**

Today, health promotion and prevention strategies are recognized as essential components to reduce the burden of non-communicable diseases and rising health care costs (Public Health Agency of Canada, 2010). In 2005, Canada declared health promotion and disease prevention as a priority to improve the health of Canadians (Public Health Agency of Canada [PHAC], 2010). Many health related documents identify the need to consider the social determinants of health when implementing health promoting and prevention strategies. For example, the Healthy People 2020 document on health promotion focuses on the importance of addressing the social determinants of health by including the “social and physical environments that promote good health for all” as one of the four overarching goals (Secretary's Advisory Committee on Health Promotion and

Disease Prevention (2010, p.). This goal is also supported by the (2008) WHO's commission on SDOH. While health-promoting documents recognize the need to acknowledge and address the social determinants of health, very few policies reflect this ideology (Raphael, 2007).

Health promotion and prevention strategies have historically targeted individual characteristics and behaviours (Hofrichter, 2003), supporting a narrowly focused biomedical approach to health (Bryant, 2009). Some argue that the broader aspects of the health care system, such as the social, economic and political forces that shape health care services and delivery, are neglected altogether (Bryant, 2009). Canadian health policy has traditionally been dominated by an individual lifestyle approach to health (Bryant, 2009). Although individual characteristics are an important consideration, it is equally imperative to consider the various levels of influence that affect individual health (Raphael, 2009). An individualistic focus can be problematic as it can result in "victim blaming" (Bryant, 2009). Placing blame on the individual assumes that negative health outcomes are related to lifestyle choices, rather than considering how socio-environmental factors influence health (Bryant, 2009). Health promotion and disease prevention strategies need to have a broader scope that addresses the intrapersonal, interpersonal, community, organizational and political forces that shape the health of Canadians.

According to the Ontario Ministry of Health and Long-Term Care (2006), health promotion and disease prevention is a proactive approach to health care. Such an approach assumes that health exists on a continuum. There are varying levels of prevention strategies, which depend on where an individual falls on that health continuum. Primary prevention strategies include supporting an active lifestyle,

encouraging nutritional balance and weight maintenance, and focusing on the reduction of diabetes risk factors (World Health Organization, 2006). Secondary prevention strategies, such as periodic blood glucose screening, monitoring and consistent follow up can reduce the risk of developing type 2 diabetes and its subsequent complications (World Health Organization, 2006). Tertiary prevention strategies include those interventions that would prevent further complication of a disease such as strict metabolic control of a client with diabetes, diet counselling and social support (World Health Organization, 2006).

Prevention strategies have been characterized in a number of ways in the literature. In 2004, Goldsmith, Hutchinson, & Hurley classified prevention strategies into four distinct areas from a Canadian perspective: clinical prevention, health promotion, health protection and healthy public policy. Clinical prevention refers to any activity that takes place between a healthcare provider and a patient on a one-on-one basis (Goldsmith et al., 2004). Health promotion activities include any intervention whereby the primary goal is to increase healthy behaviours and discourage unhealthy ones (Goldsmith et al., 2004). Health protection refers to interventions that help reduce health risks by modifying the environment to support healthier living (Goldsmith et al., 2004). Healthy public policy refers to the broader social or economic interventions that indirectly influence health outcomes (Goldsmith et al., 2004). According to the WHO (2013), health policy involves: "decisions, plans, and actions that are undertaken to achieve specific health care goals within a society" (para. 1).

Ball, DesMueles, Kwan, Jacobsen, Luo, & Jackson (2009) reported key findings from their comprehensive systematic review of the literature on the economics of prevention. They define 'four faces of prevention' (clinical prevention, health promotion,

health protection and healthy public policy), and use them as a framework to guide the Public Health Agency of Canada's (PHAC) development of health policies. They concluded that a large proportion of public health interventions that fall within the realm of the four faces of prevention are cost effective. One example used to demonstrate clinical prevention strategies related to diabetes prevention are two clinical trials, namely the Look AHEAD (Action for Health in Diabetes) and the Diabetes Prevention Program. These types of studies are important as they help determine prevention rates of diabetes of at risk populations, and to determine the impact of lifestyle interventions on the development of diabetes (Delahanty & Nathan, 2008).

The DPP was conducted over a three year period involving 3234 study participants while the Look AHEAD is ongoing, and is projected to last approximately 12 years (Delhanty & Nathan, 2008). To date, lifestyle interventions such as diet and physical activity have been shown to reduce the incidence of diabetes by 58% in at risk populations (Delhanty & Nathan, 2008). Health promotion and disease prevention strategies such as those utilized in the DPP and the Look AHEAD program have garnered much attention by the Canadian government as a means to reduce the financial burden of diabetes on the healthcare system. The challenge in adopting health promotion and disease prevention strategies however is having a model to inform policies that addresses the complexities involved in the prevention of chronic diseases.

There are a number of significant individual focused models or frameworks that underpin current practices of health promotion and inform policy (Raphael & Bryant, 2002). Some argue that most of these models lack critical perspective, and are derived from one form of knowledge (Raphael & Bryant, 2002). Behavioural change and lifestyle modification theories such as the self-efficacy theory, stages of behaviour change theory,

and the health belief model, emphasize the role of the individual in promoting health (Stokolos, 1996). These theories were typically developed from post-positivist, quantitative and reductionist methods (Raphael & Bryant, 2002). Although these models have made significant contributions to the body of knowledge on disease prevention, they focus primarily on individual factors rather than addressing broader contextual factors that influence health. As such, it is important to note the benefits of gaining evidence from various methodologies to inform policy rather than relying solely on one form of knowledge.

According to Bryant (2002), the public policy change process is informed through various sources of knowledge and how different groups in society use knowledge to influence policy outcomes. Raphael & Bryant (2002), note that it is essential to acquire the contributions of non-experts (such as the individuals affected by those policies) in order to develop relevant and effective health policy. This approach to policy development locates the individual at the center of the process. The Ontario provincial government has embraced this 'individual centered' approach to health, as imperative to the successful implementation of healthcare reform (Ministry of Health and Long-Term Care, 2012).

### **Ontario Policy Context**

In 2012, the Ontario Ministry of Health and Long-Term Care (MOHLTC) introduced their Action Plan for Healthcare to address a number of issues within the current health care system. The provincial government has recognized that the current health care system is not sustainable, and that action must be taken in order to protect and strengthen the health care system. It is estimated that 25% of health care costs are due to preventable illnesses (MOHLTC, 2012). As a result, the government has devised a plan



that will help provide "the right care, at the right time, in the right place (p. 10)", in order to keep Ontarians healthy. One of the major concerns involves people who are struggling to navigate through the current healthcare system and ultimately get lost in the process, are missed, or forgotten (MOHLTC, 2012). Ontarians struggle with accessing the healthcare they need, and lack knowledge on the services that are available (MOHLTC, 2012). The government recognizes the need for a patient centered system whereby patients move more seamlessly from one care setting to another (MOHLTC, 2012).

The Ontario government has offered a number of initiatives and strategies to encourage health promotion and disease prevention however, there is a disconnect between those strategies and successful execution. For example, women with a prior history of GDM are a population who would benefit from health promotion and disease prevention strategies such as postpartum glucose screening. Despite this knowledge however, postpartum diabetes screening rates remain poor. Low screening rates are in part due to personal characteristics and risk perception however, experience with the healthcare system, and fragmentation of care are also recognized as important contributing factors (Keely, 2012).

Disjointed healthcare is problematic and is one of the most difficult aspects of managing the health of women with prior GDM postpartum for healthcare providers. For example, the Healthy Babies Healthy Children Program in Ontario offers information on pregnancy, breastfeeding, parenting and child development, and also provides essential referrals to community services (Health Stats, 2010). The program primarily focuses on the health of the newborn rather than targeting high-risk women postpartum. In addition, women may choose not to take advantage of this program leading to missed opportunities

for ongoing teaching, breastfeeding support and encouragement, anticipatory guidance, health promotion and disease prevention.

### **Access to Health Services**

In Canada, physicians are the dominant primary care health providers and are typically the gatekeepers of the majority of aspects of the healthcare system (Bryant, 2009). This dominance over healthcare service influences the relationships with other health care professionals, and ultimately affects the delivery of care (Bryant, 2009). This is of particular importance when it comes to postpartum screening practices, as fragmentation of care postpartum can be the result of a lack in communication between providers about the diagnosis of gestational diabetes (Keely, 2012). Women with GDM receive a great deal of attention and support during pregnancy to ensure optimal maternal-fetal outcomes. This is not the case postpartum as continuity of care for these women is often problematic and sporadic. Poor communication and lack of support has been attributed to a lack of infrastructure and/or organization of care between providers (Keely, 2012), as there are currently no clear guidelines on who is responsible for providing follow-up with a woman with prior GDM.

It is apparent that current practices fall short in managing the needs of this population. Knowledge providing context and meaning as to *why* this is the case, will offer insight and provide direction on how to confront the issue. Increased understanding of what factors limit the adherence to recommendations in women with prior GDM is crucial so they can be effectively addressed in postpartum follow-up strategies.

### **Conclusion**

The social ecological model of health promotion is a useful conceptual framework to understand the multiple factors that serve as enablers, and/or barriers to postpartum

women with a history of GDM engaging in health promoting activities. A diagnosis of GDM presents opportunities for prevention of type 2 diabetes through the provision of health education, monitoring and social support to postpartum women. These opportunities are often overlooked or missed by health providers in Ontario, a symptom of the fragmented health services delivery that is provided in our current healthcare system (Keely, 2012). Greater attention is needed during the postpartum period for women with prior GDM. Continuity of care, provision of information, support and resources for postpartum women with prior GDM, is a major gap in our current healthcare system. Health promotion and disease prevention strategies that consider the multiple levels of influence on health outcomes are needed to overcome existing barriers to following CPG's for postpartum women with prior GDM.

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### **Chapter 3**

#### **Gestational diabetes mellitus management: How well are we doing postpartum?**

##### **A scoping review**

##### **Introduction**

Approximately 30% of Canadian women with a history of gestational diabetes mellitus (GDM) will develop type 2-diabetes within 15 years postpartum (Canadian Diabetes Association [CDA], 2013). GDM is defined as glucose intolerance with onset or first diagnosis during pregnancy depending on the population studied (CDA, 2013). The incidence of GDM and pre-GDM has doubled over the last 14 years, and the overall burden of diabetes in pregnancy on society is growing (Feig, Hwee, Shah, Booth, Bierman, and Lipscombe, 2014). According to the International Diabetes Federation (IDF), there were an estimated 199.5 million women with diabetes in 2015 and the number is expected to rise to 313.3 million by 2030. The IDF (2015) estimates that 20.9 million or 16.2% of live births to women had some form of hyperglycaemia in pregnancy. An estimated 85.1% of diabetic pregnancies (or approximately 17.79 million) were due to gestational diabetes. These statistics demonstrate that GDM is a major health issue that healthcare providers are contending with globally.

Women diagnosed with GDM are at an increased risk for type-2 diabetes and metabolic syndrome later in life, as well as developing GDM in subsequent pregnancies (Feig, Zinman, Wang, & Hux, 2008; Gatullo, & Olubummo 2009; Khangura, Grimshaw, & Moher 2010; Reece, Leguizamon, & Wiznitzer 2009; Schneiderman 2010). Children of women with a history of GDM are also at an increased risk for developing obesity (Zhao, Liu, Qiao, Katzmarzyk, Chapput, Fogelholm, et al., 2016), pre-diabetes, and type 2 diabetes later in life (Clausen, Mathiesen, Hansen, Pedersen, Jensen, Lauenborg et al.,

2008; Dabelea & Pettit, 2001; Damm, 2009; Egeland & Meltzer, 2010). The purpose of this scoping review is to examine the current state of the literature on the implementation of IDF (2009) clinical practice guidelines (CPG's) pertaining to diabetes prevention in women with prior GDM (blood glucose screening, breastfeeding, and lifestyle modifications).

### **Background and Significance**

The increased incidence of GDM and type 2-diabetes is associated with higher healthcare costs related to diabetes management and associated health complications (Zhou, Zhang, Barker, Albright, Thompson, & Gregg, 2014). The costs associated with diabetes management and complications not only affects those individuals living with the disease, but also their families, communities, and society as a whole (CDA, 2009). Direct costs for individuals with diabetes include medications and diabetic supplies that range between \$1000 and \$15,000 per year (CDA, 2008) as well as the indirect costs due to associated complications, injury-related work disability and premature death (CDA 2009). It is estimated that the direct cost of diabetes to the Canadian health care system accounts for 3.5% of total health care spending and has soared to \$12.2 billion in 2010, nearly double the cost reported in 2000, and is expected to increase by another \$4.7 billion by 2020 (CDA, 2009). The increasing financial demands that diabetes care places on the healthcare system, paired with dwindling fiscal resources, require innovative planning and diabetes prevention strategies to reduce the growing burden of diabetes on women, their children, and on our healthcare system.

Given that GDM is on the rise globally, the IDF established global Clinical Practice Guidelines (CPG) for postpartum management, and type-2 diabetes prevention in 2005. These guidelines have since been reviewed and updated in 2009. The CPG's

determined by the IDF have been adopted by many countries around the globe, including Canada. CPG's are typically developed based on input from professional bodies and organizations who seek to summarize current available evidence. The goal of CPG's is to improve the quality of care by creating a standard of evidence-informed practice worldwide (O'Reiley, 2014). One of the issues with best practice guidelines however, is the delivery of care within a particular healthcare system. Healthcare practitioners often lack consistent guidance on who is responsible for the implementation of these guidelines postpartum.

The CPG's for prevention of type 2 diabetes in women who experienced GDM include: 1) screening for diabetes at six weeks to six months postpartum and subsequent annual screening, 2) nutrition and lifestyle counseling, and 3) exclusive breastfeeding for at least three months postpartum (CDA, 2013; IDF, 2015). Although these clinical guidelines are based on the best available evidence (Khangura et al., 2010), they only offer recommendations on postpartum follow up care. Further evidence indicates that the CPG regarding postpartum recommendations are not being followed by healthcare providers or women with a history of GDM (Case, Willoughby, & Haley-Zitlin, 2006; England, Dietz, Njoroge, Calaghan, Bruce, Buus et al., 2009; Dietz, Vesco, Callaghan, Bachman, Bruce, Berg et al., 2008; Tovar, Chasan-Taber, Eggelston & Okem, 2011). Problems implementing CPGs can be due to factors external to the recommendations, or issues with the guidelines themselves (Lawrence, Polipnick, & Colby, 2008). Ploeg and colleagues (2007) suggest effective implementation of CPG's is related to factors at the individual, organizational, and societal levels, which all need to be addressed.

Social support has shown to play a significant role to engaging in health behaviours in people at risk for type 2 diabetes (Diabetes Prevention Program, 2002), and

has been associated with increased involvement in health enhancing activities by postpartum women with prior GDM (Koh, Miller, Marshall, Brown, & McIntyre, 2010; Razee, van der Ploeg, Blignault, Smith, Bauman, McLean et al., 2010). Previous studies have focused on linking social support to positive physical health outcomes in at risk-populations (Ali, Merlo, Rosvall, Lithman, and Lindström, 2006; Tomaka, Thompson, and Palacios, 2006; & Zhang, Norris, Gregg, and Beckles, 2007). Studies that emphasize the link between the provision of social support and positive health outcomes, are gaining momentum (Reblin and Uchino, 2008; Strom & Egede, 2012; Uchino, Bowen, Carlisle, and Birmingham, 2012).

Social support has been studied and defined in many different ways and therefore must be clearly defined to understand the overall construct (Schwarzer, Knoll, & Reikmann, 2004). Social support, social support networks, and social integration are concepts that are interrelated yet are quite different. Social support networks are objective in nature, referring to the people or providers of support within one's environment and provide the foundation upon which social integration and social support will eventually occur (Schwarzer et al., 2004). Social integration and social support, on the other hand, are theoretical constructs that refer to one's social embeddedness, sense of belonging, closeness, and obligation (Schwarzer et al., 2004). There are two aspects of social integration: 1) configuration of social relationships (the size and degree of networks and how often they interact), and 2) one's perception of embeddedness within their social network (Schwarzer et al., 2004). In contrast, the idea of social support in its broadest sense is subjective, and represents the purpose and quality of social relationships that occurs through a process of engaging with others (Schwarzer et al., 2004). A more

focused definition of social support is typically used in research studies and is dependent on the context in which it used.

For the purpose of this scoping review, social support was defined as any resource provided by others, any exchange of resources, or any assistance with coping (Schwarzer et al., 2004). There are various types of social support that may be exchanged including instrumental (e.g., problem solving), informational (e.g., advice or education), tangible (e.g., material goods) or emotional support (e.g., reassurance) (Schwarzer et al., 2004). It is important to note that the health of an individual is not solely dependent on the provision of social support itself. According to Rook (1990), health results from a reciprocal process that occurs through the participation in a meaningful social context. This means that when people engage socially, they become vested and more embedded in their social networks over time. The more the individual engages socially and builds relationships, the greater their ties become, the higher the obligations and the desire to give reciprocate increases (Schwarzer et al., 2004).

Women with a history of GDM have consistently expressed a strong need for social support to make and sustain changes in dietary and physical activity habits to prevent future diabetes (Dasgupta, Da Costa, Pillay, De Civita, Gougeon, Leong et al., 2013; Evans, Patrick & Wellington 2010; Jagiello & Chertok 2015; Razee et al., 2010). Women have identified face-to-face engagement with peers and healthcare providers as their primary preference for support (Dasgupta et al., 2013). Women who experienced GDM however, report feeling disconnected from their healthcare providers postpartum (Evans et al., 2010; Thomas 2004) at a time when their need for support is the greatest (Thomas, 2004). Women who have experienced medical complications in pregnancy discussed additional stress postpartum (Thomas, 2004). Not only are these women



transitioning to motherhood with all of the demands of a newborn, they are also trying to regain control over their health (Thomas, 2004). These findings suggest that women who have experienced medically complicated pregnancies encounter additional challenges to regain health postpartum than in the general population, and would benefit from additional support to help overcome those challenges (Thomas, 2004).

The aim of this scoping review is to examine the existing literature on the implementation of CPG's pertaining to diabetes prevention in women with prior GDM, and to identify the role of social support for women engaging in lifestyle changes after GDM. The specific questions guiding this scoping review were: 1) to what extent are women with a history of GDM receiving the postpartum care as recommended by the IDF (2009) clinical practice guidelines? 2) what role does social support play in the implementation of CPG's for postpartum women with prior GDM? The findings and gaps identified from this scoping review provide key information about the status of clinical practice guideline implementation. This information was then used to inform the development of a grounded theory study to explore the role that social support processes play in how postpartum women with prior GDM maintaining or implementing healthy lifestyle behaviours.

### **Methods**

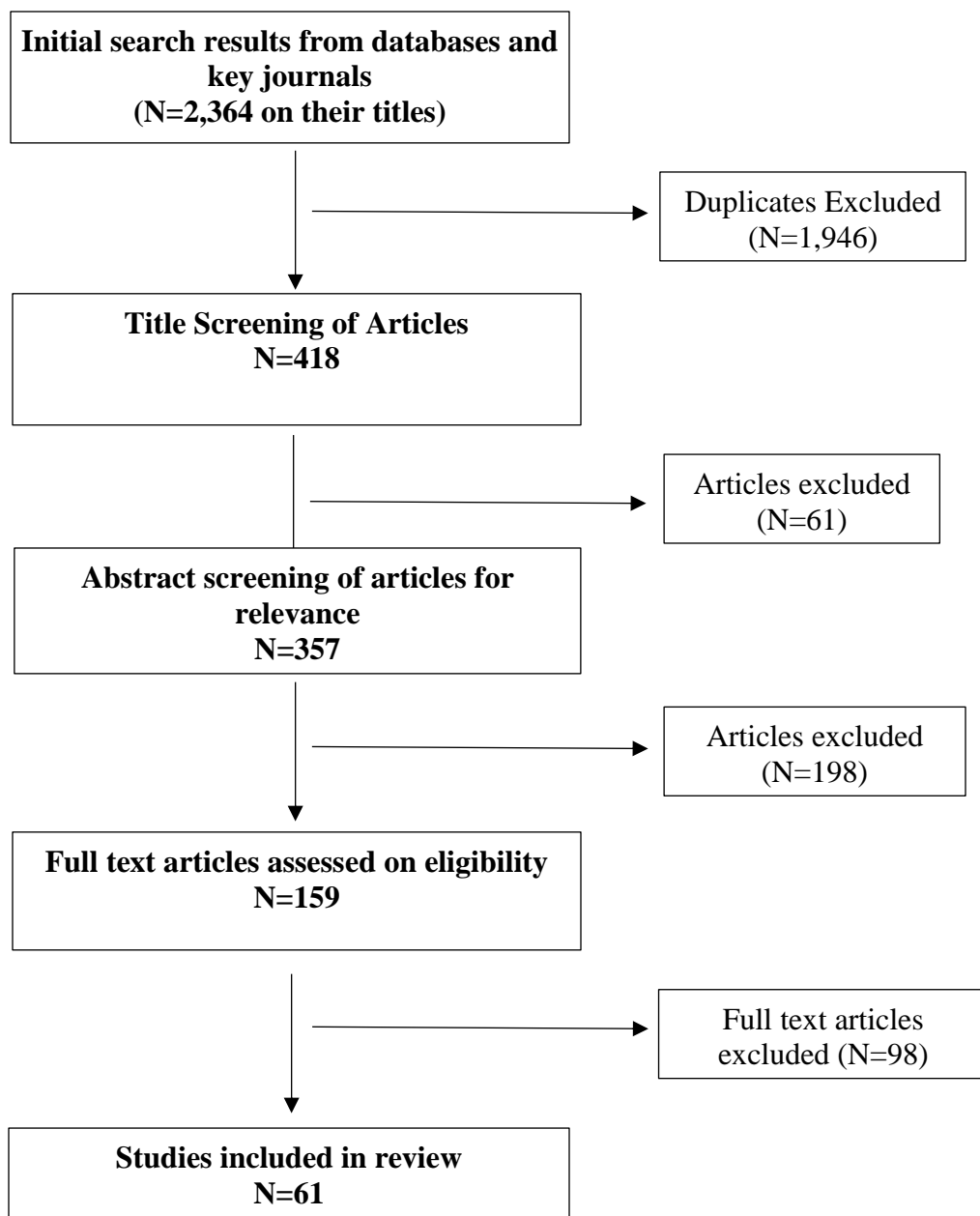
The scoping review framework of Arksey and O'Malley (2005) informed the methodology used for this review. Scoping reviews are typically used as a means to review results from studies available on a particular topic, summarize key health evidence, and identify research gaps (Levac, Colquhoun, and O'Brien, 2010). According to the Canadian Institute of Health Research (2010), scoping reviews are "exploratory projects that systematically map the literature available on a topic, identifying the key

concepts, theories, sources of evidence, and gaps in the research” (p. 34). A scoping review was selected for this project as it enabled a broader range of literature to be captured, including quantitative and qualitative research studies that address the research questions (Arskey and O’Malley, 2005). The following five steps were followed using the Arskey & O’Malley framework (2005): 1) forming the research question; 2) performing a comprehensive literature search and development of relevancy criteria; 3) identification of relevant studies; 4) charting the data from those studies and reports; and, 5) summarize and report the results.

To conduct the review, seven electronic databases (Academic Search Complete, CINAHL, EBSCOhost, MEDLINE, OVID, CHOCHRANE, and Proquest) were used to systematically retrieve relevant studies. Search criteria included articles that were: 1) published between January 2005 and July 2015, 2) written in English, and 3) peer reviewed. The dates were restricted to the last ten years given the vast number of research articles that address the multitude of complexities that surround women with gestational diabetes and to ensure current literature on the topic. To obtain relevant articles to address the research questions gestational diabetes was combined with the following search terms and Boolean phrases in various combinations: postpartum screening, breastfeeding, follow-up, lifestyle modification, social support, clinical practice guidelines, strategies, best practice guidelines, and type-2 diabetes prevention. The initial search yielded 2364 papers, all of which were screened based on their titles. Next, 1946 articles were excluded based on their lack of relevance to GDM and the postpartum period or were found to be duplicate articles resulting in a total of 418 articles. The abstracts of the remaining 418 articles were then read for relevance to GDM postpartum follow-up, breastfeeding, and lifestyle modifications rendering the exclusion of an

additional 357 articles. An additional 98 articles were excluded, as they did not address the research questions. The remaining 61 articles were included in this scoping review (See Figure 3.1).

**Figure 3.1**



## **Results**

A total of 61 studies from a variety of countries were reviewed, summarized and placed in categories according to the CPG recommendation they addressed (postpartum follow-up and blood glucose screening, lifestyle modification, and breastfeeding) (See Appendix A for details of these studies). Of the 61 articles reviewed, 34 exclusively addressed postpartum follow up and blood glucose screening, 17 articles exclusively addressed lifestyle modification, six articles exclusively addressed breastfeeding, and the remaining four articles addressed more than one component. Each of the articles were initially summarized according to their main findings, and then categorized in a mapping chart according to the author, country of origin, methodology, main findings, and the clinical practice guideline it addressed (See Table 1). Original articles found within systematic and other literature reviews are discussed in conjunction with those reviews and are not discussed independently. Breastfeeding rates, postpartum blood glucose screening rates and postpartum follow-up were all found to be suboptimal, and lifestyle modifications remain challenging for postpartum women with previous GDM despite their knowledge of the benefits. Provision of social support overwhelmingly emerged as a crucial influencing factor assisting women postpartum for each of the categories regardless of the origin of country. The findings of the scoping review are discussed as follows: Postpartum blood glucose screening and follow-up, GDM and postpartum lifestyle modifications, and GDM and breastfeeding.

### **Postpartum Blood Glucose Screening and Follow-Up**

#### **Screening Rates**

Screening for type-2 diabetes is recommended by the International Diabetes Federation [IDF] (2015) as a health promoting strategy for women with prior GDM. A

US retrospective cohort study of 14, 448 postpartum women with prior GDM was conducted to trend postpartum blood glucose screening rates for type 2 diabetes between 1995 and 2006 (Ferrera, Peng, & Kim, 2009). The results indicated that although screening rates have increased from 20.7% in 1995 to 53.8% in 2006, they remain inadequate (Ferrera et al., 2009). Similarly results from another retrospective study of 11, 825 US women with prior GDM showed that only 50% of women received the recommended postpartum oral glucose tolerance test between the years 1999 and 2006 (Lawrence, Black, Hsu, Chen, & Sacks, 2010). A systematic review of 11 studies evaluating postpartum screening for diabetes between 2008 and 2010, revealed approximately 34%-73% of women with histories of GDM completed postpartum screening, with a median of 48% (Tovar et al., 2011).

A Canadian retrospective cohort study of 1006 women with a history of GDM revealed a postpartum screening rate of 48% (Kwong, Mitchell, Senior, & Chick, 2009). Screening rates varied by numerous factors such as race, ethnicity, age, education, previous gestational diabetes and severity of gestational diabetes. Results of a large qualitative Chinese study with 2152 women with a history of GDM indicated that only 282 (13.1%) of the women were screened for blood glucose levels postpartum (Chang, Chen, Hongyan, Zhang, & Cheng, 2014). The primary reasons for women not seeking blood glucose screening were not being informed by their physicians, believing that GDM would disappear after delivery, and being pre-occupied with the baby (Chang et al., 2014). In addition, 30 obstetricians were interviewed for this study and, although a majority of them reported being aware of the need for blood glucose screening for women with GDM after delivery, only 15 of had informed their patients (Chang et al., 2014).

### **Postpartum Follow-up: Barriers and Facilitators**

A Canadian survey was conducted to explore primary care providers and women with previous diagnosed GDM perspectives on postpartum screening for type 2 diabetes (Keely, Clark, Karovitch, & Graham, 2010). A follow-up survey was given to 173 primary care providers and 140 women with prior GDM who participated in a randomized controlled trial to assess the effectiveness of postpartum postal reminders (Keely et al., 2010). The results showed that implementing a follow-up reminder system for both women and primary care providers was valued, postpartum screening rates increased with having reminders, and fragmentation of care (often resulting from a lack in communication between health care providers) was reduced (Keely et al., 2010). Barriers to follow-up included primary care providers not seeing women postpartum or, they were seen and testing arrangements were made yet the woman did not follow through with blood glucose testing (Keely et al., 2010). Although the women valued postpartum blood glucose screening, they reported time constraints, complexity of the glucose tolerance test, and lost laboratory requisition as the most common barriers to screening (Keely et al., 2010).

In a Canadian longitudinal concurrent mixed method study to explore health behaviours and perceived health status of 13 postpartum women with a history of GDM, Evans, Patrick, & Wellington, (2010) found that a diagnosis of GDM was not communicated at the time of hospital discharge to community health nurses or other health providers creating an unfavourable environment for follow-up care postpartum. For example, in Ontario, women are typically screened by their obstetrician or midwife during pregnancy for gestational diabetes. When elevated blood glucose levels are detected, women are referred to a specialist such as an endocrinologist or internist (Keely

et al., 2010) and after giving birth, women resume care from their primary care provider (physician, midwife). This creates fragmented health care as a diagnosis of GDM is often not communicated to their primary care physician or other health care providers (Keely et al., 2010).

A US survey of 207 primary care providers and primary obstetric providers was conducted to determine barriers to follow-up for women with a history of GDM (Stuebe, Ecker, Bates, Zera, Bentley-Lewis, & Seely, 2010). Primary care physicians were found less likely to ask about a history of GDM versus obstetric care physicians during routine patient visits (Stuebe et al., 2010). Poor communication between healthcare providers was identified as a major barrier to screening postpartum (Stuebe et al., 2010). In a qualitative study conducted in the US, Bennett et al., (2011) interviewed 22 women with prior GDM to explore barriers to and facilitators of postpartum follow-up care. Feelings of emotional stress related to transition to motherhood (adjusting to a new baby), and the fear of receiving a diabetes diagnosis were identified as key barriers to follow-up care, while child care availability and desire for a checkup were among the key facilitators (Bennett, Ennen, Carrese, Hill-Briggs, Levine, Nicholson et al., 2011).

In 2014, Neilson, Kapur, Dam, De Courten, and Bygbjerg conducted a large systematic review to assess the evidence on determinants and barriers for GDM services in low, medium and high-income countries (Neilson et al., 2014). GDM services were characterized by screening and diagnosis, treatment during pregnancy, postpartum glucose screening, and consistent postpartum lifestyle modification. The review included 58 relevant quantitative and qualitative studies. The results of this review revealed that little is known about how societal factors or the healthcare system itself hinders provision of GDM services postpartum, or what can be done to improve follow-up compliance rates

(Nielson et al., 2014). Numerous barriers related to the health care provider, healthcare system, and women's personal attributes were also identified by a number of the qualitative studies reviewed (Nielson et al., 2014). This review also showed that most women had intentions to maintain healthy lifestyles to prevent future diabetes however, found it quite challenging to do so. Lifestyle modifications were more likely to occur in the presence of a sense of self-efficacy and social support (Nielson et al., 2014).

### **Postpartum Screening and Provision of Support**

A large Italian intervention study involving 1159 postpartum women with histories of GDM was conducted between 2004 and 2011 to determine if counselling, demographic characteristics, clinical, and/or biochemical characters were predictors of postpartum glucose screening (Capula, Chiefari, Vero, Iiritano, Arcidiacono, Puccio, et al., 2013). Counselling (verbal and written), was provided to 247 pregnant women between 35–40 weeks gestation in the intervention group while no counselling was provided to the control group (n=220). Women in the control group were provided information about the increased risk for type 2 diabetes and subsequent pregnancy risks. Pregnant women were then given a handout identifying the risks of GDM, provided follow-up recommendations, and healthy lifestyle tips. A significant increased rate of blood glucose testing was reported following introduction of counselling to at risk women versus women who did not receive the intervention. In addition, a previous diagnosis of polycystic ovary syndrome (PCOS) emerged as the major predictor of postpartum follow-up, even in the absence of counselling (Capula et al., 2013). Previous diagnosis of GDM, higher educational status, and insulin treatment were also significant predictors of postpartum glucose screening (Capula et al., 2013).



In a similar study, a US retrospective chart review of 221 postpartum women with previous GDM was conducted between 2006 and 2008 to identify postpartum follow-up rates, as well as counselling opportunities before and after the implementation of a Postpartum Follow-up Initiative (Tsai, Nakashima, Yamamoto, Ngo, & Kaneshiro, 2011). Women were provided with an appointment card indicating a date and time for a postpartum visit prior to discharge home from the hospital. The incentive involved photographing the mother and baby at the first follow-up visit and the completed photo album was given at the second follow-up visit. Postpartum follow-up rates, breastfeeding rates and contraception use were all significantly higher after the postpartum follow-up initiative was introduced (Tsai et al., 2011).

Evidence from this scoping review indicates that postpartum blood glucose screening rates remain suboptimal despite its known importance. It is evident that both healthcare providers, and women with prior GDM, face barriers to screening and implementing preventive interventions. The provision of support has been shown to significantly increase screening rates postpartum. More research is needed to identify strategies and interventions that can further enhance screening in postpartum women with prior GDM.

### **GDM and Postpartum Lifestyle Modification**

#### **Postpartum Lifestyle Modifications: Barriers and Facilitators**

Women with prior GDM experience difficulty making healthy lifestyle changes and engaging in healthy behaviours despite knowing of their risk for developing diabetes (Doran, 2008; Evans et al., 2010; Kim, McEwen, Kieffer, Herman, & Piete, 2008; Morrison, Koh, Lowe, Miller, Marshall, Colyvas et al., 2012; Peacock, Bogosian, McIntyre, & Wilkinson, 2014; Symons-Downs & Ulbrecht 2006.) A mixed methods

Australian study involving 38 postpartum women with prior GDM was performed using surveys and in-depth interviews (Doran, 2008). Doran (2008) sought to explore the role that physical activity plays in the management of gestational diabetes mellitus (GDM), the impact of a GDM diagnosis on a woman's life, follow-up support, and to identify barriers and facilitators to engage in physical activity postpartum. Although women were able to make lifestyle changes during pregnancy, those changes were difficult for them to sustain postpartum (Doran, 2008). Barriers to both postpartum screening and lifestyle modifications were identified as time constraints and family care-taking responsibilities (Doran, 2008).

A US mixed method study was conducted with 25 women with a prior history of GDM, using focus groups (with a grounded theory approach) and informant interviews (Niklas, Zera, Seely, Abdul-Rahim, Rudloff & Levkoff, 2011). Authors sought to elicit perspectives of women with a history of GDM to identify barriers and facilitators to healthy lifestyle changes postpartum, and identify specific intervention approaches that would facilitate participation in a postpartum lifestyle intervention program (Niklas et al., 2011). Results revealed time constraints, childcare responsibilities, lack of motivation, and fatigue are barriers for postpartum women to engage in physical activity and eating healthy (Niklas et al., 2011). Education directed at lifestyle modification and provision of social support from both health care providers and family members were cited as facilitating factors in making healthy lifestyle changes postpartum (Niklas et al., 2011).

Jones, Roche, & Appel (2009) performed a systematic review of the literature to examine the health beliefs, risk perceptions, and health behaviours of postpartum women with prior GDM. The review indicated that women significantly underestimated their risk of developing type 2 diabetes (Jones et al., 2009). The majority of women lead sedentary

lifestyles with poor dietary intake postpartum. Social support was found to positively influence women's affinity to engage in healthy behaviours however, was lacking for most of the women (Jones et al., 2009). In 2013, Kaiser and Razurel performed a review of the literature to critically examine the impact of perinatal stress on mothers' psychological health, the efficacy of coping strategies, and to determine what role social support plays in the interaction between birth events and mothers' psychological experiences. Results showed that postpartum women's physical activity and diet rarely met the level of physical activity and dietary recommendations set by the American College of Obstetricians and Gynecologists (Kaiser and Razurel, 2013). Risk perception, health beliefs, social support, and self-efficacy were the main factors identified as having an impact on the women's adoption of health behaviours postpartum (Kaiser & Razurel (2013).

In an Australian study, 226 postpartum women with prior GDM were surveyed by telephone to examine physical activity levels and associated psychosocial factors (Smith, Cheung, and Bauman (2005). Of the women surveyed, 25% were classified as sedentary and only 33.6% reported sufficient physical activity levels as recommended by health care providers (Smith et al., 2005). Barriers to physical activity were identified as a lack of assistance with childcare and insufficient time to exercise while receiving verbal encouragement from family, friends and healthcare providers was the main type of support reported by the women (Smith et al., 2005). More than half of the women commented never receiving assistance with housework or other daily activities (Smith et al., 2005).

Tang, Foster, Pumarino, Ackerman, and Peaceman (2015) performed a qualitative study using semi-structured interviews on 23 US women with a history of GDM to elicit

women's perspectives on prevention of type 2 diabetes mellitus. Results showed that women viewed Type 2 diabetes as a severe condition, and the desire to avoid developing diabetes in the future was an important motivator for making behavioral changes. Children represented both a key motivator and critical barrier to behavioral change. Women viewed preventive healthcare visits (follow-up visits) as important to inform them about potential health concerns (Tang et al., 2015). Tang et al., (2015) encourage healthcare providers to leverage women's focus on their children to motivate and facilitate behavioural change, and support women in making healthy behavioural changes during healthcare visits in the postpartum period and beyond.

### **Postpartum Lifestyle Modification and Provision of Support**

Provision of support consistently shows to increase women's likelihood of adhering to CPG's. Koh et al., (2010) completed a cross sectional study using telephone survey to describe the incidence and association between physical activity, social support and self-efficacy among 331 postpartum women with prior GDM. Results revealed that 37.2% of the women surveyed were participating in regular physical activity (Koh et al., 2010). Social support was found to be significantly associated with increased levels of physical activity postpartum (Koh et al., 2010). In 2008, Australian researchers investigated postpartum dietary behaviours among 226 postpartum women with recent GDM via telephone survey (Zehle, Smith, Chey, McLean, Bauman, & Cheung, 2008). The findings revealed higher rates of vegetable consumption were positively associated with increased self-efficacy to cook healthy foods (Zehle et al., 2008). Fruit consumption was also positively related to self-efficacy when women were busy and when not reporting a dislike of healthy foods by others at home. Receiving advice from a dietitian and telephone support from a health educator were the most preferred forms of health

assistance reported by the women and was related to an increase in self-efficacy (Zehle et al., 2008).

Razee, van der Ploeg, Blignault, Smith, Bauman, McLean, & Cheung (2010) performed 57 in-depth semi-structured telephone interviews to explore the beliefs, attitudes, social support, environmental influences and other factors related to diabetes risk behaviours among Arabic (n=20), Cantonese/Mandarin (n=20), and English (n=17) speaking women with recent GDM in Australia. Mental distress, role perceptions, social support and cultural expectations were major issues related to women's struggles to find the right balance between household and childcare responsibilities, and leading a healthy lifestyle (Razee et al., 2010). Women's ability to follow a healthy lifestyle is thought to be entrenched in their psychological wellbeing and the social and cultural context of their lives (Razee et al., 2010).

Role expectations of new mothers, cultural beliefs, mental health, perceived stress and social support networks are among the many identified factors that influence a woman's ability to make lifestyle modifications (Razee et al., 2010; Stark & Brinkley, 2007; Bandyopadhyay, Small, Davey, Oats, Forster & Aylward, 2011). Mental health, role perceptions, social support, and information or access to resources have been shown to impact a women's ability to manage child-care responsibilities, and to be healthy including staying physically active and eating well (Razee et al., 2010). The evidence validates that women with prior GDM experience difficulty maintaining or implementing healthy lifestyle choices postpartum. There are a multitude of barriers that contribute to this finding including time constraints, lack of support for childcare, mental distress, lack of motivation and fatigue. The major influencing factor identified from the review to engage and maintain healthy lifestyle postpartum was the provision of social support.

Despite this evidence, women with prior GDM consistently report a lack of support postpartum.

### **GDM and Breastfeeding**

Exclusive breastfeeding is strongly recommended for women who have experienced GDM due to its numerous health benefits for both mother and baby (CDA, 2013, IDF 2009). Breast milk is preferred for newborns due to its potential to stabilize blood glucose levels (Chertok, Raz, Shoham, Haddad, & Wiznitzer, 2009). Breastfeeding has been identified as an important strategy to improve early postpartum glucose tolerance (Gunderson, Henderson, Chiang, Crites, Walton, Azevedo et al., 2012; O'Reilly, Avalos, Denedy, O'Sullivan, & Dunne, 2011), and has also been shown to have a possible protective effect in preventing type 2 diabetes long-term in both mother and child (Ziegler, Wallner, Kaiser, Rossbauer, Harsunen, Lachmann et al., 2012). Despite its positive health effects, breastfeeding rates in postpartum women with prior GDM remain poor, and there is a paucity of research on why this is the case.

### **GDM and Breastfeeding Rates**

A systematic review of 12 observation studies examined the breastfeeding rates of women with prior GDM, the effect of lactation on subsequent type 2 diabetes development, and the impact of breastfeeding on the development of type 2 diabetes in infants (Taylor, Kacmar, Nothnagle, & Lawrence, 2005). The review indicated that fewer women with a GDM history breastfed than women without GDM histories (Taylor et al., 2005). A large Canadian retrospective cohort study was performed analyzing the data of 24, 755 health records including demographics, health behaviours, pre-existing maternal health problems, obstetric complications, intrapartum interventions and birth outcomes (Finkelstein, Keely, Feig, Tu, Yasseen, and Walker, 2013). Data were obtained from four

Ontario hospitals between 2008 and 2010 to explore breastfeeding intention and breastfeeding rates in hospital and on discharge across women with pre-GDM (borderline gestational diabetic), GDM or no diabetes (Finkelstein, et al., 2013). Women diagnosed with gestational diabetes were reported to have lower breastfeeding rates both in hospital, and upon discharge when compared to women without gestational diabetes (Finkelstein et al., 2013). Women treated with insulin during pregnancy had the poorest breastfeeding rates. Gestational diabetic women and women with non-insulin-treated diabetes were found to have lower breastfeeding rates in hospital, while gestational diabetes was additionally associated with lower breastfeeding rates at discharge (Finkelstein et al., 2013).

A retrospective cohort study was conducted in the U.K. to identify factors that influence breastfeeding rates in 94 postpartum women with histories of GDM, type 1 diabetes and type 2 diabetes over a 2 year period (Soltani & Arden, 2009). Women were exposed to a 'Baby-Friendly Initiative' whereby they received supportive counselling to encourage breastfeeding (Soltani & Arden, 2009). Breastfeeding rates were found to be similar to women in the general population suggesting that provision of support postpartum, may play a part in higher breastfeeding rates (Soltani & Arden, 2009). In 2014, Kozhimannil, Jou, Attanasio, Joarnt, and McGovern, conducted a large retrospective analysis of data from a national survey of 2,400 women who gave birth in 2011–2012 in a US hospital. Women who experienced a complex pregnancy including self-reported pre-pregnancy diabetes, hypertension, gestational diabetes, or obesity were included in the study. The intention to breastfeed was reported to be 30% less among women who experienced a medically complicated pregnancy compared to women with uncomplicated pregnancies (Kozhimannil, et al, 2014). Supportive hospital practices

were strongly associated with higher intentions of breastfeeding. Kozhimannil, et al., (2014) suggest that provision of support from healthcare providers for women with complex pregnancies may increase breastfeeding rates (Kozhimannil, et al, 2014).

Jagiello, Azulay, and Chertok (2015) conducted a phenomenological study in the U.S. with 27 women who had been diagnosed with GDM and had initiated breastfeeding following delivery to explore the women's experience of early breastfeeding. Three themes emerged to describe the women's early breastfeeding experience: breastfeeding challenges and breastfeeding support, milk supply challenges, and concern for infant health. Delayed lactogenesis was reported by 30% of the women, and 44% perceived having decreased milk supply. Participants verbalized a need for consistent lactation advice and education to occur beyond the initiation of breastfeeding, periodic assistance while breastfeeding, and strategies that address breastfeeding challenges and milk supply issues (Jagiello et al., 2015).

An Australian study used a cross-sectional online self-administered questionnaire involving 729 women diagnosed with GDM to determine factors associated with early cessation of breastfeeding (Morrison, Collins, Lowe, and Giglia, 2015). Cessation of breastfeeding at or before 3 months was associated with breastfeeding problems at home, return to work prior to three months, inadequate breastfeeding support, caesarean delivery, low socioeconomic status, and an increase in BMI compared to their prenatal weight. Morrison et al., (2015) suggest addressing risk factors and the provision of postpartum breastfeeding support as important strategy to increase breastfeeding rates with women who experienced GDM. Youngwanichsetha (2013) performed a cross sectional analysis to explore the factors related to exclusive breastfeeding among 120 postpartum Thai women with a history of GDM. The results revealed maternal age,



employment, parity, body mass index, duration of newborn's admission in NICU, and exclusive breastfeeding intention were significantly related to exclusive breastfeeding for six months postpartum (Youngwanichsetha, 2013). The duration of exclusive breastfeeding was influenced by the women's breastfeeding intentions; more specifically their attitude towards the benefits of exclusive breastfeeding on reducing blood glucose, losing gestational weight gain, and the prevention of diabetes (Youngwanichsetha, 2013).

The scoping review revealed many challenges associated with adhering to the CPG's for women with prior GDM as well as for their healthcare providers. Healthcare providers contend with a fragmented healthcare system whereby communication about a GDM diagnosis is problematic. Women are also faced with a multitude of barriers to following the guidelines however, some facilitating factors have been identified. Social support overwhelmingly emerged as a facilitating factor to overcoming many of the obstacles to support women with postpartum screening, breastfeeding and making healthy lifestyle modifications.

### **Discussion**

The results of the scoping review are concerning as they reveal that many women with prior GDM are not receiving the recommended follow up care outlined by the IDF (2009) CPG. Women with a history of GDM experience difficulty making the recommended lifestyle modifications, breastfeeding rates are poor, and follow-up by healthcare providers remains inadequate. Poor adherence to the 2013 CDA CPG's renders this population at an even greater risk for developing type-2 diabetes, and metabolic syndrome later in life. While poor blood glucose screening rates are in part due to women's personal characteristics and risk perception, women's experience within

the healthcare system and, fragmentation of care are significant contributing factors (Keely, 2012).

Disjointed healthcare is one of the most difficult aspects of managing the health of women with prior GDM postpartum for healthcare providers. In Canada, physicians are the dominant primary care health providers and are typically the gatekeepers of the majority aspects of the healthcare system such as specialist care (Bryant, 2009). This dominance over health care service influences the relationships with other health care professionals, and ultimately affects the delivery of care for women with prior GDM (Bryant, 2009). This is of particular importance when it comes to postpartum screening practices, as fragmentation of care postpartum can be the result of a lack of communication among healthcare providers about the diagnosis of gestational diabetes. This breakdown in communication tends to occur when women are discharged from their primary obstetric care providers' care postpartum. After delivery, women will typically resume care from their primary care provider, which is the critical time period for communication to occur. Communication about a GDM diagnosis is essential during this time as following the CPG's can help prevent type-2 diabetes. Poor communication and lack of support has been attributed to a lack of infrastructure and/or organization of care between providers (Keely, 2012), as there are currently no clear guidelines on who is responsible for follow-up care for a woman with prior GDM.

Women with GDM receive a great deal of attention and support during pregnancy including strict monitoring, diabetes education, access to resources, and diabetes self-management support to ensure optimal maternal-fetal outcomes. The support received during a GDM complicated pregnancy far surpasses the level of support and monitoring during an uncomplicated pregnancy. Women with prior GDM are encouraged to follow

CPG's postpartum to help reduce their risk for type-2 diabetes yet, continuity of care is shown to be problematic during this time.

Optimal growth and development of mothers and children have been shown to occur in settings that provide social support, physical and emotional care, and guidelines for healthy behaviour (Mercer, 1995). Mercer and Walker (2006) performed a literature review of 28 reports to determine the current state of knowledge of nursing interventions that foster the process of becoming a mother. Interactive nurse-client relationships were associated with positive maternal growth and increased competence, especially in high-risk situations. These findings of this review provide valuable insight on how to overcome the obstacles that new mothers experience while transitioning to motherhood.

Understanding and acknowledging the multitude of barriers and complexities that exist around breastfeeding, blood glucose monitoring, and lifestyle modifications is an important consideration for health promotion postpartum. Provision of social support can help ensure that women are not only their own immediate and newborn's needs, but can also encourage and support women to engage in healthy lifestyle modification. Additional research is needed to further our understanding of the role social support plays in implementing the recommended clinical practice guidelines, as women transition from experiencing a pregnancy complicated by gestational diabetes, to becoming a new mother attempting to regain her health postpartum without diabetes.

The results of this scoping review demonstrate that recommended clinical practice guidelines for postpartum women with prior GDM are not consistently followed. A lack in continuity of care postpartum and poor communication between healthcare providers often result in individuals' experiencing difficulty navigating the healthcare system (MOHLTC, 2012) and engaging in healthy lifestyles, leaving women with prior GDM at

risk for type-2 diabetes. Provision of support that integrates interventions at all levels of influence are essential to overcoming these barriers. This is particularly imperative for women with prior GDM as they transition to motherhood with the added burden of maintaining or restoring their health. Additional research is needed to determine innovative ways to increase postpartum screening rates and follow-up care, encourage and support the recommended lifestyle modifications, and increase breastfeeding rates by drawing upon social supports in women with prior GDM.

### **Concluding Remarks**

Gestational diabetes is a well-known risk factor for the development of future diabetes for at risk women. Current postpartum blood glucose screening rates remain poor, and current interventions are inadequate to address existing barriers faced by postpartum women. Women with prior GDM, and their health care providers, often face barriers to screening and managing care postpartum. Evidence indicates that clinical practice guidelines fall short in managing postpartum women's health successfully as women tend to be overlooked postpartum due to a poor infrastructure and primary focus on the newborn. While barriers to blood glucose screening and postpartum follow-up among women with prior GDM are well documented in the literature, knowledge about how to specifically combat them within the context of the Canadian healthcare system is lacking. Knowledge providing context and meaning as to why this is the case will offer insight and provide direction on how to confront the issue.

While there are copious amounts of information known about gestational diabetes, the associated risk factors, poor screening rates, and barriers to self-care management, current research fails to provide effective strategies to address these issues. What is known however is that provision of social support has been shown to improve

health outcomes for postpartum women however, social support is lacking at a time when women have identified a need for it. Social support processes are not fully understood as experienced by postpartum women as they try to restore and maintain their health after having experienced GDM. Research is needed to further explore the social support processes as experienced by postpartum women with a history of GDM and to critically examine the identified barriers and facilitators to engaging in health within the context of the individual, interpersonal, organizational, community, and political levels of influence on health within the context of the Canadian healthcare system. A critical approach to understanding the multiple complexities involved in implementing and/or maintaining health behaviours postpartum, will help to explain *how* and *why* barriers and facilitators influence behavior. Understanding the *why* and *how* behind health behaviours in postpartum women with prior GDM will provide key insight on how to effectively overcome barriers, and benefit from facilitators. To help prevent or delay future onset of type 2 diabetes in women with prior GDM, early detection, optimal treatment, preventive postpartum-care, and consistent follow-up that addresses those influencing factors is essential. Successful implementation of the clinical practice guidelines for postpartum women with prior GDM can be ensured through the provision of social support.

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## **Chapter 4**

### **It's About Time! GDM: A Transformative Postpartum Process**

#### **Introduction**

Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance with onset or first diagnosis during pregnancy. According to the Canadian Diabetes Association (CDA), the prevalence of gestational diabetes varies between 3.7% and 18% of Canadian women, depending on the population studied (CDA, 2013). Women diagnosed with gestational diabetes are at an increased risk for type 2 diabetes and metabolic syndrome later in life, as well as developing GDM in subsequent pregnancies (Feig, Zinman, Wang, & Hux, 2008; Gatullo, & Olubummo 2009; Khangura, Grimshaw, & Moher 2010; Reece, Leguizamon, & Wiznitzer 2009; Schneiderman 2010).

A 2008 analysis of Ontario-wide data revealed that nearly 4% of women with prior GDM developed type 2 diabetes nine months postpartum, and close to 20% had developed type 2 diabetes within nine years (Feig et al., 2008). According to the CDA (2012), 30% of Canadian women with a history of GDM will develop type 2 diabetes within 15 years. This is concerning since the overall incidence of gestational diabetes has increased in Ontario from 3.2% in 1995, to 3.6% in 2001 (Feig et al., 2008), and has essentially doubled over the last 14 years (Feig, Hwee, Shah, Booth, Bierman, and Lipscombe, 2014). In addition, work by Lipscombe & Hux (2007) has shown that diabetes rates in Ontario have increased dramatically over the last decade with the biggest rise in diabetes seen in women aged 20 to 49 years. Children of women with a history of GDM are also at an increased risk for developing obesity (Zhao, Liu, Qiao, Katzmarzyk, Chapput, Fogelholm, et al., 2016), pre-diabetes and type 2 diabetes later in life (Clausen,

Mathiesen, Hansen, Pedersen, Jensen, Lauenborg et al., 2008; Dabelea & Pettit, 2001; Damm, 2009; Egeland & Meltzer, 2010).

### **Background and Significance**

An increased incidence of GDM and type 2 diabetes is associated with higher healthcare costs related to diabetes management and associated health complications. The costs associated with diabetes management and complications not only affects those individuals living with the disease, but also their families, communities, and society as a whole (CDA, 2009). The Canadian Diabetes Association [CDA] (2013) clinical practice guidelines for prevention of type 2 diabetes in women with a history of GDM recommend the following: screening for diabetes at six weeks to six months postpartum and subsequent annual screening, nutrition and lifestyle counseling, and exclusive breastfeeding for at least three months. Evidence shows however, that recommended postpartum protocols for women with GDM are not being followed by health providers and women (Case, Willoughby, & Haley-Zitlin, 2006; (England, Dietz, Njoroge, Calaghan, Bruce, Buus et al., 2009; Dietz, Vesco, Callaghan, Bachman, Bruce, Berg, et al., 2008; Tovar, Chasan-Taber, Eggelston & Okem, 2011). Poor adherence to recommendation protocols renders postpartum women with prior GDM at risk for type 2 diabetes.

Fortunately, social support has been shown to positively influence people at risk for type 2 diabetes, to engage in health promoting behaviours to prevent diabetes (Diabetes Prevention Program, 2002). Social support has also been associated with increased involvement in health enhancing activities in postpartum women with prior GDM (Koh, Miller, Marshall, Brown & McIntyre, 2010; Razee, van der Ploeg, Blignault, Smith, Bauman, McLean et al., 2010). Women with a history of GDM have consistently

expressed a strong desire for social support to make and sustain recommended changes in dietary and physical activity habits (Dasgupta, Da Costa, Pillay, De Civita, Gougeon, Leong et al., 2013; Evans, Patrick & Wellington et al., 2010; Jagiello & Chertok, 2015; Razee et al., 2010). Women have identified face-to-face engagement with peers and healthcare providers as their primary preference for social support (Dasgupta et al., 2013). Women who have experienced medical complications in pregnancy experience additional stress postpartum increasing their need for social support during that time (Thomas, 2004), yet women with prior GDM report feeling disconnected from their healthcare providers postpartum (Evans et al., 2010; Thomas 2004).

This research study aims to address the current gaps in the literature by determining how the provision of social support, addressing barriers, and drawing on current strengths, can be integrated in health promoting strategies for postpartum women with prior GDM. For the purpose of this research study, social support was defined as any resource provided by others, any exchange of resources, or any assistance with coping (Schwarzer et. al., 2004). Social support can come from a variety of individuals including family, friends, co-workers, and healthcare providers. There are various types of social support that may be exchanged including instrumental (e.g., problem solving), informational (e.g., advice, or education), and tangible (e.g., material goods) or emotional support (ex. reassurance) (Schwarzer, Knoll, & Reikmann, 2004).

### **Research Purpose**

The goal of this qualitative study was to generate a substantive theory to explain the role that social support plays within various levels of influence, and on the health promoting behaviours of postpartum women with prior GDM. The purpose of this constructivist grounded theory research was twofold:

- (1) To explore the social supports of postpartum women with a history of GDM, as they navigate through the healthcare system postpartum to restore and maintain their health, and,
- (2) To critically examine facilitators and barriers to engaging in health behaviours among postpartum women with a history of GDM, within the context of the individual, interpersonal, organizational, community, and political levels of influence on health.

### **Research Questions**

The research questions guiding this research were:

- 1) What are the social support processes experienced by postpartum women with prior GDM between 3 months and 24 months postpartum,
- 2) How do social supports and various levels of influence, impact engaging in, and maintaining healthy lifestyles in postpartum women with prior GDM?

### **Review of the Literature**

The CDA (2013) clinical practice guidelines for prevention of type 2 diabetes in women with prior GDM recommend diabetes screening, lifestyle counselling and breastfeeding. Although these guidelines are in place, they only offer recommendations on postpartum follow up care. The following review of the literature will present what is currently known about the implementation of the CPG's for diabetes prevention among postpartum women with prior GDM.

### **Postpartum Blood Glucose Screening and Follow-Up**

Screening for type-2 diabetes is recommended by the International Diabetes Federation [IDF] (2015) as a health promoting strategy for women with prior GDM however, evidence suggests that screening rates remain poor. A US retrospective cohort study of 14, 448 postpartum women with prior GDM was conducted to trend postpartum

blood glucose screening rates for type 2 diabetes between 1995 and 2006 (Ferrera, Peng, & Kim, 2009). The results indicated that although screening rates have increased from 20.7% in 1995 to 53.8% in 2006, they remain inadequate (Ferrera et al., 2009). Similarly, results from another retrospective study of 11, 825 US women with prior GDM showed that only 50% of women received the recommended postpartum oral glucose tolerance test between the years 1999 and 2006 (Lawrence, Black, Hsu, Chen, & Sacks, 2010). A systematic review of 11 studies evaluating postpartum screening for diabetes between 2008 and 2010, revealed approximately 34%-73% of women with histories of GDM completed postpartum screening, with a median of 48% (Tovar et al., 2011).

A Canadian retrospective cohort study of 1006 women with a history of GDM revealed a postpartum screening rate of 48% (Kwong, Mitchell, Senior, & Chick, 2009). Screening rates varied by numerous factors such as race, ethnicity, age, education, previous gestational diabetes and severity of gestational diabetes. Results of a large qualitative Chinese study with 2152 women with a history of GDM indicated that only 282 (13.1%) of the women were screened for blood glucose levels postpartum (Chang, Chen, Hongyan, Zhang, & Cheng, 2014). The primary reasons for women not seeking blood glucose screening were not being informed by their physicians, believing that GDM would disappear after delivery, and being occupied with the baby (Chang et al., 2014). In addition, 30 obstetricians were interviewed for this study and, although a majority of them reported being aware of the need for blood glucose screening for women with GDM after delivery, only 15 of them had informed their patients (Chang et al., 2014).

### **Postpartum Follow-up: Barriers and Facilitators**

A Canadian survey was conducted to explore primary care providers and women with previous diagnosed GDM perspectives on postpartum screening for type 2 diabetes (Keely, Clark, Karovitch, & Graham, 2010). A follow-up survey was given to 173 primary care providers and 140 women with prior GDM who participated in a randomized controlled trial to assess the effectiveness of postpartum postal reminders (Keely et al., 2010). The results showed that implementing a follow-up reminder system for both women and primary care providers was valued, postpartum screening rates increased, and fragmentation of care (often resulting from a lack in communication between health care providers) was reduced (Keely et al., 2010). Barriers to follow-up included primary care providers not seeing women postpartum or, they were seen and testing arrangements were made yet the woman did not follow through with blood glucose testing (Keely et al., 2010). Although the women valued postpartum blood glucose screening, they reported time constraints, complexity of the glucose tolerance test, and lost laboratory requisition as the most common barriers to screening (Keely et al., 2010).

In a longitudinal concurrent mixed method study to explore health behaviours and perceived health status of 13 postpartum women with a history of GDM, Evans, Patrick, & Wellington, (2010) found that a diagnosis of GDM was not communicated at the time of hospital discharge to community health nurses or other health providers creating an unfavourable environment for follow-up care postpartum. For example, in Ontario, women are typically screened by their obstetrician or midwife during pregnancy for gestational diabetes. When elevated blood glucose levels are detected, women are referred to a specialist such as an endocrinologist or internist (Keely et al., 2010) and

after giving birth, women resume care from their primary care provider (physician, midwife). This creates fragmented healthcare, as a diagnosis of GDM is often not communicated to their primary healthcare provider (Keely et al., 2010).

A US survey of 207 primary care providers and primary obstetric providers was conducted to determine barriers to follow-up for women with a history of GDM (Stuebe, Ecker, Bates, Zera, Bentley-Lewis, & Seely, 2010). Primary care physicians were found less likely to ask about a history of GDM versus obstetric care physicians during routine patient visits (Stuebe et al., 2010). Poor communication between healthcare providers was identified as a major barrier to screening postpartum (Stuebe et al., 2010). In a qualitative study conducted in the US, Bennett, Ennen, Carrese, Hill-Briggs, Levine, Nicholson et al., (2011) interviewed 22 women with prior GDM to explore barriers to and facilitators of postpartum follow-up care. Feelings of emotional stress related to transition to motherhood (adjusting to a new baby), and the fear of receiving a diabetes diagnosis were identified as key barriers to follow-up care, while child care availability and desire for a checkup were among the key facilitators (Bennet et al., 2011).

In 2014, Neilson, Kapur, Dam, De Courten, and Bygbjerg conducted a large systematic review to assess the evidence on determinants and barriers for GDM services in low, medium and high-income countries (Nielson et al., 2014). GDM services were characterized by screening and diagnosis, treatment during pregnancy, postpartum glucose screening, and consistent postpartum lifestyle modification. The review included 58 relevant quantitative and qualitative studies. The results of this review revealed that little is known about how societal factors or the healthcare system itself hinders provision of GDM services postpartum, or what can be done to improve follow-up compliance rates (Nielson et al., 2014). Numerous barriers related to the health care provider, healthcare



system, and women's personal attributes were also identified by a number of the qualitative studies reviewed (Nielson et al., 2014). This review also showed that most women had intentions to maintain healthy lifestyles to prevent future diabetes however, found it quite challenging to do so. Lifestyle modifications were more likely to occur in the presence of a sense of self-efficacy and social support (Nielson et al., 2014).

### **Postpartum Screening and Provision of Support**

A large Italian intervention study involving 1159 postpartum women with histories of GDM was conducted between 2004 and 2011 to determine if counselling, demographic characteristics, clinical, and/or biochemical characters were predictors of postpartum glucose screening (Capula, Chiefari, Vero, Iritano, Arcidiacono, Puccio et al., 2013). Counselling, verbal and written, was provided to 247 pregnant women between 35–40 weeks gestation in the intervention group while no counselling was provided to the control group (n=220). Women in the control group were provided information about the increased risk for type 2 diabetes and subsequent pregnancy risks. Pregnant women were then given a handout identifying the risks of GDM, provided follow-up recommendations, and healthy lifestyle tips. A significant increased rate of blood glucose testing was reported following introduction of counselling to at risk women versus women who did not receive the intervention. In addition, a previous diagnosis of polycystic ovary syndrome (PCOS) emerged as the major predictor of postpartum follow-up, even in the absence of counselling (Capula et al., 2013). Previous diagnosis of GDM, higher educational status, and insulin treatment were also significant predictors of postpartum glucose screening (Capula et al., 2013).

In a similar study, a US retrospective chart review of 221 postpartum women with previous GDM was conducted between 2006 and 2008 to identify postpartum follow-up

rates, as well as counselling opportunities before and after the implementation of a Postpartum Follow-up Initiative (Tsai, Nakashima, Yamamoto, Ngo, and Kaneshiro, 2011). Women were provided with an appointment card indicating a date and time for a postpartum visit prior to discharge home from the hospital. The incentive involved photographing the mother and baby at the first follow-up visit and the completed photo album was given at the second follow-up visit. Postpartum follow-up rates, breastfeeding rates and contraception use were all significantly higher after the postpartum follow-up initiative was introduced (Tsai et al., 2011).

### **GDM and Postpartum Lifestyle Modification**

Women with prior GDM experience difficulty making healthy lifestyle changes and engaging in healthy behaviours despite knowing of their risk for developing diabetes (Doran, 2008; Evans et al., 2010; Kim, McEwen, Kieffer, Herman, & Piete, 2008; Morrison, Koh, Lowe, Miller, Marshall, Colyvas et al., 2012; Peacock, Bogosian, McIntyre, & Wilkinson, 2014; Symons-Downs & Ulbrecht 2006.) A mixed methods Australian study involving 38 postpartum women with prior GDM was performed using surveys and in-depth interviews (Doran, 2008). Doran (2008) sought to explore the role that physical activity plays in the management of gestational diabetes mellitus (GDM), the impact of a GDM diagnosis on a woman's life, follow-up support, and to identify barriers and facilitators to engage in physical activity postpartum. Although women were able to make lifestyle changes during pregnancy, those changes were difficult for them to sustain postpartum (Doran, 2008). Barriers to both postpartum screening and lifestyle modifications were identified as time constraints and family care-taking responsibilities (Doran, 2008).

A US mixed method study was conducted with 25 women with a prior history of GDM, using focus groups (with a grounded theory approach) and informant interviews (Niklas, Zera, Seely, Abdul-Rahim, Rudloff & Levkoff, 2011). Authors sought to elicit perspectives of women with a history of GDM to identify barriers and facilitators to healthy lifestyle changes postpartum, and identify specific intervention approaches that would facilitate participation in a postpartum lifestyle intervention program (Niklas et al., 2011). Results revealed time constraints, child-care responsibilities, lack of motivation, and fatigue are barriers for postpartum women to engage in physical activity and eating healthy (Niklas et al., 2011). Education directed at lifestyle modification and provision of social support from both health care providers and family members were cited as facilitating factors in making healthy lifestyle changes postpartum (Niklas et al., 2011).

Jones, Roche, & Appel (2009) performed a systematic review of the literature to examine the health beliefs, risk perceptions, and health behaviours of postpartum women with prior GDM. The review indicated that women significantly underestimated their risk of developing type 2 diabetes (Jones et al., 2009). The majority of women lead sedentary lifestyles with poor dietary intake postpartum. Social support was found to positively influence women's affinity to engage in healthy behaviours however, was reported as lacking by most of the women (Jones et al., 2009).

In 2013, Kaiser and Razurel performed a review of the literature to critically examine the impact of perinatal stress on mothers' psychological health, the efficacy of coping strategies, and to determine what role social support plays in the interaction between birth events and mothers' psychological experiences. Results showed that postpartum women's physical activity and diet rarely met the level of physical activity and dietary recommendations set by the American College of Obstetricians and

Gynecologists (Kaiser and Razurel, 2013). Risk perception, health beliefs, social support, and self-efficacy were the main factors identified as having an impact on the women's adoption of health behaviours postpartum (Kaiser & Razurel, 2013).

In an Australian study, 226 postpartum women with prior GDM were surveyed by telephone to examine physical activity levels and associated psychosocial factors (Smith, Cheung, and Bauman, 2005). Of the women surveyed, 25% were classified as sedentary, and only 33.6% reported sufficient physical activity levels as recommended by health care providers (Smith et al., 2005). Barriers to physical activity were identified as a lack of assistance with childcare and insufficient time to exercise while receiving verbal encouragement from family, friends and healthcare providers was the main type of received support reported by the women (Smith et al., 2005). More than half of the women commented never receiving assistance with housework or other daily activities (Smith et al., 2005). Tang, Foster, Pumarino, Ackerman, and Peaceman (2015), performed a qualitative study using semi-structured interviews on 23 US women with a history of GDM to elicit women's perspectives on prevention of type 2 diabetes mellitus. Results showed that women viewed Type 2 diabetes as a severe condition, and the desire to avoid developing diabetes in the future was an important motivator for making behavioral changes. Children represented both a key motivator and critical barrier to behavioral change. Women viewed preventive follow-up healthcare visits as important to inform them about potential health concerns (Tang et al., 2015). Tang et al., (2015) encourage healthcare providers to leverage women's focus on their children to encourage a healthy lifestyle, and provide support for any healthy behavioral changes during healthcare visits in the postpartum period and beyond.

## **Postpartum Lifestyle Modification and Provision of Support**

Provision of social support was consistently found to increase women's likelihood of adhering to CPG's pertaining to diabetes prevention. Koh et al., (2010) completed a cross sectional study using telephone survey to describe the incidence and association between physical activity, social support and self-efficacy among 331 postpartum women with prior GDM. Results revealed that only 37.2% of the women surveyed were participating in regular physical activity (Koh et al., 2010). Social support was found to be significantly associated with increased levels of physical activity postpartum (Koh et al., 2010). In 2008, Australian researchers investigated postpartum dietary behaviors among 226 postpartum women with recent GDM via telephone survey (Zehle, Smith, Chey, McLean, Bauman, & Cheung, 2008). The findings revealed higher rates of vegetable consumption were positively associated with increased self-efficacy to cook healthy foods (Zehle et al., 2008). Fruit consumption was also positively related to self-efficacy when women were busy and when not reporting a dislike of healthy foods by others at home. Receiving advice from a dietitian and telephone support from a health educator were the most preferred forms of health assistance reported by the women and were related to an increase in self-efficacy (Zehle et al., 2008).

Razee et al., (2010) performed 57 in-depth semi-structured telephone interviews to explore the beliefs, attitudes, social support, environmental influences and other factors related to diabetes risk behaviours among Arabic (n=20), Cantonese/Mandarin (n=20), and English (n=17) speaking women with recent GDM in Australia. Mental distress, role perceptions, social support and cultural expectations were major issues related to women's struggles to find the right balance between household and childcare responsibilities, and leading a healthy lifestyle (Razee et al., 2010). Women's ability to

follow a healthy lifestyle is thought to be entrenched in their psychological wellbeing and the social and cultural context of their lives (Razee et al., 2010).

Role expectations of new mothers, cultural beliefs, mental health, perceived stress and social support networks are among the many factors that influence a woman's ability to make lifestyle modifications (Razee et al., 2010; Stark & Brinkley, 2007; Bandyopadhyay, Small, Davey, Oats, Forster & Aylward, 2011). Mental health, role perceptions, social support, and information or access to resources have been shown to impact a women's ability to manage child-care responsibilities, and to lead healthy lifestyles including staying physically active and eating well (Razee et al., 2010). The evidence indicates that women with prior GDM experience difficulty maintaining or implementing healthy lifestyle choices postpartum. There are a multitude of barriers that contribute to this finding including time constraints, lack of support for childcare, mental distress, lack of motivation and fatigue. The major influencing factor identified from the literature to assist women to engage and maintain healthy lifestyle postpartum was the provision of social support. Despite this fact, women have consistently report a lack of support postpartum.

### **GDM and Breastfeeding Rates**

A systematic review of 12 observation studies examined the breastfeeding rates of women with prior GDM, the effect of lactation on subsequent type 2 diabetes development, and the impact of breastfeeding on the development of type 2 diabetes in infants (Taylor, Kacmar, Nothnagle, & Lawrence, 2005). The review indicated that fewer women with a GDM history breastfed than women without GDM histories (Taylor et al., 2005). A large Canadian retrospective cohort study was performed analyzing the data of 24, 755 health records including demographics, health behaviours, pre-existing maternal

health problems, obstetric complications, intrapartum interventions and birth outcomes (Finkelstein, Keely, Feig, Tu, Yasseen, and Walker, 2013). Data were obtained from four Ontario hospitals between 2008 and 2010 to explore breastfeeding intention and breastfeeding rates in hospital and on discharge across women with pre-GDM (borderline gestational diabetic), GDM or no diabetes (Finkelstein, et al., 2013). Women diagnosed with GDM were reported to have lower breastfeeding rates both in hospital, and upon discharge when compared to women without GDM (Finkelstein et al., 2013). Women treated with insulin during pregnancy had the poorest breastfeeding rates. Gestational diabetic women and women with non-insulin-treated diabetes were found to have lower breastfeeding rates in hospital, while gestational diabetes was additionally associated with lower breastfeeding rates at discharge (Finkelstein et al., 2013).

A retrospective cohort study was conducted in the U.K. to identify factors that influence breastfeeding rates in 94 postpartum women with histories of GDM, type 1 diabetes and type 2 diabetes over a 2 year period (Soltani & Arden, 2009). Women were exposed to a 'Baby-Friendly Initiative' whereby they received supportive counseling to encourage breastfeeding (Soltani & Arden, 2009). Breastfeeding rates were found to be similar to women in the general population suggesting that provision of support postpartum, may play a part in higher breastfeeding rates (Soltani & Arden, 2009). In 2014, Kozhimannil, Jou, Attanasio, Joarnt, and McGovern, conducted a large retrospective analysis of data from a national survey of 2,400 women who gave birth in 2011–2012 in a US hospital. Women who experienced a complex pregnancy including self-reported pre-pregnancy diabetes or hypertension, gestational diabetes, or obesity (including gestational diabetes) were included in the study. The intention to breastfeed was reported to be 30% less among women who experienced a medically complicated

pregnancy compared to women with uncomplicated pregnancies (Kozhimannil, et al, 2014). Supportive hospital practices were strongly associated with higher intentions of breastfeeding. Kozhimannil, et al., (2014) suggest that provision of support from healthcare providers for women with complex pregnancies may increase breastfeeding rates (Kozhimannil, et al, 2014).

Jagiello, Azulay, and Chertok (2015) conducted a phenomenological study in the U.S. with 27 women who had been diagnosed with GDM and had initiated breastfeeding following delivery to explore the women's experience of early breastfeeding. Three themes emerged to describe the women's early breastfeeding experience: breastfeeding challenges and breastfeeding support, milk supply challenges, and concern for infant health. Delayed lactogenesis was reported by 30% of the women, and 44% perceived having decreased milk supply. Participants verbalized a need for consistent lactation advice and education to occur beyond the initiation of breastfeeding, periodic assistance while breastfeeding, and strategies that address breastfeeding challenges and milk supply issues (Jagiello et al., 2015).

An Australian study used a cross-sectional online self-administered questionnaire involving 729 women diagnosed with GDM to determine factors associated with early cessation of breastfeeding (Morrison, Collins, Lowe, and Giglia, 2015). Cessation of breastfeeding at or before 3 months was associated with breastfeeding problems at home, return to work prior to three months, inadequate breastfeeding support, caesarean delivery, low socioeconomic status, and an increase in BMI compared to their prenatal weight. Morrison et al., (2015) suggest addressing risk factors and the provision of postpartum breastfeeding support as important strategy to increase breastfeeding rates with women who experienced GDM. Youngwanichsetha (2013) performed a cross-



sectional analysis to explore the factors related to exclusive breastfeeding among 120 postpartum Thai women with a history of GDM. The results revealed maternal age, employment, parity, body mass index, duration of newborn's admission in NICU, and exclusive breastfeeding intention were significantly related to exclusive breastfeeding for six months postpartum (Youngwanichsetha, 2013). The duration of exclusive breastfeeding was influenced by the women's breastfeeding intentions; more specifically their attitude towards the benefits of exclusive breastfeeding on reducing blood glucose, losing gestational weight gain, and the prevention of diabetes (Youngwanichsetha, 2013).

While there is a great deal of information known about gestational diabetes, the associated risk factors, poor screening rates, and barriers to self-care management, current research fails to provide strategies to address these issues. What is known however, is that provision of social support has been shown to improve health outcomes for postpartum women however, social support is lacking at a time when women have identified a need for it.

It is well documented that social support is one of the most important psychosocial factors influencing positive health outcomes (Berkman, Glass, Brissette, & Seeman, 2000; Seeman, 1996; Uchino, 2004). Empirical studies have shown that generally, people lacking social support have high mortality rates, most notably from cardiovascular disease (Brummett, Barefoot, Siegler, Clapp-Channing, Lytle, Bosworth et al., 2001; Frasure-Smith, Lesperance, Gravel, Masson, Juneau, Talajic, et al., 2000; Rutledge, Reis, Olson, Owen, Kelsey, Pepine et al., 2004). Previous studies have focused on linking social support to positive physical health outcomes in at risk-populations (Ali, Merlo, Rosvall, Lithman, and Lindström, 2006; Tomaka, Thompson, and Palacios, 2006; & Zhang, Norris, Gregg, and Beckles, 2007). Newer research focusing on the link

between the provision of social support and health outcomes is gaining momentum, as it considers the impact that social support plays in the health of at risk populations (Reblin and Uchino, 2008).

In summary, the literature demonstrates that recommended clinical practice guidelines for postpartum women with prior GDM are not being consistently followed. A lack in continuity of care postpartum, and poor communication between healthcare providers often result in difficulty navigating the healthcare system (MOHLTC, 2012), leaving women with prior GDM at risk for type-2 diabetes. Provision of social support that integrates interventions at all levels of influence are essential to overcoming these barriers. This is particularly imperative for women with prior GDM as they transition to motherhood with the added burden of maintaining or restoring their health. There is need for further understanding on the social support processes on women as they transition from being pregnant with GDM to postpartum without GDM but at risk for diabetes in the future.

### **Theoretical Perspective**

The prevention of type 2 diabetes requires individuals to modify a complex set of lifestyle behaviours that are influenced by personal characteristics, interpersonal relationships, organizational structures, community supports, and political forces. The Social Ecological Model of Health Promotion (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokolos, 1996) offers a framework to portray the intricate relationships amongst the various levels of influence that facilitate or act as barriers to postpartum women with a history of GDM engaging in health behaviours. The social ecological model is used to understand various areas of study and, is particularly useful for understanding social processes (Stokolos, 1996). This model proposes that while individuals are responsible

for implementing the necessary lifestyle modifications to improve their health, individual behaviour is predominantly dictated by the social environment in which they live (Stokolos, 1996). The various levels of influence on individual health include individual, interpersonal, organizational, community, and political (Stokolos, 1996). Social ecological models help to address the interdependence between the multiple layers of influence, rather than focus simply on the individual (Stokolos, 1996).

### **Methodology**

This research study was guided by constructivist grounded theory methodology as described by Charmaz (2007). Grounded theory was originally developed by Glaser and Strauss (1967), and was introduced in their book titled "The Discovery of Grounded Theory". Grounded theory is now one of the most widely used methodologies in the social sciences (Strauss & Corbin, 1998). Grounded theory was established as a general qualitative methodology, and offered a "new way of thinking about and conceptualizing data" (Strauss & Corbin, 1994, p. 275). It was specifically developed to help narrow the gap between theory and empirical research, provide logic behind the theory it generated, and to validate qualitative research (Strauss and Corbin, 1994). Ultimately, grounded theory was designed to construct theory that captures issues of importance in people's lives (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998), by constructing "abstract theoretical explanations of social processes" (Charmaz, 2007, p. 5). According to Strauss and Corbin (1994), grounded theory was designed to assist researchers in creating theory that is 'conceptually dense'. In other words, grounded theory is best suited to provide rich descriptions and detailed explanations of experiences and phenomena. They assert that theoretical conceptualizations are concerned with the

interplay between a variety of social units, as well as patterns of action or processes (Strauss & Corbin, 1994).

Grounded theory has evolved over the years as various researchers have differing ideas on the implementation of grounded theory methods (Jones & Alony, 2011). Today, there are three prevalent variations of grounded theory (Traditional, Straussian, and Constructivist) which are differentiated by their philosophical underpinnings and methodological approach (Kenney & Fourie, 2015). It has been argued that "all variations of grounded theory exist on a methodological spiral and reflect their epistemological underpinnings" (Mills, Bonner, & Francis, 2006, p.9). This means that all versions of grounded theory share the same foundation, but may differ philosophically in their approach to the research process.

Grounded theory is a natural fit with the purpose of this study as it intended to explore the social supports experienced by women with prior GDM as they attempt to restore and maintain their health postpartum. Traditional grounded theory approach encourages researchers to enter the research process with as little pre-determined notions as possible to "remain sensitive to the data by being able to record events and detect happenings without first having them filtered through and squared with pre-existing hypotheses and biases" (Glaser 1978, p. 3). Glaser maintains that grounded theory is a method of discovery whereby theory emerges from the data (1992). Philosophical differences have emerged since the traditional version of grounded theory was developed. Glaser and Strauss diverged on their original views of grounded theory (1967). Strauss worked with Juliet Corbin in 1990 to offer a more creative version of grounded theory, allowing for more flexibility in the research process. Strauss and Corbin (1998) rejected the idea that theory is out there to be discovered, viewing theory as abstract, explanatory

and, relative. Although both approaches have the same pragmatic approach to the research process, Strauss and Corbin acknowledged interpretivist views in the development of grounded theory (1998). As such, the coding process and use of literature to inform research differs from the traditional approach (Kenney and Fourie, 2015), an important distinction between traditional grounded theory and Straussian grounded theory.

Charmaz (2000) further transformed grounded theory into one with a distinct constructivist thread. According to Charmaz (2005) a constructivist grounded theory is similar to traditional and Straussian grounded theory in that it follows the guidelines as tools, however it "does not subscribe to the objectivist positivist assumptions of its earlier formulations" (p. 509). Ontologically relativist and epistemologically subjectivist, constructivists believe that multiple realities exist (Charmaz 2007). Realities are considered to be local and specific; they are elusive mental constructions that are socially constructed; they are specific to the individual (although some constructions tend to be shared amongst individuals or groups of people); and are actively constructed rather than merely discovered (Guba & Lincoln, 1994).

According to Charmaz (2000) "data do not provide a window on reality. Rather, the 'discovered' reality arises from the interactive process and its temporal, cultural, and structural contexts" (p. 524). In other words, the emergent theory can only describe and explain social processes within the time, place and culture in which they are embedded (Charmaz, 2007). This further distinguishes constructivism from earlier grounded theory approaches whereby the researcher will "assume the role of authoritative experts who bring an objective view to the research" (Charmaz, 2007 p. 132). The constructivist revision of Glaser and Strauss's (1967) position on grounded theory suggests "people

construct both the studied phenomena and the research process through their actions" (Charmaz, 2011, p.360), rejecting the notion of a single objective social reality. The resultant theory is therefore an interpretation of reality rather than an objective reporting of it (Charmaz, 2005). This belief is congruent with the constructivists' notion that reality is actively and socially constructed.

Qualitative researchers can use constructivist grounded theory to advance social inquiry through an 'iterative process' in which data collection and analysis mutually shape and inform one another (Charmaz, 2011). The resultant theory is reflective of both the participant and the researcher (Charmaz, 2011), an approach to grounded theory that further differentiates itself from the earlier versions whereby the researcher constructs theory as an external expert. A constructivist approach allows for the sharing of power and responsibility between the researcher and the participants, creating a vested interest in all involved in the research. According to Charmaz (2011), grounded theory offers 'much analytic power', an advantage over other qualitative methods in that grounded theory methods "provide tools to reveal links between concrete experiences of suffering and social structure, culture and social practices or policies" (p. 362).

Grounded theory allows us to study processes, opens the researcher up to various theoretical understandings, and provides systematic checks of the researcher's theoretical categories which in turn increase the analytic level of the work (Charmaz, 2013). According to Charmaz (2007), studying social processes refers to recounting events that have occurred sequentially in time. These events possess clearly distinguishable beginnings and endings with periods of time in between (Charmaz, 2007). The occurrence of single events become interrelated and will eventually lead to some form of change, no matter how small the change might be (Charmaz, 2007).

There is a vast amount of evidence related to poor blood glucose screening rates, inadequate breastfeeding rates, and challenges implementing lifestyle modifications in women with prior GDM. Constructivist grounded theory was the chosen methodology for this research to help us move beyond simply identifying the issues and challenges related to CPG implementation. Constructivist grounded theory methods help to unveil complex social processes by integrating subjective experiences with social conditions in the analysis (Charmaz, 2007). This means that individual perspectives and social contexts are not ignored, but rather are valued and emphasized in the theory it produces. This research sought to understand the wide range of contextual and situational factors that contribute to women's ability to implement CPG's. A constructivist grounded theory approach to this research offered a means to elicit multiple realities, while presenting theoretical interpretations of women's experiences. It provided the means to acquire the context and meaning behind the current state of the evidence, while considering the broader aspects influencing their ability follow the CPG's.

## **Methods**

### **Sampling**

Consistent with constructivist grounded theory methodology, purposive sampling was initially used followed by theoretical sampling techniques to collect the richest possible data (Charmaz, 2007). Purposive sampling provides a starting point for data collection, and refers to selecting individuals to participate in a research study who have first-hand knowledge and experience of the area of interest (Charmaz, 2007). Based on the premise of theoretical sampling, it was difficult to provide an exact number of interviews needed for sufficient data. Morse (1994) recommends a sample size of approximately 35 participants for grounded theory studies. Therefore, 30-35 women were

sought to participate in the study as a starting point recognizing that more or less participants may have been needed in order to achieve theoretical saturation.

Theoretical sampling is a critical strategy used to achieve the goal of theoretical saturation whereby categories or concepts have been well defined, and adding additional data will not provide any new insights. Theoretical sampling involves strategically seeking people or information to define the boundaries and provide relevance of the categories (Charmaz, 2007). Semi-structured interviews, follow-up interviews with enrolled participants, recruiting additional participants for subsequent interviews, and pertinent health documents related to GDM postpartum management were sourced to assist with the theoretical sampling process. The purpose of this is to help develop the properties of the emerging categories or theory (Charmaz, 2007).

Theoretical sampling is an iterative process that helps ensure rigour in the research process by providing a systematic checking procedure. Once an interview was conducted and analyzed, it was then used to provide further direction on what to examine next, and allowed me, the researcher, to affirm emergent concepts and categories in the process until the point of redundancy (Charmaz, 2013). The final sample size of 29 women was reached when theoretical saturation determined (Charmaz, 2007; Glaser & Strauss, 1967; Strauss & Corbin, 1998).

Postpartum woman with a recent history of GDM residing in Ontario were invited to participate in this study. Eligibility criteria included able to read and speak English; 18 years of age or older; a diagnosis of GDM with their most recent pregnancy; and delivered a healthy live singleton infant either vaginally or by caesarean section. Women were invited to participate at any point between 3 and 24 months postpartum. Participation during this period was crucial as it captured women's in-the-moment



experiences, as they navigated the healthcare system while attempting to restore or maintain their health. This time frame highlighted the experiences of women at various key postpartum stages, from early stages of transition to motherhood, to returning to 'normal routines' such as resuming physical activity, working, or attending school. Most employed women have maternity leave of up to 12 months. Some women went back to work sooner than 12 months while others decided to take additional time off beyond the 12 month time frame. To limit potential confounding effect of numerous health issues, exclusion criteria were set and included multiple gestations, recent pregnancy complicated by additional high risk medical conditions, and previously diagnosed high-risk medical conditions such as type 1 diabetes, cardiovascular disease, autoimmune disorders, or cancer.

### **Recruitment**

Participants were recruited through a variety of approaches. Initially, obstetric healthcare providers in South-Western Ontario were identified through the following website: <http://www.doctor-ontario.com/medecin/medecin-s-obstetrics-and-gynecology-windsor-8.htm>. Healthcare provider refers to any member of the healthcare team that is responsible for providing primary prenatal, intrapartum and postpartum care for women (i.e., family practitioners, obstetricians, endocrinologist, midwives, and registered nurses). At the time of the study, only one endocrinologist was in the local area. Each of the healthcare providers on the list were contacted by the researcher via telephone. When a healthcare provider expressed interest in the study, face-to-face meetings were arranged to explain the purpose of the study, and to ask for their assistance in the recruitment process. Prior to the meeting, they were provided, through mail or email, with a letter of information about the study (see Appendix B). Healthcare providers were afforded the

opportunity to ask any questions they had about the study at the meeting. When healthcare providers were agreeable to assist with recruitment, they were asked to sign a consent form (see Appendix C) agreeing to display posters about the study in their practice settings(see Appendix D), and to provide recruitments handouts (see Appendix E) to eligible participants outlining the details of the study. Healthcare providers were asked to approach prospective participants during routine prenatal visits, and at the 6 week postpartum follow-up visit. Women who were interested in participating in the study were invited by the healthcare provider to contact the researcher directly. This recruitment technique proved to be extraordinarily challenging as only three participants expressed interest and were recruited using this technique after a 4 month period.

Due to these significant recruitment challenges in the beginning of data collection, the sample pool was changed from recruiting participants in Southwestern Ontario, to a larger population of prospective participants in all of Ontario. In addition, new recruitment strategies using social media were also introduced. The decision to use social media to reach prospective participants was met with great success. The majority of participants were recruited through the use of social media, a strategy that was not initially considered as a primary strategy. Advertisements were placed on Kijiji and Facebook (See Appendix F) to target this population on a larger scale. Advertisements provided brief information about the study along with a direct link to the following website <http://www.gdmpostpartumsupport.com> . Any person that viewed the advertisement was able to click directly on the link to the website which provided all of the details about the study. The website could also be accessed through on-line search engines with combinations of the following keywords: women, gestational diabetes, GDM, postpartum, social support, research, and study.

The advertisements generated a great deal of interest in the website in a very short period of time. The majority of advertisements ran between March 2014 and May 2014. Additional advertisements were placed between July 2014 and October 2014. I was able to monitor how many people visited the website on a daily, weekly and on a monthly basis. The website was developed through Weebly.com which provides secured access through the use of password protection. I was the only person that knew the username and password to access the website. The website was purchased for a one year period to cover the duration of the study at a cost of \$99.00. The website allowed me to track the statistics on how many people viewed the website (both unique views and total views). It was developed on March 15, 2014, went live on March 18, 2014 and could be accessed until March 15, 2015. Within the first week, there were 468 views with 390 of those views being unique. This means that 78 times, the website was accessed more than once by individuals who had visited prior. By the end of the year, there were a total of 4065 views, 3479 of which were unique. The highest months of website activity were those months during which advertisements were placed however, a large proportion of repeat visitors accessed the website after recruitment was completed.

The website had a home tab, an about the study tab, and eligibility tab, a contact tab, and an external resources and helpful links tab (see Appendix G). Prospective participants interested in the study could access the website directly by clicking on the link in the advertisement, or by conducting an online search for the study. Once the website was accessed, prospective participants could enter their contact information through the contact tab. The contact tab asked for the prospective participant's first name and email address only. The contact information provided was kept strictly confidential as it could only be accessed through a password protected account. All contact forms

submitted through the website were reviewed and a follow-up email was sent to clarify eligibility. If eligible, prospective participants were given a letter of information about the study (see Appendix H). Arrangements were made to meet with eligible women interested in the study and they were given the option of participating either in person (if they resided within the South-Western Ontario area) or by phone for all other locations. Once arrangements were made to conduct the initial interview, the researcher reviewed all information about the study with participants and was followed by a question and answer period. After the review of all research related information, formal informed consent was obtained from the participant (see Appendix I).

### **Data Collection**

All data were simultaneously collected and analyzed including, semi-structured, open-ended in-depth interviews, as well as pertinent written documents pertaining to gestational diabetes such as diabetes prevention, and maternal health promotion. Extant texts were analyzed to help guide the interview questions, and to sensitize me to the possible influences that impact women with prior GDM experiences engaging in healthy behaviours postpartum. Pertinent documents included in this study were the CDA's 2013 Clinical Practice Guidelines on Pregnancy and Gestational Diabetes, the CDA's 2013 Gestational Diabetes Fact Sheet, the Center for Disease Control and Prevention's (CDC) 2015 Diabetes and Pregnancy Guidelines, the International Diabetes Federation (IDF) 2009 Global Guidelines for Pregnancy and diabetes, the Ontario Ministry of Labour's 2015 pregnancy and parental leave (see Appendix J for Document Analysis).

Each interview began with a brief overview of the study followed by some time to interact socially and help build a rapport and convey respect to the participants (Charmaz, 2007). Interview questions were designed to address the purpose of the study by

exploring social support processes and unveiling the barriers and facilitating factors to engaging in a healthy lifestyle and maintaining health in postpartum women with prior GDM (see Appendix K). Every effort was made to conduct interviews in person whenever possible however, due to participant's geographical location, a total of 14 interviews were conducted in person while the remaining 15 were completed by telephone. Participants chose the location (when conducted in person), the date, and the time of the interview. Each interview was audio-taped with the participant's permission for later transcription and subsequent analysis. Interviews were transcribed verbatim by a trained research transcriptionist. Each of the transcripts were then read for accuracy and completeness and corrected when errors were noted. Demographic data was collected prior to the start of the interview and included: age, marital status, number of children, country of origin, level of education, and household income bracket (see Appendix L).

In order to equalize the power between myself and participants, as well as garner the richest data possible, a semi-structured, open-ended, in-depth interview strategy was employed (Charmaz, 2007). I began each interview by establishing a reciprocal relationship with the participants. In order to achieve this, the interview was designed to feel more like a conversation rather than an interview. The power of the interview lies in the opportunity for the participant to contribute to the direction of the study (Tappen, 2011), which is consistent with the constructivist researcher's purpose. As such, I remained open to what may be learned about the participants throughout the interview (Charmaz, 2007). I performed in-depth interviews to allow me to intensely explore topics, while eliciting the participant's perspective on their experience (Charmaz, 2007). Each of the interviews lasted between 45-75 min each in length. During the interview, I wrote field notes, making comments about context of the conversation, initial thoughts,

and general impressions (Charmaz, 2007). During the analysis phase, I engaged in theoretical sampling which allowed me to alter subsequent questions, create new questions and change interview strategies for the next interview.

Constructivist grounded theory interviews differ from traditional grounded theory interviews. The constructivist version of interviews emphasize the participants' views, definitions, and meanings whereas traditional grounded theory interviews focus on events, timelines and behaviours (Charmaz, 2007). Interview questions began by inviting women to share their initial thoughts with a few broad open-ended questions (Charmaz, 2007). For example, the first question that all women were asked was "what was your experience like having gestational diabetes"? (See Appendix M). As the interviews unfolded, questions remained open and flexible. While focusing on specific topics, I also listened for cues about women's feelings and meanings (Charmaz, 2007). When feelings were identified, paraphrasing, probing, and reflection techniques were used to help the participant articulate their thoughts, and give meaning to their responses (Charmaz, 2007).

The following excerpt from an interview with MaryAnn demonstrates the richness of the data gathered during her interview. When asked about her experience with healthcare providers, MaryAnn responded:

*I found that if I had had any issues managing my gestational diabetes, if my blood sugars were too high or too low, they would just say o.k... go have some juice to get it higher and that would be the end of it.*

My probing response to her statement was "and what would you have liked them to do?" MaryAnn responded:

*Well how about sitting them down with me and saying o.k., let's go over what you've eaten the past week, and let's try and figure it out, you need more fruit or vegetables or whatever it happens to be, not just here you go, do this and you're on your way.*

My response to this comment “So what I’m hearing you say is you were feeling brushed off?” MaryAnn replied “*Absolutely! Nobody really took the time try and actually figure out what’s going on*”. This example demonstrates how my response to MaryAnn validated her feelings and gave meaning to her experience.

### **Data Analysis**

I began the analysis process by first reading each transcript in its entirety, while listening to its audiotape for accuracy and completeness. All of the transcribed interviews, field notes memos, and pertinent documents were uploaded into NVivo 10 (2012), a qualitative data analysis software. I used NVivo 10 (2012) to assist with organizing the data, to help with the coding process, and the subsequent analysis (QSR International, 2012). Each interview was analyzed through an 'iterative process' of constant comparison. As the data were analyzed, it is important to note the process of coding and subsequent development of categories, were supported through the use of memo writing. Memos refer to the notes made by the researcher whereby initial thoughts, comparisons and connections are documented along with questions and further areas for investigation (Charmaz, 2007).

Memos were written throughout the data collection and data analysis process. According to Charmaz (2007), memoing is "crucial to the development of grounded theory as writing successive memos... keeps the researcher involved in the analysis, and increases the level of abstraction in your ideas" (p. 72). When I engaged in memo

writing, it helped me reflect on what was happening in the data. It also allowed me to reflect on my own personal assumptions, as well as to clarify the decisions I made (Charmaz, 2007). Memos were written as an intermediate step between collecting data and writing up drafts of the paper (Charmaz, 2007). Once another interview was scheduled, I read each of the previous transcripts and memos prior to the start of the next interview.

In addition to analyzing the interviews, I analyzed written documents pertaining to gestational diabetes, diabetes prevention, and maternal health promotion. Each of the documents were read in their entirety, then coded based on the level of influence they impacted (individual, interpersonal, organizational, community and political). Once this was established, memos were written to help identify how each level could impact a woman with prior GDM while transitioning to life without diabetes. The purpose of this was to sensitize me to the emerging concepts and assist with the theoretical sampling process. The main purpose of theoretical sampling is to help the researcher elaborate and further refine categories (Charmaz, 2007). As such, my intent with each interview was to purposefully sample to develop the properties of the categories, until no further properties emerged (Charmaz, 2007). For example, during my initial coding phase with MaryAnn's interview, I wrote memos about the impact of experience with healthcare providers. Uncovering this category allowed me to alter subsequent questions and create new questions for future interviews. I continued to sample in this manner until no further properties about the impact of experience with healthcare providers emerged.

### **Developing the Categories**

Coding the data in grounded theory occurs in several phases or steps. Charmaz, (2007) recommends that coding take place in the following order: initial coding, focused



coding, axial coding, and theoretical coding. I began initial coding of the transcripts by reading each interview line by line, assigning each line a name or label to provide a solid basis for identifying phenomena (Charmaz, 2007). Labels were given to almost all of the lines of the data to serve the purpose of capturing what the participant is saying (Charmaz, 2007). Emphasis was placed on actions and processes embedded in the data. Charmaz (2007) encourages the use of gerunds, words that depict actions, when assigning labels to each line. For example, when initially coding on the subject of breastfeeding, words such as *wanting to breastfeed*, *having support to breastfeed*, and *encouraging breastfeeding* were used. The use of gerunds in coding helps the researcher to make connections and identify processes (Charmaz, 2007). The coded gerunds should reflect the language participants used in the interview whenever possible. I remained open to exploring a number of theoretical possibilities, and moved quickly through the data as Charmaz, (2007) suggests. Initial coding strategies were helpful as I was able to establish sound analytic trends in the data, as well as move the data toward fit and relevance (Charmaz, 2007). This initial coding process helped me to separate the data into categories, and later served to define the core conceptual categories (Charmaz, 2007).

Focused coding was the next coding phase in the analysis process. During this phase, I compared the data on a more abstract level than during the initial coding processes. I sorted through the large numbers of assigned labels to categorize them in a way that made sense analytically (Charmaz, 2007), and to determine which initial codes should remain. I applied focused codes to multiple lines of text or paragraphs by grouping similar labels of data together. It is during this step that I chose specific text to capture each participant's voice. This is how I came to understand what the participants viewed as problematic as I began to treat the data analytically (Charmaz, 2007).

According to Charmaz (2007), the study fits empirically when the researcher has constructed codes, and developed them into categories illuminating the participants' experience. My research became relevant during this phase as I was able to offer a beginning framework for my theory. Categories became representative of what was happening in the data by illuminating existing relationships and revealing social processes (Charmaz, 2007).

Axial coding is described by Charmaz (2007) as an intermediate step between focused and theoretical coding, and suggests that it may or may not be used by researchers. Although the purpose of axial coding is to add depth and structure to the categories (Strauss & Corbin, 1998), Charmaz (2007) cautions us that axial coding may be too rigid and suggests a modified strategy. Therefore, instead of axial coding, I engaged in a more flexible approach as suggested by Charmaz (2007) whereby subcategories were developed by reflecting on categories. This step helped me to establish the links between categories and make sense of the data (Charmaz, 2007). The end result of this process facilitated abstraction of the categories onto a theoretical level (Glaser & Strauss, 1967).

Theoretical coding is a complex level of coding that tracks the codes selected during the focused coding phase (Charmaz, 2007). Theoretical coding leads to “selecting the central or core category, systematically relating it to other categories, validating those relationships, and filling in categories that needed further refinement and development” (Strauss & Corbin, 1990, p. 116). During this step I was able to “pull the other categories together to form an explanatory whole” (Strauss & Corbin, 1990, p. 146). This phase helped me identify the relationships between previously established categories. The analysis of the established relationships took place on an abstract level in developing the

theory. Constant comparisons made throughout the analysis helped me to 'crystallize' the ideas that eventually became emerging theory (Charmaz, 2007). Theoretical saturation, the point at which categories or concepts have been well defined, and adding additional data will not provide any new insights was reached during this level of coding (Charmaz, 2007) (See Appendix N).

### **Rigor**

Rigor was an important consideration in the both the planning, and execution of this research study. Rigor was ensured by following the criteria as outlined by Charmaz in order to be consistent with constructivist methods (2007): credibility, originality, resonance, and usefulness. Credibility was achieved by ensuring the data were sufficient to merit the claims made. I performed a total of 29 in-depth semi-structured interviews with participants in an open conversational style to elicit the richest and most robust data possible. The use of theoretical sampling helped verify that adequate data were collected, until the point of theoretical saturation and no new categories emerged (Charmaz, 2007). For example, one of the main questions on the semi-structured interview guideline was *what, if anything, do you think would be most helpful in keeping/making healthy lifestyle?* While the basic question itself did not change much throughout the interviews, the probing questions evolved to specifically capture women's perspectives on this. Original probing questions evolved over time from *how could your family, friends, or healthcare providers support you to make dietary changes or to stay active now?*, to *what would support you to make dietary changes or to stay active now? What has worked for you in the past? Are there resources you would like to have access to that you don't currently have access to?* This process helped to ensure the categories covered a wide range of empirical observations.

The members of my PhD committee reviewed the emerging categories during the analysis phase and as the theory emerged to offer feedback and verify findings. The results of this study are presented along with a discussion section providing logical links between the gathered data, the argument, and analysis (Charmaz, 2007). Credibility was also ensured by engaging in reflexivity throughout the course of this research. Reflexivity requires researchers to understand and acknowledge that they are part of the world that they study, and the data they collect (Charmaz, 1995). I wrote reflective notes to clarify my feelings and thoughts throughout the course of research. Participants in the study were asked at the beginning of the interview if they were interested in participating in the process of member checking. A total of 21 women were agreeable to this however, only 4 women actually engaged in this process. I sent copies of my codes and interpretations to participants. Participants provided feedback by telephone. This was done to ensure that I had accurately captured their thoughts as well as to enhance reciprocity in our relationship.

Originality was ensured by offering new insights and providing new concepts, by outlining the social and theoretical significance of this work, and by identifying how this research challenges, extends, and refines current ideas concepts and practices (Charmaz, 2007). To the best of my knowledge, no studies have uncovered or explored how women adjust to a GDM diagnosis while considering social support at various levels of influencing factors. In addition, time has been identified as a significant barrier to engaging in health behaviours postpartum in previous studies however, no research to date has identified the influence of time as a supportive measure. These findings contribute to a new body of knowledge that address, from the perspective of the women

themselves, how the provision of support can assist their desire to maintain or restore health after experiencing gestational diabetes.

Resonance was established by ensuring the categories portray the fullness of the womens' experiences, by ensuring the theory makes sense to postpartum women with a history of GDM, and by offering deeper insights about the world of a woman with a history of GDM who is trying to maintain a healthy lifestyle postpartum (Charmaz, 2007). The themes were described using the voices of the participants contributing to the richness of the process depicted by the model. I paraphrased women's comments during the interviews to ensure I had accurately captured what they were describing and asked for clarification as needed.

Usefulness was ensured by offering interpretations that people can use in their everyday life and by contributing to the current knowledge base about postpartum gestational diabetes management, as well as generating further substantive research areas which is discussed in the future directions section (Charmaz, 2007). The clinical relevance and implications section suggests individualized interventions that target and address various levels of influence. This section was written to inform practice, guide the provision of social support to postpartum women, modify best practice guidelines and inform policies to support health promotion and type 2 diabetes prevention

### **Researcher Reflexivity**

The basis of constructivist grounded theory is that realities are co-constructed through interaction between the researcher and participants whereby, the researcher's perspective is a part of the research process (Charmaz, 1995). Researchers are part of the world that they study and the data they collect (Charmaz, 1995). The co-construction of theory is influenced by many factors including time, space, experiences, interactions, and

perspectives, assuming that "people create social realities from individual and collective actions" (Charmaz, 2007, p.189). According to Charmaz (2007), reflexivity refers to acknowledging and having constant awareness of how the researcher influences and transforms research by accounting for personal interests, positions, and assumptions in every aspect of the research process. Engaging in reflexivity in grounded theory requires a commitment to a reciprocal relationship between researcher and participants (Birks & Mills, 2011). A reciprocal relationship with participants requires the researcher to acknowledge and attempt to equalize power differences that exist (Birks & Mills, 2011).

There are a number of strategies that can be used to help balance the power differentials between researcher and participants (Birks & Mills, 2011). Self-disclosure is a strategy that can be used to help foster a reciprocal relationship between the researcher and participant (Gubrium & Holstein, 2002), and reduce inequities in a relationship (Birks & Mills, 2011). Assuming an open position toward the participant, and sharing personal details when appropriate, and answering questions are essential to lessen the hierarchical relationship (Birks & Mills, 2011). When planning how to establish reciprocity with participants during the interviews, I began by engaging in a short period of social conversation to help the participant feel comfortable. I then provided a brief introduction to the study and how I became interested in women with a history of GDM. I purposefully explained that I too had experienced GDM with my first pregnancy, and was interested in hearing about other women's experiences postpartum. There were no additional comments made about my experience with having gestational diabetes unless specifically asked by a participant. The conversation was then intentionally directed at the women's experiences to ensure the focus was about them. In doing so, I was able to create the basis of a trusting relationship with the participants.

Transparency about being a registered nurse, having worked with prenatal and postpartum women, having had GDM, and a non-judgmental approach to questioning helped facilitate a positive and open relationship with participants. Many of the women in the study stated they were happy to be interviewed by someone who had experienced GDM. Women made comments such as “I think it’s great you’re doing this research”, or “oh good... so you know what it was like”. Many women expressed uncertainty about what the questions would be like, or that they didn’t know what to expect during the interview process. At the end of the interview, some women discussed their initial apprehensions about “being put on the spot” however, after knowing we had GDM in common, they indicated they felt safe in sharing their experience. According to many of the participants, self-disclosure helped establish trust early on allowing women to feel free with their responses.

After each of the interviews, I engaged in reflective journaling. I was especially concerned about how participants would view my interpretations of their experience. As such, there were several occasions on which I shared my interpretations with the women in my study. Lather (1991) argues that this strategy empowers participants in the research study and can help to balance the power relationship between researcher and participant. As I take a reflexive stance, I have scrutinized each of the steps throughout the research process from the many decisions I’ve made, to the interpretations I’ve co-created with participants (Charmaz, 2007). I acknowledge my own personal interests, assumptions and perspectives having experienced gestational diabetes myself with my first pregnancy, and having clinical experience as a registered nurse in the area of obstetrics. In journaling my thoughts after interviews and sharing my interpretations with women, I recognize that I too am reflected in this research. My lived experience of having gestational diabetes and

the journey that I have been on since that time, has shaped and informed my perspective as a consumer of our healthcare system, as a woman at risk for diabetes, as a concerned mother, as a registered nurse, and as a researcher.

### **Ethical Considerations**

Careful consideration in the planning and implementation of this study to ensure the protection of human rights and to address ethical issues. The research proposal was submitted and approved by the Western University Health Sciences Research Ethics Board (HSREB). Informed verbal and/or written consent (when able) was obtained from each participant. All participants received a letter of information about the study as well as a copy of the consent form, and were given the opportunity to ask questions at the beginning of the interview. Participants were informed that confidentiality and anonymity will be maintained and their identity will not be revealed in any publications or presentations on the results of the study. Each participant was assigned a pseudonym to protect confidentiality when transcribing the original interviews, and have been used in reporting the results of this study. Pseudonyms will also be used in future publications, and or presentations. All of the transcribed interviews have been stored on a password protected memory stick and kept in a locked box.

Engaging in the interview process may induce stress or anxiety in some participants. As such, appropriate educational resources and emotional supports were offered to participants. Resources and supports included referrals to local Canadian Diabetes Association support groups, referral to tele-health, referral to community counselling services, brochures on health eating, Canada Food Guide pamphlet, brochures on strategies for increasing activity levels, and quick reference sheet providing a list of on-line resources were provided to each participant. It was also recognized that



some participants may share information about their experiences that they may later regret. In order to remain congruent with the constructivist approach to conducting grounded theory, participants were offered the opportunity to review the transcripts and final summaries for accuracy, and to ensure accurate representation of their experiences. Participants were informed that they may choose to have any information that they provided deleted from the analysis.

## **Results**

### **Participant Demographics**

The average participant age was 33.17 years, ranging from the age of 23 years to 43 years. The average time postpartum was 9.28 months at the time of the interview with 3 months being the shortest time frame and 24 months being the longest time frame. Most women reported English as their first language, were Caucasian, married, and had a family annual income between 60,000-99,999. Employment status varied ranging from stay at home, returned to work on a part time basis or returned to work on a full time basis at the time of the interview (See Appendix O).

### **It's About Time! GDM: A Transformative Postpartum Process**

Through the process of data analysis, the construction of a core category and the subsequent development of three main themes emerged. While data obtained from women revealed some variations, several commonalities were easily identified in their experiences. Transformation was identified as the core category. The three predominant themes (stages of the transformation process) were: 1) Dealing with a GDM diagnosis, 2) Adjusting to life without diabetes while maintaining or restoring health and, 3) Reconciling a normal (See Figure 4.1). Time, social support, individual characteristics and extrinsic variables were found to be the most salient interrelated influencing factors

affecting women during each of the stages of the transformation process (See Table 4.1). These factors continuously interact with each other, and in turn influence, each of the stages of GDM: a transformative postpartum process.

**Figure 4.1: Theoretical Model-GDM: A Transformative Postpartum Process**

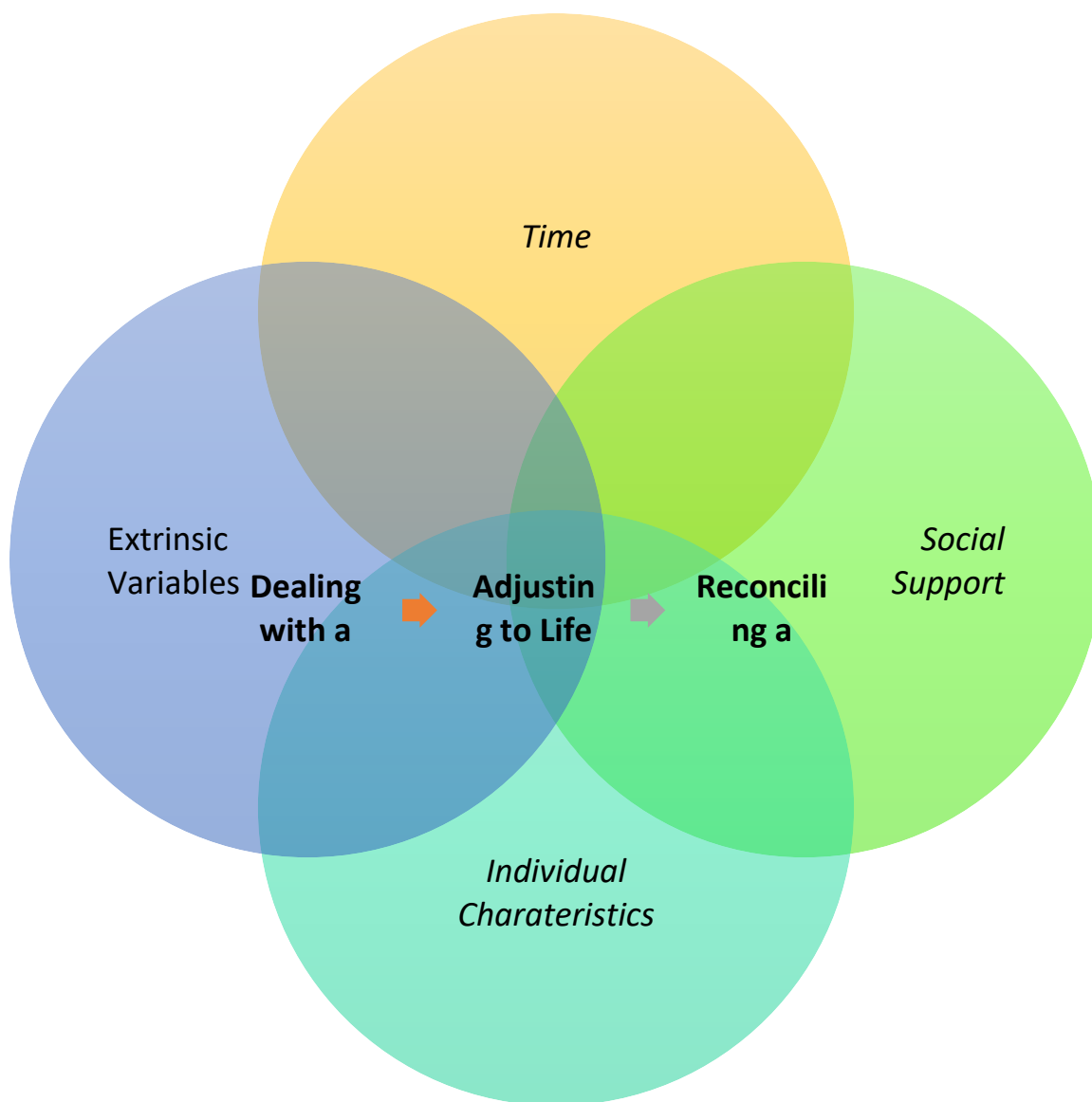


Table 4.1 Stages and Factors Influencing the Stages of Transformation

<b>Stage of Transformation</b>	
<b>1. Dealing with a GDM Diagnosis</b>	Begins with the initial GDM diagnosis and ends with the birth of her child.
<b>2. Adjusting to Life Without Diabetes</b>	Begins with the birth of her child and ends when a woman has settled into a new normal.
<b>3. Reconciling a New Normal</b>	Begins when women have adjusted to life without diabetes and a new lifestyle has emerged.
<b>Interrelated Influencing Factors</b>	
	<p><b>Time</b> A critical influencing factor on women's adaptation process and day-to-day experiences. Refers to moments, events or periods of time as experienced by the individual</p>
	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>Time as space</li> <li>Time constraints</li> <li>Timing of education</li> <li>Timing of Interventions</li> <li>Lack of time</li> <li>Competing demands on time</li> <li>Amount and quality of time spent with healthcare providers</li> <li>Specific moments in time</li> <li>Moving through periods of time</li> </ul>
	<p><b>Social Support</b> The provision of any desired resource</p>
	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>Emotional support</li> <li>Instrumental support</li> <li>Informational support</li> <li>Tangible support</li> </ul>
	<p><b>Individual Characteristics</b> Any variable unique to the individual</p>

	<b>Examples</b>	Values Beliefs Coping mechanisms The GDM experience Diabetes risk perception Psychological well-being Physical abilities Physical healing Health status Intention to breastfeed Ability to breastfeed Motivation Accountability	
<b>Extrinsic Variables</b> Any variable external to the individual			
	<b>Examples</b>	<b>Interpersonal</b>	Needs of the newborn (feeding, bathing, diaper changes, health status) Family dynamics (ex. having other children, family responsibilities, presence of significant other Relationship with extended family and friends) Availability of social supports (ex. breastfeeding support, support from family friends, and healthcare providers.
		<b>Organizational</b>	Nature of the job Work environment Work Culture Work schedule Lunch and break schedules

		<b>Community</b>	Availability of community services (programs targeted at new mothers, programs targeted at children and families, access to fitness programs, cooking classes etc.) Access to resources (information, education, program availability, nutritional counselling, lifestyle counselling, healthcare providers etc.)
		<b>Political</b>	Clinical practice guidelines Information pamphlets Availability of resources Maternity/parental leave benefits Delivery of health care Healthcare structure

### **A Transformative Postpartum Process**

There are three stages of GDM: a transformative postpartum process (dealing with a GDM diagnosis, adjusting to life without diabetes, and reconciling a new normal). Time is identified a critical influencing factor on women's adaptation processes and day-to-day experiences along with a constant interplay between time, social support, individual characteristics, extrinsic variables at every stage of the transformative postpartum process. As women encountered each of the phases of of this process, time played a major role in how women adapted to their situation. Time essentially affected how women responded to the demands of a GDM complicated pregnancy, adjusted to life without diabetes, and settled into a new routine. Time was conceptualized by participants in a number of ways. Women referred to time in terms of the following; provision of time as space, a lack of time, competing demands on time, the amount and quality of time

spent with healthcare providers, specific moments in time, and moving through periods of time.

During pregnancy, provision of time, the demands for time, the amount and quality of time spent with healthcare professionals, having convenient and timely access to healthcare providers, and the timing of information provided all influenced how effectively a woman deals with a GDM diagnosis and its aftermath. After the birth of her baby, time constraints, timing of education provided, quality of time with healthcare providers, provision of time, lack of time, and competing demands for time were identified as influencing how the women effectively engaged in health promoting behaviours. The women's priorities for self-care management shifted as time passed, while women's needs varied depending on the circumstance. Eventually, women settled into a new normal that incorporated a new baby. In addition to this transition from pregnancy to being a new mother, women were also faced with the additional demands of maintaining or restoring their health after a GDM complicated pregnancy.

A GDM diagnosis alters the trajectory of a pregnancy which requires women to make modifications to their lifestyle based on the needs of the growing fetus while managing their diabetes. The totality of her GDM experience ultimately influences her subsequent adjustment to life without diabetes and settling into a new normal. The process begins with the diagnosis of GDM during pregnancy as the experience of GDM impacts how a woman adjusts to life postpartum. After giving birth, women diagnosed with GDM during pregnancy are strongly encouraged to follow the CDA (2013) clinical practice guidelines (CPG's). The 2013 CPG's include the following: exclusive breastfeeding for a minimum of 3-6 months, complete a glucose tolerance test between 6 weeks and 6 months postpartum along with subsequent annual glucose screening,

maintain healthy eating habits, and engage in physical activity. Time, provision of social support, individual characteristics and, extrinsic variables influenced women's ability to implement these recommendations postpartum.

The concept of time, in every sense of the word, was a constant influence on every experience women had throughout pregnancy and postpartum. The quality of time spent with healthcare providers, the timing of support provided, readiness to learn, time as space time to do things, time requirements, and/or a lack of time shaped the women's perception of feeling supported or unsupported as they adapted to postpartum after having GDM. Having timely and convenient access to healthcare providers was identified by women as supportive. Elissa describes her experience with healthcare professionals during pregnancy:

*Having the diabetes care centre available by email and telephone was very, very convenient... I could ask questions at any time, on my schedule... You don't always have the time with your doctor, so having that accessibility through telephone and email was really good.*

The provision of adequate time with healthcare providers was highly valued by women. Women expressed feeling supported when their healthcare providers took the time during their healthcare visits to explore their specific concerns and answer their questions. Corie described feeling supported by never being *rushed* when meeting her health provider: *"I felt very supported but I think that that's because I had good health-care professionals. They would always take the time with me to address my concerns. I never felt rushed, I was well cared for."* Sonia describes how she felt supported due to the amount of time she had to spent with her midwife:

*If I did it again I would prefer the midwife because I saw her until 6 weeks postpartum. She saw both of us actually and it was so helpful. I was able to contact her anytime and ask her questions, she was so great... She's spent so much time with us... she was so supportive, she came to my house like, I don't know how many times...*

Many women also described appointment time with healthcare providers were limited resulting in frustration in not having their concerns addressed. Chantelle explains her experience with her physician:

*She did not spend much time with me... maybe five minutes and that's it. She just said after one month, make an appointment, after a couple weeks you need to make some other appointment. So I forgot what I wanted to tell her... she was in a hurry so most of the time I forgot about my concerns. She was no help to me.*

Many women discussed the impact of their relationship with their healthcare provider. When women had a poor relationship or a negative perception of their healthcare provider, they were much less likely to ask them questions. Danielle described her frustration with the quality of time spent with her healthcare provider:

*I was very frustrated with the doctor that I had. I think I was just confused and looking for answers and was really wasn't getting them. I felt very of brushed off. He never took the time to explain things to me, I was in and out very quickly... I never bothered asking him anything after that.*

The timing of information provided was also identified by the women as an important factor in the retention of information. Many women described being confused, unable to remember what they were told, or were unclear about what they were told about



diabetes. Avani explains her experience when she was first informed about gestational diabetes and the risks involved:

*I'm confused about type-2 diabetes, like what is the difference between all those different types? They mentioned type-2 diabetes and the risk in after delivery, but at that time I was not in the condition to accept all the information, I don't know I was maybe more concentrating on the baby. Now I really don't know what to do about it.*

Most women identified a lack of time to engage in healthy behaviours as one of the most difficult obstacles to overcome, especially as women transitioned from pregnancy to postpartum. Corrie describes her struggle in managing her time and numerous obligations postpartum:

*It's become increasingly challenging... just having the time for myself... to be healthy. There's no time during the day to go on the treadmill, or go for a walk let alone make healthy meals for me and my family... there are hundreds of other things that you have to do. Yeah so time is a big thing. Just being able to manage my time is a huge deal.*

Most women discussed the desire to have access to the same resources they had during pregnancy after the delivery of their baby. Healthcare providers were often viewed as the gatekeepers to resources postpartum. MaryAnn states:

*The biggest one (resource) is the dietician... if you could just have easy access to these people I swear, I'd be good to go... she (the dietician) was my eye opener and was the best thing for me to be honest. If only if they could give access to them without needing a medical condition that would be great... Like why do I need to get diabetes for them to let me see one?*

### **Stages of GDM: A Transformative Postpartum Process**

The three stages of GDM: a transformative postpartum process are presented below in a time sequenced order. Dealing with a GDM diagnosis, adjusting to life without diabetes, and reconciling a new normal are described. Direct quotations from participants are included to illustrate women`s experience in each of the stages of of this process.

#### **Dealing With a Diagnosis of GDM**

Dealing with GDM begins with the initial diagnosis, and ends with the birth of her child. Being diagnosed with GDM alters the trajectory of a normal pregnancy as it requires a great deal of commitment from women to ensure a healthy outcome for herself and her baby. Many women stated that the diagnosis of GDM came as a “*shock*”. Trisha explains “*I was sure the blood results were gonna come back good because all my other pregnancies were fine, so then it came back that it wasn’t and I was like oh my God, I was in shock*”. The GDM diagnosis was viewed by many as a stressful time and often triggered an intense emotional response. Many women mentioned a lack of emotional support during that initial moment of diagnosis. Bonny Lee described the lack of support she received from various healthcare providers at the time of her GDM diagnosis:

*When I found out that I had gestational diabetes it wasn’t good, I went to my OB appointment and as I was signing in when they said, oh you’ve got gestational diabetes and I said do I? They said, yep, you’ve got an appointment tomorrow with Dr. (endocrinologist)... then when a different nurse called me in she just looked at my file and said, oh yes you’ve got gestational diabetes, and then when my OB walked in and said so... and I said let me guess? I have gestational diabetes? I was really upset that that’s how I found out. It was a lot of stress at*

*the time. Then I went to the endocrinologist appointment and nobody told me it was going to be a two and half hour appointment. I had to de-robe and get completely naked, I didn't know that was happening so I was frustrated with that... I wasn't given any information, I was expecting to go see the doctor and tell me I had diabetes, give me a little lesson and be out the door... not a good experience.*

Some women expressed feelings of guilt thinking they had done something to cause the diabetes. Maude reflected on her thoughts when she was diagnosed with GDM, and the impact it has on her today:

*I had in my mind... that maybe I could have done something better... I had this guilt you know, that I should have known better, or done better, or should have eaten better, so I still have hope that my blood sugar will go back to normal, and that I'm not gonna have diabetes because, if I do, it's because I haven't eaten right or something like that. That guilt feeling was still there even seven or eight months after when I had the glucose test again.*

Women who experienced GDM in a previous pregnancy commented that although they anticipated having diabetes again, they were upset that it had returned.

Bonny Lee described her how she felt being diagnosed with GDM for the second time:

*I cried in the office when he told me... and well, I was holding up good because I knew it could happen again but then they were like you need to stay for another hour and a half. All I could think about was my that my father-in-law was with my 3 year old, and someone is covering me at work right now until I get back... that's when I got upset. I was thinking about all of these other appointments and stuff*

*I'd have to do and I'm like, how am I going to do this? That's when I started crying.*

After their initial GDM diagnosis, women described being instantly thrust into the demanding position of managing their diabetes. Managing their GDM was something they now had to think about on a daily basis. Women talked about the strict requirements imposed, many of which were time sensitive and/or time consuming. Women described their experience learning about dietary restrictions, consuming frequent meals, increasing activity levels, self-glucose monitoring, learning how to self-inject insulin, and the demands of frequent healthcare provider appointments. The women commented on how these new demands often competed with their existing responsibilities such as work schedules, family, child care, and other life commitments. A lack of time to self-manage diabetes was discussed by many of the women as an additional stressor during the pregnancy. Michelle describes what her experience was like trying to balance family life and manage her GDM:

*It all happened so fast, it was like a whirlwind. I just didn't have time to do it all. I was working full time, I had two other kids I needed to take care of... throw in blood sugar checks, insulin shots, food restrictions and all of the doctors appointments... it was just too much, it was overwhelming for sure.*

Women discussed how they managed their gestational diabetes, the supports they received (or didn't receive), and the difficulties they encountered self-managing their GDM. Women often described their experience with GDM as emotional, and frustrating. *"Well it was quite emotional, it was hard, I was still working at the time and was having to take my blood sugars and eat properly... then my glucose was still way up which was very frustrating".* Corrie

Many women struggled with the amount of time required to self-manage their GDM. There were increasing demands placed on them such as the time needed for frequent healthcare provider visits, dietary restrictions, exercise requirements, blood sugar testing, and insulin administration. These additional requirements often conflicted with their daily routines, work life, and social experiences. Rae recalls how difficult it was for her to manage her GDM while trying to work full time:

*So it was tough... working full-time still was really difficult... I have a pretty demanding, high stress job and this whole thing just adds further stress, and you have to take these additional breaks at work, and you have to make sure you're eating at appropriate times, and going to the washroom constantly even more than a regular pregnant woman would. It's just, I found it very stressful personally... I had a tough time.*

Women discussed their frustrations receiving conflicting information from healthcare providers on diabetes self-management. This made it difficult for women to know how to troubleshoot when their blood sugars were out of the recommended range. Kelly described how frustrating it was to get conflicting advice from healthcare providers:

*I just I've lost all trust in them (healthcare providers)... I was told so many different things during pregnancy I didn't know what to believe. Am I supposed to be increasing my insulin now or later? How should I control my high sugars, what was I supposed to be eating? Everyone needs to get on the same page... it was so frustrating.*

While a GDM diagnosis and self-management presented women with many emotions and challenges during their pregnancy, “*doing it for the baby*” was identified as

a motivating factor to help them cope with being pregnant with diabetes. Maude expresses how frustrating dealing with GDM was for her. She describes being consumed with having to follow a diabetic diet however, ensuring the health of her fetus helped her stay focused:

*When I had gestational diabetes, at the beginning I would get really frustrated because I could not eat a lot of what I used to... or eat what I liked, and I had to be very strict on my diet but you know in the end it all paid off. It's tough. It is tough to do it but you do it for the baby."*

All of the women discussed their relationship with their healthcare providers whether it was positive or negative. Having an open and trusting relationship with knowledgeable healthcare providers was considered supportive by many women. Elissa commented: *"My OB was very, very informative... if I did ever have any questions, I could definitely turn to her, she was very open and made me feel comfortable"*. Sue explains her relationship with her health provider: *"My doctor was a great and he really knows his stuff... I could always ask him anything, I was very lucky."* Elissa described how having access to healthcare providers was supportive and helped her manage her diabetes: *My experience was very good, I was able to manage because I had easy access to people who were very supportive"*.

Women described how having experienced GDM made them think differently about their health. Most women disclosed that they had strong intentions to engage in healthy behaviours to prevent type 2 diabetes postpartum. Sarah explains how GDM affected her attitude about maintaining her health: *"For me it was a wake-up call of what I need to do to make sure that I don't ever have that again. I know that I never want to*

*have diabetes thank you very much.*” Paula explains how her GDM experience impacted her lifestyle postpartum:

*When I went through gestational diabetes, it made me realize I don't want any part of that. I think for me, because I was insulin dependent, having four injections a day... just that memory reminds me why I want to stay healthy.*

*Knowing it could happen down the road makes me think twice about what I put in my mouth... because I really don't want to be doing that again.*

Kelley describes how the GDM experience serves as a reminder of her risk for type-2 diabetes however, acknowledges the challenges to engaging in healthy behaviours with a newborn:

*It's always on my mind, I wonder if my sugars are out of whack and I worry about possibly getting type 2 diabetes in the future... and I'm trying my best to exercise and get back into shape because I do realize that if I continue to watch what I eat and exercise, the chances of getting it are lower but it's been really hard with a baby.*

### **Adjusting to Life without Diabetes While Maintaining or Restoring Health**

Adjusting to life without diabetes while maintaining or restoring health, is the next stage of the transformative postpartum process. It begins with the birth of her child and ends when a woman has settled into a new normal. This phase will vary in length and is also dependent on many influencing factors. Many women described the transition from pregnancy to postpartum required a shift in their thinking. Danielle describes what it was like having to think about food after having to follow such a regimented diet during pregnancy:

*The biggest change after I had him was just coming home and having to think about food again. For those three months prior, food was just such a huge deal, having to think about what you can eat and when you could eat it... it was overwhelming for sure. So coming home and still being in that mind frame but then realizing I don't really have to be that crazy about it anymore but, I still need to be healthy. It was a big shift.*

Women discussed the new competing demands for time after having a baby. Adjusting to life with a newborn after experiencing a GDM complicated pregnancy was described as challenging by all the women while they attempted to maintain or restore their health after a GDM complicated pregnancy. Beth describes how difficult the transition was for her while attempting to maintain a healthy lifestyle, care for a newborn and fulfill her other obligations:

*It's exhausting and it's challenging because when you do feel good, you have to take care of the baby. You have to clean bottles, you gotta clean up the kitchen a little, you gotta get a load of laundry in, and by the time that's done your back's*



*hurting or the baby wants you again. There's no time to take care of myself like I'm supposed to.*

MaryAnn a mother of three, describes her transition period after the delivery of her baby: *"it was difficult, it was hard, it was a rough road."* and having *"no time for me to do what I was supposed to do to stay healthy."* Women described how challenging it was finding the time to maintain a healthy lifestyle while adjusting to her new life as a mother. After the birth of their child, priorities shifted from focusing on themselves and diabetes management, to focusing on the baby. Catarina describes what it was like for her after the birth of her baby, balancing her time between caring for her baby and trying to restore her health:

*It's hard. Like the biggest thing for me has been adapting to this new life. Just trying to find the time to balance things... making sure that he's (baby) o.k. first before I can have time for myself to be healthy like I used to, that's the hardest thing I guess right now because I know I have to make myself a priority too.*

The experience of GDM was often described as *"life changing"* leaving a lasting impression on women about the experience. Iris explains her ever present experience with GDM: *"It stays with you all the time and it really makes you aware of what you're supposed to be doing now"*. Lara explains how the GDM experience subsequently altered the way she thought about her health, eating habits and making positive lifestyle changes:

*When you don't have any health problems, there are some things that you just don't realize you're doing ... like overeating. So once I got gestational diabetes and I realized how much I was supposed to eat, and how important exercise was for managing my sugars, that changed everything. Now we are more aware, both*

*of us (husband)...aware of what we eat and we try to exercise like I did in my pregnancy, it was life changing.*

Many women talked about wanting to breastfeed their baby. Some women knew about health benefits of breastfeeding while others did not. One of the major concerns identified about breastfeeding was how GDM would affect them postpartum. Avani described how she wanted to breastfeed her baby however, after following a strict diet during pregnancy, she wasn't told about her dietary needs for breastfeeding after delivery: *"I was concerned after delivery how to go ahead with my diet. Should I follow the same diet? Is it enough for baby because I was breastfeeding... I just had no idea."* Chantelle had a similar experience: *I just wanted to know about what happens after delivery with all this diet and exercising stuff, like what I am supposed to do now? And what about my baby? I want to breastfeed, how will this affect it?*

Provision of support was identified as essential for women to breastfeed. Support for breastfeeding ranged from education about the benefits, to having a support person present to guide and assist them. While most women had intended to breastfeed their infant, a lack of support often resulted in early cessation or the decision not to breastfeed at all. Many women found breastfeeding difficult. Lara identified a lack of available lactation consultants to support breastfeeding as a barrier and led to her early breastfeeding cessation. *"I would have had a lactation consultant if one had it been accessible... I had such a hard time. I just couldn't get one so I had to stop"*. Similarly, Sonia recalled her struggle with breastfeeding and stated *"if I had someone there to help me through it, I would have stuck with it."*

Many women talked about the need for education about the potential adverse effects of GDM on breastfeeding. Women stated that providing information on the

potential effects that GDM has on breastfeeding is important to help women overcome breastfeeding difficulties. Elissa describes how her previous experience breastfeeding, and new knowledge about the effects of GDM on breastfeeding influenced her decision to work through any difficulties initiating and establishing a breastfeeding routine:

*All I could remember was how hard it was with my first, trying to pump, trying to get a latch and it didn't work... I didn't know it at the time, but I guess having gestational diabetes can affect your milk... Plus I had a C-section which apparently can affect your milk too. That would have been really nice to know... They should really tell you these things. At least I knew what to expect this time... It took a while but we finally got there.*

Both the length of time required to undergo the postpartum glucose tolerance test (GTT), and when a woman is encouraged to have blood glucose screening done postpartum were reported as contributing factors as to whether or not the women would follow-through. Sonia explains *"I have the lab requisition slip, I need to go and get the screening done again (GTT)... I just haven't had the time to do it... things are to hectic right now"*. Women also felt the amount of time it takes to complete the glucose tolerance test is challenging with a newborn, especially if she has other children. Cecilia explains why having the GTT screening was difficult for her: *"It's just hard to do a two hour test that you have to fast for, but with three kids... it definitely gets put on the back burner unfortunately... but I know it's something I really need to do"*. Some women went back to work before the six month postpartum mark making it difficult to take the test for scheduling reasons. Women also cited misplacing the lab requisition slip and therefore never followed had the screening test completed at all. Sarah describes *"I never did the*

*glucose test afterwards. We moved a few weeks after he was born, and I lost the slip that he gave me for it when I was still pregnant, I actually forgot about it until now”.*

While women acknowledge the challenges associated with a fasting GTT, periodic self-monitoring was considered a timely way for many women to spot check themselves. Kelley explains *“I still have my monitor so I do check it every once in a while, it’s easy to do, it doesn’t take a lot of time so why not?”* Given the challenges associated with taking the GTT, and particularly the length of time to complete it, many women expressed a desire for alternative means to complete the test. Tanya explains *“It would be better if there was an easier way to do the test like if I didn’t have to sit there for that amount of time I would have already had it done”*. Sonia explains her need for planning and support to encourage her to complete the GTT: *“I need to go and get the screening done again... I am planning on my mom coming over next week to watch the kids so I can go, otherwise there’s no way I could do it”*

Some women reported forgetting about having to complete the GTT. Iris describes how follow-up from her healthcare provider served as a reminder to complete the test:

*Things came back normal... Once I had the baby I wasn’t diabetic anymore so it was like, oh that was just a moment in time... I haven’t thought about it until my doctor gave me a requisition form for the glucose test... She has a reminder in her computer so every time I’m there she asks me about it.... otherwise I would have forgotten about it..*

### **Reconciling a New Normal**

Reconciling a new normal refers to the stage when women move from adjusting to life without diabetes, to settling into new daily routines. Women typically entered this

phase between three and six months postpartum. It is during this phase that most women attempt to maintain or restore their health as priorities shift once again. Maude explains what it was like trying to settle into her new life after having her baby:

*The most difficult part was the first two or three months... you feed them a lot, you're up a lot, and you're not sleeping well, so exercising and preparing healthy food was really hard. Then we got into a routine, and things got much better after that.*

Marianna explains her transition from adjusting to life without diabetes, to settling into a new normal while trying to keep a healthy lifestyle:

*I've been maintaining a healthy lifestyle now that I've got breastfeeding down... and things are starting to settle... I'm watching my carbohydrate intake and trying to be active, because after getting gestational diabetes, I know I don't want to deal with that again.*

Danielle explains her increased risks for future diabetes as motivation for establishing and maintaining a healthy lifestyle postpartum:

*I know that I'm at higher risk (type-2 diabetes) for sure. Being checked regularly is a priority now because of gestational diabetes, I'm much more aware of what I'm eating, and I continue to exercise. I just had to get back into a routine. It took quite a while but my life is back to normal now.*

Many women expressed a strong intrinsic desire to lead a healthy lifestyle after having their baby however, they found it difficult to be successful and commented on the need for more information on how to self-care. When asked about implementing healthy behaviours, Rae responded:

*Every week I say I'm gonna do it, I need to do it, but there's always something... like now of course my child's teething and he's miserable so he's really demanding. I really want to lose the weight and change my diet... I'm trying to incorporate a healthy lifestyle, and find the information on what to do but it's hard. I don't even know where to begin right now.*

Women discussed how implementing or maintaining the recommended lifestyle modifications requires a great deal of planning, social support, and access to resources, *"Having someone to watch the kids would just give me the boost that I need to get out and do it (exercise) and I don't have to worry about my kids."* Michelle. Sue describes the combination of planning and having support in her successful implementation of a healthy lifestyle:

*I pulled up the workout schedule, and we made sure that I was available to go at least twice a week. My husband comes home half an hour early on Mondays so I'm able to go to class while he watches the kids.*

Cecilia explains the need for having a strategy to maintain a healthy lifestyle *"Planning is the biggest thing. Organization is key, because if you just kind of roll with it, you end up making unhealthy choices but if you have a schedule and a plan, you'll stick to it"*.

Paula explains how the combination of practical support from her husband and having a plan helps her be successful in maintaining a healthy lifestyle: *My partner is wonderful for making food... he's very health conscious so when he gets in from work, he prepares our meals.*

Many women verbalized the need to have time for themselves in order to implement the recommended lifestyle modifications and take care of their health.

Recognizing the need for self-time and actually taking it was a struggle that many women

expressed. Women commented that taking time for themselves would in a sense, be taking time away from her baby, family, and familial responsibilities. While acknowledging the fact that personal time was important, for some women, there were feelings of guilt attached to it. Leslie describes feeling guilty about taking the time for herself: *It's a struggle to have time to myself... I want to work out but I feel guilty, when my husband's home we like to spend our time together as a family.*

For many women, a lack of postpartum follow-up after a GDM-complicated pregnancy undermined their need to maintain or restore their health. Women commented on the seriousness and attention given to a GDM-complicated pregnancy. Many women felt that there should have been a shift in care postpartum as they were now the one at risk for type 2 diabetes and the associated co-morbidities. Lara describes how a lack of postpartum follow-up, left her feeling that her health was inconsequential to her healthcare providers.

*It all seemed so serious when it was about the baby (GDM)... it doesn't really matter after because it's no longer a threat to the baby. The thing is, it's a big threat to you still, but then for some reason it's not taken as seriously... You should have to follow up about it because you are a patient just as much as the baby.*

Most women expressed a strong desire to have access to the same resources they had during their pregnancy to maintain or restore their health postpartum (dietitians, nurses, physicians, lifestyle counselling, education classes etc.). Women also wanted ongoing postpartum follow-up from their healthcare providers. Women recalled all of the attention and education they received during their pregnancy related to GDM and postpartum recommendations. Women also discussed living a very controlled pregnancy

and once delivered, they felt alone in dealing with the aftermath of a GDM complicated pregnancy. Iris explains how after her delivery, she was left feeling lost and confused about how to restore her health:

*Throughout the pregnancy it was all about me and what I was doing. Then when I had her, I didn't see the doctor till I was discharged... when I left, I had a severe lack of education about what to expect, and what I was supposed to do. I wasn't told how to care for myself... and what to expect to happen with my body at that point. Like, I was just gestational diabetic... now what?*

The majority of women in this study identified the use of technology as a way to increase access to resources postpartum. Many women discussed the convenience of accessing the internet for information. Women using the internet appreciated finding answers to their questions during their time of need. One woman in this study recalled accessing an online dietician who would answer questions daily. She reported this type of resource as extremely valuable as she was able to address her questions as they arose

Danielle describes her experience, and the need to become a self-advocate for one's own health:

*You have to push for your own well-being. If you're not getting the answers and the support you need then go somewhere else... but really you should be able to get the help you need, you shouldn't have to push. I often found myself googling my own information. I had to figure things out for myself. The problem with googling things is that you don't always know if it's reliable information.*

Once delivered, women resumed care with their primary healthcare providers whereby women felt their risk for type-2 diabetes wasn't taken as seriously. Lara describes her frustration with her primary care provider:



*I find that family doctors could do more... I had to ask for everything, even to get my blood sugar checked after my baby... it should definitely still be on the health radar! Afterwards I asked the doctor for another prescription for testing strips and he was like 'why you were fine?' and I said but I want to continue to make sure that I'm fine, if I have this little machine that can tell me my blood sugar numbers, why shouldn't I use it?*

Women described their frustration with a lack of support postpartum from healthcare providers. Maude describes:

*I seriously want some follow-up, just to see what I need now... I remember asking her when I was still pregnant... I said if I follow these instructions post-partum, would I be ok? Then, you have your baby, things get busy, you don't really think about seeking them out, I wish he followed up with me after I had my baby.*

While the provision of individual social support to maintain a healthy lifestyle was appreciated, women voiced their concerns for a lack of accessible resources to both her and her family. A lack of resources that are inclusive of families were often recognized as a barrier to engaging in healthy behaviours. Catarina explains *"It's tough to do it alone. I'm really surprised that there aren't any family workout classes, it would help the whole family be active, we could do it together, I would love that"*. Women spoke about wanting the entire family to be healthy, wanting to role model healthy behaviours and make healthy choices for their children.

Women mentioned wanting to *"get healthy as a family"*. They explained that targeting and including families would encourage healthy behaviours for all, and a new way of living would eventually become the norm. Iris explains how being a role model and being healthy would influence her daughter:

*So I know that the more active we are, and the more she sees us exercising, then it'll become sort of a norm in our home, that oh people exercise, this is how people stay healthy, and knowing that I'm the biggest influence being her same sex parent, I want her to see that mom works out every day.*

Financial constraints were also identified as a barrier to accessing existing resources within their communities. Women discussed the impact of a year maternity leave on their current budget. Iris explains:

*Financially we're not in a position to spend \$500 dollars a year on a gym membership but we're also in too good of a position to qualify for any kind of subsidy. Don't get me wrong, I am so thankful to be off for the year but it's tough financially to live off of EI when you're used to a certain income.*

Most women talked about wanting to join a gym that offers daycare for children. Women commented that it is expensive, and added to the cost of a gym membership. Sue explains the need for family centered activities, and how the cost of daycare has prohibited her from taking advantage of a gymnasium daycare:

*I think maybe something that would allow the whole family to participate... I know there are a lot of classes for babies and moms but there aren't a lot of classes for moms who have older kids as well... so maybe something that was available so that my toddler could be occupied. Truthfully, I'm not gonna sign her up for a daycare because I'm home with her and it's expensive.*

## **Discussion**

Pregnancy is an unparalleled time in a woman's life marked by a series of physical, emotional, psychological, and spiritual changes. The results of this study indicate that women's experience dealing with a GDM diagnosis during pregnancy marks

the beginning of a new adaptation process, and distinct transition to motherhood. The natural course of a typical pregnancy will be altered when a woman is diagnosed with GDM, as she will endure a host of additional stressors related to managing diabetes during pregnancy (Carolan, Gill and Steele, 2012; Carolan, 2013; Persson, Winkivist, and Mogren, 2010), and engaging in health promoting behaviours postpartum (Evans, et al., 2010). GDM requires women to adhere to a strict dietary, lifestyle, and glucose monitoring regimen to ensure a healthy baby and subsequent health status (Blumer, Hadar, Hadden, Jovanovic, Mestman, Hassan Murad et al., 2013; Thompson, Berger, Feig, Gagnon, Kader, Keely, et al., 2013). Women were given the opportunity to reflect on their GDM experience and present-day lifestyles to identify ways to help them maintain or implement healthy behaviours. The GDM experience during pregnancy inevitably affected women's attitude toward health as they move through the stages of the transformative process. The complications and associated health risks related to a diagnosis of GDM will affect how a mother adjusts to a diagnosis of GDM (Persson et al., 2010), adapts to living without diabetes, and transition to motherhood and her new life with a baby.

Mercer's (1995) theory of maternal role attainment states that becoming a mother is a developmental process that occurs over time. Women will become attached to their infant while acquiring competence in care taking responsibilities until she eventually fully realizes the mother role (Mercer, 1995). Women unable to fully realize the maternal role may be experiencing role strain whereby women have difficulty fulfilling their obligations (Mercer, 1995). Transitioning from a GDM complicated pregnancy, to life without diabetes while restoring or maintaining maternal health varies from the typical transition to motherhood. While women prior GDM must adapt to becoming a new

mother just as any other woman would, they have additional stress to restore or maintain their health to prevent type 2 diabetes.

Women in this study described their transition to motherhood as particularly stressful due to the ‘extra worries’ that GDM creates postpartum. Women described the transition to motherhood as emotional, exhausting, physically demanding, and time consuming. Maintaining or implementing healthy lifestyle behaviours, while attempting to breastfeed and comply with the GTT recommendations, all contributed to heightened stress levels postpartum. Women recognized and longed for additional social supports to facilitate an easier transition to motherhood, and to allow them to make or sustain the recommended lifestyle behaviours. Yet women also realized the multitude of variables that interplay to influence both healthy and unhealthy behaviours. In this study, women identified the following individual characteristics as having an impact on their transition to life after GDM; their GDM experience, diabetes risk perception, being informed, coping mechanisms, psychological well-being, physical abilities, physical healing, health status, intention to breastfeed, ability to breastfeed, motivation, and accountability. The remaining influences affecting women’s transition from living with GDM while pregnant to life without diabetes postpartum are extrinsic influences (external to the individual) that interact with her individual characteristics.

The GDM experience increased the women’s awareness of their risk for type-2 diabetes. Many referred to the experience as *a wake up call*. While the impact of women’s experience with GDM was often reported as a motivating factor to follow CPG’s postpartum, it did not ensure compliance. A wide range of barriers and facilitators were found to contribute to women’s ability to engage in healthy lifestyle behaviours. Women identified a lack of care postpartum lead to feelings of uncertainty on how to

manage their healthcare needs. Many women identified the need for continued access to healthcare providers such as dietician, physicians, and nurses. These findings are consistent with previous research related to GDM experiences postpartum. In 2008, Doran sought to explore the the impact of a GDM diagnosis on a woman's life, Although women were able to make lifestyle changes during pregnancy, those changes were difficult for them to sustain postpartum despite their knowledge of the risks (Doran, 2008).

In 2010, Evans, Patrick and Wellington performed a concurrent mixed methods study to compare women's perceived health status with their actual experiences in establishing and maintaining healthy lifestyle changes. They found that women had difficulty had difficulty maintaining a healthy lifestyle in the first year postpartum despite their knowledge of their risk. Abandonment by the healthcare system and uncertainty with respect to staying healthy were identified as challenges while continuing support and education postpartum were identified as being needed to maintain changes made during pregnancy. A qualitative study was conducted to gain insight into experiences of multiethnic women diagnosed with GDM (Kaptein, Evans, McTavish, Banerjee, Feig, Lowe et al, 2015). Women in this study also reported their experience with gestational diabetes as a wakeup call, yet the experience did not ensure women would follow the recommended CPG (Kaptein, et al., 2015).

In addition to identified individual characteristics, extrinsic variables including interpersonal, organizational, community and political factors will also impact a woman's ability to engage in health behaviours postpartum. The interpersonal influences the women identified were; needs of the newborn (feeding, bathing, diaper changes, health status); family dynamics (ex. having other children, family responsibilities, presence of

significant other, relationship with extended family and friends); availability of social supports (ex. breastfeeding support, support from family friends, and healthcare providers). At an organizational level, women identified that the nature of their work and work environment played a significant role in whether or not they were able to implement and maintain healthy behaviours. On a community level, women identified community services (programs targeted at new mothers, programs targeted at children and families, access to fitness programs, cooking classes etc.), and access to resources (information, education, program availability, nutritional counselling, lifestyle counselling, healthcare providers etc.) as influencing factors in their ability to implement health lifestyle choices. Clinical practice guidelines, information pamphlets, availability of resources, maternity/parental leave benefits, delivery of health care, and the healthcare structure were identified as influences that affected women's knowledge and ability to implement health behaviours postpartum. The sum of these variables either facilitated or served as barriers to the women engaging in healthy behaviours.

Based on the findings of this study, successful health promoting strategies for women with prior GDM must reflect the needs of women, at the time of need, and in the context of their current situation. A socio-ecological approach that considers and plans for the multiple complexities influencing health can help ensure interventions are adopted successfully. Future care for women with prior GDM should focus on time, provision of social support, individual characteristics and, extrinsic variables that influence health behaviours. These influences need to be considered and integrated at every stage of the transformative postpartum process as women's needs change depending on the context of the situation.

Women who experience GDM face many additional postpartum challenges as they attempt to follow CPG's to help prevent type 2 diabetes. Preparing women for this transition should begin when women are diagnosed with GDM and carefully planned out to target each stage of the transformative postpartum process as women's needs change. For example, education about the importance of CPG recommendations and the risk for type-2 diabetes needs to take place at every prenatal appointment, after the delivery of her infant, and should continue postpartum. Strategies that consider contextual factors to assist women to implement the CPG's are also needed. For example, simple reminders about the GTT and the provision of alternative means and times for completing it should be offered to increase women's likelihood to complete it. Women identified a phone call or email reminder as their preferred follow-up method for glucose screening.

### **Conclusion**

Care of women with prior GDM should not cease postpartum. Rather, the postpartum period should be viewed as an entry point to a second stage of care focusing on health promotion and disease prevention. This strategy would help to address a lack of continuity in care by bridging the gap between the experience of a GDM controlled pregnancy, and maintaining/restoring health as women transition to motherhood. Follow-up care from healthcare providers is crucial to help overcome some of the barriers, and to support women to breastfeed successfully, complete the glucose tolerance test, and make or sustain healthy lifestyle choices postpartum.

Furthermore, healthcare providers need to ensure provision of quality time during each healthcare visit to foster a positive relationship with women. The provision of education about CPG recommendations and the risk for type-2 diabetes postpartum need to be communicated and reinforced during every healthcare visit (antenatal and

postpartum). There is a need to ensure communication between healthcare providers regarding GDM diagnosis. We need to develop systematic reminders about glucose tolerance testing (between 6 weeks and 6months postpartum and annually) and CPG recommendations. We need to develop and provide access to online postpartum resources for breastfeeding, lifestyle modifications, and the prevention of type-2 diabetes that women can access depending on their needs at the time. The provision of access to the same resources received during pregnancy would enhance women's feeling of support. Lastly, the provision of resources that are inclusive of families is needed to address the growing trend of partners becoming the primary caregiver postpartum (see Appendix P).

Greater attention is needed during the postpartum period for women with prior GDM. Continuity of care, provision of social support, education, and resources for postpartum women with prior GDM, is a major gap in our current healthcare system. Healthcare providers need to work together to understand how to ensure positive health outcomes for women with prior GDM. Identifying existing resources and creating new ones, provision of quality time with healthcare providers during healthcare visit, enhancing communication about a GDM diagnosis, and the provision of support will aid in the transition from a GDM pregnancy to the postpartum period while women attempt to maintain or restore health.



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## Chapter 5

### Discussion

GDM: A transformative postpartum process is a process that begins with the diagnosis of GDM during pregnancy. The GDM experience during pregnancy inevitably affects women's attitude toward health as they move through the stages of the transformative process. The three stages of the transformative postpartum process include: 1) dealing with a GDM diagnosis, 2) adjusting to life without diabetes while maintaining or restoring health and, 3) reconciling a normal. Together, the three themes and constant interplay between influencing variables (time, social support, individual characteristics and, extrinsic variables), illustrate the stages that women work through, from a GDM diagnosis, and establishing a life without diabetes, to reconciling a new normal postpartum. Time is identified a critical influencing factor on women's adaptation process and day-to-day experiences. Moreover, a constant interplay between time, social support, individual characteristics, extrinsic variables and barriers & facilitators influence women at every stage of the transformative process.

Women's experience dealing with a GDM diagnosis during pregnancy marks the beginning of an adaptation process and her transition to motherhood. Pregnancy is an unparalleled time in a woman's life marked by a series of physical, emotional, psychological, and spiritual changes. These normal changes during pregnancy will be altered (to varying degrees) when a woman is diagnosed with GDM, as she will endure a host of additional stressors related to managing diabetes during pregnancy (Carolan, Gill and Steele, 2012; Carolan, 2013; Persson, Winkivist, and Mogren, 2010), and engaging in health promoting behaviours postpartum (Evans, Patrick, and Wellington 2010). A diagnosis of GDM marks the beginning of a new pathway that women must follow, to

ensure a healthy baby and subsequent health (Blumer, Hadar, Hadden, Jovanovic, Mestman, Hassan Murad et al., 2013; Thompson, Berger, Feig, Gagnon, Kader, Keely, et al., 2013). The complications and associated health risks related to a diagnosis of GDM will inevitably affect how a mother adjusts to a diagnosis of GDM (Persson et al., 2010), adapts to living without diabetes, and transitions to motherhood and her new life with a baby.

There is a transition period from pregnancy to life postpartum for all women. GDM: a transformative postpartum process differs however from the typical transition to motherhood that takes place in women with an uncomplicated pregnancy. Mercer's (1995) theory of maternal role attainment states that becoming a mother is a developmental process that occurs over time. Women will become attached to their infant while acquiring competence in care taking responsibilities until she eventually fully realizes the mother role (Mercer, 1995). Women unable to fully realize the maternal role may experience role strain and as a result have difficulty fulfilling their obligations (Mercer, 1995). While women prior GDM must still adapt to becoming a new mother, the additional stress to restore or maintain their health to prevent type 2 diabetes will alter the course of that path. Women in this study described their transition to motherhood as particularly stressful due to the 'extra worries' that GDM creates postpartum. Women described the transition to motherhood itself as emotional, exhausting, physically demanding, and time consuming. Maintaining or implementing healthy lifestyle behaviours, while attempting to breastfeed and comply with the GTT recommendations, all contributed to heightened stress levels postpartum. Women recognized and longed for additional social supports to facilitate an easier transition to motherhood, and to allow them to make or sustain the recommended lifestyle behaviours. Yet women also realized



the multitude of variables that interplay to influence both healthy and unhealthy behaviours while adjusting to life without diabetes.

Poor adherence to the 2013 CDA CPG's renders women with prior GDM at great risk for developing type-2 diabetes, and metabolic syndrome later in life. Individual characteristics have an impact on women's transition to life after GDM. Women identified the following individual characteristics that influence their health postpartum: their GDM experience, risk perception, being aware, coping mechanisms, psychological well-being, physical abilities, physical healing, health status, intention to breastfeed, ability to breastfeed, motivation and, accountability. The remaining influences affecting women's transition to life without diabetes are extrinsic influences (interpersonal, organizational, community and political factors) that will interact with her individual characteristics. While poor implementation of CPG's are in part due to women's personal characteristics and risk perception, women's experience within the healthcare system and, fragmentation of care are also significant contributing factors (Keely, 2012).

Disjointed healthcare is one of the most difficult aspects of managing the health of women with prior GDM postpartum for healthcare providers. In Canada, physicians are the dominant primary care health providers and are typically the gatekeepers of the majority aspects of the healthcare system such as specialist care (Bryant, 2009). This dominance over health care service influences the relationships with other health care professionals, and ultimately affects the delivery of care for women with prior GDM (Bryant, 2009). This is of particular importance when it comes to postpartum screening practices, as fragmentation of care postpartum can be the result of a lack of communication among healthcare providers about the diagnosis of gestational diabetes.

A breakdown in communication tends to occur when women are discharged from their primary obstetric care providers' care postpartum. After delivery, women will typically resume care from their primary care provider, which is the critical time period for communication to occur. Communication about a GDM diagnosis is essential during this time as following the CPG's can help prevent type-2 diabetes. Poor communication and lack of support has been attributed to a lack of infrastructure and/or organization of care between providers (Keely, 2012), as there are currently no clear guidelines on who is responsible for follow-up care for a woman with prior GDM. Women with GDM receive a great deal of attention and support during pregnancy including strict monitoring, diabetes education, access to resources, and diabetes self-management support to ensure optimal maternal-fetal outcomes. The support received during a GDM complicated pregnancy far surpasses the level of support and monitoring during an uncomplicated pregnancy. Women with prior GDM are encouraged to follow CPG's postpartum to help reduce their risk for type-2 diabetes yet, continuity of care is shown to be problematic during this time.

Interpersonal relationships were strongly identified by women as a significant contributing factor to engage in health behaviours postpartum. The interpersonal influences women identified were; needs of the newborn (feeding, bathing, diaper changes, health status); family dynamics (ex. having other children, family responsibilities, presence of significant other, relationship with extended family and friends); availability of social supports (ex. breastfeeding support, support from family friends, and healthcare providers). At an organizational level, women identified that the nature of their work and work environment played a significant role in whether or not they were able to implement and maintain healthy behaviours. On a community level,

women identified community services (programs targeted at new mothers, programs targeted at children and families, access to fitness programs, cooking classes etc.), and access to resources (information, education, program availability, nutritional counselling, lifestyle counselling, healthcare providers etc.) as influencing factors in their ability to implement health lifestyle choices. Clinical practice guidelines, information pamphlets, availability of resources, maternity/parental leave benefits, delivery of health care, and the healthcare structure were identified as influences that affected women's knowledge and ability to implement health behaviours postpartum. The sum of these variables either facilitated or served as barriers to engaging in healthy behaviours.

GDM: a transformative postpartum process is defined as an internal process that occurs over a period of time as a women move through pregnancy beginning with a GDM diagnosis, after she gives birth, and as she adjusts to her new life as a mother. The time spent as a woman with GDM will affect her thoughts, decisions, priorities and subsequent lifestyle choices. Once her "*new normal*" has been established, a new lifestyle has emerged and will continue to evolve. The time it takes to move from each of the phases of this process varies for every woman as it is dependent on the multitudes of influencing factors. The adaptation process is influenced by the constant interplay between personal attributes, time as conceptualized by women, the facilitators and barriers she encounters, the provision of social support, and a multitude of extrinsic variables.

The GDM experience increased the women's awareness of their risk for type-2 diabetes. Many referred to the experience as *a wake up call*. While the impact of women's experience with GDM was often reported as a motivating factor to follow CPG's postpartum, it did not ensure compliance. A wide range of barriers and facilitators

were found to contribute to women's ability to engage in healthy lifestyle behaviours. Women identified a lack of care postpartum lead to feelings of uncertainty on how to manage their healthcare needs. Many women identified the need for continued access to healthcare providers such as dietician, physicians, and nurses. These findings are consistent with previous research related to GDM experiences postpartum. In 2008, Doran sought to explore the the impact of a GDM diagnosis on a woman's life, Although women were able to make lifestyle changes during pregnancy, those changes were difficult for them to sustain postpartum despite their knowledge of the risks (Doran, 2008). These findings suggest the need to revisit our current health promotion and disease prevention strategies.

Health promotion and prevention strategies have historically targeted individual characteristics and behaviours (Hofrichter, 2003), supporting a narrowly focused biomedical approach to health (Bryant, 2009). Some argue that the broader aspects of the health care system, such as the social, economic and political forces that shape health care services and delivery, are neglected altogether (Bryant, 2009). Canadian health policy has traditionally been dominated by an individual lifestyle approach to health (Bryant, 2009). Although individual characteristics are an important consideration, it is equally imperative to consider the various levels of influence that affect individual health (Raphael, 2009). An individualistic focus can be problematic as it can result in "victim blaming" (Bryant, 2009). Placing blame on the individual assumes that negative health outcomes are related to lifestyle choices, rather than considering how socio-environmental factors influence health (Bryant, 2009). Health promotion and disease prevention strategies need to have a broader scope that addresses the intrapersonal,

interpersonal, community, organizational and political forces that shape the health of Canadians.

There are a number of significant individual focused models or frameworks that underpin current practices of health promotion and inform policy (Raphael & Bryant, 2002). Some argue that most of these models lack critical perspective, and are derived from one form of knowledge (Raphael & Bryant, 2002). Behavioural change and lifestyle modification theories such as the self-efficacy theory, stages of behaviour change theory, and the health belief model, emphasize the role of the individual in promoting health (Stokolos, 1996). Although these models have made significant contributions to the body of knowledge on disease prevention, they focus primarily on individual factors rather than addressing broader contextual factors that influence health. Behavioural change models offer interventions for diabetes prevention for women with prior GDM to implement however, these types of interventions are limited as they do not take into account personal characteristics or potential barriers.

The CDA GPG's (2013) state that women who have had GDM can take charge of their own health by booking and following up on postpartum testing. The guidelines also suggest that healthcare providers can help improve the frequency of diabetes screening for women who have had GDM, whether it's the diabetes care team, the obstetrician, family physician, nurse practitioner, public health clinic, or midwife. These guidelines imply that there is a shared responsibility for ensuring the health of postpartum women with prior GDM. The CPG's propose that the importance of postpartum screening is discussed during pregnancy and that healthcare providers ensure the postpartum OGTT is booked at the first postpartum encounter (CDA, 2013). Healthcare providers are encouraged to follow-up on the postpartum OGTT results and review them with women.

If the result is positive, referral to a diabetes education program for the management of pre-diabetes or type-2 diabetes is recommended (CDA, 2013). If the result is negative, re-screening is suggested prior to any future planned pregnancy and/or every 3 years or more often depending on other risk factors (CDA, 2013). Healthcare providers are also encouraged to reinforce healthy lifestyle including modification of diet and exercise to reduce the risk of developing type 2 diabetes by up to 60% (CDA, 2013). Lifestyle counselling should begin during pregnancy and continue postpartum (CDA, 2013). One of the major gaps in the recommendations is the provision of support for women with prior GDM to breastfeed. There are no recommendations of how or when to encourage women to breastfeed successfully. Despite these recommendations, the findings of this study suggest that these guidelines are not well executed by women or their healthcare providers. Women's postpartum experiences varied however, the majority of women strongly desired additional social support.

In 2010, Evans, Patrick and Wellington performed a concurrent mixed methods study to compare women's perceived health status with their actual experiences in establishing and maintaining healthy lifestyle changes. They found that women had difficulty had difficulty maintaining a healthy lifestyle in the first year postpartum despite their knowledge of their risk. Abandonment by the healthcare system and uncertainty with respect to staying healthy were identified as challenges while continuing support and education postpartum were identified as being needed to maintain changes made during pregnancy. A qualitative study was conducted to gain insight into experiences of multiethnic women diagnosed with GDM (Kaptein, Evans, McTavish, Banerjee, Feig, Lowe et al, 2015). Women in this study also reported their experience with gestational

diabetes as a wakeup call, yet the experience did not ensure women would follow the recommended CPG (Kaptein, et al., 2015).

Time as conceptualized by women in this study, provision of support, lack of support, relationship with healthcare providers and access to resources overwhelmingly emerged as salient influencing factors to breastfeeding, glucose screening and making and or sustaining healthy lifestyle behaviours. Women's needs varied based on the context of their situation, the presence of barriers or facilitators at the time, and the phase of the transformative postpartum process they were in. Personal attributes such as coping skills, attitudes, and beliefs can be challenging to address when planning and implementing health interventions for postpartum women with prior GDM. External influences were found however, to impact women's health behaviours on other levels. Healthcare providers in particular, are in a strong position to influence women's ability to follow the CPG's by ensuring a positive relationship with their patients. For example, women identified various forms of support including practical, informational, emotional and instrumental as essential to lifestyle modification. Provision of support came from sources including family, friends, and healthcare providers however, most women considered informational, instrumental and emotional support from healthcare providers as particularly important to them. Women often viewed their healthcare providers as the gatekeepers to education, and to access valuable resources and as such were important stakeholders in their care.

Women reported that provision of support from their healthcare providers, influenced the probability of seeking health information, and following the recommended CPG's. These findings support Rook's (1990) position that health behaviours occur as a result from a reciprocal process that occurs through the participation in a meaningful

social context. This means that when people engage socially, they become vested and more embedded in their social networks over time. The more the individual engages socially and builds relationships, the greater their ties become, the higher the obligations, and the desire to give in return becomes greater (Schwarzer et al., 2004). As women reflected on the impact of their relationship with healthcare providers, the establishment of good rapport early on, helped build a trusting relationship. This foundation instilled confidence in women to ask questions, ask for assistance, and request additional resources.

When the relationship with their health provider was poor, women perceived their healthcare provider's ability to appropriately address their needs as compromised. Women with negative relationships with their healthcare providers dismissed their advice and were unlikely to ask questions, address their concerns or follow their advice. These findings are consistent with the current evidence related to healthcare provider-patient relationships in women in GDM. A qualitative study with 12 pregnant women to explore a greater understanding of women's experiences of GDM and perceived needs was conducted (Khooshehchin, Keshavarz, Afrakhteh, Shakibazadeh, & Faghihzadeh, 2016). Results showed that the role of health care providers is critical and considered one of the most important social support for pregnant women. Similar to the findings in this study, some participants were not satisfied with how their physician responded to them, the amount and clarity of the information provided, and expressed a need for more social support from their health care providers and specialists (Khooshehchin et al., 2016).

A lack of instrumental, informational and emotional support from healthcare providers served as barriers to engaging in health behaviours as women deal with a GDM diagnosis, adjust to life without diabetes and settle into a new normal. The relationship



between women and their healthcare provider sets the tone for future healthcare encounters and women's readiness to learn new information. It is important to acknowledge that the relationship building process begins with the first interaction between women and healthcare providers and will continue to evolve until women have delivered their infant. After giving birth, women identified the need for continued care to help them maintain or restore health. Continuity in care postpartum however, is challenging as obstetricians and endocrinologists typically discharge women from their care in this period. Women will typically resume care from their primary care physician where a GDM diagnosis is often not communicated. The results indicate that care for women with prior GDM needs to continue rather than cease with the delivery of a live healthy infant. The days and weeks following childbirth is an important time for the health of all new mothers (World Health Organization, 2013). Yet, this is the most neglected time for the provision of quality services in women's health care (2013). While this evidence is concerning for the general population of women with uncomplicated pregnancies, it is particularly distressing for women with prior GDM due to their risk for type-2 diabetes. The postpartum period for women with prior GDM should be viewed as the entry point to another stage of care, focusing on health promotion and disease prevention. Despite this fact, the rates of provision of care are lower after childbirth when compared to rates before and during childbirth (WHO, 2013).

Our findings indicated a lack of knowledge about how GDM might affect breastfeeding, a lack of knowledge related to dietary needs postpartum, and how to achieve a healthy lifestyle. Continuity of care that extends beyond the delivery of a healthy infant can increase the likelihood that women will retain the information and successfully implement the CPG's. For example, many women intended to breastfeed

their child however, breastfeeding was challenging for most. Research has shown that GDM can delay lactogenesis postpartum (Matias, Dewey, Queensberry & Gunderson, 2013). Women would have liked to receive information about the potential effects of GDM on breastfeeding. Provision of education about the effects of GDM on breastfeeding could help women anticipate and troubleshoot potential breastfeeding issues. The benefits of breastfeeding and the potential effects of GDM on breastfeeding need to be discussed prior to delivery, and reinforced postpartum.

Women with a history of GDM have consistently expressed a strong need for social support to make and sustain healthy lifestyle choices (Dasgupta, Da Costa, Pillay, De Civita, Gougeon, Leong, et al., 2013; Evans et al., 2010; Jagiello & Chertok 2015; Razee, van der Ploeg, Blignault, Smith, Bauman, McLean et al., 2010), a finding that is confirmed in this study. Previous research also shows that women prefer face-to-face engagement with peers and healthcare providers as their primary means of support (Dasgupta et al., 2013). Consistent with the findings in this study, women who experienced GDM, however, report feeling disconnected from their healthcare providers postpartum (Evans et al., 2010; Thomas 2004) at a time when their need for support is the greatest (Thomas, 2004).

Despite this evidence, there has been some debate around the most effective time to intervene with health promoting strategies for women with prior GDM. Some interventions have focused solely on prenatal strategies arguing that interventions would be too difficult to implement given the change in healthcare providers after delivery of the infant (O'Reilly, Dunbar, Versace, Janus, Best, Carter, et al., 2016; Philis-Tsimikas, Fortmann, Dharkar-Surber, Euyoque, Ruiz, Schultz et al., 2014; Hu, Tian, Zhang, Liu, Zhang et al., 2012). Others have focused both prenatally and postpartum based on the

premise that women's motivation is high during her pregnancy to care for her infant, and interventions postpartum should build upon that motivation (Ferrara, Hedderson, Albright, Brown, Ehrlich, Caan, et al., 2014; Berry, Neal, Hall, Schwartz, Verbiest, Bonuck, 2013; Chasan-Taber, Marcus, Rosal, Tucker, Hartman, Pekow et al., 2014). Some women however, prefer to focus on diabetes prevention postpartum when the focus is no longer on their infant but rather on themselves (Lie, Hayes, Lewis-Barned, May, White, Bell, 2013). The women in this study however, reported the desire to adopt a healthy lifestyle while they adjust to their new life without diabetes and they settle into their new normal. While the evidence waivers on the best timing of health promoting strategies, the findings from this study suggest that health promoting strategies (provision of education, access to resources, provision of social support etc.) for women should begin during pregnancy and continue postpartum to help overcome a multitude of barriers.

Women reported the amount of time spent with health care providers as one of the most important influencing factors in implementing CPG's postpartum. For example, provision of care from a midwife was viewed as an advantage by women who had them. Women considered themselves "lucky" or "fortunate" having a midwife given the additional time spent with them during pregnancy and postpartum. Women recognized that they spent more time with their midwife than they would have with an obstetrician.

Most of the women in this study had intentions of making lifestyle modifications however, lacked the education and resources to do it. Increased accessibility to healthcare providers during pregnancy, and continuity of care postpartum was viewed as a supportive measure to assist women to follow the CPG's. Many women discussed the benefits of accessing a dietician for GDM self-management during pregnancy. These

women voiced a strong desire to have the same access to a dietician postpartum, as their nutritional requirements and need for lifestyle modifications changed after the delivery of their infant.

The findings in this study also support previous research that has explored barriers, facilitators, and social support in postpartum women with prior GDM. In 2014, Neilson, Kapur, Damm, De Courten, and Bygbjerg conducted a large systematic review to assess the evidence on determinants and barriers for GDM services in low, medium and high-income countries (Nielson et al., 2014). GDM services were characterized by screening and diagnosis, treatment during pregnancy, postpartum glucose screening, and consistent postpartum lifestyle modification. The review included 58 relevant quantitative and qualitative studies. A number of barriers related to the health care provider, healthcare system, and women's personal attributes were identified (Nielson et al., 2014). This review also showed that most women had intentions to maintain healthy lifestyles to prevent future diabetes however, found it quite challenging to do so. Lifestyle modifications were more likely to occur in the presence of social support (Nielson et al., 2014).

The CDA (2013) clinical practice guidelines recommend that women have their GTT between 6 week and 6 month postpartum time frame. The time required for the GTT, timing of the test, complexity of the test, lost requisition slips and forgetting about the test were reported as barriers to following this recommendation. Women identified this time period for blood glucose testing as an unrealistic time frame given that most newborns are eating and sleeping frequently throughout the day making it difficult to plan for a GTT, especially when there are other children in her care. Many women expressed a need for a new way of testing blood glucose postpartum, one that is sensitive

to their time constraints. These results are consistent with current evidence related to barriers for screening. A 2010 Canadian survey was conducted to explore primary care providers and women with previous diagnosed GDM perspectives on postpartum screening for type 2 diabetes (Keely, Clark, Karovitch, & Graham, 2010). Although the participants valued postpartum screening they reported time constraints, complexity of the glucose tolerance test, and lost laboratory requisition as the most common barriers to screening for postpartum women (Keely et al, 2010). Alternative means for testing blood glucose have been studied such as using the HgA1C test however, CPG's continue to recommend the oral GTT despite its drawbacks (O'Reilly, 2014). New ways of testing blood glucose need to be explored to account for these challenges.

The majority of women in this study identified the use of technology as a way to increase access to resources postpartum. Many women discussed the convenience of accessing the internet for information. Women using the internet appreciated finding answers to their questions during their time of need. Many women sought instrumental support online while trying to troubleshoot challenges managing their GDM. While the convenience of the internet in real time was found to be helpful, women identified some drawbacks to this type of support. Finding reputable sources was often a challenge and often times women found themselves reading unmonitored blogs from other women with GDM. Many of the comments made in this type of a platform came from women who were not properly educated to engage in the discussions. Many reputable online sources were found by the women in this study however, often times the answers they were looking for were not available. One woman in this study recalled accessing an online dietician who would answer questions daily. She reported this type of resource as extremely valuable as she was able to address her questions as they arose

Women in this study were provided with a host of online resources through the recruitment website for this study at [www.gdmpostpartumsupport.com](http://www.gdmpostpartumsupport.com). Daily and weekly reports on the number of users accessing the website provided statistics on the number of unique visitors versus repeat visitors. A total of 4065 views, 3479 of which were unique. This means that the website was accessed a total of 586 times by the repeat visitors. The highest months of website activity were those months during which advertisements were placed however, a large proportion of repeat visitors accessed the website after recruitment was completed. These findings suggest that women accessed the website for resources either at the time of viewing the website initially, or returned at a later time to access them. This evidence speaks to the growing trend of people seeking online resources to meet their educational needs. Further research studies should explore the use of online support programs as a supplemental resource to health education.

### **Implications for Practice**

Based on the findings of this study, successful health promoting strategies for women with prior GDM must reflect the needs of women, at the time of need, and in the context of their current situation. A socio-ecological approach that considers and plans for the multiple complexities influencing health can help ensure interventions are adopted successfully. Future care for women with prior GDM should focus on “time” in terms of constraints, quality of time provided, timing of interventions, provision of support, individual characteristics, extrinsic variables, and barriers and facilitators to engaging in health behaviours. These influences need to be considered and integrated at every phase of the transformative postpartum process as women`s needs changed depending on the context of the situation.

Equally important to addressing these influences, is that women who experience GDM face many additional postpartum challenges, as they are encouraged to follow CPG to help prevent type 2 diabetes. Preparing women for this transition should begin at the time of diagnosis and carefully planned out to target each phase of the transformative postpartum process as women`s needs change. For example, education about the importance of CPG recommendations and the risk for type-2 diabetes needs to take place at every prenatal appointment, after the delivery of her infant, and should continue postpartum. Strategies that consider contextual factors to assist women to implement the CPG`s are also needed. For example, simple reminders about the GTT and the provision of alternative means and times for completing it should be offered to increase women`s likelihood to complete it. The social ecological approach for health promotion (SEMHP) helps to address the interdependence between the multiple layers of influence, rather than focus simply on the individual level (Stokolos, 1996). The various layers of influence are the individual, interpersonal, organizational, community and political levels. These levels of influence will be used to guide the implications discussion.

In the transformative postpartum process the *individual characteristics* capture the individual level of influence in the SEMHP. The *extrinsic variables* depicted in the transformative postpartum process model are intended to capture the interpersonal, organizational, community and political levels of influence. Women, family, friends, healthcare providers, communities, healthcare organizations and the provincial government all share some level of responsibility in the successful implementation of CPG for diabetes prevention among women with prior gestational diabetes. On an individual level, there is a need for education, coping strategies, and motivation so that women have the knowledge to be successful in implementing the CPG`s. The provision

of social support throughout the transformative postpartum process can help establish or enhance women's coping strategies in dealing with the challenges associated with a GDM complicated pregnancy and the postpartum recommendations. Women need education about their risk for type 2 diabetes, dietary recommendations, the benefits of breastfeeding, how to breastfeed, the need for, timing of, and rationale for completing their GTT etc. With appropriate education, it is possible to influence women's motivation, attitudes, and beliefs, about their health. While addressing individual characteristics can be challenging, addressing the extrinsic variables can have a positive impact on women's ability to implement CPG's.

On an interpersonal level, women need the support from family, friends, and healthcare providers to engage in a healthy lifestyle. It can be a challenge to address the interpersonal relationships of women within their social network however; healthcare providers can make a difference. As such, healthcare providers should focus on improving relationships with women during every healthcare encounter by ensuring the time spent with women is quality time. It is important to note that the amount of time spent with women is not the same as the quality of time spent. Quality time refers to the healthcare provider's ability to convey a genuine interest and concern for women's needs during their healthcare encounters. Women need to feel there is sufficient time to discuss their concerns and need to have a level of comfort with their healthcare provider in order to do so. Given the time constraints that healthcare providers face during prenatal visits, it is not always possible to spend more time with patients. Healthcare providers can however, convey a genuine interest in their patients by simply listening, supporting, and responding to their needs as they arise. Family members or close friends should also be encouraged to attend healthcare provider appointments with women. The purpose of this



strategy is to help ensure women remember the information provided as their readiness to learn in that moment may/may not be optimal. Family and friends can help reinforce the education provided during that visit and can be supportive to women in their time of need.

At a community level, women need programs and access to resources to implement healthy behaviours. For example, postpartum women should be referred to diabetes prevention programs within their local communities when available. These types of programs are typically available to high risk populations however, women with prior GDM are often overlooked as an at-risk population. On a local, provincial and national political level, policies and strategies that address health promotion in women with prior GDM are needed. For example, current CPG's for women with GDM focus mainly on prenatal management and strategies to improve neonatal outcomes. Few recommendations are geared toward the postpartum period, and they are heavily dependent on women for their implementation. After the delivery of an infant, women are discharged from their obstetric healthcare provider and typically resume care from their family healthcare provider when needed. CPG's for women with GDM however, should be revised to include postpartum care as an additional point of entry to the healthcare system. Emphasis during this time should be placed on the preservation of health by ensuring the current recommendations are being followed.

On an individual, organizational, and political level, communication between healthcare providers regarding a GDM diagnosis is problematic. Current recommendations suggest there is a shared responsibility among women and their healthcare providers to communicate a GDM diagnosis (IDF, 2009). The issue with this however, is that no one is specifically responsible for ensuring communication. As a

result, communication about a GDM diagnosis often does not occur. Women with GDM should be encouraged to share their GDM diagnosis when they resume care with their primary healthcare provider after giving birth however, not all women will do this. One way to ensure communication would be to assign the responsibility of communicating a GDM diagnosis to primary healthcare providers. Communication about the GDM diagnosis should fall in the hands of the primary obstetric healthcare provider during pregnancy. This could take place on a local, organizational, and/or provincial levels by creating guidelines, standards or practice, and/or policies that clearly identify a specific healthcare provider responsible for postpartum follow-up. The obstetrician or midwife should share this information with the woman's primary care provider at the time of diagnosis, and with community health nurses at the time of discharge. Women with prior GDM are often not captured in our current health care system as an at-risk population. As such, the delivery of a newborn after a GDM complicated pregnancy should trigger another entry point for care for the purpose of maintaining or restoring health.

On a community and organizational level, systematic reminders about the GTT and lifestyle recommendations need to be developed to support women postpartum. Emails, letters and telephone calls can be a cost effective measure to help increase GTT compliance. Emails can be set up to be automatically generated on a specific date and time. A reminder and lab requisition could be sent by mail to those who do not have access to a computer. Another strategy to provide realistic timely recommendations and access to resources for nutrition would be to develop online resources. The development of online resources that women can access at the time of need can target their stage of postpartum adaptation. Women identified this strategy as a way to access resources when they are ready to learn.

On a community, organizational and political level, women identified the desire to have access to the same resources they had during pregnancy (dietician, diabetes education), as well as and resources that are inclusive of families (postpartum programs that spouses and all children). The majority of postpartum programs in Ontario target the health of women and their babies. The typical health promoting activity for postpartum women, focus on “mommy and me” classes to promote fitness and healthy eating for mom and baby. Women discussed the need for programs that include the entire family (including other children and their partners) to develop health lifestyle habits for everyone. Today, the Ontario government supports women and their families in childbearing years through the provision of maternity or parental leave (Ontario Ministry of Labour, 2015). There is a growing trend of fathers taking parental leave either concurrently with the mother or individually as the woman returns to work. This new trend needs to be considered in the development of supportive programs postpartum.

### **Research Implications**

New research studies to test the grounded theory describing social support processes are needed to confirm these findings on provincial and national levels. These studies should focus on the variety of areas relating to the provision of social support. More specifically, research should focus on how continuity of social support throughout the transformative postpartum process (beginning with a GDM diagnosis and continuing postpartum) influences the health outcomes of women with prior GDM. Future research studies are also needed to determine innovative ways to increase postpartum screening rates and follow-up care, encourage and support the recommended lifestyle modifications, and increase breastfeeding rates among women with prior GDM. Further investigation is also needed to determine the extent to which the provision of social

support at various levels impacts the health behaviours of women with prior GDM as they move from pregnancy to becoming a mother and establishing a new lifestyle.

### **Strengths and Limitations**

The findings in this study must be considered along with some potential limitations. Participants in this study were selected based on a limited pool of willing participants. Most of the women participating in this study were middle class, well-educated Caucasians. These participants are likely to value research more than other eligible participants who chose not to participate. Women were also offered a small \$25 gift card to a local grocery store as incentive to participate. This incentive may have influenced women's decision to participate in the study.

This study had a number of significant strengths. Women were recruited from a large geographical pool in the province of Ontario. As the categories emerged and the eventual theory developed, reaching theoretical saturation from participants across Ontario speaks to the fact that the issues addressed in this research are occurring provincially. Women consistently verbalized similar experiences and desire for the same supports postpartum. The use of member checking also contributed to the rigor in this study as women had the opportunity to confirm the findings during the analysis phase.

### **Conclusion**

In summary, care of women with prior GDM should not cease postpartum. Rather, the postpartum period should be viewed as an entry point to a second stage of care focusing on health promotion and disease prevention. Healthcare providers need to ensure provision of quality time during each healthcare visit to foster a positive relationship with women. The provision of education about CPG recommendations and the risk for type-2 diabetes postpartum need to be communicated and reinforced during

every healthcare visit (antenatal and postpartum). There is a need to ensure communication between healthcare providers regarding GDM diagnosis. We need to develop systematic reminders about glucose tolerance testing (between 6 weeks and 6months postpartum and annually) and CPG recommendations. We need to develop and provide access to online postpartum resources for breastfeeding, lifestyle modifications, and the prevention of type-2 diabetes that women can access depending on their needs at the time. The provision of access to the same resources received during pregnancy would enhance women's feeling of support. Lastly, the provision of resources that are inclusive of families is needed to address the growing trend of partners becoming the primary caregiver postpartum (see Appendix P List of Clinical Recommendations).

Greater attention is needed during the postpartum period for women with prior GDM. Continuity of care, provision of information, support and resources for postpartum women with prior GDM, is a major gap in our current healthcare system. Healthcare providers need to work together to understand how to ensure positive health outcomes for women with prior GDM. Identifying existing resources and creating new ones, provision of quality time with healthcare providers during healthcare visit, enhancing communication about a GDM diagnosis, and the provision of support will aid in the transition from a GDM pregnancy to the postpartum period while women attempt to maintain or restore health.

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### **Contributions of the study**

The results of this study related to facilitators and barriers to implementing health behaviours postpartum in women with prior GDM confirm previous studies that have been conducted. To the best of my knowledge, no studies have uncovered or explored how women adjust to a GDM diagnosis while considering various levels of influencing factors. Additionally, while time has been identified as a significant barrier to engaging in health behaviours postpartum in previous studies, no research to date has identified the influence of time as a supportive measure. These findings contribute to a new body of knowledge that address, from the perspective of the women themselves, how the provision of support can assist their desire to maintain or restore health.

Appendix A Table 1- Articles Categorized

<b>Author</b>	<b>Country</b>	<b>Quantitative/ Qualitative/Mixed Methods</b>	<b>Follow-up Breastfeeding Lifestyle Modification</b>
Bennett, et al., 2011	US	Qualitative- Semi-structured interviews Sample-22	Follow up
Capula et al., 2013	Italy	Quantitative-Intervention Study Sample-1159	Follow up
Chang et al., 2014	China	Qualitative- Telephone interviews Sample 2152	Follow up
Cordero et al., 2013	US	Quantitative- Retrospective Cohort Design Sample 303	Breastfeeding
Cosson et al., 2015	France	Quantitative-Retrospective Comparison Sample 961	Follow-up
Clark, H., & Keely, E. 2012	Canada	Research Summary	Follow up
Dasgupta et al., 2013	Canada	Qualitative- Focus Group Interviews Sample-29	Follow up
Dietz et al., 2008	US	Quantitative- Cohort Study Sample 36,251	Follow up
Doran 2008	Australia	Mixed Methods	Follow up and Lifestyle Modification
Evans et al., 2010	Canada	Mixed Methods	Follow up Lifestyle Modification
Ferrara et al., 2014	US	Quantitative- RCT Sample 2320	Lifestyle Modification

Ferrera et al., 2009	US	Quantitative- Cohort study Sample 14,448	Follow up
Ferrara et al., 2011	US	Quantitative- Intervention Sample 197 Total 96 (intervention Group) 101 (Usual medical care)	Lifestyle Modification
Finkelstein et al., 2013	Canada	Quantitative Retrospective Cohort	Breastfeeding
Hunsberger et al., 2012	US	Quantitative- Cross sectional design Sample 285	Follow up
Jagiello et al., 2015	US	Qualitative-Phenomenology Sample 27	Breastfeeding
Jones et al., 2009	US	Literature Review 8 Articles	Lifestyle Modification
Kaiser & Razurel 2013	Switzerland	Literature Review 18 Articles	Lifestyle Modifications
Keely et al., 2010	Canada	Quantitative- RCT Sample-173 Primary Care Physicians 140 PP women with GDM	Follow up
Khangura et al., 2010	Canada	Evidence Summary	Follow-up, Lifestyle Modification Breast Feeding
Kim et al., 2006	US	Quantitative- Retrospective Sample-570	Follow-up
Kim et al., 2007	US	Quantitative- Cross Sectional Analysis Sample 228	Follow-up and Lifestyle Modification
Kim et al., 2008	US	Quantitative- Cross Sectional Analysis Sample 228	Lifestyle Modifications

Kim 2010	US	Evidence Summary	Follow up
Ko et al., 2013, Gestational Diabetes Mellitus...	US	Quantitative- Survey Sample-146	Follow-up
Ko et al., 2013, Strategies associated...	US	Quantitative- Cross Sectional Analysis Sample-306	Follow-up
Korpi-Hyövähti et al., 2013	Finland	Quantitative--Prospective Observational Study Sample-266	Follow-up
Kozhimannil et al., 2014	US	Quantitative- Retrospective Analysis Sample-2400	Breastfeeding
Kwong et al., 2009	Canada	Quantitative-Retrospective Cohort Study Sample-1006	Follow-up
Lawrence et al., 2010	US	Quantitative-Retrospective Study Sample 11,825	Follow-up
<u>Lega</u> et al, 2012	Canada	Quantitative-Retrospective Chart Review Sample 314	Follow-up
Lie et al., 2013	UK	Qualitative-Semi-structured Interviews Sample 31	Lifestyle Modification
<u>Lipscombe</u> et al., 2014	Canada	Mixed Methods-Prospective Cohort Study Interviews Sample 960	Lifestyle Modification
Mathieu et al., 2014	US	Quantitative- Retrospective Chart Review Sample-373	Follow-up
McCloskey et al., 2014	US	Quantitative- Cross Sectional Analysis Sample 415	Follow-up

McIntyre et al., 2012	Australia	Quantitative- Intervention Pilot Study Sample 28 (13 usual care and 15 intervention)	Lifestyle Modification
Mendez-Figueroa et al., 2014	US	Quantitative- Retrospective intervention Sample 181	Follow up
Mielke et al., 2013	US	Literature Review	Follow up
Minsart et al., 2014	Belgium	Quantitative-Questionnaire Sample 87	Follow up
Morrison et al., 2009	Australia	Quantitative-Cross Sectional Design using survey Sample 1372	Follow up
Morrison et al., 2012	Australia	Quantitative Survey Sample 1499	Lifestyle Modification
Morrison et al., 2015	Australia	Quantitative-Cross Sectional Design (Survey) Sample-729	Breastfeeding
Nicklas et al., 2011	US	Mixed Methods- Focus Group Interviews (GT) Sample 38	Lifestyle Modification
Nielsen et al., 2014	Denmark	Systematic Review of the literature 54 Articles	Follow up
Oza-Frank 2014	US	Quantitative- Secondary analysis Sample 829	Follow up
Pai-Jong et al., 2011	US	Quantitative- Retrospective Chart Review Sample 221	Follow-up
Peacock et al., 2014	Australia	Systematic Review of the literature Articles Reviewed 30	Lifestyle Modifications

Peacock et al., 2015	Australia	Quantitative- RCT Sample 31 (intervention group 16, control group 15)	Lifestyle Modification
Razee et al., 2010	Australia	Qualitative Semi structured interviews Sample 57	Lifestyle Modification
Rodgers et al., 2014	US	Quantitative Survey Sample 380	Follow up
Shah et al., 2011	Canada	Population Based Cohort Study Sample- 46, 691	Follow up
Smith et al., 2005	Australia	Quantitative-Survey Sample-226	Lifestyle Modification
Stasenکو et al., 2010	US	Quantitative- Retrospective cohort study Sample- 745	Follow up
Sterne et al., 2011	Australia	Quantitative- Cross Sectional Design Sample 88	Follow-up
Stuebe et al., 2010	US	Quantitative- Survey Sample-207	Follow-up
Symons-Downs & Ulbrecht 2006	US	Quantitative- Survey (Self-Report) Sample 28	Lifestyle Modification
Tang et al., 2015	US	Qualitative Semi-structured interviews Sample 23	Lifestyle modification
Tovar et al., (2011).	US	Systematic review of the literature Sample- 265 studies	Follow-up
Van Ryswyka et al., 2014	Australia	Systematic Review of the Literature	Follow up
Youngwanichsetha 2013	Thailand	Quantitative- Cross Sectional Analysis	Breastfeeding

Zehle et al., 2008	Australia	Quantitative- Survey Sample 226	Lifestyle Modification
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## Appendix B Letter of Information for Healthcare Providers



### Letter of Information for Healthcare Providers

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**Project Title:** Social Support in Postpartum Women with Previous Gestational Diabetes

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD

Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)

Doctoral Student, Arthur Labatt Family School of Nursing, Western University

### Introduction

You are being asked to assist in the recruitment of postpartum women with prior gestational diabetes by identifying eligible participants for the study during routine clinic appointments. You are asked to provide eligible participants with a leaflet that provides information about the study, as well as to display a poster in your office. The aim of this qualitative study is to explore the social support processes of postpartum women with a history of GDM experience, as they navigate through the healthcare system postpartum and, to critically examine facilitating factors, and barriers to engaging in health behaviours postpartum.

### Research Procedures

Women will be asked to participate in 1-2 interviews with me. Each interview will take approximately 1 hour to complete. Women will be asked questions that will help me to understand how they feel about their risk for developing type 2 diabetes, their experience with the healthcare system since having their baby, their social support networks while pregnant, and since having their baby, as well as their ability to engage



in health behaviours (such as physical activity and healthy eating) since having their baby.

**Risks**

There are no known risks to participating in this study. However, talking about certain issues could cause some emotional discomfort.

**Benefits**

Participants will not directly benefit from this study however, the information provided may improve health services delivery and support programs for women with prior gestational diabetes.

**Participant Inclusion Criteria**

Women are eligible to participate in this study if they meet all of the following criteria: a diagnosis of gestational diabetes with their last pregnancy, gave birth to a live healthy infant, is between the 3 and 24 months postpartum, is able to speak and read English, is 18 years of age or older, and currently resides in Ontario.

**Participant Exclusion Criteria**

Women are not eligible to participate in this study if they were previously diagnosed high-risk medical conditions (such as diabetes, kidney disease, liver disease, cancer, auto-immune diseases etc.). Women are not eligible to participate in this study if their most recent pregnancy was complicated by additional high risk conditions.

**Contact Information**

If you have any questions about this study, please feel free to contact any of the following:

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD

Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)

Doctoral Student, Arthur Labatt Family School of Nursing, Western University

**The Office of Research Ethics**

Western University

\*Thank you for your time and consideration, we appreciate any assistance in the recruitment of this study.

## Appendix C



### Consent Form for Healthcare Provider

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**Project Title:** Social Support in Postpartum Women with Previous Gestational Diabetes

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD

Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)

Doctoral Student, Arthur Labatt Family School of Nursing, Western University

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to assist in the recruitment of the above noted study. All questions have been answered to my satisfaction.

Participant's Name (please print): \_\_\_\_\_

Participant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Signature of Witness: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix D Recruitment Poster



*Did you or someone you know, have Gestational Diabetes with your last pregnancy? If so, you may be eligible to participate in a study to help us better understand some of the things that have either helped, or prevented you from participating in healthy behaviours after having your baby.*

You are eligible to participate in this study IF YOU MEET ALL OF THE FOLLOWING CRITERIA:

- You were diagnosed with gestational diabetes with your last pregnancy
- This was the first time being diagnosed with gestational diabetes
- You gave birth to a live healthy infant
- You have had your baby within the last 3-24 months
- Are able to speak and read English
- Are 18 years of age or older -and-
- Currently reside in southwestern Ontario

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD  
Associate Professor, Arthur Labatt Family School of Nursing, Western University

**If you are interested in participating in this study,** please contact Natalie Giannotti, a Doctoral Student in the Arthur Labatt Family School of Nursing at Western University.

## Appendix E Recruitment Handout



*Do you or did you have Gestational Diabetes with your current/most recent pregnancy? If so, you may be eligible to participate in a study to help us better understand some of the things that have either helped, or prevented you from participating in healthy behaviours after having your baby.*

**You are eligible to participate in this study IF YOU MEET ALL OF THE FOLLOWING CRITERIA:**

- You were diagnosed with gestational diabetes with your last pregnancy
- This was the first time being diagnosed with gestational diabetes
- You gave birth to a live healthy infant
- You have had your baby within the last 3-24 months
- Are able to speak and read English
- Are 18 years of age or older -and-
- Currently reside in southwestern Ontario

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD  
Associate Professor, Arthur Labatt Family School of Nursing, Western University

**If you are interested in participating in this study,** or for further information, please contact Natalie Giannotti, a Doctoral Student in the Arthur Labatt Family School of Nursing at Western University.

## Appendix F Recruitment Advertisement



Did you have Gestational Diabetes with your last pregnancy? If so, you are invited to participate in a very important study to help us better understand some of the things that have either helped, or prevented you from participating in healthy behaviours after having your baby. ***We want to hear from you!***

The results of this study may impact future health initiatives in Ontario that target at-risk populations. You will be given a unique opportunity to tell your story... this is your chance to have a voice and make a difference!

*As a thank you for your participation in this study, you will receive a \$25 gift card to Zehrs/Superstore in order to support healthy eating!*

**You are eligible for this study if you meet all of the following criteria:**

- You were diagnosed with gestational diabetes with your most recent pregnancy
- You had your baby within the last 3 months to 24 months (2 years)
- You gave birth to a live healthy infant
- You are able to speak and read English
- You are 18 years of age or older
- You currently reside in Ontario

For more information about this study, please visit the following website:

<http://www.gdmpostpartumsupport.com/>

Or you can contact Natalie Giannotti, a Doctoral Student in the Arthur Labatt Family School of Nursing at Western University.

## Appendix G GDM Website Layout

[www.gdmpostpartumsupport.com](http://www.gdmpostpartumsupport.com)

### Home Tab

Social Support in Women with Prior Gestational Diabetes

### Important Study

Did you experience Gestational Diabetes with your last pregnancy? If so, you are invited to participate in a very important study to help us better understand some of the things that have either helped, or prevented you from participating in healthy behaviours after having your baby. We want to hear from you!

### About the Study Tab

Gestational Diabetes Mellitus (GDM) is a sugar intolerance that is first diagnosed during pregnancy (CDA, 2013). A diagnosis of gestational diabetes places women at risk for developing type 2 diabetes later in life (Bellamy et al., 2009). Social support can help women with a history of GDM be successful in getting healthy after their baby however, women often face challenges to making healthy lifestyle changes. We would like to know more specifically what those challenges are but, we need your help!

The purpose of this study is to better understand some of the things that have helped or prevented you from making healthy changes since you have had your baby. The results of this study may improve the delivery of health services and inform support programs for women with prior gestational diabetes. You will be given a unique opportunity to tell your story... this is your chance to have a voice and make a difference!

\*If you are interested in participating in this study, you will be asked to meet with the researcher either in person or by phone to answer some questions about your experience.

### References

- Canadian Diabetes Association. (2013). Clinical practice guidelines; Screening for type 1 and type 2 diabetes. *Canadian Journal of Diabetes*, 37, S12-S-15.
- Bellamy, L., Casas, J.P., Hingorani, A.D., Williams, D. (2009). Type 2 diabetes mellitus after gestational diabetes; A systematic review and meta-analysis. *Lancet*, 373(9771), 1773- 1779. doi:10.1016/S0140-6736(09)60731-5

### **Eligibility Tab**

You are eligible for this study if you meet all of the following criteria:  
 You were diagnosed with gestational diabetes with your most recent pregnancy  
 You had your baby within the last 3 months to 2 years (24 months)  
 You gave birth to a live healthy infant  
 You are able to speak and read English  
 You are 18 years of age or older  
 You currently reside in Ontario

### **Contact Tab**

For more information about the study or if you are interested in participating, please enter your contact information above or contact the Study Investigator directly by email:

Study Investigator: Natalie Giannotti, RN, PhD (c)  
 Doctoral Student, Arthur Labatt Family School of Nursing, Western University  
 \*Any information that is provided through this website will be kept confidential

Principal Investigator: Dr. Marilyn Evans, RN, PhD  
 Associate Professor, Arthur Labatt Family School of Nursing, Western University

The Office of Research Ethics  
 Western University

### **External Resources and Helpful Links Tab**

Public Health Agency of Canada: Gestational Diabetes- <http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/gest-gros-eng.php>

Public Health Agency of Canada- How to Prevent Type 2 Diabetes- <http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/prevent-prevenir-eng.php>

Health Canada- Canada's Food Guide- <http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>

Eat Right Ontario- <https://www.eatrightontario.ca/en/default.aspx>

Canadian Diabetes Association- <http://www.diabetes.ca/>

ParticipACTION- <http://www.participaction.com/splash/>

## Appendix H Letter of Information for Participants



### Letter of Information for Participants

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**Project Title:** Social Support in Postpartum Women with Previous Gestational Diabetes

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD  
Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)  
Doctoral Student, Arthur Labatt Family School of Nursing, Western University

#### Invitation to Participate

You have received this letter of information because you have expressed an interest in this study by responding to an advertisement, poster or pamphlet. As a woman who has recently experienced gestational diabetes you are invited to participate in a research study about the health of postpartum women with prior gestational diabetes mellitus.

#### Purpose of the Letter

The purpose of this letter is to provide you with the information to make an informed decision about participating in this research. I am a Doctoral student in the School of Nursing at Western University in London, Ontario and the information collected will be used in my thesis.

#### Purpose of the Study

The purpose of this study is to better understand some of the things that have helped or prevented you from participating in healthy behaviours, as well as to gain a better understanding of your social support networks since you have had your baby.



**Inclusion Criteria**

You are eligible to participate in this study if you meet all of the following criteria: were diagnosed with gestational diabetes with your last pregnancy, gave birth to a live healthy infant, you have had your baby within the last 3-24 months, you are able to read and speak English, you are 18 years of age or older, and you currently reside in Ontario.

**Exclusion Criteria**

You will not be eligible to participate in this study if you had previously diagnosed high-risk medical conditions (such as diabetes, kidney disease, liver disease, cancer, autoimmune diseases etc.). You are not eligible to participate in this study if your most recent pregnancy was complicated by additional high risk conditions (such as pre-eclampsia, HELLP Syndrome, etc.)

**Study Procedures**

If you take part in the study, you will be asked to participate in 1-2 interviews with me. Each interview will take approximately 1 hour to complete. You will be asked questions that will help me understand how you feel about the risk for developing type 2 diabetes, your experience with the healthcare system since having your baby, your social support networks while pregnant and since having your baby, and your ability to engage in health behaviours (such as being physical active and healthy eating) since having your baby. Interviews will be held at a place of your choice such as your home, a coffee-shop, or any place you would feel most comfortable. With your permission, interviews will be audio taped however, will not record any identifiable information (such as name or contact information). Following completion of the study, the researcher may continue to review your interview information contained on the transcripts from this study. This process is known as secondary analysis and may be done to gain more understanding of the interview information obtained from your postpartum experience. By consenting to participate in this study, you agree to the researcher doing future secondary analysis with your interview data.

**Possible Risks and Harms**

There are no known risks to your participation however, talking about certain issues

could cause you some emotional discomfort. You can ask to stop the interview if you feel uncomfortable in any way. Resources and supports will be provided to you at any point during or after the interview.

**Possible Benefits**

There is no direct benefit to you from participating in this study. Potential benefits include having a better understanding of what resources are available to assist you to improve your health and things you can do to help prevent type 2 diabetes. In addition, the information provided may improve health services delivery and support programs for women with prior gestational diabetes.

**Compensation**

As a token of appreciation for participating in this study, you will receive a gift certificate to a local grocery store such as Zerhrs/Superstore in order to help support healthy eating.

**Voluntary Participation**

Participation in this study is voluntary. You may refuse to participate, refuse to answer questions or withdraw from the study at any time. You have no obligation to participate in concurrent or future studies.

**Confidentiality**

All data collected will remain confidential and accessible only to the investigators of this study and research assistant. If you choose to withdraw from this study, your data will be removed and destroyed from our database. Any data resulting from your participation will be identified only by code number, without any reference to your name or personal information. The data will be stored on a secure computer in a locked room at Western University. Both the computer and the room will be accessible only to the researchers and research assistants. After completion of the interviews, data will be transcribed and archived on storage disks with no personal identifiers and stored in a locked room for 10 years, after which they will be destroyed.

**Contacts for Further Information**

If you have any questions about your rights as a research participant or the conduct of the study you may contact any of the following:

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD

Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)

Doctoral Student, Arthur Labatt Family School of Nursing, Western University

**The Office of Research Ethics**

Western University

**Publication**

If the results are published, your name or any identifiers will not be used. If you would like to receive a copy of the overall results of the study, please print your name and address on the following page and give it to the researcher.

**Consent form**

You do not waive any legal rights by signing the consent form. You will be provided with a copy of this letter of information and the consent form. Representatives of the University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

## Appendix I Participant Consent Form



### Consent Form

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**Project Title:** Social Support in Postpartum Women with Previous Gestational Diabetes

**Principal Investigator:** Dr. Marilyn Evans, RN, PhD

Associate Professor, Arthur Labatt Family School of Nursing, Western University

**Study Investigator:** Natalie Giannotti, RN, PhD (c)

Doctoral Student, Arthur Labatt Family School of Nursing, Western University

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to participate. All questions have been answered to my satisfaction.

Participant's Name (please print): \_\_\_\_\_

Participant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Signature of Witness: \_\_\_\_\_

Date: \_\_\_\_\_

On completion of the study, would you like a copy of the study results? (Please Circle)

YES    NO

If yes, please provide contact information and preferred method of receiving the results (email or mail)

### Appendix J GDM Document Analysis Chart

<p><b>Document #1</b></p>	<p><b>Center for Disease Control and Prevention. (2015). Gestational diabetes and pregnancy.</b></p> <p>Stay healthy after the birth of your baby. Gestational diabetes goes away after pregnancy, but sometimes diabetes stays.</p> <p>It's important to be checked for diabetes after your baby is born. About half of all women who have gestational diabetes get type 2 diabetes later in life.</p> <p>Make sure to ask your doctor about testing for diabetes soon after delivery and again 6 weeks after delivery.</p> <ul style="list-style-type: none"> <li>✓ Continue to eat healthy foods and exercise regularly.</li> <li>✓ Have regular checkups and get your blood sugar checked by your doctor every 1 to 3 years.</li> <li>✓ Talk with your doctor about your plans for more children before your next pregnancy.</li> <li>✓ Watch your weight. Six to twelve months after your baby is born, your weight should be back down to what you weighed before you got pregnant. If you still weigh too much, work to lose 5% to 7% (10 to 14 pounds if you weigh 200 pounds) of your body weight.</li> <li>✓ Plan to lose weight slowly. This will help you keep it off.</li> </ul> <p>Eating healthy, losing weight and exercising regularly can help you delay or prevent type-2 diabetes in the future. Talk with your doctor to learn more.</p>
<p><b>Level of Influence &amp; Implications</b></p>	<p><b>Individual-</b> The focus of this document is placed on the individual. Women are simply told what they need to do.</p> <p><b>Interpersonal-</b> A woman's ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers</p> <p><b>Community</b> Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available</p> <p><b>Organizational-</b> Successful implementation is dependent on the structure of the healthcare system</p>
<p><b>Target Audience</b></p>	<p>Postpartum women with prior GDM</p>

<b>How is it Accessed?</b>	Online- Difficult for women to find without proper search terms
<b>Additional resources?</b>	No
<b>Gaps</b>	<p>Does not address breastfeeding</p> <p>Does not give a specific time frame for GTT postpartum</p> <p>There are no strategies to assist with the recommended lifestyle modifications</p> <p>There are no other resources provided for aftercare.</p> <p>Women are encouraged to follow-up with their physician however, it does not address how their physician will be informed</p>

<b>Questions to address with Participants</b>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>How has your health been since you had your baby.</p> <p>How have you tried to stay healthy?</p> <p>How would you describe your health right now?</p> <p>Tell me about your risk for type 2 diabetes after having your baby?</p> <p>How could your family or friends support you to make dietary changes or to stay active?</p> <p>How could healthcare providers support you to make healthy lifestyle changes?</p> <p>How could your workplace/school support you to be healthy?</p> <p>What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?</p> <p>What resources are needed to help support women after having gestational diabetes?</p>
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<b>Document #2</b>	<b>CDA 2013- Gestational Diabetes Fact Sheet</b> After your pregnancy, it is important to be screened for type 2 diabetes: <ul style="list-style-type: none"> <li>•within six weeks to six months of giving birth</li> <li>•before planning another pregnancy</li> <li>•every three years (or more often depending on your risk factors)</li> </ul> Early diagnosis and management of type 2 diabetes IS IMPORTANT because: <ul style="list-style-type: none"> <li>•undiagnosed or poorly controlled type 2 diabetes in a pregnant women increases her risk of miscarrying or having a baby born with a malformation</li> <li>•it will improve your chances of having healthy pregnancies and healthy babies in the future</li> </ul>
<b>Level of Influence &amp; Implications</b>	<b>Individual-</b> The focus of this document is placed on the individual. Women are simply told what they need to do.  <b>Interpersonal-</b> A woman’s ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers  <b>Community</b> Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available  <b>Organizational-</b> Successful implementation is dependent on the structure of the healthcare system
<b>Target Audience</b>	Postpartum women with prior GDM
<b>How is it Accessed?</b>	Online- Difficult for women to find without proper search terms
<b>Are references provided to other resources</b>	No



<b>Gaps</b>	<p>There are no strategies to assist with the recommended lifestyle modifications</p> <p>There are no other resources provided for aftercare.</p> <p>Women are encouraged to follow-up with their physician however, it does not address how their physician will be informed</p>
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<b>Questions to address with Participants</b>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>How has your health been since you had your baby.</p> <p>How have you tried to stay healthy?</p> <p>How would you describe your health right now?</p> <p>Tell me about your risk for type 2 diabetes after having your baby?</p> <p>How could your family or friends support you to make dietary changes or to stay active?</p> <p>How could healthcare providers support you to make healthy lifestyle changes?</p> <p>How could your workplace/school support you to be healthy?</p> <p>What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?</p> <p>What resources are needed to help support women after having gestational diabetes?</p>
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**Document  
#3**

**CDA 2013 Patient Fact Sheet: Postpartum Screening  
Gestational diabetes: gone but not forgotten**

With their newborn in their arms, women who have had gestational diabetes mellitus (GDM) may be happy to leave behind the work involved with the management of diabetes.

However, these women require regular diabetes screening as they remain at high risk for developing type 2 diabetes.

**When should women who have had GDM be screened for type 2 diabetes?**

- Within 6 weeks to 6 months postpartum, with a 2 hour 75 g oral glucose tolerance test (OGTT).
- Before a future pregnancy.
- Every 3 years or more often, depending on the presence of other risk factors for type 2 diabetes.

Why focus on screening?

- GDM increases significantly the risk of developing type 2 diabetes later in life.
- As few as 50% of women who have had GDM receive appropriate postpartum screening. Identifying women:
  - With prediabetes allows for targeted lifestyle intervention to reduce the risk for developing type 2 diabetes later in life.
  - With type-2 diabetes allows for targeted intervention to reduce the risk of end-organ injury and allows for optimized blood glucose control prior to any future pregnancies. Insufficiently controlled blood glucose leads to increased maternal and perinatal morbidity OR leads to higher rates of complications compared to the general population, including perinatal mortality, congenital malformations, hypertension, preterm delivery, large-for-gestational-age infants, caesarean delivery and neonatal morbidities.

**Why the 2 hour OGTT?**

Because a postpartum fasting glucose alone can miss up to 40% of dysglycemia, a 75g OGTT should be done between 6 weeks and 6 months postpartum.

**Who Can Make a Difference?**

Women who have had GDM

- During pregnancy and postpartum, women can take charge of their own health by booking and following up on postpartum testing.

All healthcare providers

- Everyone can help improve the frequency of diabetes screening for women who have had GDM, whether it's the diabetes care team, the obstetrician, family physician, nurse practitioner, public health clinic, or midwife.
- During pregnancy discuss the importance of postpartum screening.
- At the first postpartum encounter, ensure the postpartum OGTT is booked.

• Follow up on the postpartum OGTT results and review them with the patient. If the result is positive, refer to a diabetes education program for the management of prediabetes or type-2 diabetes.

If the result is negative, rescreen prior to any future planned pregnancy and/or every 3 years or more often depending on other risk factors.

- Reinforce healthy lifestyle. Modification of diet and exercise can reduce the risk of developing type 2 diabetes by up to 60%.

- Ensure proper use of birth control, so pregnancies are planned and appropriate care can be provided before conception

Additional resources to support women with GDM during pregnancy and postpartum can be found at [www.guidelines.diabetes.ca](http://www.guidelines.diabetes.ca).

**WHO is responsible?**

Each healthcare professional has the responsibility to ensure that the OGTT has been ordered and the results have been reviewed.

Start lifestyle counselling during pregnancy and continue postpartum.

Screen women who have had GDM for type 2 diabetes

- Within 6 weeks to 6 months postpartum.
- Before a future pregnancy.
- Every 3 years or more often.

<p><b>Level of Influence &amp; Implications</b></p>	<p><b>Individual-</b> The focus of this document is placed on the individual. Women are simply told what they need to do.</p> <p><b>Interpersonal-</b> A woman’s ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers</p> <p><b>Community</b> Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available.</p> <p><b>Organizational-</b> Successful implementation is dependent on the structure of the healthcare system</p>
<p><b>Target Audience</b></p>	<p>Postpartum women with prior GDM Healthcare Providers</p>
<p><b>How is it Accessed?</b></p>	<p>Online- Difficult for women to find without proper search terms</p> <p>Easily Accessible to healthcare providers using the following search terms: Gestational Diabetes, Clinical Practice Guidelines, Postpartum Screening</p>
<p><b>Additional Resources?</b></p>	<p>Yes Additional Resource for healthcare providers</p>
<p><b>Gaps</b></p>	<p>There are no strategies to assist with the recommended lifestyle modifications There are no other resources provided for aftercare.</p> <p>Women are encouraged to follow-up with their physician however, it does not address how their physician will be informed</p> <p>The guidelines make recommendations on who can make a difference and who is responsible however, no one is specifically responsible to follow-up</p>

<p><b>Questions to address with Participants</b></p>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>How has your health been since you had your baby.</p> <p>How have you tried to stay healthy?</p> <p>How would you describe your health right now?</p> <p>Tell me about your risk for type 2 diabetes after having your baby?</p> <p>How could your family or friends support you to make dietary changes or to stay active?</p> <p>How could healthcare providers support you to make healthy lifestyle changes?</p> <p>How could your workplace/school support you to be healthy?</p> <p>What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?</p> <p>What resources are needed to help support women after having gestational diabetes?</p>
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<b>Document #4</b>	<p><b>CDA 2013 CPG's Recommendations on Gestational Diabetes: Postpartum</b></p> <p>Postpartum women with GDM should be encouraged to breastfeed immediately after delivery in order to avoid neonatal hypoglycemia and to continue for at least 3 months postpartum in order to prevent childhood and reduce risk of maternal hyperglycemia.</p> <p>Women should be screened with a 75 g OGTT between 6 weeks and 6 months postpartum to detect prediabetes and diabetes.</p> <p>Receive nutrition counselling from a registered dietitian during pregnancy and postpartum.</p> <p>Recommendations for weight gain during pregnancy should be based on pregravid BMI</p>
<b>Level of Influence &amp; Implications</b>	<p><b>Individual-</b> The focus of this document is placed on the individual. Women are simply told what they need to do.</p> <p><b>Interpersonal-</b> A woman's ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers</p> <p><b>Community</b> Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available.</p> <p><b>Organizational-</b> Successful implementation is dependent on the structure of the healthcare system</p>
<b>Target Audience</b>	Healthcare Providers
<b>How is it Accessed?</b>	Easily Accessible to healthcare providers using the following search terms: Gestational Diabetes, Clinical Practice Guidelines, Postpartum Screening
<b>Additional resources?</b>	No

<b>Gaps</b>	<p>There are no strategies to assist with the recommended lifestyle modifications There are no other resources provided for aftercare.</p> <p>Women are encouraged to follow-up with their physician however, it does not address how their physician will be informed</p>
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<b>Questions to address with Participants</b>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>How has your health been since you had your baby.</p> <p>How have you tried to stay healthy?</p> <p>How would you describe your health right now?</p> <p>Tell me about your risk for type 2 diabetes after having your baby?</p> <p>How could your family or friends support you to make dietary changes or to stay active?</p> <p>How could healthcare providers support you to make healthy lifestyle changes?</p> <p>How could your workplace/school support you to be healthy?</p> <p>What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?</p> <p>What resources are needed to help support women after having gestational diabetes?</p>
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**Document  
#5**

**International Diabetes Federation 2009  
Gestational Diabetes: After pregnancy 5.1**

**Breastfeeding-**

Unless there is a specific contraindication or concern, breastfeeding is the preferred option for all women.

This general recommendation is also applicable to women whose pregnancy was affected by pre-existing or gestational diabetes.

However, it should be noted that it is possible for breastfeeding to have an influence on maternal glycaemic control, and maternal diabetes may in turn influence the composition of breast milk.

Along with nutritional and immunological advantages, breastfeeding has been associated in the general population with a reduction in the rates of childhood obesity.

The breast milk of mothers with diabetes has been shown to have a higher glucose and energy content than that of non-diabetic mothers. Perhaps because of this, the potential for breastfeeding to be protective against subsequent overweight in the children of women with diabetes has been questioned, and this has been examined without clear conclusions being drawn.

In the absence of evidence, it seems advisable to maintain good maternal glycaemic control during the breastfeeding period.

**5.2 Follow-up of GDM**

Unless known to have diabetes, all women who have been treated as GDM should have a postpartum OGTT. The timing of this will depend on the local healthcare arrangements and will vary from being conducted in hospital before discharge to around 6 weeks postpartum ideally as part of other postpartum assessments.

Women with GDM are at increased risk of GDM in a subsequent pregnancy and also of developing type 2 diabetes. Therefore intermediate and long-term follow-up will depend on future pregnancy plans.

If further pregnancies are planned, then a repeat OGTT prior to conception or at least in the first trimester is desirable. If no abnormality is present, then testing should be repeated at the usual time and with the usual indications during pregnancy. If no further pregnancies are planned, the long-term follow-up arrangements will depend heavily on the perceived risk of developing type-2 diabetes.

In a high-risk group there should be an annual OGTT. In a low-risk group there could be fasting glucose every two to three years and an OGTT only if this level is  $\geq 5.5$  mmol/l (100 mg/dl).

**5.3 Prevention of type 2 diabetes in women who developed GDM**

Women with previous GDM are at very high risk of developing type 2 diabetes [113]. The rate of conversion will depend on a mixture of community and genetic factors. The prevention, or at least delay in the

development, of type 2 diabetes is an attractive option, as it is likely to reduce the risks associated with having established diabetes.

There are several diabetes prevention studies, all with positive outcomes. Two studies have targeted women with previous GDM. The first was the Troglitazone in Prevention of Diabetes (TRIPOD) study that exclusively enrolled women with previous GDM and showed a 55% risk reduction in the troglitazone treated group compared with placebo

This beneficial effect was substantiated in the follow-on Pioglitazone in Prevention of Diabetes (PIPOD) study when pioglitazone was substituted. The second study was the Diabetes Prevention Program (DPP), where women with previous GDM were included. This study demonstrated a significant reduction in type 2 diabetes for both lifestyle modification and metformin therapy compared with placebo. A subsequent sub-group analysis of the results found that, for women with previous GDM, lifestyle modification and metformin were equally effective.

<p><b>Level of Influence &amp; Implications</b></p>	<p><b>Individual-</b> The focus of this document is placed on the individual. Women are simply told what they need to do.</p> <p><b>Interpersonal-</b> A woman’s ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers</p> <p><b>Community</b> Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available.</p> <p><b>Organizational-</b> Successful implementation is dependent on the structure of the healthcare system</p>
<p><b>Target Audience</b></p>	<p>Postpartum women with prior GDM</p> <p>Healthcare Providers</p>
<p><b>How is it Accessed?</b></p>	<p>Easily Accessible to healthcare providers using the following search terms: Gestational Diabetes, Clinical Practice Guidelines, Postpartum Screening</p>
<p><b>Additional resources?</b></p>	<p>No</p>
<p><b>Gaps</b></p>	<p>There are no strategies to assist with the recommended lifestyle modifications</p> <p>There are no other resources provided for aftercare.</p> <p>Women are encouraged to follow-up with their physician however, it does not address how their physician will be informed</p>

<b>Questions to address with Participants</b>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>How has your health been since you had your baby.</p> <p>How have you tried to stay healthy?</p> <p>How would you describe your health right now?</p> <p>Tell me about your risk for type 2 diabetes after having your baby?</p> <p>How could your family or friends support you to make dietary changes or to stay active?</p> <p>How could healthcare providers support you to make healthy lifestyle changes?</p> <p>How could your workplace/school support you to be healthy?</p> <p>What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?</p> <p>What resources are needed to help support women after having gestational diabetes?</p>
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<p><b>Document #6</b></p>	<p><b>La Leche League Canada</b></p> <p>La Leche League Canada gives permission to download and print these information sheets. Your donation is essential and very much appreciated. Contributions to our work help us cover the cost of producing these Information Sheets and future breastfeeding resources. For more information on these or other breastfeeding topics or to discuss your own situation, please contact a La Leche League Canada Leader. You may also contact our Professional Liaison Administrator at <a href="mailto:profliaison@lllc.ca">profliaison@lllc.ca</a>.</p> <p>#410 Amazing Milk  #420 Why Does My Baby Cry? (standard format, limited graphics)  #430 How Fathers Help Breastfeeding Happen  #456 Breastfeeding Tips  #457 How to Know Your Baby is Getting Enough Milk  #461 Thrush &amp; The Breastfeeding Family  #462 Tips for Breastfeeding Twins  #469 Establishing Your Milk Supply  #471 Storing Human Milk  #481 Preparing to Breastfeed</p>
<p><b>Level of Influence &amp; Implications</b></p>	<p><b>Individual-</b> The focus of this document is placed on the individual. Individual support is offered.  <b>Interpersonal-</b> A woman's ability to implement the recommended changes depend on her relationships with support persons including family, friends, healthcare providers  <b>Community</b>  Successful implementation is dependent on the delivery of care in her geographical location (programs, available resources, follow-up). It requires women to find out what resources are available.</p>
<p><b>Target Audience</b></p>	<p>Primarily Postpartum women</p> <p>Fathers are also targeted in a brief handout as one of the topics of interest.</p>
<p><b>How is it Accessed?</b></p>	<p>Online- Difficult for women to find without proper search terms</p>

<b>Additional resources?</b>	Yes
<b>Gaps</b>	<p>Does not address how the broader community can help support breastfeeding</p> <p>Does not specifically address at risk populations that may experience difficulty breastfeeding</p>
<b>Questions to address with Participants</b>	<p>Did you breastfeed your baby? If so, for how long? If not, can you tell me why?</p> <p>What did you know about breastfeeding before having your baby?</p> <p>How were you supported breast feed?</p> <p>What was your experience with support from healthcare services and your healthcare since you had your baby.</p> <p>Did you complete your glucose tolerance test after you had your baby?</p> <p>What type of follow-up did you receive from your healthcare providers after you had your baby?</p> <p>What services did you receive during your pregnancy? (prenatal classes, diabetes education)</p> <p>What resources are needed to help support women after having gestational diabetes to breastfeed?</p>

<p><b>Document #7</b></p>	<p><b>Ontario Ministry of Labour (2015) Pregnancy and Parental Leave</b></p> <p>Pregnant employees have the right to take pregnancy leave of up to 17 weeks of unpaid time off work. In some cases the leave may be longer. Employers do not have to pay wages to someone who is on pregnancy leave.</p> <p>New parents have the right to take parental leave--unpaid time off work when a baby or child is born or first comes into their care. Birth mothers who took pregnancy leave are entitled to up to 35 weeks' leave. Birth mothers who do not take pregnancy leave and all other new parents are entitled to up to 37 weeks' parental leave.</p> <p>Parental leave is not part of pregnancy leave and so a birth mother may take both pregnancy and parental leave. In addition, the right to a parental leave is independent of the right to pregnancy leave. For example, a birth father could be on parental leave at the same time the birth mother is on either her pregnancy leave or parental leave.</p> <p>Employees on leave have the right to continue participation in certain benefit plans and continue to earn credit for length of employment, length of service, and seniority. In most cases, employees must be given their old job back at the end of their pregnancy or parental leave.</p> <p>An employer cannot penalize an employee in any way because the employee is or will be eligible to take a pregnancy or parental leave, or for taking or planning to take a pregnancy or parental leave.</p>
<p><b>Level of Influence &amp; Implications</b></p>	<p>Individual- Eligibility for the benefits, woman vs significant other. Who is going to take the parental leave? For how long</p> <p>Interpersonal- What relationships are affected by the parental leave? Who will help support the family?</p> <p>Community- Availability of community programs to support new families. Who do they target? Who is eligible to participate? How do families access such programs? Are there costs involved?</p> <p>Organizational- Workplace needs to accommodate the parental leave. Does the workplace offer additional financial compensation? If so, for how long?</p> <p>Political- Provincial government supports families to be off of work and financially compensated for a period of up to</p>
<p><b>Target Audience</b></p>	<p>Parents</p>



<b>How is it Accessed?</b>	Easily accessed online
<b>Additional Resources?</b>	Yes
<b>Gaps</b>	
<b>Questions to address with Participants</b>	How could your workplace/school support you to be healthy?  What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?  What resources are needed to help support women after having gestational diabetes?

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**Appendix K**  
**Facilitator and Barriers to Following the Clinical Practice Guidelines**

<b>All of the following facilitators and barriers were identified by women in implementing the recommended clinical practice guidelines of breastfeeding, completing the glucose tolerance test and making healthy lifestyle modifications (healthy eating and exercise)</b>	
<b>Facilitators</b>	<b>Barriers</b>
Having the time Quality time with healthcare providers Timing of activity Timing of education Timing of interventions Having time off of work (maternity/parental leave)	Time constraints Healthy activities are time consuming Poor time management Time restriction with healthcare providers Timing of activity Timing of education Timing of interventions
Being Supported- From a variety of sources, family, friends, co-workers, health providers	Lacking support- From a variety of sources- family, friends, co-workers, health providers
Risk perception- Understanding the Risks	Being Responsible (family responsibilities, work, service in their community)
Being accountable	Feeling tired
Being a role model	Lacking motivation
Having strategies Having a plan	Financial constraints (cost of healthy food, gym membership, childcare expenses, maternity leave/parental leave income)
Being a self-advocate	Risk perception (does not understand the risks)
Enjoying activity	Embarrassed to ask for help
Having access to resources	Being tempted (with foods or inactivity)
Being educated	Being lazy
Being aware	Lacking education
Being motivated	Emotional Status (postpartum depression)

Previously healthy lifestyle	Postpartum healing status
Preserving health	Lacking resources
Being a priority	Misplace lab requisition slip (for GTT)
Readiness to learn	Physical abilities (to exercise or breastfeed)
	Lack of follow-up
	Uncooperative weather (to exercise)
	Turning down available resources
	Social isolation

## Appendix L Demographic Data

The following demographic information will be collected by the researcher prior to the start of the interview.

Participant Identification #:

1. Age:
2. Geographical place of residence (urban or rural setting):
3. Highest level of education (elementary, secondary, post secondary, graduate):
4. Marital status (single, common law, married, divorced, widowed):
5. Who do you live with:
6. Employment Status (stay at home, maternity leave, casual, part time, full time):
7. Gravida (number of pregnancies):
8. Number of children:
9. Postpartum time period (how many months postpartum):
8. Ethnic background (cultural identity):
8. Is English your first language:
9. Gross Family Income bracket:
  - < \$20, 000
  - \$20,000-\$39,999
  - \$40,000-\$59,999
  - \$60,000-\$79,999
  - \$80,000-\$99,999
  - \$100,000-\$129,000
  - ≥ \$130, 000

## Appendix M Semi-Structured Interview Questions

**Introduction:** Thank-you for participating in this study. I would like to understand as much as possible about your experiences since having your baby.

1. What can you tell me about having gestational diabetes?

Probes:

How did you manage your diabetes while you were pregnant?

How did you change your lifestyle during pregnancy, if at all?

How has having gestational diabetes affected you after having your baby?

2. Tell me about the day that you were discharged home after having your baby.

Probes:

How were you supported during that first few days after discharge?

What were your needs at the time?

Who did you access for your needs? What did you find helpful; not helpful?

3. Describe for me how you have been supported during your pregnancy and since having your baby.

Probes:

How have your family/friends/co-workers/health providers supported you?

4. Did you breastfeed your baby? If so, for how long? If not, can you tell me why?

Probes:

What did you know about breastfeeding before having your baby?

How were you supported breast feed?

5. Tell me about your experience with receiving support from healthcare services and your healthcare provider during pregnancy and since you have had your baby.

Probes:

Did you complete your glucose tolerance test after you had your baby? What type of follow-up did you receive from your healthcare providers after you had your baby? What services did you receive during your pregnancy? (prenatal classes, diabetes education)

6. Tell me about how your health has been since you have had your baby.

Probes:

How have you tried to stay healthy?

How would you describe your health right now?

Tell me about your risk for type 2 diabetes after having your baby?

7. What, if anything, do you think would be most helpful in keeping/making healthy lifestyle changes (ex increasing physical activity, eating healthy) after having gestational diabetes?

Probes:

How could your family or friends support you to make dietary changes or to stay active?

How could healthcare providers support you to make healthy lifestyle changes?

How could your workplace/school support you to be healthy?

What community services and/or health services do you feel could help support you to maintain a healthy lifestyle?

What resources are needed to help support women after having gestational diabetes?

8. What advice would you give other women who experienced gestational diabetes?

9. Is there anything you would like to share that hasn't already been raised? Is there anything else you feel is important to say about your experience?

10. Why did you participate in this study? How do you feel now about participating?

Thank you for your time, I appreciate that you have shared your experiences with me

**Appendix N**  
**Example of Data, Code, to a Category**  
**Having Access to Resources**

Category	Sub-categories	Codes	Sub-Codes	Data
Having Access to Resources	Wanting access to lactation support	Wanting to breastfeed but need support	Wanting to breastfeed	I learned that breastfeeding would be a huge benefit for both of us, so I knew it was something I was going to do for sure...
			Not knowing how to start breastfeeding	I just didn't know how I was going to do it... Like, where do I even begin?
			Wanting someone to show her how to breastfeed	Shouldn't someone be there to help me?
		Getting support is an extra expense	Wanting support with breastfeeding	I would have had a lactation consultant if one had it been accessible, but you know too...
			Having support costs money	there's a cost that comes with that too though
Having access to breastfeeding resources was supportive	Using available resources		Having a hard time breastfeeding	Breastfeeding was very hard at first. It took almost 5 days for my milk to come in...
			Having someone there to help breastfeed was helpful	I had a Doula so she was still texting all the time and helping me with it, I saw her every couple of weeks so I could always ask her questions. I'm very, very fortunate.



			Having someone to answer questions and help breastfeed	My midwife was my key support person, she would come to my house and see me if I needed her to help breastfeed... she showed me everything so that was my main support. I also had a friend who was also a long time breast feeder. Just having her there, a good listening ear for me... that was really important.
Wanting ongoing access to dietician	Wanting same access to dietician as accessed during pregnancy	Wanting access to supports to help make a lifestyle change	Not having the access to desired supports when needed	The biggest one (resource) is the dietician... if you could just have easy access to these people I swear, I'd be good to go... she (the dietician) was my eye opener and was the best thing for me to be honest.  If only if they could give access to them without needing a medical condition that would be great...
		Wanting to be proactive in maintaining health		

			<p>Wanting access to the same supports as during pregnancy</p> <hr/> <p>Learning takes time</p>	<p>If I could meet with a dietician now that would be great, or better yet, have one come to my home. You know some people would be probably willing to pay a little bit extra for that, like o.k. have your visit but then be available after too.</p> <p>I can't learn everything overnight.</p>
	<p>Wanting access to individual education in real time</p>	<p>Wanting to make healthy lifestyle changes</p> <hr/> <p>Having difficulty finding education on how to make changes</p>	<p>Wanting to make lifestyle changes</p> <hr/> <p>Making healthy lifestyle changes and finding the information is hard</p> <hr/> <p>Lacking direction on how to do it</p>	<p>I really want to lose the weight and change my diet...</p> <p>I'm trying to incorporate a healthy lifestyle, and find the information on what to do but it's hard...</p> <p>I don't even know where to begin right now.</p>
			<p>Wanting access to support in real time</p>	<p>It would nice if there was somewhere to call to ask questions, because then it would be like oh, I have a question... well here's the number, I will just give it a call and get an answer rather than stewing about while a poopy diaper pops up with a screaming 2 year old running around.</p>

			<p>Wanting access to supports and education</p> <hr/> <p>Wanting access to information that is individual</p>	<p>I would really like some kind of a reliable on-line program or even something over the phone...</p> <p>it would have to be interactive though, so I can ask questions and stuff, that would be really helpful right now</p>
	Wanting family inclusive resources	Wanting resources for families	<p>Wanting resources for the whole family</p> <hr/> <p>Recognizing there aren't many options inclusive of families</p> <hr/> <p>Recognizing the cost as a barrier</p>	<p>I would love to have something for the family.</p> <p>I know there are a lot of classes for babies and moms but there's not a lot of classes for moms who have older kids as well... so maybe something that was available so that my toddler could be occupied...</p> <p>but like I'm not gonna sign her up for a daycare because I'm home with her and it's expensive</p>

	Wanting healthcare provider follow-up postpartum	Wanting follow up with healthcare providers to help stay motivated	<p>Wanting follow-up postpartum</p> <hr/> <p>Needing help with motivation</p>	<p>I'd like to pop in to the office quick once in a while, you know, just to check in and see how things are going with the lifestyle stuff.</p> <p>it would keep me motivated, and it's easier when you're around people who are going support you to make the right choices</p>
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### Appendix O Participant Demographics

Age	Geographic Location	Education Level	Marital Status	Lives With	Employ Status	Grav	# of Children	Months Post partum	Ethnic Identity	English First Language	Family Income
36	Windsor (Urban)	Bachelor Degree	Married	Spouse And 2 children	Full Time	4	2	16	Caucasian	Yes	80-99,000
28	Windsor (Urban)	Bachelor Degree	Married	Spouse And 1 child	Mat Leave (Full time)	1	1	3	Caucasian	Yes	60-79,999
43	Windsor (Urban)	College Diploma	Single	1 child	Mat Leave (Full Time)	2	1	3	Hungarian	No	40-59,999
39	Toronto (Urban)	Bachelor Degree	Married	Spouse and 2 children	Stay @ Home	2	2	13	Caucasian	Yes	60-79,999

35	Georgetown (Urban)	Bachelor Degree	Married	Spouse and 2 Children	Part time	2	2	24	Caucasian	Yes	>130,000
33	Windsor	Some College	Married	Spouse and 2 children	Mat Leave Full Time	5	5	4	Caucasian	Yes	40-59,999
29	Amherstburg (Urban)	College Diploma	Common Law	Spouse and 2 children	Stay @ home	2	2	3	Caucasian	Yes	20-39,999
35	Orangeville (Urban)	Bachelor Degree	Married	Spouse and child	Mat Leave (Full Time)	1	1	6	East Indian	Yes	80-99,999
34	Windsor (Urban)	Grad Degree	Married	Spouse and 3 Children	Stay @ home	4	3	4	Caucasian	Yes	80-99,999

34	Neebing (rural)	Grad Degree	Married	Spouse and child	Mat Leave (Full Time)	1	1	5	Caucasian	Yes	>130,000
28	Tecumseh (Urban)	Bachelor Degree	Married	Husband and 2 children	Stay @ home	3	2	3	Caucasian	Yes	80-99,999
35	Lasalle (Urban)	Bachelor Degree	Married	Husband and 2 children	Mat Leave (Part Time)	2	2	5	Caucasian	Yes	>13,0,000
28	Hammer Urban	Bachelor Degree	Married	Husband and child	Mat Leave (Full Time)	1	1	9	Caucasian	Yes	100-129,000
33	London (Urban)	College Diploma	Married	Husband and 2 children	Stay @ home	2	2	18	Caucasian	Yes	40-59,999

40	Windsor (urban)	College Diploma	Married	Husband and 3 children	Stay @ Home	7	3	22	Caucasian	Yes	20-39,999
32	Mississauga (Urban)	Some College	Married	Husband and 2 children	Stay @ Home	2	2	5	East Indian	Yes	60-79,999
30	Urban	College Diploma	Married	Husband and child	Mat Leave (Full Time)	1	1	6	Caucasian	Yes	>130,000
34	Sudbury (Urban)	Bachelor Degree	Married	Husband and 2 children	Mat Leave (Full Time)	2	2	5	Caucasian	Yes	100-129,999
40	Windsor (Urban)	Bachelor Degree	Married	Husband and child	Mat Leave (Full time)	2	1	3	Caucasian	Yes	80-99,999



30	Toronto (Urban)	Grad Degree	Married	Husband and child	Mat Leave (Part Time)	1	1	3	South Asian	No	20-39,999
23	Chatham (Urban)	College Diploma	Common Law	Husband and child	Full Time	1	1	19	Caucasian	Yes	40-59,999
33	Sudbury (Urban)	Some University	Married	Husband and child	Mat Leave (Full Time)	1	1	6	Caucasian	Yes	80-99,999
34	Sudbury (Urban)	Bachelor Degree	Married	Husband and child	Mat Leave (Full Time)	1	1	9	Caucasian	Yes	80-99,999
34	Ottawa (Urban)	College Diploma	Married	Husband and 3 children	Full Time	5	3	20	Caucasian	Yes	80-99,999

30	Oakville (Urban)	Bachelor Degree	Married	Husband and child	Full Time	1	1	5	Caucasian	Yes	100-129,000
31	Brockville Urban	College Degree	Married	Husband and child	Full Time	3	1	21	Hispanic	No	100-129,000
34	Toronto (Urban)	Bachelor Degree	Married	Husband and 2 children	Mat Leave (part time)	2	2	6	Caucasian	Yes	20-39,999
31	Scarborough (Urban)	College Diploma	Common Law	Husband and 2 children	Stay @ Home	3	2	16	Caucasian	Yes	20-39,999
36	Cottom (Rural)	Grad Degree	Married	Husband and 2 children	Mat Leave (Full Time)	4	2	7	Caucasian	Yes	>130,000

### Appendix P Clinical Recommendations

Care should not cease postpartum, this should be viewed as an entry point to a second stage of care focusing on health promotion and disease prevention.
Ensure provision of quality time during each healthcare visit
Provision of education about CPG recommendations and the risk for type-2 diabetes postpartum need to be communicated and reinforced during every healthcare visit (antenatal and postpartum)
Ensure communication between healthcare providers re: GDM Diagnosis
Develop systematic reminders about glucose tolerance testing (between 6 weeks and 6months postpartum and annually).
Develop and provide access to online postpartum resources for breastfeeding, lifestyle modifications, and the prevention of type-2 diabetes
Provide access to the same resources received during pregnancy
Provide resources that are inclusive of families.

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## Appendix Q

### Ethics Application and Approval

#### General Info

FileNo: 104665

Title: Social Support in Postpartum Women with Prior Gestational Diabetes Mellitus

Start Date: 10/02/2014

End Date: 30/06/2015

Approval Date: 13/02/2014

Keywords: Gestational Diabetes Postpartum Social Support Diabetes Prevention Health Promotion Women's health

#### Project Members

##### Principal Investigator

Prefix: Dr.

Last Name: Evans

First Name: Marilyn

Affiliation: Health Sciences\Nursing

Rank: Associate Professor

Gender:

Email:

Phone1:

Phone2:

Fax:

Mailing Address:

Institution: Western University

Country:

Comments:

##### Others

Rank	Last Name	First Name	Affiliation	Role In Project
PhD Student	Giannotti	Natalie	Health Sciences	Co-Investigator
Assistant Professor	Regan	Sandra		Co-Investigator

## Common Questions

### 1. Registration Information

#	Question	Answer
1. 1	Do you confirm that you have read the above information and that based on that information you are completing the correct form?	Yes
1. 2	Has this study been submitted to any other REB? If yes, please include the approval letter (or relevant correspondence).	No
1. 3	If YES is selected in question 1.2 above, please indicate where this project has been submitted and when.	
1. 4	Indicate the funding source for this study or if there is no funding simply indicate "None".	None
1. 5	If you have indicated a funding source in question 1.4 above, please specify the name of the funding source selected as well as the title of the grant and if applicable the ROLA number.	
1. 6	Is this a sequel to previously approved research?	No
1. 7	If YES is selected in question 1.6 above, what is the REB number and what are the differences?	
1. 8	Is this a student project?	Yes - PhD
1. 9	Is this a multi-site study?	No

1. 10	If YES has been selected in question 1.9 above, name the lead site and project leader for the study. If the study is administered by a Coordinating or Contract Research Organization (CRO) provide the name and contact information.	
1. 11	Please list the names of ALL Local (Western affiliated) team members who are working on this project. Please ALSO list their ROLE in the project, i.e. what exactly is it that the team member will do in this study? Please see the “i” for this question for instructions on how to link their Romeo accounts to this form so they have access to it.	Natalie Gianotti (Co-Investigator) is a doctoral student who is undertaking this research for her dissertation. Dr Marilyn Evans (Principal Investigator) will supervise and guide Natalie as she carries out all elements of the research process for her dissertation. (e.g. ethics submission, recruitment of participants, data collection, data analysis and dissemination of findings) Dr Sandra Regan(Co-Investigator) as a member of the thesis advisory committee will consult with Natalie as needed during the conduct of the study.
1. 12	Are the investigator(s) based at any of the sites below or will the study utilize any patient data, staff resources or facilities within any of these sites? (Please indicate all applicable sites and read the associated notes found in the blue information icon above)	No
1. 13	If this form was started by a team member, has the role of Principal Investigator been changed to the Faculty member who will hold this role for the study? This is required for review of your submission, and any forms submitted without this change being made will be returned without being reviewed. (The blue information “i” has the instructions on how to change the role of PI.)	Yes

1. 14	Please provide a lay summary of the study (typically fewer than 5 lines).	A grounded theory study is proposed to explore the social support processes of women with a history of gestational diabetes mellitus as they navigate through the healthcare system postpartum. Facilitating factors and barriers to engaging in health behaviours will be explored within the context of the Canadian healthcare system.
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## 2. Methodology

#	Question	Answer
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2. 1	<p>Outline the study rationale including relevant background information and justification. Cite references where appropriate.</p>	<p>Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance with onset or first diagnosis during pregnancy. According to the Canadian Diabetes Association (CDA), gestational diabetes affects between 3.7% and 18% of Canadian women, depending on the population studied (CDA, 2008). Women diagnosed with gestational diabetes are at an increased risk for type 2 diabetes and metabolic syndrome later in life, as well as developing GDM in subsequent pregnancies (Feig, Zinman, Wang, &amp; Hux, 2008; Gatullo, &amp; Olubummo 2009; Khangura, Grimshaw, &amp; Moher 2010; Reece, Leguizamon, &amp; Wiznitzer 2009; Schneiderman 2010). A 2008 analysis of Ontario-wide data revealed that nearly 4% of women with prior GDM developed type 2 diabetes 9 months postpartum, and close to 20% had developed type 2 diabetes within 9 years (Feig et al., 2008). According to the CDA (2012), 30% of Canadian women with a history of GDM will develop type 2 diabetes within 15 years. This is concerning since the overall incidence of gestational diabetes has increased in Ontario from 3.2% in 1995, to 3.6% in 2001 and continues to rise (Feig et al., 2008). In addition, work by Lipscombe &amp; Hux (2007) has shown that diabetes rates in Ontario have increased dramatically over the last decade with the biggest rise in diabetes seen in women aged 20 to 49 years. Children of women with a history of GDM are also at an increased risk for developing pre-diabetes and type 2 diabetes later in life (Clausen et al., 2008; Dabelea &amp; Pettit, 2001; Damm, 2009; Egeland &amp; Meltzer, 2010). An increased incidence of GDM and type 2 diabetes is associated with higher healthcare costs related to diabetes management and associated health complications. The CDA (2013) clinical practice guidelines for prevention of type 2 diabetes in women with a history of GDM recommend the following: screening for diabetes at six weeks to six months postpartum and subsequent annual screening, nutrition and lifestyle counseling, and exclusive breastfeeding for at least three months. Although these guidelines are based on the best available evidence (Khangura et al., 2010), they only offer recommendations on postpartum follow up care. Evidence shows that recommended postpartum diabetes screening protocols for women with GDM are not being followed (Case, Willoughby, &amp; Haley-Zitlin, 2006; England et al., 2009; Dietz et al., 2008; Tovar, Chasan-Taber, Eggelston &amp; Okem, 2011). Research also indicates that type 2 diabetes can be delayed or prevented in people who are at risk through lifestyle modifications (Case et al., 2006; Delhanty &amp; Nathan, 2008; Khangura et al., 2010). However women with a history of GDM report difficulty making recommended lifestyle modifications and postpartum follow-up remains suboptimal (Koh, Miller, Marshall, Brown &amp; McIntyre, 2010; Smith, Cheung, Bauman,</p>
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Zehle, & McLean, 2005). The lack of postpartum follow-up care and ongoing support for women with a history of GDM leaves them at high risk for developing type 2 diabetes. A diagnosis of GDM presents opportunities for prevention of type 2 diabetes through the provision of health education, monitoring and social support to postpartum women. These opportunities are often overlooked or missed by health providers in Ontario, a symptom of the fragmented healthcare that is provided in our current healthcare system (Keely, 2012). The proposed research is designed to engage postpartum women with prior GDM in the research process to capture their perspective of health care and support processes. This knowledge will provide the foundation to develop a framework to inform health policy for the prevention of type 2 diabetes in an at risk population. Results from this study can be used to guide the provision of social support to postpartum women, inform practice, and develop highly individualized interventions that target various levels of influence, modify best practice guidelines and inform policies to support health promotion and type 2 diabetes prevention.

References Canadian Diabetes Association. (2008). Gestational diabetes: Preventing complications in pregnancy. Retrieved from <http://www.diabetes.ca/diabetes-and-you/what/gestational/>

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2. 2	Please provide a clear statement of the purpose and objectives of this project (one page maximum).	<p>The goal of this research is to generate a substantive theory to explain the social support processes involved with women with prior GDM, within various levels of influence on their health. The purpose of this constructivist grounded theory research is twofold: (1) To explore the social support processes of postpartum women with a history of GDM experience, as they navigate through the healthcare system postpartum to restore and maintain their health, and (2) To critically examine facilitators and barriers to engaging in health behaviours among postpartum women with a history of GDM, within the context of the individual, interpersonal, organizational, community, and political levels of influence on health. The research questions guiding the proposed research are: 1) What are the social support processes experienced by postpartum women with prior GDM between 3 months and 18 months postpartum, 2) How do the various levels of influence impact the health behaviours of women with prior GDM?</p>
2. 3	Describe the study design/methodology and attach all supporting documents in the attachments tab.	<p>This proposed research will be guided by constructivist grounded theory methodology. Grounded theory is a general qualitative methodology designed to help narrow the gap between theory and empirical research, provide logic behind the theory it generates and to validate qualitative research (Strauss and Corbin, 1994). Grounded theory is best suited to provide rich descriptions and detailed explanations of phenomena. Grounded theory is a natural fit with the purpose of the proposed study as the intent is to explore the social processes of women with prior GDM as they attempt to restore and maintain their health postpartum. References Straus, A. &amp; Corbin, J. (1994). Grounded theory methodology; An overview. In Denzin, N. &amp; Lincoln, Y. (p. 273-285). Handbook of Qualitative Research. Thousand Oaks, CA: Sage Publications.</p>
2. 4	Indicate the inclusion criteria for participant recruitment.	<p><b>WOMEN MUST MEET ALL OF THE FOLLOWING CRITERIA IN ORDER TO BE ELIGIBLE TO PARTICIPATE IN THE STUDY</b> -1. Women must be between 3 to 24 months postpartum of recent pregnancy with GDM, 2.Able to read and speak English, 3. 18 years of age or older, and 4. Delivered a healthy live infant</p>

2.5	Considering your inclusion criteria listed above, what is the basis to exclude a potential participant?	Exclusion Criteria – 1. Multiple gestation, 2. Recent pregnancy complicated by additional high risk medical conditions, and 3. Previously diagnosed high-risk medical conditions such as type 1 diabetes, cardiovascular disease, auto-immune disorders, cancer etc.
2.6	If using patients, describe the usual standard of care at the study site(s) for this population (including diagnostic testing, frequency of follow up visits).	Once women have delivered their baby, they typically follow up with their Obstetrician, Family physician or midwife at 6 weeks postpartum however, not specifically for gestational diabetes. Usually, after six weeks postpartum no further follow up will occur.

2. 7	Describe the study procedures and any study specific testing that will be done, outside of standard care.	<p>Data will be acquired predominantly through the use of semi-structured individual interviews (Appendix A) with participants. Extant texts pertaining to gestational diabetes, diabetes prevention and maternal health promotion will also be accessed and analyzed. For example, I will access and read pertinent documents such as best practice guidelines, government reports, and policies available through government and other reputable and public websites such as the Canadian Diabetes Association and Society of Obstetrics and Gynecology Canada. Interviews will last approximately 60 - 90 minutes each, and will be conversational in style. One to two interviews will be conducted <b>IN PERSON, FACE TO FACE</b>. As the interview proceeds, questioning will remain open and flexible while focussing in on specific topics (Charmaz, 2007). Paraphrasing, probing, and reflection will be used throughout the interview to help the participant articulate their thoughts, and give meaning to their responses (Charmaz, 2007). Participants will choose the location, time, style of the interview, and will actively participate in the interview process by guiding discussion on aspects that they have identified as important. All of the interviews will be audio-taped verbatim with participants' permission, for later transcription and subsequent analysis. A trained transcriptionist will be used to transcribe the audiotapes. The transcriptionist will be subject to maintain confidentiality of the data. A second interview may be requested if I feel the need to clarify some aspects of the first interview, or if the participant is interested in the member checking process. Participants will be invited to engage in the process of member checking before the interview takes place. Participants will fill out the request for member checking form (see Appendix B) and may choose to either participate in this process or not. If participants are agreeable, they will be given the opportunity to review their coded transcripts, and comment on the extent to which the categories reflect their experience (Charmaz, 2007). This process may last approximately 30-60 minutes. Interviews will be transcribed verbatim by a research assistant <b>AND PROMPTLY DELETED. ONLY THE TRANSCRIBED DATA MAY BE USED FOR THE PURPOSE OF SECONDARY ANALYSIS AT A LATER TIME. THE INTERVIEWS WILL NOT RECORD ANY IDENTIFIABLE INFORMATION (SUCH AS NAME OR CONTACT INFORMATION)</b>. Demographic information will be collected prior to the start of the interview for the purpose of sample description in the final written component of this research (see Appendix C). Observations made during interviews will be recorded as field notes. I will write field notes as the interviews take place or immediately following the interview. I will write freely on any observations or impressions that I get</p>
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		<p>during the interview to stimulate recollection at a later time (Montgomery &amp; Bailey, 2007). References Charmaz, K. (2007). <i>Constructing grounded theory: A practical guide through qualitative analysis</i>. Thousand Oaks, CA. Sage Publications.</p> <p>Montgomery, P., &amp; Bailey, P. H. (2007). Field notes and theoretical memos in grounded theory. <i>Western Journal of Nursing Research</i>, 29(1), 65-79. doi: 10.1177/0193945906292557</p>
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2. 8	How many participants over the age of 18 from London will be enrolled in your study? This includes hospital and university sites within London.	0
2. 9	How many participants under the age of 18 from London will be enrolled in your study? This includes hospital and university sites within London.	0
2. 10	How many participants over the age of 18 will be included at all study locations? (London + Other locations = Total)	35
2. 11	How many participants under the age of 18 will be included at all study locations? (London + Other locations = Total)	0

2. 12	Describe the method(s) of data analysis.	<p>Each of the transcripts will be analyzed immediately, prior to the start of the next interview. I will begin the data analysis process by first reading each of the transcripts in its entirety while listening to the audiotapes for accuracy and completeness. Data will then be analyzed through an 'iterative process' of constant comparative data analysis in the following order; comparing data with data as codes develop (initial coding), data will then be compared to codes, compare codes and bring forward possible categories, compare data codes with possible categories, and lastly compare concept to concept (Charmaz, 2011). Memos will be written throughout data analysis and during subsequent data collection. Memos refer to the notes made by the researcher whereby initial thoughts, comparisons and connections are documented along with questions and further areas for investigation (Charmaz, 2007). Memos are written as an intermediate step between collecting data and writing up drafts of the paper (Charmaz, 2007). All of the transcribed interviews, memos, and pertinent documents will be uploaded into NVivo 10, a qualitative data analysis software to assist with organizing the data, the coding process, and subsequent analysis (QSR International, 2012).</p>
2. 13	How will the results of this study be made public?	Peer reviewed publication Thesis Presentation
2. 14	If report to participants or other is selected above, please explain.	
2. 15	Briefly provide any plans for provision of feedback of results to the participants.	<p>The final results of the study will be presented to participants if they are interested. Results of the study will be mailed or emailed to the participant depending on their preference.</p>



2. 16	Does this study include any use of deliberate deception or withholding of key information that may influence a participant's performance or response?	No
2. 17	If YES in question 2.16 above, describe this process and justification including how the participants will be debriefed at some point. Please include the debriefing script.	

### 3. Risks and Benefits

#	Question	Answer
3.1	List any potential anticipated benefit to the participants.	Participants will not directly benefit from this study however, potential benefits include gaining a better understanding of what resources are available to them, and may assist women improve their health and help prevent type 2 diabetes. Participants in this study may become much more aware of their risk for type 2 diabetes. As a result of this heightened awareness, women may make positive lifestyle modifications as outlined by current clinical practice guidelines. IN ADDITION, THE INFORMATION PROVIDED MAY IMPROVE HEALTH SERVICES DELIVERY AND SUPPORT PROGRAMS FOR WOMEN WITH PRIOR GESTATIONAL DIABETES.
3.2	List the potential benefits to society.	Changes in lifestyle may lead to the delay or prevention of type 2 diabetes, reducing the cost to our healthcare system.
3.3	List any potential risks to study participants.	There are no known risks to participating in this study however, talking about certain issues could cause some emotional discomfort for participants. If a participant becomes uncomfortable at any point during the interview, participants may take a break, they do not have to answer any further questions, and the interview can/will be stopped altogether at their request.
3.4	List any potential inconveniences to daily activities.	Participation in this study will require participants to offer approximately 60-180 minutes of their time in total. The time and place for interviews will be negotiated with each participant to be convenient and least disruptive. There are no other potential inconveniences other than loss of time.

**4. Recruitment and Informed Consent**

#	Question	Answer
4.1	How will potential participants be contacted and recruited? Select all that apply. A copy of all recruitment tools that will be used must be included with this submission in the attachments tab.	Investigators will approach their own patients/students Investigators will receive referrals from other Healthcare providers. Advertising (i.e. poster or email or web-based). Please submit a copy of all advertisements.

4. 2	Please explain in detail your selection from 4.1 and how it will be used to recruit participants.	<p>Women will be approached during routine women's health clinic or diabetes education clinic appointments at facilities within Ontario that meet with pregnant and postpartum women (hospitals, diabetes education clinics, public health units). Prospective participants will be introduced to the research study and be given a letter of information about the research. If agreeable at that time, the participant's full name, telephone number and email address will be collected for the purpose of contacting them in the future (once they have had their baby).</p> <p>Letters of information and invitations to participate in this research study will be mailed to postpartum women that have delivered a live healthy infant in the last 2 years.</p> <p>Obstetric healthcare practitioners in South-Western Ontario (PREDOMINENTLY WITHIN WINDSOR-ESSEX COUNTY, ONTARIO) will be contacted by the researcher via telephone to ask for their assistance in the recruitment process, and will be followed up with a letter of information about the proposed study (see Appendix D). <b>THEY WILL BE ASKED TO ASSIST IN THE RECRUITMENT PROCESS BY IDENTIFYING ELIGIBLE PARTICIPANTS FOR THE STUDY DURING ROUTINE CLINIC APPOINTMENTS. IN ADDITION, THEY WILL BE ASKED TO PROVIDE ELIGIBLE PARTICIPANTS WITH A PAMPHLET THAT PROVIDES INFORMATION ABOUT THE STUDY, AS WELL AS TO DISPLAY POSTERS ABOUT THE STUDY IN THEIR OFFICE. HEALTHCARE PRACTITIONERS WILL NOT BE RESPONSIBLE FOR OBTAINING CONSENT AS THIS WILL BE THE RESPONSIBILITY OF THE STUDY INVESTIGATOR.</b> Healthcare practitioner</p>
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		<p>phone numbers will be accessed through public telephone record databases such as yellow pages. Healthcare practitioner refers to any member of the healthcare team that is responsible for providing primary prenatal, intrapartum and postpartum care for women (i.e., family practitioners, obstetricians, endocrinologist, nurse-midwives, midwives and registered nurses). At the initial contact the researcher will introduce the health practitioners to the proposed study, and ask assistance in the recruitment of women with a current first time diagnosis of gestational diabetes (for prospective postpartum interviews), as well as women with a recent history of gestational diabetes. Healthcare practitioners will be asked to display posters about the study <b>IN THEIR OFFICE OR CLINIC</b> (see Appendix E) and to hand out <b>RECRUITMENT LEAFLETS</b> (see Appendix F) to eligible participants outlining the details of the study during routine prenatal visits, and at the 6 week postpartum follow-up visit. <b>THE PAMPHLETS WILL PROVIDE THE SAME INFORMATION AS THE POSTERS HOWEVER, WOMEN WILL BE ABLE TO TAKE THE INFORMATION HOME WITH THEM.</b> The posters and pamphlets will provide the researcher's contact information (<b>BOTH THE PI AND THE STUDY INVESTIGATOR</b>). Women who are interested in participating in the study will be asked to contact the researcher directly.</p> <p>Potential participants will also be recruited through various types of social media for example: advertisements in free and traditional newspapers, and on-line advertising spaces (such as Kijiji and Craig's List). Advertisements will provide <b>BRIEF</b> information about the study and contact information should they be interested in participating in the study. The</p>
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		<p>posters and LEAFLETS will also be distributed to hospitals, ultrasound and laboratory offices, churches, and public health units. Permission will be sought out to post advertisements on walls and in waiting areas where they can be seen by postpartum women.</p> <p>Snowball sampling techniques will also be used whereby participants will be asked to identify other women who may be interested in participating in the study (Morgan, 2008). Women will be given a pamphlet describing the study to distribute to other women they know who have experienced gestational diabetes. Interested women will contact the researcher directly. Once contacted, the researcher will tell the woman about the research and if she is still interested in participating and arrangements will be made to meet either in person or by phone(SEE APPENDIX G), to receive a letter of information about the study (see Appendix H) as well as to obtain consent (see Appendix I). The researcher will review all information with the interested participants followed by a question and answer period. THERE IS NO NEED TO DEFINE GESTATIONAL DIABETES AS WOMEN WITH A PRIOR HISTORY OF GDM WILL HAVE KNOWLEDGE ABOUT WHAT GESTATIONAL DIABETES IS GIVEN THEIR PREVIOUS DIAGNOSIS AND MANAGEMENT. FOLLOWING THE QUESTION AND ANSWER PERIOD, formal consent will be obtained.</p>
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4.3	Which research team members will be recruiting the potential participants?	Natalie Giannotti (Co-Investigator)
4.4	Does the Principal Investigator have any relationship to the potential participants?	No
4.5	Does the person recruiting the participants have any relationship or hold any authority over the potential participants?	No
4.6	If you have answered "Yes" to either 4.4 or 4.5, please explain here.	
4.7	What method of obtaining consent will you use for participants? A copy of all forms being used for obtaining consent must be included with this submission.	Written Consent Explicit Verbal Consent (eg. Telephone survey)
4.8	If you are unable to obtain consent or assent using one of the methods listed above, please explain here.	
4.9	Indicate if you will be recruiting from any of the following groups specifically for this study. (select all that apply)	Patients
4.10	Will minors or persons not able to consent for themselves be included in the study?	No
4.11	If YES is selected in question 4.10 above, describe the consent process and indicate who will be asked to consent on their behalf and discuss what safeguards will be employed to ensure the rights of the research participant are protected.	

4. 12	When the inability to provide an informed consent is expected to be temporary, describe what procedures will be used to regularly assess capacity and to obtain consent if the individual later becomes capable of providing consent. Alternatively, if diminished capacity is anticipated for the study population, describe the procedure used to assess capacity and obtain ongoing consent.	
4. 13	List any anticipated communication difficulties:	None
4. 14	Describe the procedures to address any communication difficulties (if applicable):	
4. 15	Indicate what compensation, if any, will be provided to subjects. For example, reimbursement for expenses incurred as a result of research, description of gifts for participation, draws and/or compensation for time. Include a justification for this compensation.	None

#### 5. Confidentiality and Data Security

#	Question	Answer
5. 1	Are you collecting personal identifiers for this study?	Yes
5. 2	Identify any personal identifiers collected for this study.	Full name Telephone number Email



5.3	If you checked any of the personal information in 5.2 above, please explain and justify the collection of this identifier.	The participant's full name, telephone number and email address will be collected for the purpose of contacting them in the future (if they consent to this). Participants who agree to become a part of the member checking process will be contacted once the preliminary results of the study are available. This information will also be used to present the final summary of findings upon completion of the study to those who request them. Contact information will be requested on enrollment and entered into a tracking sheet and stored in a secure locked filing cabinet separately from all study data. The women's name and ID number will appear on the master list of participants and will also be securely stored separately from the study data. All contact information will be destroyed after study summaries have been sent out. In addition, I may need to contact participants for a second interview in order to present additional questions for clarification.
5.4	Where will information collected as part of this study be stored? (select all that apply)	Laptop Memory stick Off-site (specify below)
5.5	If you have indicated any of the locations in question 5.4, please specify here.	Data will be collected off site and at a distance from Western. Hard copies of all data and audiotapes will be stored in a locked filing cabinet at the residence of Natalie Gianotti during the data collection.
5.6	If identifiable participant information is stored on a hard drive or portable device, the device must be encrypted. Describe encryption being used.	
5.7	How will you record study data?	Instrument Other

5. 8	If you select "Other" in 5.7, please explain why here:	Interviews will be audio-taped, transcribed by a trained transcriptionist in preparation for data analysis. Each participant will be asked demographic questions; electronic field notes of observations will be kept.
5. 9	Describe the coding system to protect identifiable information or explain why the data must remain identifiable.	Each participant will be assigned a study ID number. This ID number will be used to identify all data collected (no names, identifiers or contact information will appear with the data collected). The woman's name and ID number will be recorded on a Master list which will be kept separate from all study data. The Master list will be destroyed at the completion of the study.
5. 10	How will you store and protect the master list, signed original letters of information and consent documents or other data with identifiers?	Paper file (Required Protection: Locked cabinet in locked institutional office) Electronic file (off-site)(Required Protection: Encrypted (specify software used)) AV tapes (Required Protection: Encrypted (specify software used))
5. 11	If any options are selected above, please provide the specific details here.	The master list of participants, signed consent forms will be stored in a locked filing cabinet in a secure filing cabinet separate from the study data. The audiotapes of interviews will be labeled with the participant's ID number and transcribed with identifiers removed and transcripts stored in password protected electronic files. Electronically documented field notes will also be stored in password protected files.
5. 12	How will you store and protect data without identifiers?	Field notes and interview transcripts will not contain identifying information. Electronic files will be password protected and hard copies of data and audiotapes will be stored in a secure locked filing cabinet separate from identifying information (contact information, master list, consents)

5.13	If you plan to de-identify the study data, please describe the method of de-identification.	Pseudonyms will be used when transcribing the original interviews, in publications, and or presentations.
5.14	How long will you keep the study data?	Study data may be retained for the purpose of a secondary analysis at a later time.
5.15	How will you destroy the study data after this period? (If applicable)	Paper files (transcripts, field notes, memos, documents) will be shredded. Audio-tapes will be erased after they have been transcribed and analyzed. Electronic files will be erased.
5.16	Does this study require you to send data outside of the institution where it is collected? This includes data taken off-site for analysis. Please note that Western/Robarts are considered off-site locations for hospital/Lawson based studies, and vice-versa.	No
5.17	Where will the data be sent?	
5.18	Does the data to be transferred include personal identifiers? If yes, a data transfer agreement may be necessary.	No
5.19	List the personal identifiers that will be included with the data sent off-site.	
5.20	If you have answered yes to 5.18 please indicate how the data will be transmitted	
5.21	Please specify any additional details on data transmission below.	
5.22	Will you link the locally collected data with any other data sets?	No
5.23	If YES is selected in question 5.22 above, identify the dataset	
5.24	If YES is selected in question 5.22 above, explain how the linkage will occur.	

5.25	If YES is selected in question 5.22 above, provide a list of data items contained in the dataset.	
5.26	Will the data be entered into a database for future use?	No
5.27	If YES is selected in question 5.25 above, please specify where it will be stored, who the custodian will be, who will have access to the database and what security measures will be in place.	
5.28	Please list agencies/groups/persons outside of your local research team who will have access to the identifiable data and indicate why access is required.	
5.29	Western University policy requires that that you keep data for a minimum of 5 years. Please indicate if you are keeping data in accordance to this policy, otherwise please comment on how your data retention will differ from University policy and why. If you will be archiving the data, please explain why and how here.	Data will be kept for a period of 5- 7 years in accordance to Western's policy.

#### 6. Conflict of Interest

#	Question	Answer
6.1	Will any investigators, members of the research teams, and/or their partners or immediate family members function as advisors, employees, officers, directors or consultants for this study?	No

6. 2	Will any investigators, members of the research team, and/or their partners or immediate family members have a direct or indirect financial interest (including patents or stocks) in the drug, device or technology employed in this research study?	No
6. 3	Will any investigators, members of the research team, and/or their partners or immediate family members receive any personal benefit (apart from fees for service) as a result of, or connects to this study?	No
6. 4	If YES is selected in any of the above, please describe the nature of the conflict of interest and how all conflict(s) of interest will be managed.	

#### 7. Industry Sponsored Protocols

#	Question	Answer
7. 1	Is this an industry sponsored protocol?	No
7. 2	Billing Information - Company Institution:	
7. 3	Contact Person:	
7. 4	Email of Contact Person:	
7. 5	Street Address:	
7. 6	City:	
7. 7	Country:	

7. 8	Province/State:	
7. 9	Phone Number:	
7. 10	Fax:	
7. 11	Contract and/or protocol reference number required:	
7. 12	Additional Sponsor Reference or contact information:	
7. 13	Do you wish to apply for a REB Administration Fee Adjustment/Waiver?	
7. 14	If YES to question 7.13 above, provide a brief written explanation indicating how the funding will be used, who will own the data or any intellectual property arising from the agreement and indicate if there are any restrictions imposed upon the investigator by the sponsor and, if so, what they are.	
7. 15	Do you agree to the Conditions for Industry Funded Research Investigators?	
7. 16	Do you agree to provide supporting documents? (These can be added in the attachments section)	

#### 8. Confirmation of Responsibility

#	Question	Answer
8 1	As the Principal Investigator I have read the Tri-Council Policy Statement 2 and Western University's Guidelines on Research Involving Human Subjects and agree to abide by the guidelines therein: <a href="http://uwo.ca/research/ethics/health_sciences/d_guidelines.html">http://uwo.ca/research/ethics/health_sciences/d_guidelines.html</a>	Yes

8 . 2	I attest that all Collaborators working on this Research Study (co-investigators, students, post-docs, etc.) have reviewed the protocol contents and are in agreement with the protocol as submitted;	Yes
8 . 3	All Collaborators have read the Tri-Council Policy Statement 2 and Western University's Guidelines on Research Involving Human Subjects and agree to abide by the guidelines therein;	Yes
8 . 4	The Collaborators and I will adhere to the Protocol and Letter(s) of Information as approved by the REB;	Yes
8 . 5	Should I encounter any changes or adverse events/experiences, I will notify the REB in a timely manner.	Yes
8 . 6	If the Research Study is funded by an external sponsor, I will not begin the Research Study until the contract/agreement has been approved by the appropriate university, hospital, or research institute official.	Yes
8 . 7	Have you exported a copy of this submission to Word using the "Export to Word" button? Note that you will be unable to submit future revisions if this is not done.	Yes
8 . 8	Have you uploaded the following documents, if applicable, to the attachments tab? Incomplete submissions will be returned without being reviewed.	Letter(s) of Information and Consent Documentation Recruitment Materials Other

### 9. Confirmation of Responsibility - Student

#	Question	Answer
9. 1	Is this a student project?	Yes
9. 2	As the Student I have read the Tri-Council Policy Statement 2 and Western University's Guidelines on Research Involving Human Subjects and agree to abide by the guidelines therein: <a href="http://uwo.ca/research/ethics/health_sciences/d_guidelines.html">http://uwo.ca/research/ethics/health_sciences/d_guidelines.html</a>	Yes

9.3	I will adhere to the Protocol and Letter(s) of Information as approved by the REB;	Yes
9.4	I will notify the Principal Investigator as soon as possible if there are any changes or adverse/experiences, violations/deviations in regards to the Research Study.	Yes

### Attachments

Description	File Name	Version Date
Received Dec 11 2013. Letter of Information for Participants	Appendix H Letter of Information for Participants.docx	
Received Dec 11 2013. Consent Form	Appendix I Consent Form.docx	
Received Dec 11 2013. Recruitment Pamphlet	Appendix G Recruitment Pamphlet.docx	
Received Dec 11 2013. Letter of Information for Healthcare Providers	Appendix E Letter of Information for Healthcare Providers.docx	
Received Dec 11 2013. Recruitment Poster	Appendix F Recruitment Poster.docx	
Received Dec 11 2013. Demographic Data	Appendix D Demographic Data.docx	
Received Dec 11 2013. Telephone Script	Appendix B Telephone Script.docx	
Received Dec 11 2013. Member Check Request	Appendix C Member Check Request.docx	
Received Dec 11 2013. Interview Question Guide	Appendix A Semi Structured Interview Questions.docx	
Received Dec 11 2013.	104665 Evans Protocol.docx	
	104665 Evans.pdf	14/01/2014
Response to Board Requirements and Administrative Requirements	Response to Board Recommendations.docx	24/01/2014



Received Jan 27 2014. Appendix I Consent Form	Appendix I Consent Form.docx	24/01/2014
Received Jan 27 2014. Appendix H Letter of Information for Participants	Appendix H Letter of Information for Participants.docx	24/01/2014
Received Jan 27 2014. Appendix G Telephone Script	Appendix G Telephone Script.docx	24/01/2014
Received Jan 27 2014. Appendix F Recruitment Leaflet	Appendix F Recruitment Leaflet.docx	24/01/2014
Received Jan 27 2014. Appendix E Recruitment Poster	Appendix E Recruitment Poster.docx	24/01/2014
Received Jan 27 2014. Appendix D Letter of Information for Healthcare Providers	Appendix D Letter of Information for Healthcare Providers.docx	24/01/2014
Received Jan 27 2014. Appendix C Demographic Data	Appendix C Demographic Data.docx	24/01/2014
Received Jan 27 2014. Appendix B Member Check Request	Appendix B Member Check Request.docx	24/01/2014
Received Jan 27 2014. Appendix A Semi-structured Interview Questions	Appendix A Semi Structured Interview Questions.docx	24/01/2014
Received Feb 10 2014. Appendix E Recruitment Poster	Appendix E Recruitment Poster.docx	24/01/2014
Received Feb 10 2014. Appendix F Recruitment Leaflet		24/01/2014
Received Feb 10 2014. Appendix G Telephone Script	Appendix G Telephone Script.docx	10/02/2014
Received Feb 10 2014. Appendix A Semi Structured Interview Questions		01/11/2013
Received Feb 10 2014. Appendix B Member Check Request	Appendix B Member Check Request.docx	01/11/2013
Received Feb 10 2014. Appendix C Demographic Data		01/11/2013

Received Feb 10 2014. Appendix D Letter of Information for Healthcare Providers	Appendix D Letter of Information for Healthcare Providers.docx	10/02/2014
Received Feb 10 2014. Appendix H Letter of Information for Participants	Appendix H Letter of Information for Participants.docx	10/02/2014
Received Feb 10 2014. Appendix I Consent Form		10/02/2014
Received Feb 10 2014. Appendix J Consent Form for Healthcare Provider	Appendix J Consent Form for Healthcare Provider.docx	10/02/2014
Received Feb 10 2014. Western Proposal Updated Feb 2014	Western Proposal Updated Feb 2014.doc	10/02/2014
Received Feb 10 2014. Letter of Information & Consent for Healthcare Providers	Letter of Information Consent for Healthcare Providers.docx	10/02/2014
Received Feb 10 2014. Letter of Information & Consent for Participants	Letter of Information Consent for Participants.docx	10/02/2014
	DOC021114-02112014154311-0003.pdf	11/02/2014

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## Natalie Giannotti RN, BHK, MN, PhD

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### Education

May 2010 – 2018	<i>University of Western Ontario</i> London, Ontario PhD Nursing Health Promotion
2007 – 2009	<i>University of Windsor</i> Windsor, Ontario Masters of Nursing Leadership in Nursing
2004 – 2006	<i>University of Windsor</i> Windsor, Ontario Bachelor of Science in Nursing
2000 – 2003	<i>St. Clair College</i> Windsor, Ontario Diploma Nursing
1995 – 1999	<i>University of Windsor</i> Windsor, Ontario Bachelor of Human Kinetics

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### Teaching Experience

September 2014- Present	<i>University of Windsor, Faculty of Nursing, Windsor, Ontario</i> Lecturer (Limited-Term) <ul style="list-style-type: none"> <li>• Teaching core course 63-275 Family Health: Child Bearing and Child Rearing Families</li> <li>• Provide mentorship, guidance and instruction to Sessional Instructors</li> <li>• Coordinating and conducting faculty meetings</li> <li>• Develop content for, and conduct student clinical orientations</li> <li>• Manage and update lab content, lab syllabus and lab schedule</li> <li>• Create exams for clinical courses and labs including final exams and medication calculation quizzes</li> <li>• Collaborate and strengthen relationships with collaborative college partners for level 2</li> <li>• Maintain and strengthen relationships with agency partners</li> </ul>
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- September 2012-  
August 2014      *University of Windsor, Faculty of Nursing, Windsor, Ontario*  
Sessional Lecturer & 2<sup>nd</sup> Year Clinical Lead Baccalaureate Program
- Teaching our core course 63-275 Family Health: Child Bearing and Child Rearing Families
  - Provide mentorship, guidance and instruction to Sessional Instructors
  - Coordinating and conducting faculty meetings
  - Develop content for, and conduct student clinical orientations
  - Manage and update lab content, lab syllabus and lab schedule
  - Create exams for clinical courses and labs including final exams and medication calculation quizzes
  - Collaborate and strengthen relationships with collaborative college partners for level 2
  - Maintain and strengthen relationships with agency partners
- September 2006 –      *University of Windsor, Faculty of Nursing, Windsor, Ontario*
- August 2012      Sessional Instructor Baccalaureate Program
- Facilitating a learning experience for nursing students in various medical-surgical, obstetric and classroom settings among 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year students
  - Teaching students evidence-based nursing practice using theory, clinical skills, and research findings in the clinical and classroom settings
  - Providing students with professional skills such as problem solving, communication, decision making, management, and leadership
- January 2008 –  
2010      *St. Clair College, Windsor, Ontario*  
Clinical Instructor BScN Collaborative Program
- Facilitating a learning experience to first and second year nursing students in the lab and clinical settings (obstetrics)
  - Teaching students evidence-based nursing practice using theory, clinical skills, and research findings in the clinical and classroom settings
  - Providing students with professional skills such as problem solving, communication, decision making, management, and leadership
-

## Courses Taught

### ***University of Windsor***

63-171 (Lecture-Introduction to Nursing)  
 63-272 (Clinical Experience-Medical-Surgical)  
 63-274 (Clinical Experience-Obstetrics)  
 63-275 (Lecture- Family Health-Childbearing Families)  
 63-278 (Clinical Experience-Obstetrics)  
 63-372 (Clinical Experience-Medical-Surgical)  
 63-374 (Clinical Experience-Medical-Surgical &Oncology)  
 63-378 (Clinical Experience-Medical-Surgical)  
 63-379 (Lecture-Teaching/Learning and Information  
 Technology)  
 63-472 (Faculty Advisor)  
 63-478 (Faculty Advisor)

### ***St Clair College***

63-172 (Clinical Lab)  
 63-274 (Clinical Experience)

## Clinical Course Coordinator

63-272 (Clinical Experience & Labs)  
 63-274 (Clinical Experience & Labs)  
 63-472 (Hospital Setting Preceptored Clinical Experience)  
 63-476 (Community Setting Preceptored Clinical  
 Experience)

## Clinical Work Experience

- |            |   |
|------------|---|
| 2009- 2012 | <p><i>Oakwood Hospital and Medical Center, Dearborn, Michigan</i><br/>         Emergency Department</p> <ul style="list-style-type: none"> <li>• Providing professional care to high-risk individuals with a multitude of health issues</li> <li>• Monitoring and assessing cardiac rhythms of critical individuals as well as providing appropriate interventions</li> <li>• Collaboration with the multidisciplinary team members to meet the individual's needs</li> </ul> |
| 2005 –2009 | <p><i>Oakwood Hospital and Medical Center, Dearborn, Michigan</i></p> <p>Labor and Delivery</p> <ul style="list-style-type: none"> <li>• Providing professional care and support to individuals and their partners as well as promote family involvement in the birthing process</li> </ul>   |

- Develop and provide health maintenance and preventative care measures
- Monitoring and assessing fetal heart tones as well as uterine activity during the labour process, document and report findings as necessary
- Scrub nurse and circulating nurse in the O.R. assisting physicians in emergency and crash cesarean sections as well as other gynecologic surgeries
- Communicating and collaborating with all members of the healthcare team

2004 – 2005

*Oakwood Hospital and Medical Center, Dearborn, Michigan*  
Monitored Care Unit, CCU Step-down

- Providing professional care to high-risk individuals with cardiovascular health issues
- Monitoring and assessing cardiac rhythms of critical individuals as well as providing appropriate interventions
- Collaboration with the multidisciplinary team members to meet the individuals needs

## Professional Memberships and Competencies

- 2003-2018 Certificate of Competence from the College of Nurses of Ontario
- 2003-2018 State of Michigan Nursing License
- 2009-2018 Sigma Honour Society of Nursing
- 2017 BCLS for Healthcare Provider

## Professional Development

It doesn't always have to be this way: why engaging students in content laden large classes needn't be such hard work. Center for Teaching and Learning, University of Windsor (Feb 2017)

Integrating Research, Theory and Practice to Maximize Patient Safety and Health Outcomes  
University of Windsor (January 2015)

Mother's Mental Health Toolkit Training, Building Blocks for Better Babies (October 2014)

“Do No Harm” Applies to Nurses Too! Strategies to eliminate bullying and resolve conflict in the workplace- Workshop presented by Renee Thompson (June 4, 2014)

10<sup>th</sup> Annual Qualitative Research Summer Intensive (July 2013), *The Carolina Inn, North Carolina, USA*

NVivo Essentials, QSR International, (June 2013), *Ottawa Ontario*

Engaging Students: Practical Strategies for Success (February 2010), *University of Windsor, Windsor Ontario*

Clicker workshops – Curious about Clickers & Installation Bootcamp for Instructors (Fall 2009), *University of Windsor, Windsor Ontario*

Practical Techniques for Conflict Resolution (Fall 2009), *University of Windsor, Windsor Ontario*

## Conferences

*University of Windsor 6th Biennial Nursing Conference, Windsor, Ontario, November 2016*

**Oral Presentation-** Gestational diabetes mellitus management: How well are we doing postpartum? A scoping review

*CAPWHN 6<sup>th</sup> Annual National Conference. Calgary, Alberta, October 2016*

**Oral Presentation-** Gestational diabetes mellitus management: How well are we doing postpartum? A scoping review

*10<sup>th</sup> Annual International Teaching and Learning Conference. Transformative Teaching and Learning. Rochester, Michigan, May 2016*

*University of Windsor 5th Biennial Nursing Conference, Windsor, Ontario, October 2014*

*University of Windsor & Oakland University 7th Annual Conference on Teaching and Learning- On the Verge: Debating the Future of University Teaching, Windsor, Ontario, May 2013*

*University of Western Ontario 23<sup>rd</sup> Annual Research conference, May 2011*

**Poster Presentation-** Social Support in Postpartum Women with a History of Gestational Diabetes

University of Windsor 4th Biennial Nursing Conference, September 2012

University of Windsor 3<sup>rd</sup> Biennial Nursing Conference, January 2010  
**Poster Presentation-** Parental Stressors in the NICU

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## **Awards**

*Sigma Theta Tau-* Tau Upsilon April 2014 Research Support Grant Recipient

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## **Service**

**Academic Appeals Committee** Faculty of Nursing, University of Windsor (2015-Present)

**Board of Directors- Counsellor.** Sigma Theta Tau- Tau Upsilon Chapter (2015-Present)

**Clinical Practice Committee-** Co-chair Faculty of Nursing, University of Windsor (2017-Present)

**Curriculum Committee-** Faculty of Nursing, University of Windsor (2017-Present)

**Medication Administration and Patient Safety Advisory Committee (MAPSAC),** Faculty of Nursing, University of Windsor (2015-Present)

**The Interdisciplinary Medication Safety Committee,** Faculty of Nursing, University of Windsor (2015-Present)

**The Learning Management System Committee (LMS),** University of Windsor, 2016-Present)